NINE MILE 2 - VOLNEY
345kV TRANSMISSION
FACILITY

ARTICLE VII APPLICATION

EXHIBITS
AND
DIRECT TESTIMONY

prepared by
Niagara Mohawk Power Corporation
April 1982

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STATE OF NEW YORK
DEPARTMENT OF PUBLIC SERVICE
PUBLIC SERVICE COMMISSION

In the Matter of the Application - of - Niagara Mohawk Power Corporation for itself and as agent for: Central Hudson Gas & Electric Corporation, Long Island Lighting Company, New York State Electric and Gas Corporation and Rochester Gas and Electric Corporation for a Certificate of Environmental Compatibility and Public Need authorizing construction and operation of a 345 kV transmission facility from Nine Mile Point Nuclear Generating Station Unit #2 to Volney Station, together with associated equipment; Towns of Scriba and Volney, County of Oswego.	PSC CASE NO. 70068 NINE MILE 2-VOLNEY 345 KV TRANSMISSION FACILITY MOTION FOR WAIVERS

Pursuant to 16 NYCRR §85-.4, and as part of the amended filing for a Certificate of Environmental Compatibility and Public Need for the Nine Mile 2-Volney 345 kV transmission facility and associated equipment, Niagara Mohawk Power Corporation, for itself and as agent for the other Nine Mile 2 co-tenants, respectfully requests waiver of the following sections of the Commission's regulations (16 NYCRR) insofar as same apply to the instant facility:

1. Section 86·3(a)(1)(ii)
2. Section 86·3(a)(2)(ii)
3. Section 86·3(b)(1)(i-iv)
4. Section 86·5(b)(1-9)
5. Section 86·6(c)(5)

Reason: These sections of the application generally require the mapping of final design type information keyed to the precise location of the proposed facility. Although general information may be available in these subject areas, it is premature

at this time for Applicant to identify and map the requisite information absent Commission certification of a centerline for the quarter mile wide corridor. Applicant will submit this information as part of its Environmental Management and Construction Plan filing following Commission issuance of a Certificate of Environmental Compatibility and Public Need.

6. Section 86·3(b)(2). This paragraph requires that aerial photographs shall be taken within six months of the date of filing.

Reason: Applicant has included in its amended application an aerial photograph of the right-of-way which was taken in 1974. Applicant's field verification of this photograph indicates that no significant residential, commercial or industrial development has occurred in the photograph area since it was taken and current land uses in the vicinity of the proposed facility are representative of existing land uses as of the date of filing. Moreover, the right-of-way does not traverse urban areas or urbanizing fringe areas.

Respectfully submitted,
NIAGARA MOHAWK POWER CORPORATION
for itself and as agent for:
Central Hudson Gas and Electric Corporation
Long Island Lighting Company
New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

By Michael W. Murphy
Michael W. Murphy
System Attorney

Dated: April 19, 1982

NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

April 16, 1982

Honorable Samuel R. Madison
Secretary, Public Service Commission
Empire State Plaza
Agency Building #3
Albany, New York 12223

Re: Case 70068; Nine Mile 2-Volney
345 kV Transmission Facility

Dear Secretary Madison:

On December 17, 1979, the Recommended Decision of the Honorable Harold L. Colbeth was issued in the above-captioned proceeding. Although the Administrative Law Judge found and determined that a public need existed for the proposed 765 kV transmission line in order to connect the statewide transmission grid to the Nine Mile Unit #2 generating unit under construction, the Administrative Law Judge nevertheless attached an "Addendum to the Recommended Decision" to his decision. That Addendum to the Recommended Decision noted a newspaper report to the effect that construction work at the Nine Mile Unit #2 had been sharply reduced or suspended. Judge Colbeth noted that the planned in-service date for the generating unit of November, 1984 now seemed an impossibility. The Administrative Law Judge accordingly requested that the parties address this new development and its impact on the issue of the need for the subject transmission facility in their Brief on Exceptions since the need for the instant transmission line is dependent upon the need to transmit the output of generation of the Nine Mile Unit #2. In a "Notice to the Parties", issued December 17, 1979, you had noted these uncertainties surrounding the construction schedule with respect to Nine Mile Unit #2 and accordingly deferred the scheduling of Briefs on Exceptions and Replies thereto.

The procedure which you have established to bring this proceeding to a certification decision is as follows: applicants are to move for the establishment of a final briefing schedule and concurrently proffer appropriate schedules and supporting affidavits indicating that the construction of Nine Mile Unit #2 will continue and that completion is scheduled for a date certain:

Attached please find the affidavits of Niagara Mohawk witnesses Frederick J. Lange and Thomas J. F. Ordon, which affidavits substantiate that the construction of the Nine Mile Unit #2 generating facility will continue and that completion is scheduled for a date certain, i.e. late 1986. Accordingly, pursuant to the "Notice to the Parties" issued December 17, 1979, Niagara Mohawk, for itself and as agents for other co-tenants, hereby moves for the reinitiation of the Case 70068 proceeding.

The procedure contemplated at the time that you attached the "Notice to the Parties" to the December 17, 1979 Recommended Decision assumed that the proceeding would be reinitiated at the Brief on Exceptions stage. That proves not to be the case, however, since during the hiatus between December 17, 1979 and the present Niagara Mohawk has determined that the facility for which application would be made and certification sought would be a 345 kV facility. Within the next week to 10 days, Niagara Mohawk will be submitting an amended Article VII application seeking certification of a Nine Mile 2-Volney 345 kV facility and associated transmission. Accordingly, on the strength of the attached affidavits, Niagara Mohawk requests that the instant proceeding be reinitiated upon the Commission's receipt of Niagara Mohawk's amended application. Niagara Mohawk is presently prepared to resume public hearings, if necessary, on its amended Article VII application. Given that the Article VII application is being amended prior to certification issuance and the lack of any waiting period mandated by law or regulation, Niagara Mohawk respectfully requests the present assignment of an Administrative Law Judge to succeed the Honorable Harold L. Colbeth, since demised, and the resumption of the decisional process on an as soon as practical basis.

Very truly yours,

Michael W. Murphy

Michael W. Murphy
System Attorney

MWM:rl

Attachments

xc: Jack R. Lebowitz, Esq.

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STATE OF NEW YORK
DEPARTMENT OF PUBLIC SERVICE
PUBLIC SERVICE COMMISSION

In the Matter of the Application - of - Niagara Mohawk Power Corporation for itself and as agent for: Central Hudson Gas & Electric Corporation, Long Island Lighting Company, New York State Electric and Gas Corporation and Rochester Gas and Electric Corporation for a Certificate of Environmental Compatibility and Public Need authorizing construction and operation of a 345 kV transmission facility from Nine Mile Point Nuclear Generating Station Unit #2 to Volney Station, together with associated equipment; Towns of Scriba and Volney, County of Oswego.	PSC CASE NO. 70068 NINE MILE 2-VOLNEY 345 KV TRANSMISSION FACILITY AFFIDAVIT

FREDERICK J. LANGE, being duly sworn, deposes and says:

1) That he is employed by Niagara Mohawk Power Corporation, 300 Erie Boulevard West, Syracuse, New York 13202, in the capacity of Manager of Engineering Planning; and

2) That he has not heretofore rendered sworn testimony in the above-captioned proceeding, but will henceforth be sponsoring testimony pertaining to the need for the above-captioned 345 kV transmission facility and the scheduled commercial operation date of Nine Mile Unit #2, insofar as it impacts the need for the subject 345 kV transmission facilities, once the Article VII proceeding for Case 70068 is reinitiated; and

3) That subsequent to the issuance of the Recommended Decision in this proceeding, the scheduled commercial operation date for Nine Mile Unit #2 has been changed from late 1984 to late 1986; and

4) That construction activities in connection with the Nine Mile Unit #2 are currently proceeding on a schedule to attain a late 1986 commercial operation date; and

5) That the need for, and in-service date of, the Nine Mile 2-Scriba* and the Scriba-Volney* 345 kV transmission facilities are dependent upon, and must precede by one year and 5 months, respectively, the scheduled commercial operation date of the Nine Mile Unit #2 generating facility; and

6) That the instant 345 kV transmission facility is needed to transmit the output of Nine Mile Unit #2; and

7) That because of the late 1986 commercial operation date of Nine Mile Unit #2, the needed in-service date for the instant 345 kV transmission facilities should be October, 1985 and June, 1986 in order to allow sufficient time for facility testing.

8) That this Affidavit is being supplied at the behest of the Secretary of the New York State Department of Public Service for the purposes of reinitiating the certification proceeding and bringing the proceeding to a certification decision since Nine Mile Unit #2 construction is continuing and is scheduled for commercial operation at a date certain, i.e. late 1986.

Frederick J. Lange

Frederick J. Lange

Sworn to before me this 16TH day

of APRIL, 1982.

Michael W. Murphy

MICHAEL W. MURPHY
Notary Public in the State of New York
No. 4623927
My Commission Expires March 30, 1984

*The Nine Mile 2-Volney 345 kV transmission facility has two segments, i.e. Nine Mile 2-Scriba Station (.5 miles) and Scriba Station to Volney Station (8.9 miles).

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STATE OF NEW YORK
DEPARTMENT OF PUBLIC SERVICE
PUBLIC SERVICE COMMISSION

In the Matter of the Application - of - Niagara Mohawk Power Corporation for itself and as agent for: Central Hudson Gas & Electric Corporation, Long Island Lighting Company, New York State Electric and Gas Corporation and Rochester Gas and Electric Corporation for a Certificate of Environmental Compatibility and Public Need authorizing construction and operation of a 345 kV transmission facility from Nine Mile Point Nuclear Generating Station Unit #2 to Volney Station, together with associated equipment; Towns of Scriba and Volney, County of Oswego.	PSC CASE NO. 70068 NINE MILE 2-VOLNEY 345 KV TRANSMISSION FACILITY AFFIDAVIT

THOMAS J. F. ORDON, being duly sworn, deposes and says:

1) That he is employed by Niagara Mohawk Power Corporation, 300 Erie Boulevard West, Syracuse, New York, 13202, in the capacity of Senior Electrical Engineer - System Engineering in the Design Engineering Department; and

2) That he has not heretofore rendered sworn testimony in the above-captioned proceeding, but will henceforth be sponsoring testimony pertaining to the engineering, design, cost and scheduling aspects of the above-captioned 345 KV transmission facility upon the reinitiation of the Article VII proceeding for Case 70068; and

3) That subsequent to the Recommended Decision's issuance in this proceeding, the scheduled commercial operation date of Nine Mile Unit #2 has been changed from 1984 to late 1986; and

4) That the change in the commercial operation date of Nine Mile Unit #2 means that the in-service dates of the Nine Mile 2-Scriba*and the Scriba-Volney*345 KV transmission facilities are October, 1985 and June, 1986 respectively; and

5) That in order to meet appropriate in-service dates for the various segments of this filing, the following list of construction activities should ensue in the referenced times, assuming certification and EM & CP approval;

	NM2 - Scriba*	Scriba - Volney*	Scriba Station
Start Clearing	3/84	3/84	8/83
Start Grading and Site Preparation	-	-	9/83
Start Foundations	5/84	5/84	12/83
Start Structure Installations	6/84	6/84	4/84
Start Stringing	10/84	6/85	-
Start Electrical Equipment Installation	-	-	6/84
In Service	10/85	6/86	10/85

; and

6) That in order to insure the ability to commence facility construction in order to meet the scheduled 1986 in-service date for the Nine Mile Unit #2 facility, certification and EM & CP approval for the major utility transmission facilities and associated facilities should be in hand no later than August, 1983 for the Scriba Station and January, 1984 for the Nine Mile 2-Scriba*and Scriba-Volney*345 KV transmission facilities; and

7) That the certification proceeding for the instant transmission facility and associated equipment should proceed so that Niagara Mohawk will be in a position to commence construction of the instant facility in an orderly and timely manner.

*The Nine Mile 2-Volney 345 kV transmission facility has two segments, i.e. Nine Mile 2-Scriba Station (.5 miles) and Scriba Station to Volney Station (8.9 miles).

8) That the instant 345 KV transmission facility continues to be needed to transmit the output of Nine Mile Unit #2.

Thomas J. F. Ordon

Thomas J. F. Ordon

Sworn to before me this 15TH

day of APRIL, 1982.

Michael W. Murphy

MICHAEL W. MURPHY
Notary Public in the State of New York
No. 4623927
My Commission Expires March 30, 1984

In The Matter of the Amended Application*
of
NIAGARA MOHAWK POWER CORPORATION
for itself and as agent for
Central Hudson Gas and Electric Corporation
Long Island Lighting Company
New York State Electric and Gas Corporation
Rochester Gas and Electric Corporation

Pursuant to Article VII of the Public Service Law of the State of New York for a Certificate of Environmental Compatibility and Public Need authorizing construction and operation of a 345 kV electric transmission facility extending from Nine Mile Point Nuclear Generating Station Unit #2 to the existing Volney Station, said transmission facility being located in the Towns of Scriba and Volney, in Oswego County, in the State of New York, together with the associated equipment hereinafter described in Amended Exhibit E-2, "Other Facilities."

To the Public Service Commission

The amended application of NIAGARA MOHAWK POWER CORPORATION for itself and as agent for: Central Hudson Gas and Electric Corporation, Long Island Lighting Company, New York State Electric and Gas Corporation, and Rochester Gas and Electric Corporation (hereinafter sometimes referred to as the co-tenants) for a Certificate of Environmental Compatibility and Public Need authorizing the construction and operation of the 345 kV electric transmission facilities and associated equipment hereinafter described in Amended Exhibit E-2, "Other Facilities", respectively shows:

*The instant application has been amended to reflect the applicants pursuit of a Certificate of Environmental Compatibility and Public Need for a 345 kV electric transmission facility and associated equipment. Accordingly, the instant amended application supercedes the application filed on April 13, 1978, which application had sought authorization to construct, operate, and maintain 9.3 miles of 765 kV transmission line and a new East Volney Station.

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General Information Regarding the Application

This application is made pursuant to Article VII of the Public Service Law of the State of New York, and Chapter 1, Subchapter F, Parts 85, 86, and 88 of the Rules and Regulations of the Public Service Commission.

Niagara Mohawk Power Corporation and the co-tenants are electric and gas corporations organized and existing under the laws of the State of New York. Exhibit 1, attached hereto and made a part hereof, sets forth the corporate names, addresses, and telephone numbers; the names, addresses, and the telephone numbers of the applicant's principal officers; and the names, addresses and telephone numbers of the agents for service of Niagara Mohawk Power Corporation and the other co-tenants.

Description of the Proposed

Electric Transmission Facilities

The proposed transmission facility is a single circuit 345 kV electric transmission facility from the applicants' Nine Mile 2 Nuclear Generating Station to Niagara Mohawk's existing Volney Station. The proposed transmission facility is approximately 9.4 miles in length and traverses the Towns of Scriba and Volney in Oswego County in Central New York State. Associated equipment includes the construction of a new 345 kV Scriba Station located south of Lake Road in the Town of Scriba, the installation of a 345 kV line position at Volney Station, the relocation and reconnection of the Nine Mile - Volney #9 345 kV line into Scriba Station and the construction of a Scriba - Fitzpatrick 345 kV interconnecting line.

The transmission facility is proposed to be adjacent and parallel to an existing electric transmission facility right-of-way for its entire length.

The Environmental Impact Assessment was prepared by Niagara Mohawk personnel. The findings of these studies are presented in amended Exhibits 2, 3, and 4 of this amended application.

The basic need for the facility is to provide a generator lead for the Nine Mile Point Nuclear Generating Station Unit 2 to the New York Power Pool interconnected electric transmission network.

No reasonable alternative locations were identified in the corridor analysis although a number of options were identified. These options are identified in Amended Exhibit 3 of this application.

WHEREFORE, NIAGARA MOHAWK POWER CORPORATION for itself and as agent for the other co-tenants respectfully requests that the Public Service Commission:

1. Issue a Certificate of Environmental Compatibility and Public Need pursuant to Article VII of the Public Service Law for the Nine Mile 2 - Volney 345 kV Transmission Facility and the associated equipment herein described in Amended Exhibit E-2 "Other Facilities";
2. Grant such other further authorities, consents, permissions, and approvals as may be necessary for construction, operation or maintenance of the facilities herein proposed.

Respectfully submitted,
NIAGARA MOHAWK POWER CORPORATION
for itself and as agent for:
Central Hudson Gas and Electric Corporation
Long Island Lighting Company
New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation

By John H. Terry

John H. Terry
Senior Vice President, General
Counsel and Secretary

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NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 86

SECTION 86.2 AMENDED EXHIBIT 1

GENERAL INFORMATION REGARDING THE APPLICATION

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

GENERAL INFORMATION REGARDING THE APPLICANT

§ 86.2 AMENDED EXHIBIT 1

NIAGARA MOHAWK POWER CORPORATION for itself and as Agent for Central Hudson Gas and Electric, Long Island Lighting Company, New York State Electric and Gas, Rochester Gas and Electric, co-tenants, has been authorized to present this application for certification pursuant to Article VII of the Public Service Law. The names, addresses, principal officers, and other information required by Section 86.2 of the Public Service Commission's Rules of Procedure (Exhibit 1) with reference to said co-tenants are as follows:

<u>CENTRAL HUDSON GAS AND ELECTRIC</u>

MR. THEODORE A. CARLSON, CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER
CENTRAL HUDSON GAS AND ELECTRIC
284 SOUTH AVENUE
POUGHKEEPSIE, NEW YORK 12602
TELEPHONE: (914) 452-2000

<u>LONG ISLAND LIGHTING COMPANY</u>

MR. CHARLES R. PIERCE, CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER
LONG ISLAND LIGHTING COMPANY
250 OLD COUNTRY ROAD
MINEOLA, NEW YORK 11501
TELEPHONE: (516) 228-2890

<u>NEW YORK STATE ELECTRIC AND GAS CORPORATION</u>

MR. CHARLES F. KENNEDY, CHAIRMAN AND CHIEF EXECUTIVE OFFICER
NEW YORK STATE ELECTRIC GAS CORPORATION
4500 VESTAL PARKWAY EAST
BINGHAMTON, NEW YORK 13902
TELEPHONE: (607) 729-2551

ROCHESTER GAS AND ELECTRIC CORPORATION

MR. PAUL BRIGGS, CHAIRMAN AND CHIEF EXECUTIVE & OFFICER
ROCHESTER GAS AND ELECTRIC CORPORATION
89 EAST AVENUE
ROCHESTER, NEW YORK 14649
TELEPHONE: (716) 546-2700

CORPORATE APPLICANT

NIAGARA MOHAWK POWER CORPORATION

CORPORATE ADDRESS:

300 ERIE BOULEVARD WEST
SYRACUSE, NEW YORK 13202

TELEPHONE NUMBER:

AREA CODE (315) 474-1511

NAME AND BUSINESS ADDRESS OF PRINCIPAL OFFICER OF APPLICANT

JOHN G. HAEHL, JR., CHIEF EXECUTIVE OFFICER & CHAIRMAN OF THE BOARD
NIAGARA MOHAWK POWER CORPORATION
300 ERIE BOULEVARD WEST
SYRACUSE, NEW YORK 13202

DOCUMENTS AND CORRESPONDENCE TO BE SERVED UPON:

JOHN W. KEIB, ESQ.
SENIOR SYSTEM ATTORNEY, C-3
NIAGARA MOHAWK POWER CORPORATION
300 ERIE BOULEVARD WEST
SYRACUSE, NEW YORK 13202
TELEPHONE: (315) 474-1511 X1756
OR
MICHAEL W. MURPHY
SYSTEM ATTORNEY, C-3
NIAGARA MOHAWK POWER CORPORATION
300 ERIE BOULEVARD WEST
SYRACUSE, NEW YORK 13202
TELEPHONE: (315) 474-1511 X7470

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NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 86

SECTION 86.3 AMENDED EXHIBIT 2

LOCATION OF FACILITIES

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

LOCATION OF FACILITIES
§86.3 AMENDED EXHIBIT 2

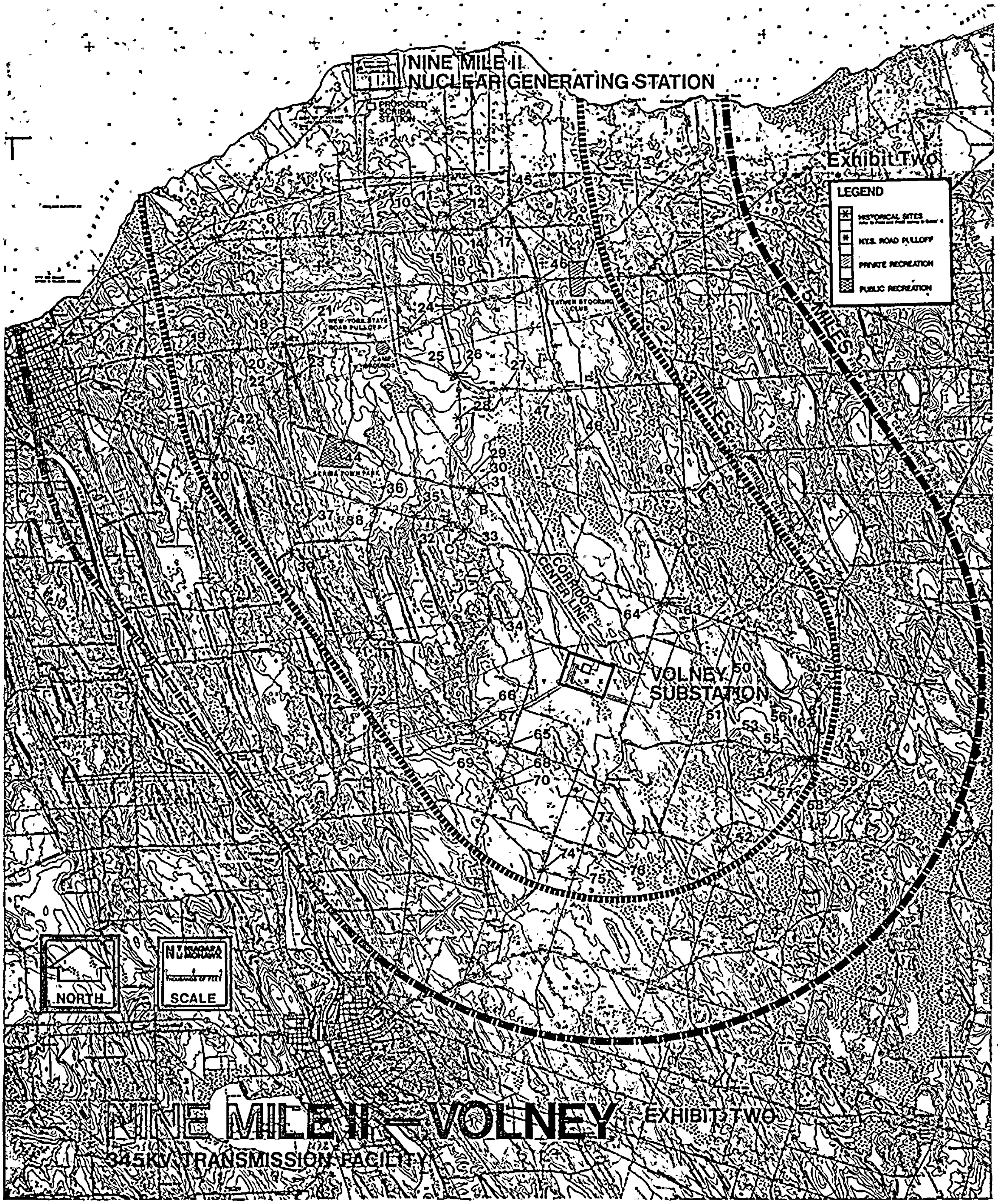
A. GENERAL INFORMATION

The area around Oswego and Lake Ontario has been and continues to be of major importance to the generation and transmission of electrical energy for New York State. The increasing energy demands on the applicants' systems require the construction of new generation and associated transmission facilities. This application has been developed to begin the process which will allow Niagara Mohawk to construct, on behalf of the applicants, a 345 kV single circuit transmission line from Niagara Mohawk's Nine Mile 2 Nuclear Generating Station to the existing Volney Station.

The map on page 2-2 shows the location of the Nine Mile 2 Nuclear Generating Station Site, the proposed Scriba Station, the associated transmission facilities, and the existing Volney Station. It also shows the proposed 345 kV centerline and the three and five mile study areas prescribed by the New York State Public Service Commission's Article VII regulations. All known existing and proposed linear rights-of-way are shown within the study area including gas and electrical lines. A larger copy of this map is included with this application under separate cover and is required as part of the Exhibit 2 submittal as explained on page 2-3.

The overall length of the line as proposed is approximately 9.4 miles. It is located entirely within a transmission line corridor owned by Niagara Mohawk and is east of Niagara Mohawk's existing Nine Mile-Clay and Nine Mile-Volney 345 kV Transmission Lines.

The Ontario Lake Plain terrain on which the proposed facility is located is generally unpronounced with glacial topographic features providing some variety. The total rise in elevation from Nine Mile 2 to Volney Station is only about 200 feet (260' - 460'). The most significant elevation change occurs in the area north of Route 104 where the 460 foot contour is first encountered going south from Nine Mile 2. The remaining distance, from Route 104 South to Volney Station, has no elevation change overall. A maximum elevation of just over 500 feet occurs immediately south of Lily Marsh Road. This lack of topography contributes significantly to the high propensity of wetlands, wet soil conditions, and muckland agricultural lands.


NINE MILE II
NUCLEAR GENERATING STATION
PROPOSED SCRIBA STATION
Exhibit Two
LEGEND
HISTORICAL SITES
N.Y.S. ROAD PULLOFF
PRIVATE RECREATION
PUBLIC RECREATION
CORRIDOR CENTER LINE
VOLNEY SUBSTATION
NORTH
SCALE
NINE MILE II — VOLNEY
EXHIBIT TWO
345KV TRANSMISSION FACILITY

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B. LOCATION OF FACILITIES

1. DEPARTMENT OF TRANSPORTATION MAPS 1:24000

In accordance with section 86.3 (a) (1), (i), (ii), and (iii) of Article VII of the New York Public Service Law, New York State Department of Transportation Maps at a scale of 1:24000 are provided in the application binder pocket. The map entitled, "EXHIBIT 2, NINE MILE 2 TO VOLNEY 345 kV, TRANSMISSION FACILITY" shows the following required information; the location of the Nine Mile 2 Nuclear Generating Station, the proposed Scriba Station with associated transmission line facilities, the proposed 345 kV transmission line route, the existing Volney Station, and any known archaeologic, geologic, historical or scenic area, park or untouched wilderness within three miles of the right-of-way.

2. AERIAL PHOTOGRAPHS

Aerial photographs showing the centerline of the proposed 345 kV transmission line and related facilities are provided on two mosaics in the binder pocket. The mosaics are entitled "NINE MILE 2 TO VOLNEY 345 kV TRANSMISSION FACILITY" and the scale is 1" = 660'. Both sets of aerial mosaics are based on photos taken on April 11, 1974.

3. SYSTEM RELATIONSHIP MAP

The System Relationship Map on page 2-6 responds to the requirements of 86.3 (a) (2) (i), (iii), and (iv). Below is a listing of the required information shown on the map with respect to:

(i) the location, length, and capacity of the proposed Nine Mile 2-Volney Facility and existing facilities related to the proposed facility;

(iii) the location and designation of each point of connection between the existing and proposed facility; and

(iv) nearby, crossing, and connecting rights-of-way and facilities of other utilities.

The requirement of 86.3 (a) (2) (ii) will be provided in the Environmental Management and Construction Plan (EM & CP) as explained in subsection D "ENVIRONMENTAL MANAGEMENT AND CONSTRUCTION REQUIREMENTS", page 2-4.

C. ENVIRONMENTAL IMPACT ASSESSMENT REQUIREMENTS

Explanations required by 86.3 (a) (2) (i), (iii), and (iv); and environmental data concerning known archaeologic, geologic, historical or scenic areas, park, or untouched wilderness is discussed beginning on page 4-1

under the title "ENVIRONMENTAL IMPACT, NINE MILE 2-VOLNEY 345 kV TRANSMISSION FACILITY", Amended Exhibit 4.

D. ENVIRONMENTAL MANAGEMENT AND CONSTRUCTION REQUIREMENTS

Detailed information required in 86.3 (a) (1) (ii) concerning permanent clearing or other changes to the topography, vegetation or man made structures will be provided in the Environmental Management and Construction Plan (EM & CP). In general, approximately 75 acres of right-of-way will be selectively cleared. The only changes to topography that will occur is minor grading at construction sites and grading for access roads. The proposed route is entirely owned by Niagara Mohawk and does not require the destruction or movement of any man made dwellings.

Detailed information required in 86.3 (a) (2) (ii) concerning the location and function of any structure to be built on, or adjacent to the right-of-way will be provided in the EM & CP. A general discussion of these facilities is provided in this application in Amended Exhibit 5, Design Drawings; Amended Exhibit E-1, Description of Proposed Transmission Line; and Amended Exhibit E-2, Other Facilities.

Detailed information required in 86.3 (b) (1) (i), (ii), (iii) and (iv) will be provided on aerial mosaics which are a part of the EM & CP. A general discussion of each requirement follows:

(i) the proposed right-of-way boundaries totally lie within the existing Nine Mile-Volney Corridor which is owned by Niagara Mohawk. Centerline of the proposed facility will be east of and located 100 feet from centerline of the existing Nine Mile-Clay #9 345 kV Line. The eastern boundary of the proposed right-of-way will be 75' east of centerline of the proposed Nine Mile 2-Volney line. Boundary details will be provided in the EM & CP.

(ii) Permanent clearing will occur within the right-of-way of the proposed Nine Mile 2-Volney Transmission Line. Selective clearing will be required for a width of approximately 75 feet along the eastern edge of the existing Nine Mile to Volney Corridor. Details will be provided in the EM & CP. Changes to topography will be minor and will result from minor grading at structure sites and at access road locations. Location of these areas will be provided in the EM & CP.

(iii) Access routes which exist on the Nine Mile-Volney Corridor will be

utilized to the extent practicle for construction of the proposed facility. The location of these access routes and new access routes will be provided in the EM & CP.

(iv) Centerline of the Nine Mile-Volney Transmission Facility will be located 100 feet east of the existing Nine Mile-Clay #9 345 kV Transmission Line. Structure locations will be provided in the EM & CP.

NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 86.

SECTION 86.4 AMENDED EXHIBIT 3

ALTERNATIVES

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

ALTERNATES

86.4 AMENDED EXHIBIT 3

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ALTERNATIVES

§ 86.4 AMENDED EXHIBIT 3

A. CORRIDOR SELECTION

1. INTRODUCTION

A number of parameters were established to aid in the selection and evaluation of the various alternative routing options for an electrical transmission connection between the Nine Mile 2 Generating Station and the Volney Station. Serious consideration was given to utilizing existing corridors. A number of reasons are apparent for this. The first is the emphasis placed on consolidation of rights-of-way in much of the literature regarding environmental siting of transmission line rights-of-way. From an economic and environmental standpoint, access to new transmission lines from existing rights-of-way and clearing which has been partially accomplished are positive factors for considering consolidation. Additionally, the visual impacts of utilizing existing corridors are less than that of totally new rights-of-way. This is especially true where a number of corridors already cross the area under consideration.

In this particular case, an evaluation of existing rights-of-way show that three corridors already exit the Nine Mile Point site. It was considered highly undesirable to create a new corridor under these conditions unless absolutely necessary. Some new rights-of-way were evaluated in combination with the existing corridors in order to make the desired Nine Mile 2 - Volney connection, but emphasis was placed on utilizing existing rights-of-way.

The most obvious corridor to utilize is the existing Nine Mile-Volney 345 kV Transmission Corridor. The directness of this right-of-way makes it a prime route to be evaluated closely. Additionally, in the initial purchase of this right-of-way, extra property was acquired along both sides of the 345 kV lines to facilitate future expansion. A myriad of options are available using this corridor as a base, including placement of the new line on either the east or west side or some combination of east and west sides.

The second corridor out of Nine Mile Point is the Fitzpatrick-Lighthouse Hill 115kV Transmission Line construction and operational feed. This is a narrow, winding corridor which extends south to the Oswego-

Lighthouse Hill double circuit 115kV east-west transmission lines. The options exist of placing the 345 kV line on either side or a combination of the two sides of the existing line. Some completely new right-of-way would be required for any option utilizing this corridor in order to continue the new line to the Volney Station from the termination of the Fitzpatrick-Lighthouse Hill Line at the Oswego-Lighthouse Hill Lines.

The third corridor exiting the Nine Mile Point Site is the Power Authority of the State of New York's (PASNY) Fitzpatrick-Edic 345 kV Transmission Line going south and southeast from the site. Again, either side of the existing line might be used for the new facility. However, a strip of uncleared right-of-way exists on the north side of the right-of-way already. Options to get to the Volney Station from this Corridor are either a new right-of-way south from near the Route 104 crossing, or a connection at the Fitzpatrick-Edic Line intersection with the certified, but not yet constructed, Volney-Marcy Line and parallel it back to the Volney Station.

Identification of the most reasonable of the corridor options from Nine Mile 2-Volney required a generalized environmental assessment of each. The following is an evaluation of each and the reasons why the existing 345 kV transmission line corridor from Nine Mile 2 to Volney was chosen; and why the Fitzpatrick-Lighthouse Hill 115kV and the Fitzpatrick-Edic 345 kV Transmission Line Corridors were rejected. The various corridors discussed here are shown on the "Options" map at the end of Exhibit 3, page 3-12.

2. CORRIDOR A: Nine Mile-Volney

Options in the Nine Mile-Volney Corridor parallel the two 345kV and the two 115kV transmission lines from Nine Mile Point to the Lighthouse Hill Lines and then continue to parallel the 345 kV lines on into the Volney Station.

Recognizing that line security problems are exacerbated by multiple crossovers of transmission lines, options within the corridor become better defined. The fewer number of crossings, the higher the security of the line.

Option A-1 in the Nine Mile - Volney Corridor parallels the existing easterly 345 kV line at a centerline to centerline distance of 100 feet to the east. Option A-2 parallels the westerly 115 kV line, then the

westerly 345 kV Line at a 100 feet centerline to centerline distance to the west or as close as possible depending on obstructions. Option A-3 in the northern section parallels the easterly side of the existing 345 kV lines at a separation distance of 100 feet, then crosses over just south of the Lighthouse Hill 115 kV Lines and parallels the westerly side of the 345 kV lines at a centerline to centerline distance of 100 feet.

3. CORRIDOR B: Fitzpatrick-Lighthouse Hill

The Fitzpatrick-Lighthouse Hill Corridor parallels the existing 115 kV service feed from the Nine Mile/Fitzpatrick Complex to the Oswego Lighthouse Hill 115 kV Lines. It would then require approximately 8000 feet of new right-of-way to intersect the Nine Mile-Volney Right-of-Way and parallel it to the Volney Station. The zig-zag meandering of the existing 115 kv transmission line and the overall similarity of the area through which it passes makes placement on either side of the line of equal impact. However, because of the lines' proximity to homes and some natural forest areas in some locations, the option considered parallels the line on the east side.

4. CORRIDOR C: Fitzpatrick-Edic

Option C-1 in the Fitzpatrick-Edic Corridor parallels the vacant section of right-of-way on the northeast side of the existing Fitzpatrick-Edic 345 kV Line to a point just north of Route 104, then turns generally south requiring new right-of-way to the Volney Station. Option C-2 also parallels the northeast side of the Fitzpatrick-Edic Line but extends to a point just south of Route 104. It then turns and continues generally south requiring new right-of-way to the Volney Station. Option C-3 parallels the existing Fitzpatrick-Edic Line and the certified Volney-Marcy Line except for about 1.1 miles of new right-of-way. At a point near its intersection with the Volney-Marcy Line, a new section of right-of-way would be required to connect the Fitzpatrick-Edic to the Volney-Marcy Right-of-Way. A new section of right-of-way near the Volney Station may also be necessary.

5. CORRIDOR D: New Corridor

The New Corridor Option was dismissed after the preliminary analysis indicated that the area was not large enough to absorb a new corridor without being seriously sectioned. Additionally, from an environmental standpoint, because the area is so homogeneous, no totally new route was believed to exist that would have less environmental impact than utilizing at least some parts of existing rights-of-way.

6. NULL ALTERNATIVE

The option of not constructing a new line at all was not open to this project. The need statement in Amended Exhibit E-4 of this report identifies why this alternative was not possible.

B. OPTION ASSESSMENT

1. INTRODUCTION

This section provides an assessment of the options within each of the corridors (see "Options" map, Page 3-12). Table 3-1 on the following page identifies and provides comparative data for the options. A discussion of each option selected for consideration begins immediately following the table. The discussion begins with the D Options and ends with the preferred A Options.

Relative to Table 3-1, p.3-5, the approximated corridor length information, length utilizing existing corridor, and length utilizing new corridor is straightforward enough to require no explanation; however, the other categories and data provided for the options require an explanation. Right-of-way acquisition required refers to the amount of right-of-way needed to construct the line, based on current engineering standards. These requirements are: 100 feet centerline to centerline between the 345 kV line and any parallel line of transmission voltage; and 75 feet from the centerline to the edge of the right-of-way. Line crossings refer to the actual number of electric transmission lines crossed from Lake Road to MacDougall Road. This count includes only lines, not circuits, in the case of a double circuit line, which would be counted as one line.

2. THE D OPTION: New Corridor

Option D was considered but discarded. Probably the single most significant factor in discarding Option D is that a new corridor would be the fourth right-of-way in a rather limited area of the lake plain. Additionally, a new corridor requires more new clearing and, therefore, has more potential impact on the existing wildlife habitat and vegetation. Construction of completely new access roads and grading of construction sites required by a new right-of-way increases the potential for erosion and associated sedimentation in comparison to utilizing, at least in part, existing right-of-way and access roads.

EXHIBIT 3

TABLE 3-1

OPTIONS CONSIDERED 1/	TOTAL LENGTH (miles)	LENGTH UTILIZING EXISTING CORRIDOR (miles)	LENGTH UTILIZING NEW CORRIDOR (miles)	ROW ACQUISITION REQUIRED: length (feet)	ROW ACQUISITION REQUIRED: required width (feet)	ROW ACQUISITION REQUIRED: acres	LINE 9/ CROSSOVERS: 115kV	LINE 9/ CROSSOVERS: 345kV
A. NM - Volney Corridor								
OPTION 1 (east)	8.9	8.9	-	-	-	-	1	-
OPTION 2 (west)	8.9	8.9	-	9520	144	31	3	4
OPTION 3 (east/west)	8.9	8.9	-	-	-	-	1	4
B. Fitz-Lighthouse Hill (east)	8.8	7.3	1.5	13,000 2/ 8,000 3/	125 150	65	2	-
C. Fitz-Edic (North side of ROW)								
OPTION 1 (new ROW west option)	9.3	3.4	5.9	13,400 4/ 31,000 5/	100 150	138 8/	2	2
OPTION 2 (new ROW east option)	9.8	4.7	5.1	20,000 4/ 27,000 5/	100 150	139 8/	2	2
OPTION 3 (Volney/Edic parallel)	12.4	11.3	1.1	37,800 4/ 16,000 6/ 6,000 7/	100 125 150	153 8/	2	2
D. New Corridor	9.0 12.0	- -	9.0 12.0	48,000 63,000	150 150	165 217	1+?	

1/ All measurements are approximations and were taken from Lake Shore Road to McDougall Road
2/ Parallels Fitzpatrick-Lighthouse Hill 115kV line
3/ New right-of-way
4/ Parallels Fitzpatrick-Edic 345kV line. ROW would have to be acquired from PASNY in order to occupy a portion of this 400' corridor.
5/ New right-of-way from Fitzpatrick-Edic 345kV line to Volney Substation
6/ Parallels proposed Volney-Edic line
7/ New right-of-way at intersection of Fitzpatrick-Edic and proposed Volney-Edic lines and new right-of-way near Volney substation
8/ Includes acres owned by PASNY within their 400' corridor and adjacent to their Fitz-Edic 345kV transmission line.
9/ Assumes that the existing line locations will remain the same with no electrical rearrangement.

3. THE C OPTIONS

The options in Corridor C were initially considered and later discarded because of their additional length, property acquisition requirements, right-of-way clearing needs, and associated environmental impacts when compared to the Corridor A Options. A discussion follows concerning each of the three C Options.

a. OPTION C-3, FITZPATRICK-EDIC/VOLNEY-MARCY

Option C-3 as shown in Table 1 is 12.4 miles in length, making it the longest option that was considered. Option C-3 would utilize existing corridors throughout most of its length. This consolidation of rights-of-way tends to minimize the general environmental impacts of this option; however, additional acquisition and clearing would be required along the existing rights-of-way. This option parallels the Fitzpatrick-Edic Line for approximately 8.3 miles. In this section an approximated 100' wide strip of right-of-way would have to be acquired from the Power Authority of the State of New York (PASNY) and subsequent clearing of this same width and length would be required. Option C-3 then parallels the certified Volney-Marcy Right-of-Way for approximately 3 miles back to Volney Station. In this section, approximately 125 feet of additional width would have to be acquired and cleared. A number of line specific impacts as explained below are associated with this option and the other Fitzpatrick-Edic based Options C-2 and C-3.

Relative to the section that would parallel the Fitzpatrick-Edic Line, it would cross a section of Scriba Woods which is described in Amended Exhibit 4. Scriba Woods is characterized as an important woods community from the standpoints of wildlife habitat and its uniqueness in size and ecological development - - a climax community in the coastal zone.1/ The line would then pass fairly close to the hamlet of Lycoming with a population of about 140 people. This option also passes through an area known as the Leatherstocking Club, a hunting preserve, just north of Route 104. Visually, Option C-3 would be the best of the C Options because it does not require a crossing of the 345 kV Fitzpatrick-Edic Line in the vicinity of Route 104.

1/ Rice Creek Biological Field Station Bulletin Habitat and Wildlife Inventory Guide to Coastal Zone Lands. Oswego County, NY 1976.

Relative to the section that parallels the proposed Volney-Marcy Right-of-Way, one of the most significant impacts is the impact on wetlands. The expanse of at least five of these wetlands exceeds the span limitations of the 345 kV structures and, therefore, would require clearing, establishment of access roads and stabilization of structure sites in these wetlands. Proper construction practices can minimize, but not completely avoid these intrusions.

b. <u>OPTION C-2, FITZPATRICK-EDIC/NEW·CORRIDOR</u>

Option C-2 as shown in Table 3-1 Utilizes an existing corridor for part of its length in that it parallels the Fitzpatrick-Edic Line for approximately 4.7 miles. This section of C-2 requires acquisition of an approximated 100' strip of right-of-way from PASNY, followed by subsequent clearing. This option then utilizes new right-of-way for approximately 5.1 miles, requiring acquisition and clearing of a new 150 foot right-of-way. Where Option C-2 parallels the Fitzpatrick-Edic line, its impacts would be the same as Option C-3 discussed above. Option C-2 would have the typical impacts of acquiring and clearing new rights-of-way.

The main benefit to Option C-2 compared to Option C-1 is that Option C-2 crosses Route 104 at the same location as the existing Fitzpatrick-Edic Line. However, this benefit is somewhat moderated because the crossover of the Fitzpatrick-Edic Line occurs such a short distance south of Route 104. The angle structure of the proposed 345 kV line will be visible to travelers along Route 104.

c. <u>OPTION C-1, FITZPATRICK EDIC/NEW CORRIDOR</u>

Option C-1 also utilized the Fitzpatrick-Edic Corridor, and parallels it for approximately 3.4 miles. Acquisition of approximately 100 feet of additional right-of-way from PASNY would be required, followed by subsequent clearing. New right-of-way is then utilized for the remaining 5.9 miles into Volney Station requiring acquisition and clearing of a new 150 foot right-of-way.

Where Option C-1 parallels the Fitzpatrick-Edic Line, its impact would be the same as C-3. It would also have the typical impacts of acquiring and clearing new right-of-way. Two immediate impacts are encountered where it diverges from the Fitzpatrick-Edic Right-of-Way. First, the Leatherstocking Club is divided into three pieces instead of two, as in Options C-3 and C-2, and secondly, a fourth crossing of Route 104 is created. Thereafter, the general impacts associated with new right-of-way construction described in the Option D assessment are similarly applicable.

The benefits of the three C Options are that they make use of an existing corridor which currently has only one line on it. The negative factors associated with the C Options are their increased length and environmental impacts and consequent cost penalties in comparison to the other options.

4. THE B OPTION - FITZPATRICK-LIGHTHOUSE HILL/NINE MILE-VOLNEY

Option B was also considered and later discarded because of additional property acquisition, clearing and associated impacts of its route when compared to the A Options.

Option B utilizes an existing corridor for a portion of its length. It parallels the Fitzpatrick-Lighthouse Hill Line for approximately 3.8 miles. In this section, approximately 125 feet of additional right-of-way would have to be acquired and cleared. Option B then utilizes new right-of-way for approximately 1.5 miles requiring acquisition and clearing of a 150 foot right-of-way. The remaining 3.5 miles of Option B utilizes Nine Mile to Volney Corridor of which about 75 feet of additional clearing will be required within the existing right-of-way owned by Niagara Mohawk. Typical impacts associated with clearing and acquisition of new right-of-way will be experienced on this option. Option B will experience the same impacts associated with the southern portion of Option A-1.

Option B has many inherent problems from Nine Mile 2 to the point where it intersects the Nine Mile-Volney Corridor, evidenced by review of its alignment. It zig-zags through Scriba Woods, identified by the Rice Creek Biological Field Station as some of the most significant woodland in the Lake Ontario coastal zone. Option B would pass within 4,000 feet of the hamlet of Lycoming and would be visible from Route 29 and County Route 1 because of existing open land.

This proposal benefits from the fact that in the northern section only a single line currently exists on the right-of-way. Option B requires a short section of new right-of-way which poses the same potential impacts as those described in Option D previously for new rights-of-way.

5. THE A OPTIONS

The A Options which follow the Nine Mile to Volney 345 kV Corridor were chosen as the most viable alternatives for routing the proposed Nine Mile 2-Volney 345 kV Transmission Line. Options A-1, A-2, and A-3 are depicted on the map titled "Alternatives" at the end of this exhibit, page 3-13. Amended Exhibit 4 provides a detailed environmental assessment of the area covered by these three options. Option A-1 was ultimately chosen over the other A Options as the preferred route. The following discussion,

supported by the general assessment of options shown in Table 3-1 and the detailed environmental assessment in Amended Exhibit 4, provides highlights of why Option A-1 is superior to Options A-2 and A-3.

a. OPTION A-3, NINE MILE-VOLNEY EAST/WEST COMBINATION

Option A-3 follows the existing corridor for its entire length crossing from the east to the west side with no additional right-of-way acquisition required. A primary disadvantage of this option when compared to Option A-1 is that it requires 4 crossovers of existing 345 kV lines. The major environmental impacts of this option's southern section is that on the west side of the right-of-way about 3150 feet of muck farm field is crossed near Hall Road and about 600 feet between County Route 29 and Lily Marsh Road. This compares to approximately 1850 feet total on the preferred Option A-1 alternate. Also, the line would run along the side slope of a small hill between Hall Road and MacDougall Road. In the northern section this option would shave off a 75 foot section of a less mature area of Scriba Woods than that crossed by Option B and C. Aside from these specific areas of impact, the line would have the typical impacts of additional clearing of approximately 75 feet and lateral access road construction commonly associated with paralleling existing facilities.

b. OPTION A-2, NINE MILE-VOLNEY/WEST OPTION

Option A-2 also follows the existing Nine Mile to Volney Corridor for its entire length; however, property acquisition of an additional 144 feet in the northern section is required for approximately 9520 feet of its distance. Option A-2 also has a primary disadvantage to Option A-1 in that 4 crossovers of existing 345 kV lines and 3 crossovers of 115 kV lines are required. In addition to line security problems, the crossovers would require additional clearing for structure construction sites and wire stringing operation.

Option A-2 has significant problems especially in its northern section. Impacts in the southern section are the same as those discussed for Option A-3 above. The northern section of Option A-2 would require a new right-of-way for a short distance at Middle Road where a cemetery should be circumvented due to cultural constraints which do not normally consider cemeteries an acceptable multiple use of the right-of-way. A break in the tangent of the line would require modifications resulting in additional right-of-way acquisition and would result in impacts associated with acquiring and clearing new right-of-way. Like the other A Options, additional clearing of 75 feet would be required along the remainder of the existing corridor.

In addition, the northern section of Option A-2 crosses through the equipment and materials storage yard used for construction of the Nine Mile 2 Nuclear Generating Station. A railroad spur is also located in this area. This 345 kV segment is scheduled for completion one year ahead of the generating station. Constructing a line through this storage yard could place an unnecessary inconvenience on its operation.

c. OPTION A-1, NINE MILE-VOLNEY/EAST OPTION

Option A-1, the preferred route, follows the east side of the existing Nine Mile to Volney Corridor for its entire length. No additional right-of-way acquisition is required. However, like the other A Options, the existing cleared portion of the corridor must be widened by 75 feet to allow for the proposed 345 kV line. Only one crossover of another transmission line is required, the Oswego-Lighthouse Hill 115 kV Line.

The environmental impacts associated with Option A-1 are spaced almost evenly along its length. In the section north of Burt Miner Road, like Option A-3, the line would shave off a 75 foot section of a less mature area of Scriba Woods than that crossed by Option B or the various C Options. The remaining section of line south to the Volney Station passes through predominantly second growth, immature woods and brushland. Some areas of muckland agriculture would be crossed just south of Hall Road. The muckland agricultural area north of Hall Road and north of County Route 29 identified in Option A-3 would not be crossed by Option A-1.

d. NINE MILE-VOLNEY WEST/EAST OPTION

Another route option considered, but rejected, also followed the existing Nine Mile-Volney Corridor. In the north section, it followed the western side of the corridor. In the southern portion, it crossed over to the eastern side near the point where the corridor turns southeastward just south of Route 104. This option was rejected because of the crossovers of the two 115 kV lines and two 345 kV lines in the vicinity of the Nine Mile Point site, and additionally, because of the disavantages occasioned by the northern portion of Option A-2 as discussed on page 3-9.

6. ALTERNATIVES TO OVERHEAD

Underground alternatives to the proposed 345 kV transmission facility are not practical as described in Amended Exhibit E-3 of this application.

No consideration was given to alternate methods that would fulfill, at comparable cost, the energy requirements that the proposed facility will fulfill. The purpose of the proposed 345 kV transmission facility is to

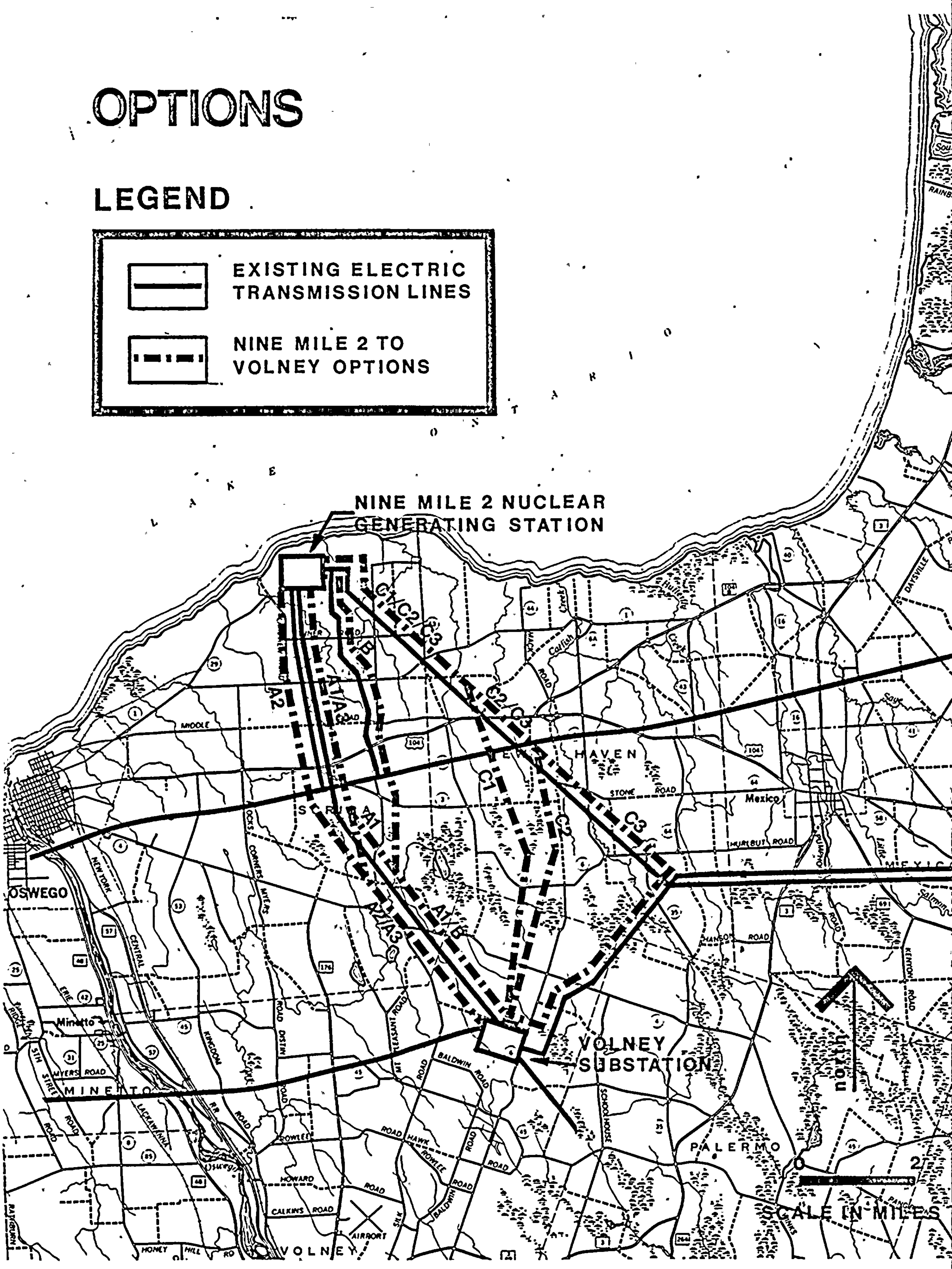
deliver the new generating capacity from the 1090 MW Nine Mile Point Unit #2 to the bulk power transmission system. Amended Exhibit E-4's "Analysis of Alternatives" indicates that construction of 765 kV transmission facilities is not recommended because facility construction at 765 kV does not break even economically with facility construction at 345 kV. Consequently, there are no comparable means to achieve system electrical requirements once Nine Mile Point Unit #2 begins operation.

OPTIONS

LEGEND

EXISTING ELECTRIC TRANSMISSION LINES

NINE MILE 2 TO VOLNEY OPTIONS



ENVIRONMENTAL IMPACT

86.5 AMENDED EXHIBIT 4

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NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 86

SECTION 86.5 AMENDED EXHIBIT 4

ENVIRONMENTAL IMPACT

NINE MILE 2-VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation.

ENVIRONMENTAL ASSESSMENT

§86.5 AMENDED EXHIBIT 4

1. INTRODUCTION

An environmental analysis was conducted for the various alternatives identified in Amended Exhibit 3. The depth of the study was determined by the overall feasibility of the alternatives. This overall feasibility was determined from evaluation of such factors as required length of transmission line, amount of totally non-virgin right-of-way required, system reliability, amount of additional right-of-way necessary to be acquired (excluding virgin right-of-way), and obvious environmental problems.

From this review, the alternatives were narrowed down to the most direct route, the existing Nine Mile-Volney Corridor. The A Options of placing the new facility on the east, west, or a combination of both sides of the existing right-of-way, were retained for closer evaluation. The B and C Options were not completely discarded, but held in abeyance of a major problem with the prime corridor.

Once the Nine Mile-Volney Corridor had been chosen, a study area was identified. In actuality, a three-level study was designed--the six and ten-mile wide study area (three and five miles either side of a centerline) required for Article VII Applications, and a two-mile wide study area identified by Niagara Mohawk for detailed environmental analysis.

Color aerial photographs were flown at scales of 1"=2000' for the two-mile wide study area, and 1"-400' scale, one photo wide along the centerline of the existing right-of-way, during August of 1976. This supplemented the basic data which had been and was being gathered regarding the existing environmental conditions of the study area. Contacts were made with various public officials and agencies to obtain the required data and discuss the impact of the proposed facility. A list of the individuals and agencies contacted is given in Section L on page 4-90.

A wide variety of information was gathered in an attempt to get a complete picture of the area. Both existing information and original interpretation and field work were used to develop the maps and other displays.

Field evaluations were conducted to reinforce the existing data and aerial interpretations. The total data available was then evaluated and charted in order to provide a basis for determining the prime centerline based on

environmental criteria.

This choice was reviewed with engineering and planning people to balance out the environmental factors with line security and engineering considerations. The final route, the A-1 Option following the east side of the existing Nine Mile-Volney Corridor as presented in this application, is a result of this balancing.

B. GENERAL LINE DESCRIPTION

The proposed 345 kV transmission facility is designed to directly parallel the two existing 345 kV lines at a centerline to centerline distance of 100 feet to the east of the easterly 345 kV line from the Nine Mile 2 Nuclear Generating Station to the Volney Station. This alignment will not require any acquisition of additional right-of-way.

The proposed transmission line will be constructed on a series of two pole, wood H-frame structures. The typical height will be 80 feet with taller poles installed where necessary to maintain required clearences. Lattice steel towers will be utilized at angle locations. The typical height will be 90 feet with taller towers installed where necessary. Sketches showing each type of structure are located in Amended Exhibit 5 on pages 5-3 and 5-4.

The existing Nine Mile to Volney Corridor contains various arrangements of 115 kV and 345 kV transmission lines. Three basic arrangements would exist along this corridor if the A-1 Option is approved. Cross sections of the right-of-way for each of these configurations are shown on the map titled "Alternatives" on page 3-13 of Amended Exhibit 3.

C. TOPOGRAPHY

1. INTRODUCTION

The subject of topography is concerned primarily with variations in the elevation of the earth's surface and the patterns those variations form on the surface. Topography can be represented by contour maps as illustrated by the Topography Map at the end of this section, or by profiles such as the one which is illustrated on page 4-5. The surficial features commonly form a pattern which can have a decided effect on the visual impact a transmission facility will have. This pattern is a major corridor identifier in the initial stages of locating a new right-of-way.

Inland Central New York has a decided north-south oriented pattern due to the glaciation which occurred in the area. The pattern is created by series of long, narrow hills and drumlins parallel to each other, and the direction of flow of the glacier. The steep slopes information delineated on the Natural Constraints Map, Page 4-17, shows this pattern very well. The coastal areas on the other hand are relatively featureless. In these coastal areas it makes little difference where a facility is located based on

topography, because there are no features with which to conflict. In areas where the more pronounced glaciated features occur, transmission facilities which are not at least nearly parallel with the topographic pattern tend to present the potential for a visual impact problem.

2. IMPACT ASSESSMENT

The proposed 345 kV transmission line leaves the Nine Mile 2 project area at a ground elevation of approximately 274 feet above mean sea level (MSL). Five thousand feet south of this point the line begins to climb to its maximum elevation of approximately 500 feet above MSL, 19,500 feet south of the station. The remaining 27,000 feet of transmission line extending south to the Volney Station remains at ground elevations of between 400 feet and 500 feet above MSL (See Illustration 1, page 4-5).

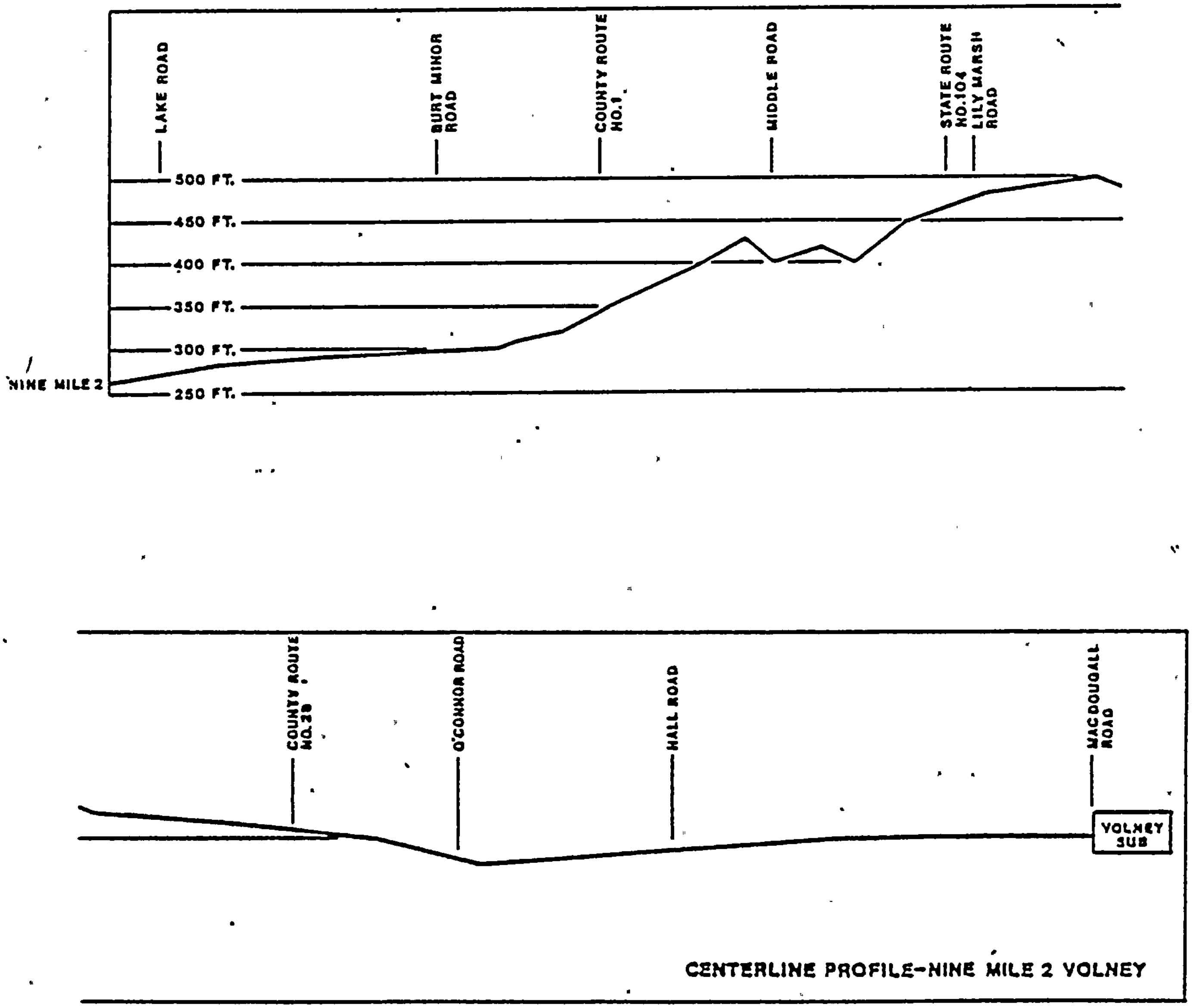
The gentle transitions from one elevation to another as shown in Illustration 1 pose no restrictions on the siting or construction of the proposed facility. The one fairly steep incline at County Route No. 1 poses no problems because of its singularity and its proximity to the highway.

The only impact associated with the type of topography found on the Ontario Lake Plain is that due to the minimal amount of relief experienced, there is little landform screening for the facility. This poses a potential visual impact problem which can only be mitigated by the taller vegetation and careful attention to avoiding open exposures of the line as much as possible. This subject is more fully discussed in a later section of this report, Visual Impact.

In the southern section of the line, the impact of topography on route siting becomes more important. In this area the landforms are representative of the glacial patterns of the general Central New York area. Based on the earlier discussions, then, the route should parallel these landforms, which it generally does. The main reason for paralleling is to avoid crossing ridges. As a result of the glaciation, many individual hills were formed rather than one continuous one. The proposed line takes advantage of this, and where it is necessary to go "across the grain", it does so in the low areas between the ends of the hills, thereby minimizing the visual impact potential.

Overall, the line is as sympathetic to the topography as any line could be while also considering the routing parameters of other environmental impacts and engineering limitations.

ILLUSTRATION 1



D. SOILS

1. INTRODUCTION

Soils will not be significantly modified by most types of construction. Soils information is necessary to identify areas where problems might occur if the facility were constructed. Problems such as soil erosion can be avoided if the areas where potential problems exist are identified. The Soils Map, page 4-9, for the project identifies the soil series for the project area, and the table adjacent to the map provides some appropriate interpretations for identifying potential problem areas. The categories of the table are described below.

The soil names and symbols, as well as the map information, are taken from the 1974 Interim Soil Survey Report and the 1981 Soil Survey for Oswego County prepared by the United States Department of Agriculture Soil Conservation Service. The percentage figures shown on the table on the Soils Map, page 4-9, are given instead of distances in order to compensate for the scale problems with the map.

The AASHO (American Association of State Highway Officials) Classification System groups soils into categories according to bearing capacity. The system has a range of A-1 through A-7 with A-1 soils having a high bearing capacity and A-7 soils having a low bearing capacity. The muck soils in the area are not listed by the classification system because they have no suitability for highway engineering design.

The water erosion hazard category is important in identifying the areas in which special erosion control measures might be necessary. The slight, moderate, and severe rating system is just as it appears in the table on the Soils Map. Soils with a slight erosion hazard are fairly stable, moderate soils less stable, and severe soils least stable with regards to the erosive action.

The depth to bedrock category is probably the least dependable because of the soil testing from which it is determined. Soil testing usually examines only the top five feet of material. The actual debth of the bedrock below that is an educated guess. In some areas where bedrock is encountered close to the surface, the information is immeasurably more beneficial than where bedrock was not encountered in the actual soil sampling.

By evaluating the various interpretations, the extent of problems which might be encountered due to soils can be assessed.

2.. IMPACT ASSESSMENT

A variety of soils are represented in the study area, but about 88 percent of the length of the proposed line would pass through just six of the 15 soil series represented. The remaining 12 percent of the line's length is fairly evenly divided among the other nine soil series. The breakdown for the percentage of the line that crosses each soil series is shown on the table adjacent to the Soils Map.

From the interpretations on the table, the areas of greatest concern can be identified. The most significant concern is the bearing capacity of the soils in the area because low bearing capacity could translate into increased construction costs. From the map, the area around Hall Road can be identified as a potential problem area. A significant portion of the soil is Carlisle Muck of extremely poor bearing capacity. Between 2,000-2,500 feet of this type soil near Hall Road is crossed by the two existing 345 kV Transmission Facilities and would be crossed again by the proposed facility. Based on experience in placing the existing structures on this type of soil, no serious construction problems are anticipated in placing new structures in this same area. Special attention will be given to existing agricultural concerns in this area during the design of the facility.

Note: The soils information shown on the Soils Map on the following page are taken from the United State Department of Agriculture Soil Conservation Service Soils Maps. The soils data was plotted on un-corrected aerial mosaics by SCS; and therefore an accurate scale change was not possible from the 1:20000 aerials to the 1:24000 base map used for this study. The information is the best available at this time.

E. HYDROLOGY

1. INTRODUCTION

The entire study area ultimately drains to Lake Ontario. However, some of the area drains to the Oswego River first. The distinction can be made between those streams which are in the Lake Ontario Basin directly and those which are in the Oswego River Basin by looking at the stream number designation shown on the map at the end of this section. Any symbol beginning with Ont-66 drains to the Oswego River. Any stream designation not including the number 66 is in the Lake Ontario Basin.

Both drainage basins are interspersed with numerous ponds and wetlands. Those identified by the United States Geological Survey, NYS Department of Environmental Conservation, and Oswego County Environmental Management Council are delineated on the Hydrology Map P. 4-13. Since 1977 the most complete wetlands mapping for Oswego County has been conducted by the County's Environmental Management Council in their efforts to inventory county wetlands in accordance with the NYS Wetlands Act.

The Department of Environmental Conservation classification of streams and ponds within the study area is shown adjacent to the symbol number for that stream. The letter shown indicates the class assigned to the waterbody by the Department of Environmental Conservation. Normal standards assigned to the various classes are applicable to these streams; no special standards such as trout waters have been assigned to any of the streams or ponds in the study area. However, during spring field investigations, rainbow trout were observed moving upstream in a fair size stream on the northern end of the study area. Department of Environmental Conservation staff noted that any little stream might have rainbow trout in the spring and brown trout in the fall. Also, trout were reported to inhabit the section of Black Creek where the proposed line crosses it.

Flood hazard areas designated on the Hydrology Map are taken from the U. S. Department of Housing and Urban Development (HUD) Flood Hazard Boundary and Rate Maps provided by the Central New York Regional Planning and Development Board and the NYSDEC. These maps were prepared in 1974 for use in HUD's Flood Insurance Program and have recently (7/81) undergone revision to reflect the results of more detailed flood studies.

2. IMPACT ASSESSMENT

a. STREAMS AND PONDS

The streams within the study area are all Class D Streams according to the New York State Department of Environmental Conservation Classification System. The best use for Class D Streams is drainage, the lowest class established in the regulations. Six streams are crossed by the proposed facility with all having already been crossed by the existing lines.

The access road for the existing lines crosses all of the streams, except Black Creek, using culverts with no apparent long-term impact. In April of 1977 dozens of large rainbow trout were seen migrating upstream through a culvert under the existing access road near the northern end of the line. Black Creek was not crossed for access in constructing the existing 345 kV lines, and it is not anticipated that a crossing would be required for the proposed transmission line construction. A full assessment of the impact on the streams caused by the culvert crossing is not possible without knowing the stream conditions prior to past 345 kV construction. However, as trout still inhabit the streams, the impact of the culverts on the trout has obviously not been disastrous in past years.

Because of this previous impact, any minor improvements of the access roads necessary for reutilization by similar construction equipment should cause little, if any, additional impact on the streams. Any approaches to stream crossings will be provided with adequate erosion control and prevention facilities necessary to minimize erosion and its consequent sedimentation. The actual operation and maintenance of the facility will have no impact on the streams of the area. Any herbicide application necessary during initial clearing or maintenance will be strictly controlled to avoid stream contamination.

Clearing can affect water temperature in a stream if all the vegetation is removed from the stream's banks. However, as stated previously--where vegetative screens exist along streams, they will be considered for retention. The actual locations of retained screens for this particular facility will be identified in the Environmental Management and Construction Plan.

b. WETLANDS

According to the wetlands mapping information provided by the Oswego County Environmental Management Council (EMC), twenty-six (26) regulated wetlands (over 12.4 acres in size) are located within the corridor study area.

Each of these regulated wetlands is shown on the Hydrology Map with its assigned regulatory number (i.e., NH-1). In addition to these regulated wetlands, many small, wet depressions are interspersed throughout the corridor study area.

Because of the recognized importance of these hydrologic modifiers, the proposed facility will be designed to minimize impact on capacity and flow. Structures will be placed outside of wet areas wherever possible to avoid access road and working area construction within the wet area. Where construction is necessary within a wet area, equalization culverts or diversions will be provided to minimize impact on the flows through the wet area.

The Oswego County EMC indicated that the proposed location of the Nine Mile 2 to Volney Transmission Line, as portrayed by the corridor centerline on the map, is placed as appropriately as possible to minimize impact on existing wetlands. The EMC felt that moving the transmission line to the east or west of the proposed location could cause impact on more ecologically sensitive wetlands.

c. FLOOD HAZARD AREAS

The proposed 345 kV line crosses through no designated flood hazard areas. Flood hazard areas do exist close to both sides of the right-of-way within the study area, but no structures will be immediately adjacent to or in designated flood hazard areas.

F. NATURAL CONSTRAINTS

1. INTRODUCTION

Natural constraints are those items or features which are not man-made which have or should have a significant impact on the routing of transmission facilities. Some will vary in importance from one geographic locale to another, while others are significant no matter where they occur.

The constraints shown on the Natural Constraints Map P.4-17 were drawn from other natural feature subjects in this report as well as being a composite of small individual areas which did not warrant a full section in the report but are important to consider.

The features identified in this section include steep slopes, sensitive or unique vegetation, wildlife and wildlife habitat, high points in elevation, severe soil conditions, and streams.

The steep slopes and elevation information is based on original interpretation of the NYSDOT 1:24,000 quadrangle maps. The sensitive or unique vegetation, wildlife, and wildlife habitat information generally comes from coastal zone reports prepared by the Central New York Regional Planning and Development Board and the Rice Creek Biological Field Station and from consultations with the NYSDEC and the NYS Museum, Science Service. The information on severe soil conditions was interpreted from the soils data presented in this report, which is based upon the United States Department of Agriculture Soil Conservation Service detailed soils information for Oswego County. Stream information is based on NYSDOT 1:24,000 scale quad information, NYSDEC Stream Classifications and Standards information, and field review.

2. IMPACT ASSESSMENT

a. STEEP SLOPES

The steep slope information presented on the Natural Constraints Map is divided into two categories: 10-20 percent slopes, and over-20 percent slopes. Steep slopes generally have the most impact on access during line construction. Slopes under 10 percent pose few problems during this period. Slopes in the 10-20 percent range can prove troublesome to construction access depending on location, i.e., whether on a tangent or curve in the road, the length of the approach to the grade, or the length of the grade itself.

Slopes above 10 percent require care during road and tower construction operations to avoid stripping all vegetation from the surface. Erosion on these slopes can be serious if the soil stabilizing vegetation,

including root systems, is removed without satisfactory soil stabilizing efforts being employed. Additionally, the type of soil which forms the slope will determine to a large extent the seriousness of the erosion potential.

Along the right-of-way no slopes in excess of 20 percent are crossed. Approximately 3,700 feet of 10-20 percent slopes are crossed with the area just south of County Route 1 being 2,400 feet of that total. Caution will be taken in constructing any structures within this area to minimize erosion and slope distrubance.

b. VEGETATION, WILDLIFE AND HABITAT

The Scriba Woods, east of the Nine Mile-Volney Transmission Lines to County Route 29 and north of Burt Miner Road, was identified by the Coastal Zone Habitat and Wildlife Inventory for Oswego County prepared by the Rice Creek Biological Field Station as an important forest warranting protection from further encroachment. It is described as the most mature section of forest within the coastal zone study area and the best example of the climax habitat.

In a field evaluation with personnel from the Rice Creek Field Station the area east of the Fitzpatrick-Lighthouse 115 kV Line was identified as the area of greatest importance. Their feeling was that from solely an ecological standpoint a location west of the existing Nine Mile-Volney Lines would create the least impact on this resource. They felt that the proposed east side is satisfactory if a line is necessary and for various reasons cannot be located to the west of the existing corridor. The only further recommendation was that the new line should hug the existing lines as close as possible to minimize the impact on the woods.

One critical wildlife habitat was identified by the NYSDEC along the Lake Ontario shoreline west of the Energy Information Center, and, therefore, was outside of the impact area of the proposed transmission line. No other unique or sensitive wildlife habitats were identified within the study area. Additionally, no rare or endangered animal species are known to habit the study area. The bog turtle (Clemmys muhlerbergli) is considered a potential inhabitant, but no individuals are known to exist.

The NYS Museum and Science Service has indicated that some rate plant species are known to occur within the wetland area which surrounds Mud Pond (see Hydrology Map 4-13). The Service felt that these plants will not be affected by the proposed transmission line as long as existing drainage patterns into this wetland are maintained. The installation and/or improvement

of proper drainage control devices will be prescribed in the Environmental Management and Construction Plans for this transmission line. Such devices will serve to maintain present drainage across the existing right-of-way and into this wetland complex.

c. TOPOGRAPHY

The highest point in elevation in the study area, approximately 510 feet above MSL, occurs just south of Lily Marsh Road about 1,100 feet west of the proposed 345 kV line.

d. SOILS

The restrictive soils shown on the Natural Constraints Map were interpreted from the USDASCS information and the Soil Survey Interpretations of Soils of New York State, December 1973. The major concern for soils impact on transmission line constructing is bearing capacity and water erosion hazard. These two concerns are discussed in the impact assessment for soils.

e. STREAMS

The streams in the study area were determined by examining the NYSDOT 1:24,000 quadrangle maps and also by cross referencing the NYSDEC Classifications and Standards for Streams in New York State. Six streams were identified, which are to be crossed by the facility as proposed. Out of these streams, Black Creek and Ont. 62-3 will be crossed. Black Creek and Ont. 62 both are inhabited by trout. The trout habitats have apparently been maintained through previous construction; and, therefore, with the precautions to be prescribed in the Environmental Management and Construction Plan and the use of existing access roads, it is anticipated that little additional impact will occur.

G. VEGETATION/LAND USE

1. INTRODUCTION

The Vegetation/Land Use Map P. 4-24 represents the vegetation and existing land use in the study area as interpreted from color aerial photography flown in August 1976. After interpretation, the information was checked against the 1968 Land Use and Natural Resources (LUNR) Information developed by Cornell University for the State of New York. Some slight refinements were made on the basis of the comparison due to more detailed vegetation mapping on LUNR than could be done from the summer photographs. Field trips were made to verify the information interpreted from the aerials.

A short description of the categories on the Vegetation/Land Use Map is necessary to establish a basis for discussion of the impact assessment. Such a description follows:

Vegetation Categories:

Forest (F)	This category generally follows the "Fc", "Forest Brushland" category established by LUNR in terms of definition, i.e., generally areas where forests are regenerating following abondonment of agricultural uses.
Main Forest (Fn)	This category is taken from LUNR directly. "Lands with natural stands where 50 percent or more of the trees are over 50 years old and over 30 feet high." Areas on the map designated "Fn" are taken directly from the LUNR maps.
Plantation (P)	Plantations are "areas artificially stocked of any species, age, class or size." In the study all "P" notations are conifer plantations.
Wetland (W)	A wetland for purposes of this study is considered to be any area where wet areas have predominantly shrub and smaller vegetative species. Very few wetlands are encountered in this area. Most have grown to the forest wetland category.

Forest Wetland (Fw)	The wooded wetland definition from LUNR is adequate to describe this category. "Areas covered with varying depths of water for much of the year, with vegetation mainly of trees."
Open Water (Ow)	Open Water is a pond or lake without significant emergent vegetation.
Brushland (B)	Brushland is a category established to group the large amounts of land in the study area which do not fall into the forest category, but are not used for active agriculture.

Land Use Categories:

Developed Residential/ Commercial Property	This category includes the structures associated with residential, commercial properties, as well as the areas of lawn and yard associated with those structures.
Industrial (I)	For the purposes of this study, the industrial category refers specifically to intensive electric utility use of a piece of property. It would include other industrial areas if they existed within the study area.
Extractive Industry (Ex)	The sand and gravel extraction operations within the area are represented by this category.
Transmission Lines (TL)	This category includes only the electrical transmission lines which existed at the time of the study.
Transportation (Tr)	This category includes only the railroad right-of-way in this area. However, if airports or major highways existed within the area, they would be included here.
Agriculture (A)	Any agricultural land use is included in this category with the exception of the areas immediately adjacent to the residence and farm buildings.

2. IMPACT ASSESSMENT

Of the thirteen Vegetation/Land Use Categories identified within the study area, eight are crossed at one time or another in the nine miles from Lake Road to MacDougall Road. The predominant category along the proposed corridor is the forest category through which 59 percent of the line would pass. Brushland would be crossed along 21.6 percent of the proposed corridor, and 9 percent of the corridor would impact the mature forest areas. Active agricultural areas would be crossed by approximately 6 percent of the line with the remaining 5 percent of the line divided among the following areas: transportation, 0.2 percent; forest wetlands, 3.0 percent; plantations, 1.6 percent; and transmission lines, 0.2 percent. Table 4-1 shows the actual distances which would be crossed by the proposed transmission line.

TABLE 4-1

LAND USE CROSSED BY PROPOSED ROUTE

Category	Linear Distance* (Crossed)	Percentage of Total**
Forest (F)	27,000'	59%
Brushland (B)	10,000'	21.6%
Mature Forest (Fn)	4,200'	9%
Agriculture (A)	2,800'	6%
Forest Wetland (Fw)	1,400'	3%
Plantation (P)	750'	1.6%
Transmission Lines (Tl)	100'	.2%
Transportation (Tr)	100'	.2%

*These distances will total only 8.84 miles rather than the 8.86 miles estimated to be the total length of the facility from Lake Road to MacDougall Road. This 130' difference is attributed to scaling from the maps and is not considered to be significant.

**These percentages, if totaled, will add up to 100.6% due to rounding of some of the figures.

The vegetation/land use configuration of the proposed line following construction is represented in Table 4-2.

TABLE 4-2

LAND USE CHANGES AFTER CONSTRUCTION

Category	Distance (Crossed)	Percentage of Total
Forest	0	0
Brushland	42,200'	90.6%
Mature Forest	0	0
Agriculture	2,800'	6%
Forest Wetland	0	0
Plantation	0	0
Transmission Lines	100'	.2%
Transportation	100'	.2%
Wetland	1,400'	3%

By comparing these two tables of before and after construction, the major vegetation/land use impacts are readily apparent. Three impacts on vegetation/land use in the study area will result from the construction of the line as proposed.

The removal of some mature forest areas is significant because of the limited number of such areas which exist within the limits of the study. In many areas the greater the diversity, the stronger the whole ecological system, and the removal of a portion of that diversity can weaken the system as a whole. It is anticipated that the line as proposed will only require clearing along that edge of mature forest which is contained within the existing right-of-way bounds. This will have far less impact than cutting additional forest from the middle of the mature forest area as would be required by one corridor option and might be required by the other corridor options identified in Amended Exhibit 3.

Plantations crossed by the line may have to be removed for line security. The major benefit of plantations for wildlife is as winter shelter for deer, but few deer are reported in this area. The deer population carrying capacity for this area is not known either, so the actual impact of removing the small plantations in the right-of-way is not discernible.

The remaining impact to the study area is the creation of wetlands from forest wetlands through clearing. As was noted previously, wetlands are extremely limited in area here and the creation of more wetland area from the more common forested wetland has to be considered a positive impact on the ecology of the area. Because of the limited nature of the increase, it is probably not significant to the general area of the Lake Ontario shoreline, but in the confines of the study area it is important to the diversity of vegetation and wildlife habitat and, therefore, the variety of wildlife.

Other lesser impacts will be experienced in other categories. Agricultural areas crossed by the line may be disrupted during the construction of the line. Also, if a structure must be placed in a field, it becomes a nuisance to farm ground, thus posing a long-term though not necessarily significant impact. By placing the line adjacent to an existing line rather than on a new right-of-way, impacts are concentrated. This is beneficial to the general area but presents an additional impact on the affected farmer. The only mitigating actions which can be initiated for this impact is by minimizing the construction impacts as much as possible and by reasonable compensation.

The impact of a transmission line on developed areas is insignificant except for those people who are displaced and for the visual impact of the line to those who live in and travel through the area. As is more fully explored in the Cultural Resources section of this report, it is anticipated that no homes or other structures will be displaced by the line as it is proposed. The visual impact of the line is more fully discussed in the Visual Assessment Section in this report.

Transmission lines and transportation corridors, such as railroads, are compatible with the proposed facility; and, therefore, the impact on them would be zero.

H. CULTURAL RESOURCES

1. INTRODUCTION

This Cultural Resources inventory is concerned with the human factors and influences within the study area. It includes historical and archaeological information, specific location of residential and commercial buildings, and other cultural features which influence transmission line siting and construction.

The historical/archaeological information for the area is represented in the wholly enclosed report by Pratt and Pratt Archaeological Consultants, which begins on page 4-26. The remaining data presented in this section is based upon field investigation and original interpretation of a variety of data sources during the period March 1976, through September 1977 with updating in November 1981.

The Cultural Map on page 4-59 identifies the various cultural factors considered in siting and evaluation of impact for the subject facility. Most items are straightforward and can be read directly from the map. Two groups of figures, however, are references to off-map information. The letters at the road crossings reference small-scale sketches, pages 4-47 to 4-57, which identify specific cultural concerns. The numbers adjacent to the historical/archaeological symbols are references to the Pratt and Pratt Report, pages 4-26 to 4-44.

2. IMPACT ASSESSMENT

a. HISTORICAL/ARCHAEOLOGICAL IMPACTS

The Pratt and Pratt Report, which follows, covers the title subject very well. The one topic of information which appears to be missing is the location of historic homes rather than just business establishments. The letter from Peter P. Pratt to Gary R. Schoonmaker, which follows the report, recognizes this problem and explains the reason for it. The situation can be easily evaluated during the field survey for this facility. Any historic structures which will be directly impacted by the line will be identified and any necessary mitigating actions will be implemented.

Based on the Pratt and Pratt research, there will be no impact from the proposed facility on known historical/archaeological resources within the area. Because so little is actually known about this area, a field survey involving actual test pits of field inspection of the line location will be completed prior to construction. Any significant historical/archaeological resources discovered in the course of the field survey will be salvaged or avoided.

b. CULTURE RESOURCE SURVEY

BACKGROUND AND LITERATURE SEARCH
FOR THE
CULTURAL RESOURCES SURVEY
OF THE PROPOSED
NINE MILE 2-VOLNEY 765 kV
ELECTRIC TRANSMISSION PROJECT

by

PRATT & PRATT ARCHAEOLOGICAL CONSULTANTS

1220 Euclid Avenue
Syracuse, New York 13210

July 5, 1977

FOR: Niagara Mohawk Power Corporation
300 Erie Boulevard West
Syracuse, New York 13202

INTRODUCTION

In a letter dated March 22, 1977, Peter P. Pratt, Pratt & Pratt Archaeological Consultants, was requested by Mr. Gary Schoonmaker, Terrestrial Ecologist for Niagara Mohawk Corporation, to submit a proposal for a cultural resources survey of the Nine Mile 2-Volney Transmission Project. This research involved was designed to meet the requirement for a cultural survey as part of the consultation process of the Public Service Commission with Niagara Mohawk Corporation in its engaging in construction activities. On May 27 agreement was reached and a contract signed between Niagara Mohawk Corporation and the firm of Pratt and Pratt Archaeological Consultants to perform the above service. Following is the background and literature search as part of the Phase I study of this project.

BACKGROUND AND LITERATURE SEARCH

Physiographic Location

The project lies within the Ontario Ridge and swampland subregion of the Erie-Ontario Lowlands Landform Region. This subregion is bordered on the west by the Ontario Drumlins subregion; on the south by the Oneida Lake Plain subregion; on the north by Lake Ontario and the Eastern Ontario Hills subregion and on the northeast by the Tug Hill Upland Landform Region (Stout 1958: Fig. 13; Thompson 1966: Fig. 9).

The general topography of the project area consists of low (400-500 foot elevations) rolling ridges running generally northwest-southeast and interspersed with swamps and shallow ponds (DeAngelo, 1976, p. 2). Many of the ridges are drumloidal or esker-like in shape and represent typical ground moraine glacial features (Thompson 1966: 34).

The entire project area is a result of the last stages of glacial retreat during the late Pleistocene epoch. With the retreat of the Port Huron substage of the Wisconsin glaciation, glacial Lake Iroquois formed in front of the recessional ice, c. 10,000 B.C. This lake covered the Erie-Ontario Lowlands and drained to the east through a channel at Rome into glacial Lake Albany in the upper Hudson Valley (Ritchie 1969: Fig. 2; Fairchild 1909: pocket map).

A well established residual beach strand line suggests that Lake Iroquois existed for approximately 1,500 years. Prior to about 8000 B.C., the Port Huron ice melted beyond Covey Pass, Quebec, causing a shift of drainage from the Rome outlet to the St. Lawrence Valley. This caused a relatively rapid draining of glacial Lake Iroquois from the Erie-Ontario Lowlands, leaving Lake Ontario behind, essentially as it is today (Ritchie 1969: 14).

The soils of the project area consist primarily of Sodus-Ira associations interspersed with smaller areas of Scriba-Ira and Muck-Peat associations (Olson et al. 1969: pocket map).

The Sodus-Ira soils are deep, well to moderately well drained, medium textured, undulating and sloping soils on glacial tills. They have high acidity, low fertility, dense fragipans and stones. Because of these characteristics most areas are in low-use farming or abandoned (Olson et al. 1969: 75).

The Scriba-Ira soils are deep or moderately deep, somewhat poorly to moderately well drained, medium textured, gently to moderately sloping soils on glacial till. They are wet due to fragipans and are stony. For the most part farming has been abandoned on these soils (Olson et al. 1969: 73-74).

Regional Cultural Perspective

Paleo-Indian (c. pre-8000 B.C.)

Recent estimates suggest that Lake Ontario began in its modern form sometime before 8000 B.C. (Ritchie 1969: 14). At this time the Valders ice front lay somewhere north of the St. Lawrence River valley and the central New York area probably supported a park-tundra environment suitable for grazing animals such as caribou and mastodon. Based on these ice free conditions and a game population, c. 9500-8000 B.C. has been postulated as probably the earliest period at which man entered the central New York area (Ritchie and Funk 1973: 6; Rippeteau 1977: Fig. 1). This is further substantiated by the concentrations of loci of the fluted projectile points of the Paleo-Indian within the bed of glacial Lake Iroquois (Ritchie 1969: Fig. 2), as well as a 10,580 B.C. c-14 date on caribou bones associated with a fluted Cumberland-like projectile point from Dutchess Quarry Cave in southeastern New York (Ritchie and Funk 1973: 6).

The Paleo-Indian Stage of cultural development appears to be one of nomadic big game hunting by small groups of individuals together with probable gathering of whatever other food resources were available in the park-tundra environment (Ritchie and Funk 1973: 333-36).

With the waning of the glacial ice south of James Bay in Canada (Valders c. 7500-8000 B.C.), the climate in central New York began to change. This resulted in a gradual shift from the park-tundra vegetation which supported the large grazing animals hunted by the Paleo-Indian, to extensive coniferous forests with a smaller game carrying capacity. It is postulated that due to this lack of suitable game the Paleo-Indian left the central New Yorka rea possibly moving north into Canada (Ritchie and Funk 1971: 46; Muller 1977: 232).

Finely chipped fluted projectile points as well as flint scrapers, gravers, bifaces and knives are the most common artifacts. While many fluted points have been found along the Seneca River in central New York only one site has been excavated in the central New York area. This site (Potts) is undated and lies 5 miles south of the project limits (Ritchie 1965: Fig. 2).

Archaic Stage (c 8000-1000 B.C.)

The coniferous forests appear to have existed in sections of central New York until c. 5000-4000 B.C. (Ritchie and Funk 1971: 46; Rippeteau 1977: 393 and Fig. 1). During this period there is little evidence of man in the central New York area. A few scattered projectile points, resembling artifacts of the Early Archaic Stage as found in the North Carolina Piedmont (c. 6500 B.C.), appear in collections from the river valleys of central New York. In New York State sites of this period include one excavated on Staten Island, c. 5300-7400 B.C. and one near Wells Bridge (southwest of Otego, New York), c. 7400 B.C. (Ritchie and Funk 1971: 45; Funk 1977: 22).

With the gradual establishment of mixed deciduous forests (c. 4000 B.C.) containing a wider range of animal and plant foods, man again appears in numbers in the central New York area (Ritchie and Funk 1971: 46; Rippeteau 1977: 393). By 2500 B.C. widespread settlement had taken place in central New York (Ritchie 1965: 40).

The series of cultures collectively known as the "Archaic" exhibit a subsistence pattern based upon hunting, fishing and gathering wild vegetal foods.

Archaic sites tend to be small and probably represent the remains of seasonal camps. Artifacts consist of ground, chipped stone and bone tools. Pottery is absent with containers being made of soapstone. Native copper tools and ornaments are occasionally found on some Archaic sites, including trade routes with the Great Lakes region.

Whie dates for the Archaic are thought to range from 8000 to 1000 B.C., for the northeast in general, in central New York the majority of known sites date from approximately 4000 B.C. to about 1500 B.C., i.e., Late Archaic (Ritchie and Funk 1973: Fig. 1; Funk 1977: 21). It has been suggested that this fact may be due in part to the fluvial history of flood plain sites and general "archaeological visibility" (Rippeteau 1977: 393-395).

In the past, most Archaic sites have been found near the rivers on the Erie-Ontario Lowlands; however, recent work indicates a site potential on rivers and creeks within the Appalachian Uplands (Funk, Rippeteau and Houck: 1973: 20-26).

<u>Transitional Stage</u> (c 1000 B.C.)

The Transitional Stage represents the change from a seasonal nomadic existence to more permanent villages, together with the development of pottery to replace the earlier soapstone pots. In the central New York area the Frost Island Phase of the Transitional Stage is thought to be related to the Susquehanna Tradition of Pennsylvania (Funk, Rippeteau and Houck 1973: 20-26; Ritchie 1969: 150-78).

Subsistence during this period is based on hunting, fishing and gathering with most sites being small seasonal camps.

Transitional sites have been most frequently found along the large rivers of the Erie-Ontario Lowlands; however, in recent years Transitional projectile point styles have been recovered from the flood plains of small tributaries within the Appalachian Uplands (Funk, Rippeteau and Houck 1973: 20-26).

The Frost Island phase was largely defined from excavations at the O'Neil Site (1250 B.C.) located on the seneca River 20 miles southwest of the project limits (Ritchie and Funk 1973: 74).

Woodland Stage (c. 1000 B.C. - 1550 ? A.D.)

The period following the Transitional Stage and continuing until the time of European contact is referred to as the Woodland Stage.

This stage, which has been divided into the Early, Middle and Late periods, has been variously defined as it occurs in different areas east of the Mississippi.

In New York State, the Early Woodland period is marked by the first significant use of clay pottery. Clay smoking pipes also make their appearance. A well-developed burial complex is characteristic of the Early Woodland period. Few Early Woodland occupation sites have been found to date, with much of the evidence of this period coming largely from burial sites. The scant evidence suggests that subsistence was still primarily based upon hunting, fishing and gathering, but cultivated plants had made their first appearance (Ritchie 1969: 179; Fisher and Hartgen 1975: 9).

The Middle Woodland period, which begins c. 200 A.D. in central New York is characterized by a transition in ceramic and pipe styles and by the development of complex mortuary customs. It is probable that the use of cultivated plants was increasing, but they still played a minor role in subsistence (Ritchie 1969: 180).

The Late Woodland period, which begins about 1000 A.D. is distinguished by a dependence on agriculture for subsistence and the growth of permanent settled villages often surrounded with palisades. The elaborate mortuary customes noted for earlier Woodland periods disappears. Emerging as distinct entities during this period are the historically known Iroquoian groups (Ritchie 1969: 180; Ritchie and Funk 1973: 359).

Proto-Historic Substage (c. 1550 ? - 1600 A.D.)

During the last half of the sixteenth century the pending impact of the cultural shock due to future European contact began to manifest itself in a growing demand for European trade goods.

This substage has been defined as a period from c. 1550 ? - 1600 A.D., during which time small amounts of European-made artifacts appear on Onondaga Iroquois sites (Bradley 1976: 16-20; DeAngelo 1976a: 12-15).

At present no documentary evidence has been uncovered to indicate direct European contact during this period, although Jacques Cartier had penetrated the St. Lawrence River valley to at least the site of present day Montreal as early as 1535 (Pendergast and Trigger 1972: 3)

During the Proto-Historic Substage we assume that the few trade goods reaching Iroquois country were the result of inter-tribal exchanges coming ultimately from various int ermittent European sources along the northeast coast.

Historic Substage (c. 1600-1783 A.D.)

The first documented contact between the European and the Iroquois in central New York was an attack on the Iroquois by Samuel Champlain in 1615 A.D. (O'Callaghan 1850, Vol. III: 10-25).

The site of the village involved has been debated for many years, but recent investigations indicate it probably was an Onondaga village located at the south end of Onondaga Lake at Syracuse (Pratt 1976: 65-66, 148; French 1949).

The first extended occupation in the central New York area involved the Jesuits from Canada whose proselytizing efforts among the Onondagas started in the 1650's (O'Callaghan, 1850; Vol. I: 27-40). Following Simon LeMoyne's contact with the Onondagas at Onondaga Lake (Syracuse) in 1654 a series of missions were established in central New York among the other Iroquois nations (Stewart 1970: 43-52; O'Callaghan 1851; Vol. XIII: 189-190).

The second half of the seventeenth and much of the eighteenth century exhibited numerous white contacts devoted to both trading ventures and religious activities (Leach 1966: 103-08).

The English-French rivalry that resulted in the French and Indian Wars (1744-1763) caused further cultural and political impacts on the Iroquois. The resulting political, economic and cultural confusion was further evident during the Revolutionary War (1776-1783) when again the Iroquois were forced to take sides. At the end of this conflict the Iroquois ceased to be a major political force in New York State and were largely divested of their lands.

At this point in time the Historic Substage of the Late Woodland Stage of Indian development gives way to the Historic Stage of non-Indian settlement of central New York.

Historic Stage (1783 A.D. - Present)

It was not until after the Revolutionary Was that permanent white settlement took place in central New York. This was largely due to the opening of the New Military Tract (1791) within central New York as "bounty" land for those soldiers who served in the Revolution. This tract of over 1,500,000 acres attracted much of the late 18th and early 19th century settlement. The New Military Tract covered all or part of Oswego, Onondaga, Cortland, Tompkins, Schuyler, Yates, Seneca, Cayuga and Wayne Counties (Smith 1904: 28; Sherwood 1926: 169-179).

In addition to this area, there were other tracts of land that were set aside and sold to private interests. These included such areas as Macomb Purchase in the northwestern Adirondacks, the Lincklaen Purchase and the Chenango Twenty Towns directly east of the New Military Tract and the Scriba Patent on the northeastern edge of the New Military Tract (Thompson 1966: Fig. 42).

The Nine Mile II-Volney project lies within the limits of the Scriba Patent.

In 1788 the State of New York appointed a group of commissioners to deal with the Iroquois regarding land in Central New York. In July of 1788 a grand council was held which resulted in the acquisition of the Military Tract, the "Boyleston Tract" and the Scriba Patent. Since John and Nicholas Roosevelt of New York City had applied to the commissioners, the Scriba Patent was mapped by William Cockburn of Kingston, New York as the "Roosevelt Purchase." On April 7, 1792 the land was sold to Frederick William Augustus Scriba, a native of H olland and at that time a merchant in New York City. Scriba received the patent to this 499,135 acres in December of 1794 and had Benjamin Wright resurvey the property into 24 towns which were further subdivided into lots. Over the next 42 years Scriba is reputed to have spent over 1.5 million dollars promoting Oswego County. He died in 1836 and is buried in Constantia, one of the model towns he hoped to develop (Churchill 1895: 9-12; DeAngelo 1976b).

The regional development of Central New York from these early beginnings was largely based on agriculture and the availability of transportation. The turnpikes (c. 1800-1830) provided the impetus for increased settlement by people from the New England States. While much of Oswego County was not settled until the 1800-1809 period, Onondaga County to the south as well as the Oswego River corridor, the outlet of Little Salmon River (Texas) and the Constantia area of Oswego County were settled within the 1790-1799 period (Thompson 1966: Fig. 43).

Oswego County was erected from parts of Oneida and Onondaga Counties in 1816 (Riley 1973: Chart).

The agricultural potential of much of Oswego County is "fair to poor" with a large segment of "poor to very poor" land within the Tug Hill Uplands to the east (Thompson 1966: Fig. 34). This fact, together with the coming of the Erie Canal (c. 1825) through the better farm land in lower central New York slowed the settlement of much of Oswego County. Salt and limestone production in the Syracuse area served as a nucleus for industrial development considerably south of the project area. This advantage was continued with the coming of the railroads c. 1840 and the building of the Enlarged Erie Canal c. 1830-1860.

Scriba's hope for a Lake Ontario port on the Little Salmon River was doomed to failure due to the location of a better water route up the Oswego River thence to Oneida Lake via the Oneida River, across the "great carry" at Rome and down the Mohawk River to the Hudson River at Albany. This route was recognized not only by the Iroquois but also in the early establishment of Fort Oswego (1727) at the mouth of the Oswego River. Thus most manufacturing in Oswego County developed along the river corridor at the cities of Oswego and Fulton, particularly with the completion of the Oswego Canal in 1838.

Although saw mills, grist mills and other small "manufactories" were established along many of the smaller streams in Oswego County in the 19th century, consolidation of industrial interests caused the disappearance of most of them by the early 1900's (see Fig. 2).

At the present time many of the marginal farm lands have been abandoned to encroaching woodlands and have been purchased as summer camp properties by people from the Syracuse metropolitan area. The better farm lands still provide moderate incomes from dairying, crops and orchards while water oriented services have developed along the highly desirable Lake Ontario shorefront.

National Register Properties

A review of National Register listings to June 7, 1977 indicates no sites listed eligible or nominated within the project limits. The only properties listed for Oswego County are located at Brewerton (14 miles southeast of the 3 mile project limits); Oswego (1.9 miles west of the 3 mile project limits); and at Mexico (3.8 miles east of the 3 mile project limits). The project will have no impact on these properties (National Register, June 7, 1977).

Prehistoric, Protohistoric and Historic Indian Site Potential

A review of the extant literature reveals no verified sites within the project limits (Beauchamp 1900; DeAngelo 1976b; Engelbrecht and White n.d.; Funk 1977; Gifford n.d.; O'Callaghan 1850; Vols. I, III and XIII; Parker 1922; Pendergast and Trigger 1972; Pratt and Pratt 1976a; Pratt 1976c; Ritchie 1957, 1965, 1969; Ritchie and Funk 1973; Stewart 1970; Thompson 1966; Tuck 1971).

In the general Oswego County area few sites are known except along the shore of Oneida Lake and the Oneida-Oswego River system located considerably south and west of the project limits (Ritchie 1969: Fig. 2).

Fluted projectile points indicative of Paleo-Indian occupation have been found along the Oswego River and a large cluster of loci is located in northwestern Onondaga County, 20 miles southwest of the project limits. One location in Oswego County appears to be in the Town of Palermo, southeast of the project (Ritchie 1957: Fig. 2; Ritchie 1969: Fig. 2). A single fluted point has been reported near the shore of Lake Ontario at North Wolcott, Wayne County, 21 miles west of the project limits (Ritchie 1957: 76).

The only verified Paleo-Indian site in Oswego County is the previously mentioned Potts site located 5 miles south of the project limits. This site was tested in 1962-1963 with limited success (Ritchie 1969: 22-23).

Verified Archaic sites are known along the Oneida River and Lake area of Oswego County, and beveled adzes indicative of Lamoka (Middle-Late Archaic) have been found along the Oswego River (Ritchie 1969: Fig. 5). A number of unreported sites in the interior of Oswego County have produced Archaic and Woodland artifactual material, particularly in the Salmon River watershed. These sites, however, are generally known only to local individual collectors (Kondratowicz 1976). Although Transitional sites are common along the Oneida-Oswego-Seneca River system south of the project area, no sites of this period have been verified within the project limits (Ritchie 1969: Fig. 4).

The presence of probable Woodland sites in the interior of Oswego County has been indicated by the recovery of typical period artifacts; however, as yet no such sites have been verified from within the project limits (Kondratowicz 1976).

Beauchamp comments: "As a rule few important works or sites are found near Lake Ontario, as there was little security . . . . Temporary fishing villages were more frequent and some should yet be found where streams of some size enter the lake, though the traces are rare" (Beauchamp 1900: 132). He further states: "There are camps and relics on the lake shore west of Oswego, near the mouth of Eight Mile Creek. They are rare in such situations, but a small camp has also been observed two miles east of Oswego on the shore. Many arrowheads." The latter site may be located on the extreme northwestern edge of the project limits (Beauchamp 1900: 134). Parker states that this site produces "early relics" and adds an unidentified site at the mouth of Catfish Creek and indications of settlement along Little Salmon River, both located east of the project limits (Parker 1922: 205).

Based on Beauchamp's early writing, the project area lies within the reputed c. 1600 A.D. boundary of Onondaga territory, midway between the Cayugas to the southwest and the Oneidas to the east. This map is quite generalized, and while the designated Onondaga territory includes the developmental homeland of the Onondagas in the central portion of Onondaga County (35 miles south of the project area), there is little factual data to support Onondaga occupancy in the project area (Beauchamp 1900: pocket map).

Recent archaeological work on prehistoric Onondaga sites suggests a developmental sequence starting c. 1100 A.D. in the vicinity of Jordan and Elbridge (Onondaga County) and moving eastward into the Pompey Hills (c. 1400 A.D.) where they were found by the first white visitors in the 17th century (Ritchie 1969: 282; Tuck 1971: Figs. 1 and 8; Bradley 1976: 16-20).

With regard to the Cayugas, little professional work has been done; however, the major villages appear to be located at least 40 or more miles southwest of the project area (DeOrio 1976: personal communication; Engelbrecht and White n.d.: 1).

Pratt's recent work on the Oneida sequence indicates that all verified sites lie within Madison and Oneida Counties, some 45 miles southeast of the project area (Pratt 1976c: Fig. 5).

In addition to these relatively well known prehistoric cultures, another group of Late Woodland sites has been located 25 miles northeast of the project area. These Jefferson County sites have been assigned to the St. Lawrence Iroquois, a little known group that appears to have left the St. Lawrence area during the mid-sixteenth century (Pratt and Pratt 1976a: 14).

Finally, a small group of Late Woodland sites of unidentified cultural affiliations is located near Baldwinsville 17 miles southwest of the project area (Tuck 1971: Figs. 1 and 8).

No known Proto-Historic sites have been reported from the general project area and other than possible Indian camps associated with Fort Oswego during the 18th century, the only reputed Historic Indian village site lies near the mouth of the Salmon River, 12 miles northeast of the project area. This site is reputed to be the mid-seventeenth century village of Otianhatague (Canohage) and was only occupied for a short period, c. 1654-1656 (Beauchamp 1900: 132).

Summary

A review of the published literature on archaeological resources appears to indicate a low to moderate potential for prehistoric, proto-historic and historic Indian sites within the project limits.

It should be noted that this fact may be due to a lack of intensive archaeological surveys in the area.

Historic Site Potential

A review of the extant literature of area cultural development indicates relatively sparse settlement starting generally in the early years of the 19th century (Burr 1829: map; Blankman 1889: map; Cleaveland 1923; Churchill 1895; Cooper 1973; DeAngelo 1976b; Faust 1934; Hojnacki 1973; Hunter 1854; Johnson 1877; Leach 1966; Landon 1932; McKeon n.d.; Pratt and Pratt 1976a; Pratt and Pratt 1976b; Riley 1973; Sherwood 1926; Simpson 1944; Stewart 1970; Thompson 1966; Whitten 1934; Wright 1794).

The Nine Mile II-Volney 3-mile corridor runs generally south-southeast across the Oswego County (erected 1816) towns of Scriba, New Haven, Volney and Palermo. These towns were erected within the Scriba Patent respectively in 1811, 1813, 1806 and 1832 (Churchill 1895: 606, 649, 758, 779; Riley 1973: chart).

Although the Oswego River and the Oswego Canal (1828) provided the major transportation corridor west of the project area, interior land routes were necessary to promote growth. Routes N.Y. 3 (in part) and 49 were in existence at least as early as 1808 as a major route from Rotterdam (Constantia) to Fulton. Later this route became part of the Rome and Rochester Turnpike (1825). Route 104 was in existence by 1812 and is mapped as a "stage road" in 1829. It later became the Rome and Oswego Plank Road c. 1844-1848. The road network present by 1829 is designated in Figure I (McKeon n.d.; Burr 1829: map; DeAngelo 1876b). Most of the state roads were paved with concrete or bituminous macadam between 1915 and 1938 (N.Y.S.D.P.W. 1941).

While railroad construction took place in central New York as early as 1834, it was not until 1863 that the Oswego and Rome Railroad was completed across the northern portion of the project area. This company was immediately taken over by the Rome, Watertown and Ogdensburg, which in turn was later controlled by the Delaware, Lackawanna and Western from 1878 to 1891 when it was leased by the New York Central and Hudson River Railroad. The complete take over by the New York Central came in 1914 (Hojnacki 1973: 4-7).

Scriba

The first settler in the Town of Scriba is reputed to be Henry Everts who settled in the southwest part of the town, near the river in 1798; however, there were few others inland until 1804 when Scriba Corners (Scriba) was settled. The first school house at Scriba Corners was built in 1807. By 1820 the town (including Oswego) had a population of 741. By mid-century, the town (excluding Oswego),had 2,738 inhabitants. In 1895 Scriba corners had a store, shoemaker, blacksmith, two evaporators and a steam cider mill. North Scriba was settled c. 1834. South Scriba (formerly Pecks Corners) appears to have been settled before 1820 and developed several local industries. Lycoming was formed due to the coming of the railroad c. 1863 (Churchill 1895: 760-770).

New Haven

New Haven when originally formed included a strip of land that separated the town of Mexico from Lake Ontario. This strip was ceded back to Mexico in 1837. In 1806 a road from Rotterdam (Constantia) north to Vera Cruz (Texas) was legislated. This was probably the first inland access from the south. By 1814 the Town of New Haven had 12 road districts. The first settler arrived in 1800 and the first sawmill was built in 1805 on Catfish Creek. By 1820 the population of the town including the "Mexico Strip" was 899. The center of development was New Haven village, known up to 1819 as Gay Head. Although this village had a store in 1809; a tavern in 1810; a ready made coffin manufacturer in 1835, and a fruit evaporator in 1882, its influence did not extend west to the project area since the South New Haven post office was not established until 1877 (Churchill 1895: 606-623).

Volney

The Town of Volney originally included the present towns of Scriba, Volney, Palermo and Schroeppell. Although Bradstreet reputedly built a fort in Fulton in 1756, the first settler in this location did not arrive until 1793. The first town meeting was held in 1812. Although riverside settlement was generally early, inland areas grew more slowly as illustrated by Volney Center (Volney) with a cemetery dated 1815 and the first store outside of Fulton (Oswego Falls) in 1816. North Volney (Druce's Corners) started a cemetery in 1829, but did not have a store until 1858. Mount Pleasant (Hubbard's Corners) had a store in 1867 and established a post office in 1872. By 1820 the Town of Volney had a population of over 2,000, due mainly to Fulton (Oswego Falls). During the 19th century industrial development on the river, such as Merick's Mill of 15 run of stone (one of the largest in the state) at Seneca Hill, overshadowed the modest improvements inland (Churchill 1895: 773-818; Anon. 1935).

Palermo

The first town meeting was held in 1833 although permanent settlement had taken place probably at Jenning's Corners (Clifford) as early as 1806, and the first frame house erected in 1812. Clifford was also known as Denton's Corners c. 1823. Palermo Center (Palmer's Post Office c. 1829) was settled in 1812; built the first tavern in 1816 and the first school house in 1820. Vermilion was settled in 1816; built the first cheese factory in the town in 1864 and at one time was the location of a pump factory (Churchill 1895: 649-657).

The above brief historic outlines of town settlement further confirm the cultural developmental pattern in the project area, i.e., the first 30 years of the 19th century. This scattered nodal development is illustrated in Figure 2, which in turn is primarily based on early transportation links (c. 1829) and mid-century commercial/industrial/educational clusters (c. 1867). Figure 2 thus may be used as a visual aid in projecting probable locations for historic sites.

Summary

A review of a representative sample of the historic literature of the project area indicates a high potential for historic sites within the project corridor, but only a moderate potential of impacting any high priority historic site.

KEY FOR FIGURE 2

No. 1 thru 77 (From: C. K. Stone's New Topographical Atlas of Oswego County, New York 1867)

1. Saw Mill
2. School House 12
3. School House 15
4. School House 16
5. Stave Factory
6. Store
7. Cemetery
8. School House 13
9. Blacksmith Shop
10. Cemetery
11. Baptist (?) Church
12. School House 14
13. Cheese Factory
14. Blacksmith Shop
15. Grocery and Post Office
16. Harness Shop and Grocery
17. Blacksmith Shop
18. I. Hubble and Co.
19. School House 4
20. Cooper Shop
21. School House 10, Cooper (?) Shops, Store, Sash Factory, Methodist-Episcopal Church, Hotel, Shoe(?) Shop, Store & Post Office, Blacksmith Shops, Wagon Shop
22. Cemetery
23. Saw Mill
24. School House 8
25. School House 7
26. Store
27. Cider Mill
28. Cooper Shop
29. Wagon & Blacksmith Shop
30. Steam Saw Mill
31. Saw Mill
32. School House 6
33. Blacksmith Shop
34. School House 21
35. Cemetery (not shown 1867)
36. H. Brown Hotel and Store
37. School House 5
38. Cheese Factory
39. Saw Mill
40. School House 3
41. Harness Shop
42. Cooper Shop
43. Cooper Shop
44. School House 17
45. School House 18
46. School House 8
47. Stave Manufactory
48. Stave Manufactory
49. School House 9
50. Stave Machine
51. Cooper Shop
52. School House 14
53. School House 11
54. Saw Mill
55. Cooper Shop
56. Cooper Shop
57. Cemetery (not shown 1867)
58. Church
59. Blacksmith Shop
60. Saw Mill
61. Methodist Church
62. Store
63. School House 10
64. Methodist-Episcopal Church
65. School House 5
66. Saw Mill
67. Cheese Factory
68. Saw Mill
69. Blacksmith Shop
70. School House (?)
71. Saw Mill
72. School House 11
73. Cooper (?) Shop
74. School House
75. Tannery
76. Blacksmith Shop
77. School House

A - C (From: David H. Burr, Map of County of Oswego, 1829)

A. Flouring Mill
B. Flouring Mill
C. Flouring Mill

———————— "County Roads" (Approximate Routes)

▬ ▬ ▬ "Stage Roads" (Approximate Routes)

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October 15, 1977

Mr. Gary R. Schoonmaker
Terrestrial Ecologist
Niagara Mohawk Power Corporation
300 Erie Boulevard West
Syracuse, New York 13202

Re: Cultural Resources Survey
Background and Literature Search
of the Nine Mile II - Volney
Transmission Line

Dear Gary:

As a result of the Nine Mile II - Volney background and Literature search, the only structures discovered within the corridor to be of historic concern related to industrial or commercial buildings. No residential structures of historic interest were located in the corridor in the course of this search. It is possible, however, that on-site inspection might locate structures of such interest.

Cordially,

Peter P. Pratt, Ph.D.
Pratt and Pratt Archaeological
Consultants
1220 Euclid Avenue
Syracuse, New York 13210

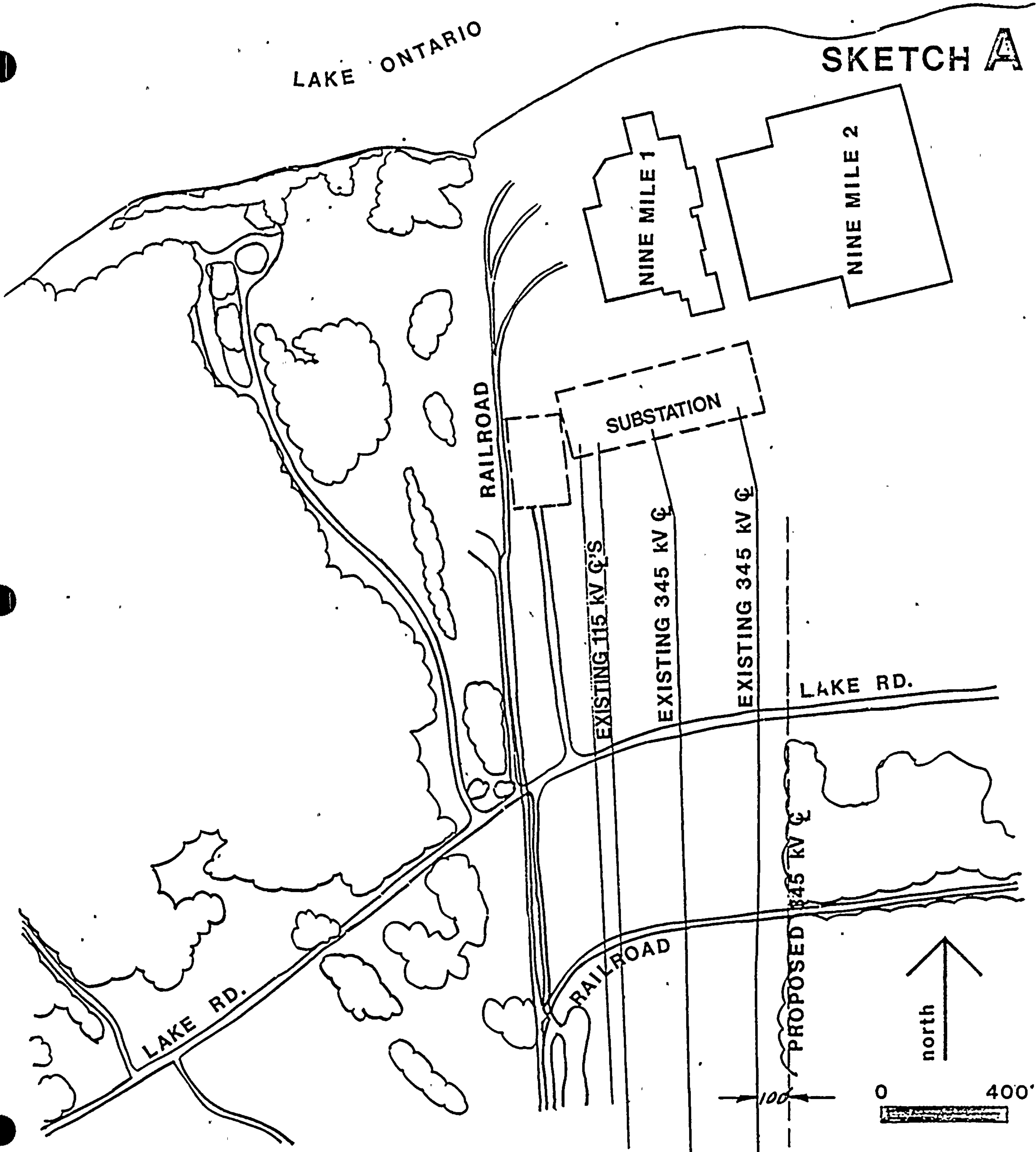
PPP/s

c. STRUCTURES NEAR THE RIGHT-OF-WAY

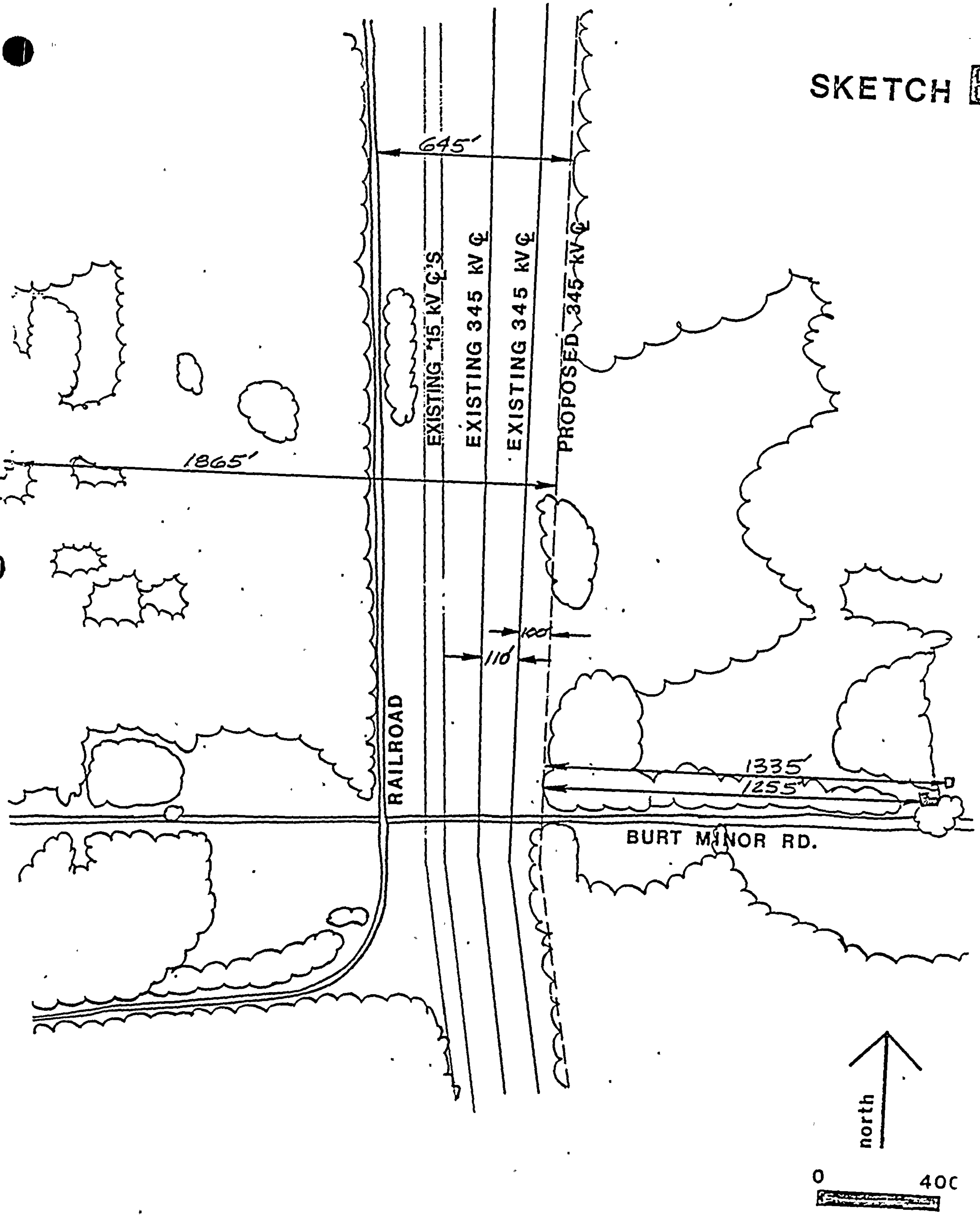
The location of all buildings in close proximity to the proposed facility including homes, sheds, barns, and commercial buildings are shown on the following Sketches A through K. The letters A through K key back to the Cultural Resources Map to show what road crossings are represented by each sketch. Homes are shown on the sketches as blackened in boxes. Commercial buildings are cross hatched. No structures need to be acquired for the proposed transmission line herein proposed.

Structures located within 250 ft. of the proposed centerline were field verified in the fall of 1981 and are listed below and identified on revised sketches A through K, pages 4-47 to 4-57 with an asterisk.

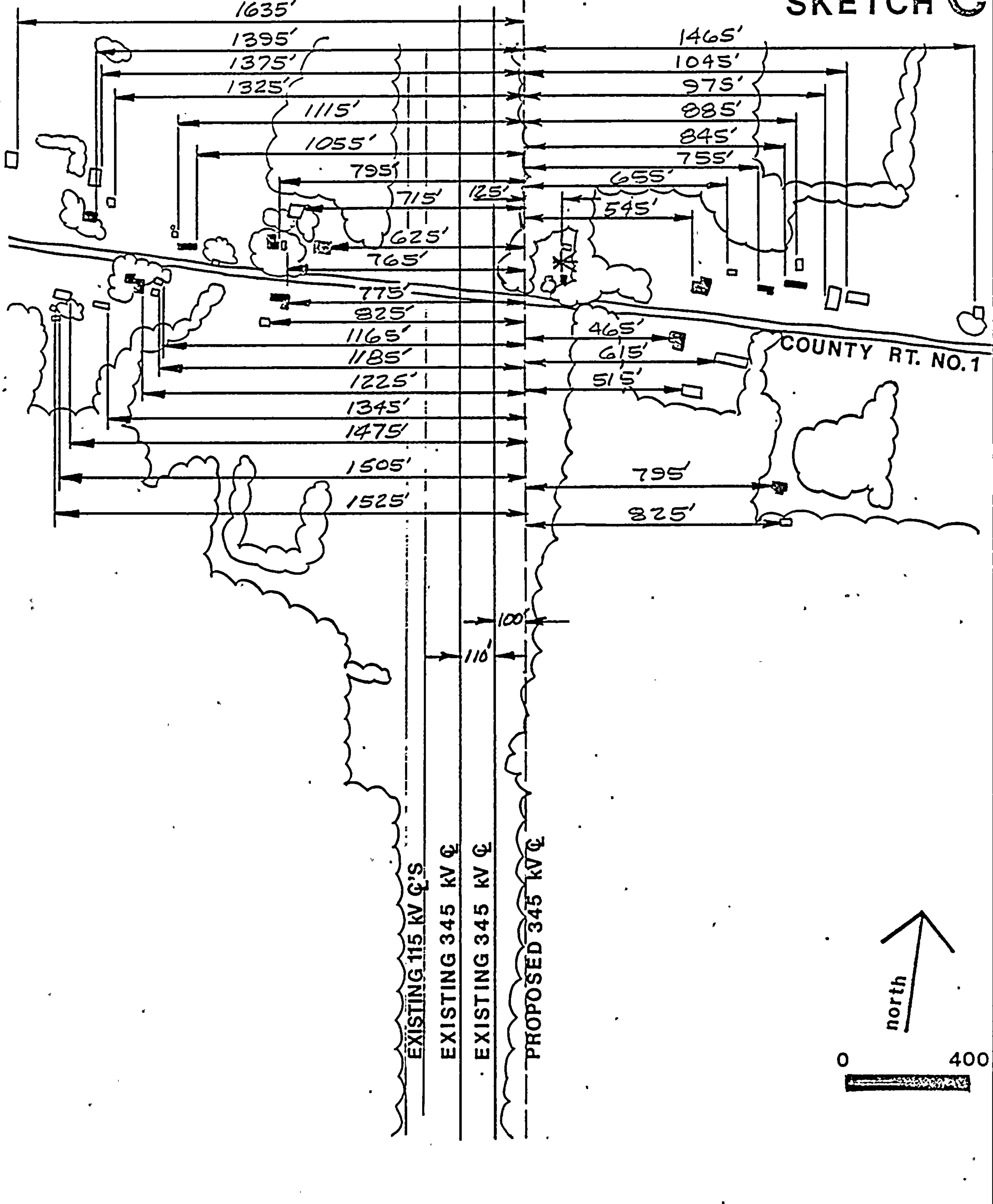
Location	Structure
Co. Rt. 1	Wood frame residence and associated out buildings
State Rt. 104	Wood frame residence and associated buildings
Lily Marsh Rd.	Wood frame residence
County Rt. 29	Two mobile homes
O'Connor Rd.	Wood frame residence


SKETCH A
LAKE ONTARIO
NINE MILE 1
NINE MILE 2
SUBSTATION
RAILROAD
EXISTING 115 kV ℄'S
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
LAKE RD.
LAKE RD.
RAILROAD
100'
0
400'
north

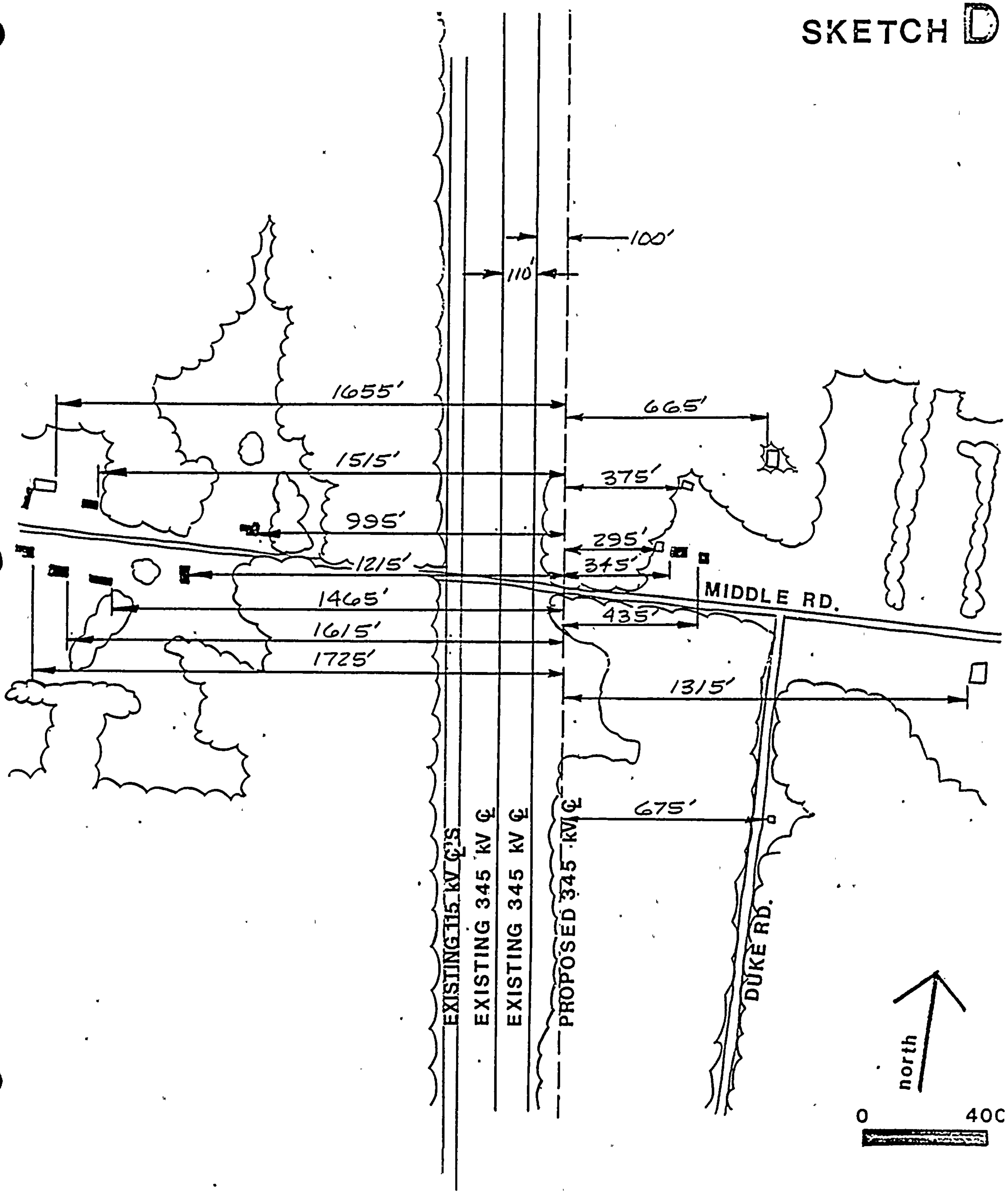
SKETCH E

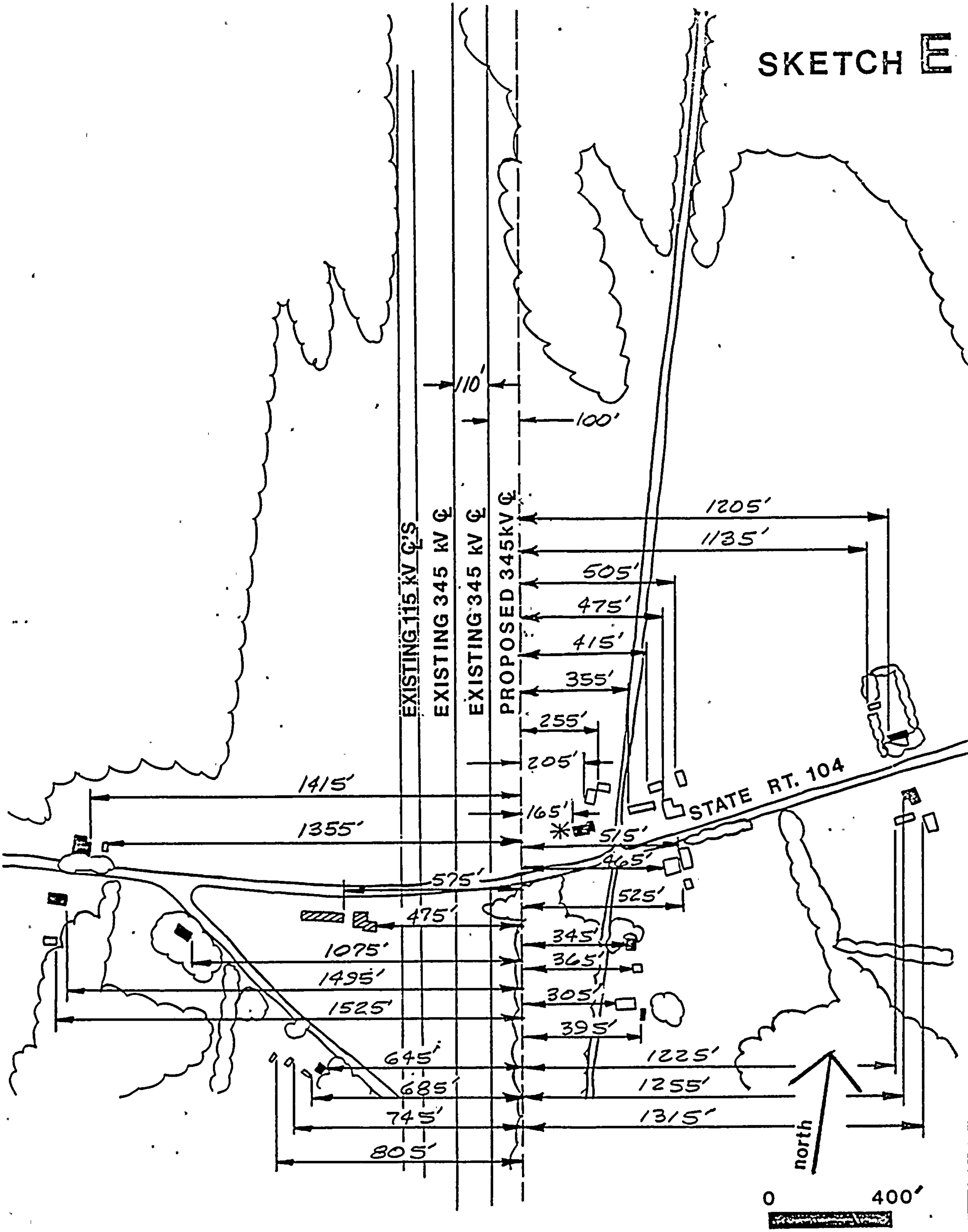

645'
EXISTING 115 kV ℄'S
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
1865'
100
110
RAILROAD
1335'
1255'
BURT MINOR RD.
north
0
400

SKETCH C

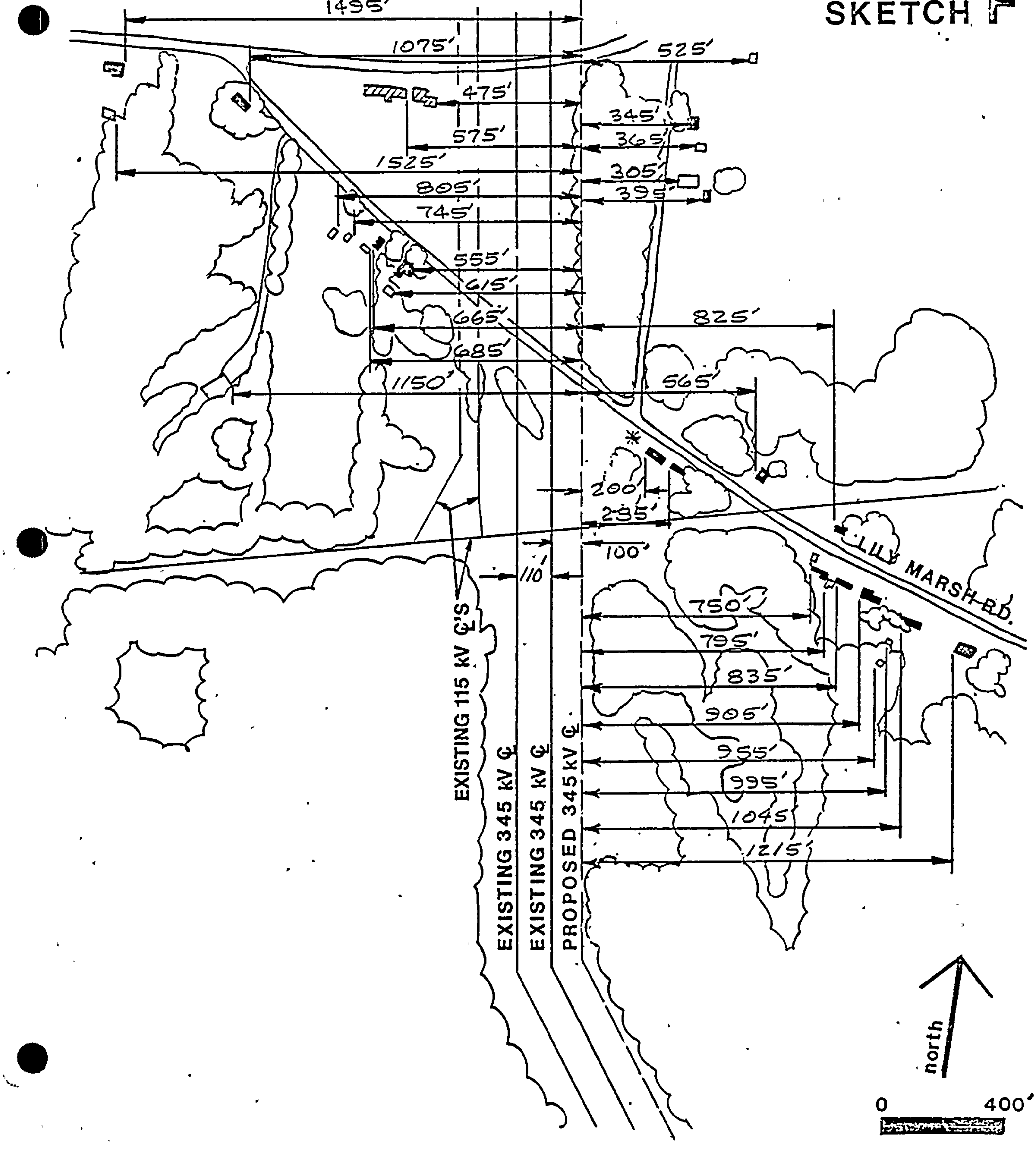


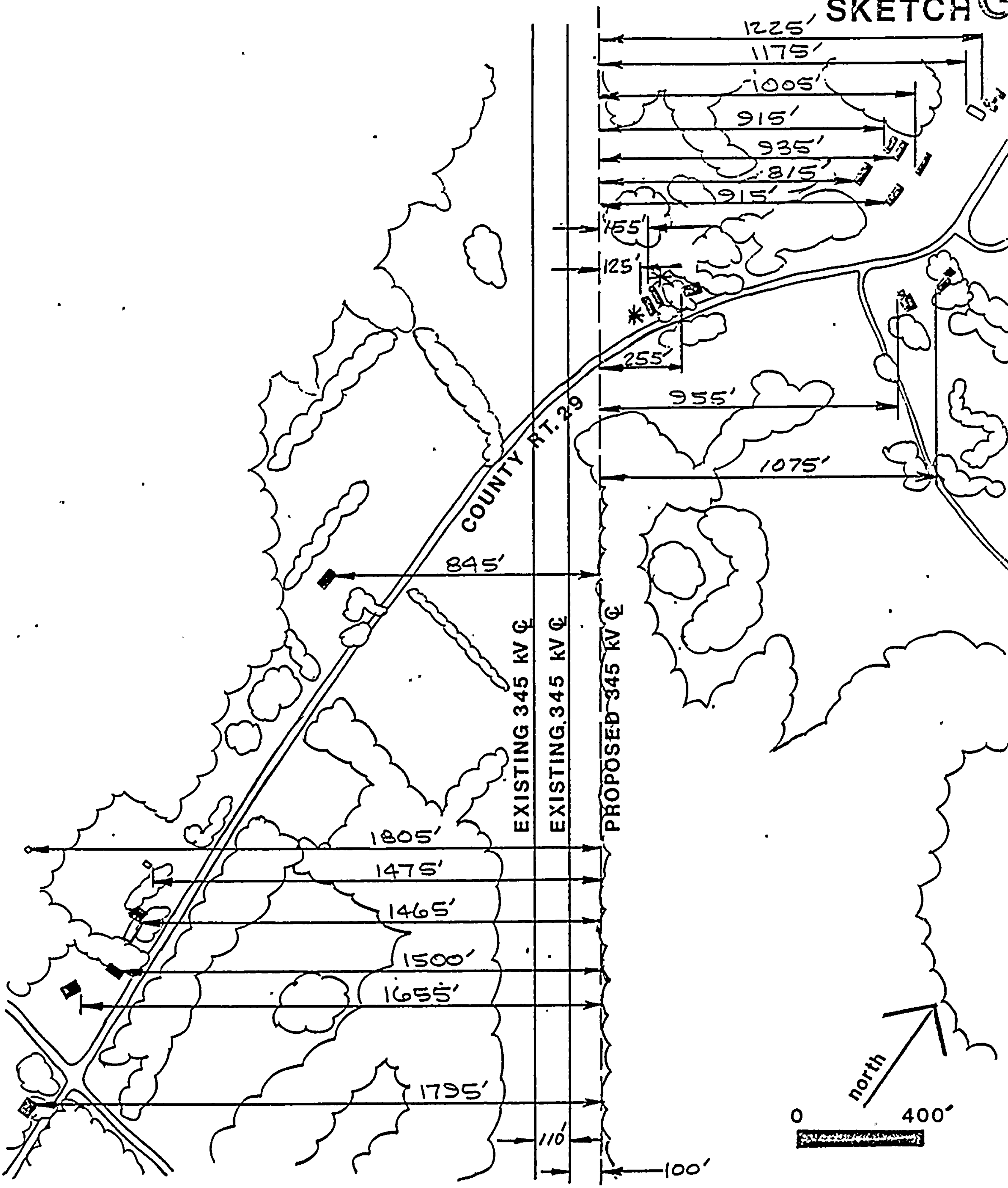
1635'
1395'
1375'
1325'
1115'
1055'
795'
715'
125'
625'
765'
775'
825'
1165'
1185'
1225'
1345'
1475'
1505'
1525'
1465'
1045'
975'
885'
845'
755'
655'
545'
465'
615'
515'
795'
825'
COUNTY RT. NO.1
100'
110'
EXISTING 115 kV ℄'S
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
north
0
400


SKETCH D
100'
110'
1655'
665'
1515'
375'
995'
295'
1215'
345'
MIDDLE RD.
1465'
435'
1615'
1725'
1315'
675'
EXISTING 115 kV ℄'S
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
DUKE RD.
north
0
400


SKETCH E
EXISTING 115 kV ℄'S
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345kV ℄
110'
100'
1205'
1135'
505'
475'
415'
355'
255'
205'
165'
1415'
1355'
515'
465'
575'
525'
475'
345'
1075'
365'
1495'
305'
1525'
395'
645'
1225'
685'
1255'
745'
1315'
805'
STATE RT. 104
north
0
400'

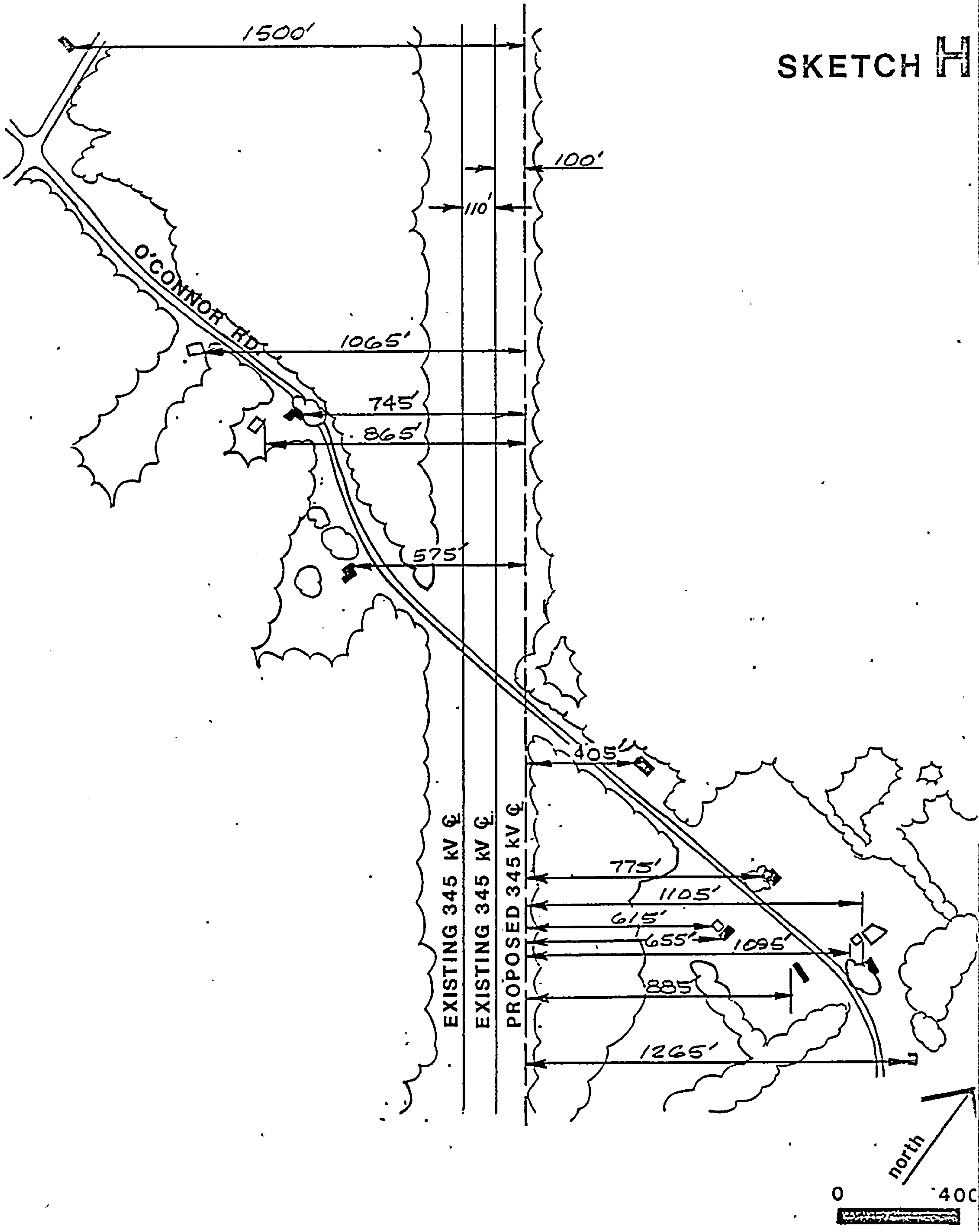
SKETCH F


1495'
1075'
525'
475'
345'
575'
365'
1525'
305'
805'
395'
745'
555'
615'
665'
825'
685'
1150'
565'
200'
235'
100'
110'
LILY MARSH RD.
750'
795'
835'
905'
955'
995'
1045'
1215'
EXISTING 115 kV ℄'S
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
north
0
400'



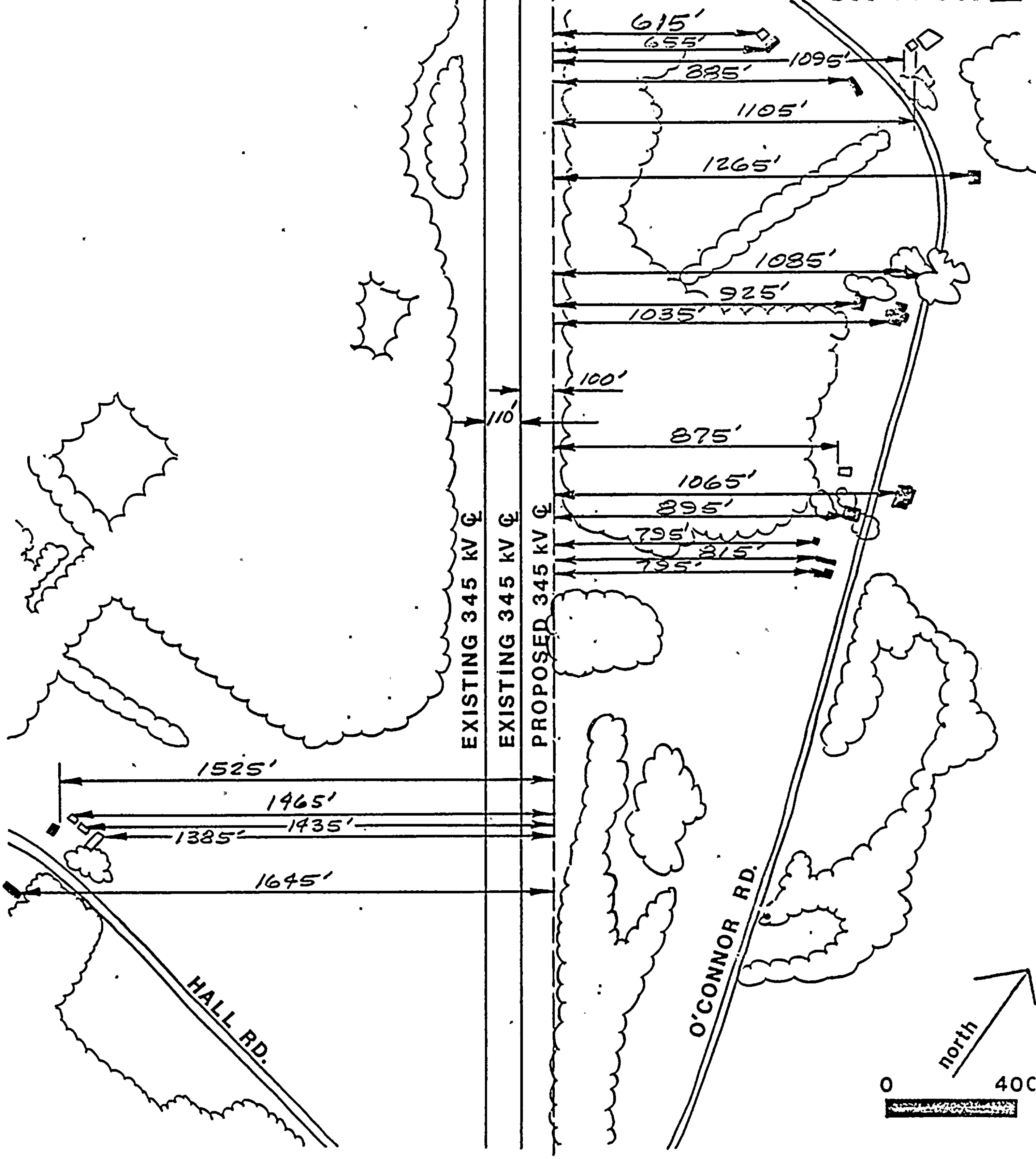
SKETCH G
1225'
1175'
1005'
915'
935'
815'
915'
155'
125'
255'
955'
1075'
COUNTY RT. 29
845'
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
1805'
1475'
1465'
1500'
1655'
1795'
110'
100'
north
0
400'

SKETCH H



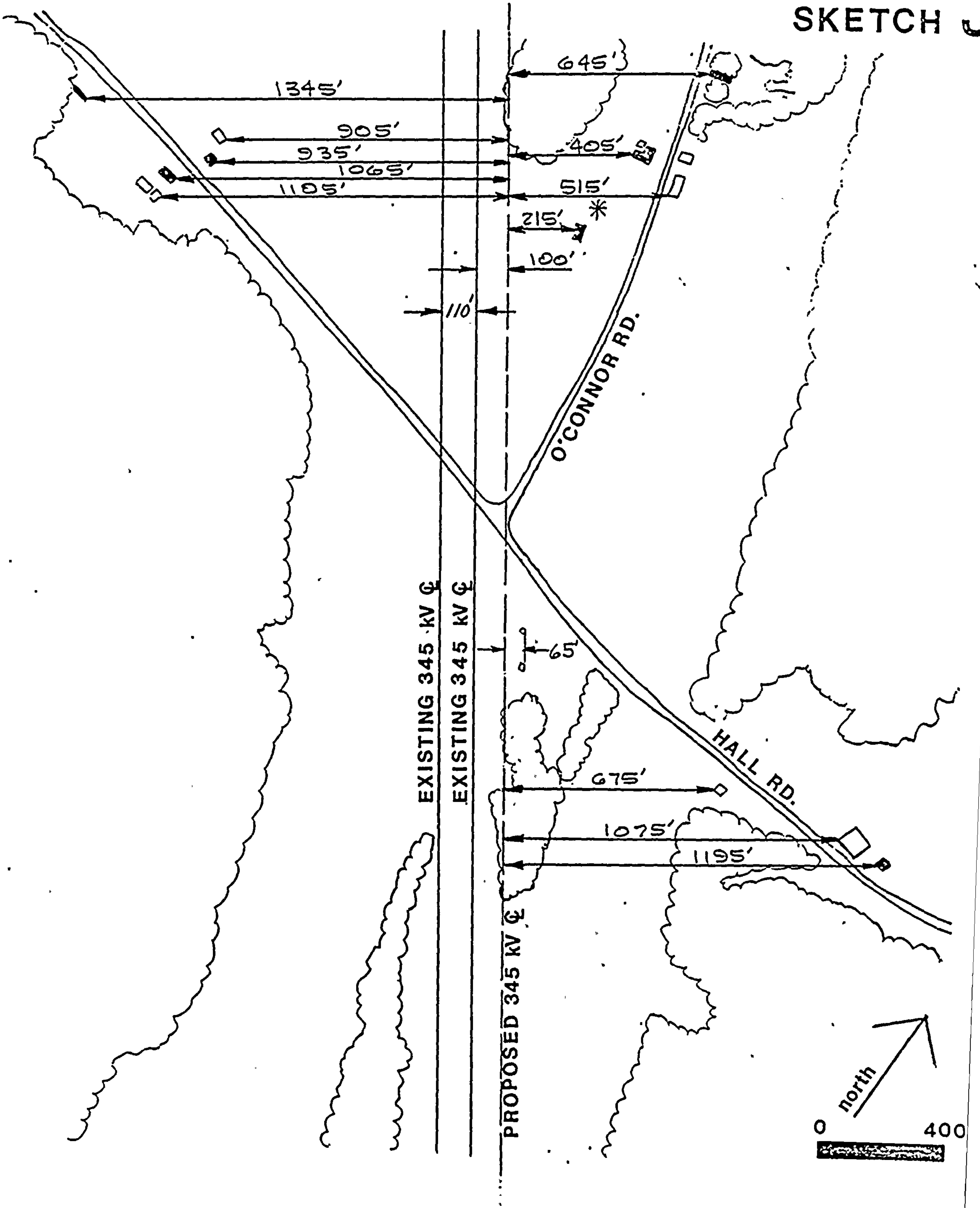
1500'
100'
110'
O'CONNOR RD
1065'
745'
865'
575'
405'
775'
1105'
615'
655'
1095'
885'
1265'
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
north
0
400

SKETCH I



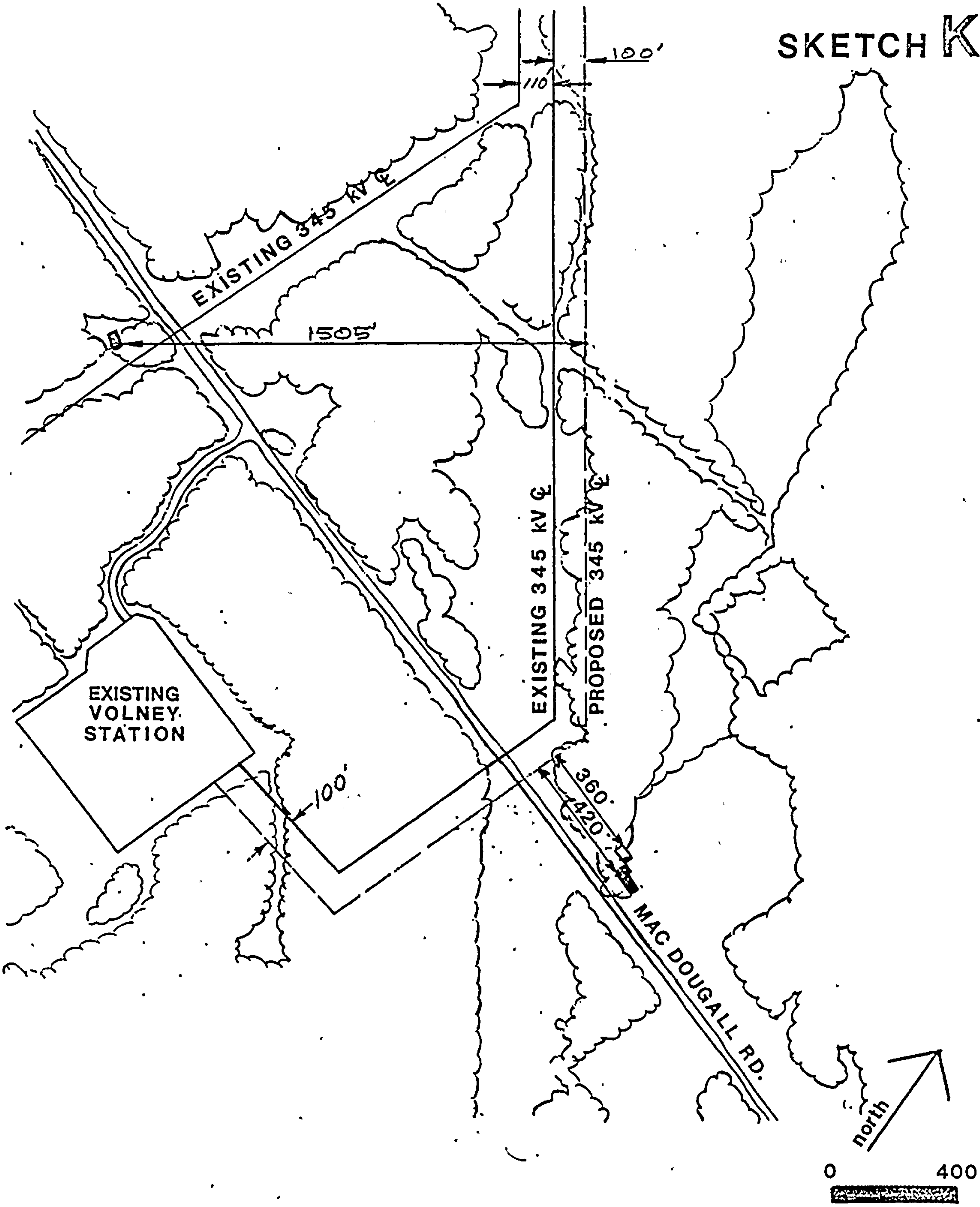
615'
655'
1095'
885'
1105'
1265'
1085'
925'
1035'
100'
110'
875'
1065'
895'
795'
815'
795'
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
1525'
1465'
1435'
1385'
1645'
HALL RD.
O'CONNOR RD.
north
0
400

SKETCH J



645'
1345'
905'
935'
405'
1065'
1105'
515'
215'
100'
110'
O'CONNOR RD.
EXISTING 345 kV ℄
EXISTING 345 kV ℄
65'
HALL RD.
675'
1075'
1195'
PROPOSED 345 kV ℄
north
0
400

SKETCH K



100'
110'
EXISTING 345 KV ℄
1505'
EXISTING 345 KV ℄
PROPOSED 345 KV ℄
EXISTING VOLNEY STATION
100'
360'
420'
MAC DOUGALL RD.
north
0
400

d. GENERAL CULTURAL INFORMATION

Other cultural features which exist in the study area but which are not impacted by the proposed line include three cemeteries and one radio tower operated by the Oswego County Highway Department 4,200 feet east of the facility and 30 feet higher than the line at ground level. A roadside pull-off maintained by the New York State Department of Transportation exists just west of the proposed facility north of Route 104. One overnight campground for trailers is also located west of the proposed facility on the south side of Lily Marsh Road. No other recreational facilities are planned for the study area through the Year 2000 according to the Oswego County 2000 Land Use Plan.

e. PLANS, ZONING AND RESTRICTED AREAS

The Town of Scriba has no zoning at this time. They do, however, have restrictions on development within flood hazard areas identified by the Federal Department of Housing and Urban Development. (See Hydrology Map for areas designated as flood hazard areas). The proposed line will not pass through these flood hazard areas. The Town of Volney has a zoning regulation as well as restricted development in flood hazard areas, as described in Amended Exhibit 7 of this application.

The Oswego County Planning Board published their Oswego County 1985 and 2000 Land Use Plan in June 1977. This Plan allows for transmission lines within the proposed corridor. There is no provision for the development of new lines made in either plan as the plan shows only the existing lines shown.

I. VISUAL IMPACT

1. INTRODUCTION

The proposed 345 kV transmission line is proposed to be located adjacent to and east of the existing Nine Mile-Volney and Nine Mile-Clay 345 kV Transmission Lines. The new line will be constructed such that towers match in design and line up with the easterly existing 345 kV facility as much as possible. The design of the new line will be slightly different than the old ones due to progress in technology since the construction of the old line. The differences include twin bundled conductors rather than single conductors and the need to install 5'± taller structures in some cases to meet National Electric Safety Code (current edition) standards.

The following visual assessment is based on the design described above and a review of the two classes of viewers, residences in proximity to the line and travellers along the roads of the study area.

2. ROAD ASSESSMENT - SIGHT LINES

The assessment of visual impact from the road network began with a review of the network itself and its relationship to the proposed line location. . Roads were identified which, if one were travelling along them, the extended visual sight line, directly along the road's alignment, and therefore the driver's view, would intersect the proposed transmission facility centerline. The sketch on the next page shows a typical example of this situation. The Visual Impact Map is located on page 4-85.

The reason for defining all of these sight lines was the assumption that the most critical visual impact from a highway occurs when a traveller is exposed to a structure located directly in his line of sight while driving down the road.

These sight lines were then evaluated to determine which views would be of primary importance and which would be secondary. Importance was determined based on the level of government which was responsible for maintaining the road. It was assumed that: (1) the bulk of the traffic would utilize the better roads; (2) the higher the level of government, the better the roads would be maintained over a long period of time; (3) that new development would occur along the better maintained roads; and (4) that any increase in traffic would therefore occur on the roads maintained by the higher levels of government.

In the study area where no Federal highways exist, the routes

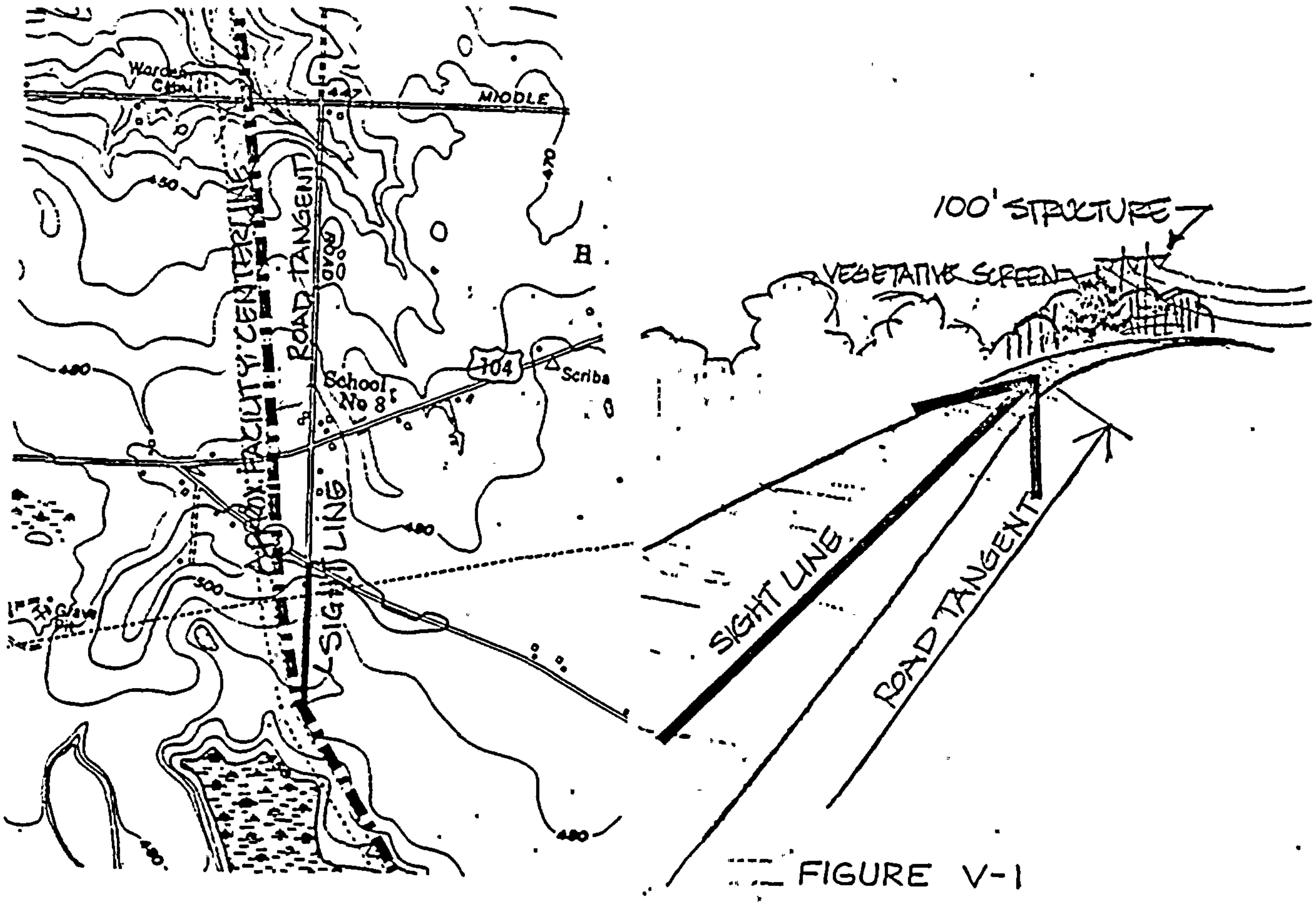


FIGURE V-1

which were assumed to be the most important were the State and County roads. In one instance the views along the sight lines from a Town road (Silk Road) were designated primary because of the road's assumed potential for increased traffic volumes based on its directness between Route 3 in Fulton and the study area.

Whether sight lines were designated primary or secondary was decided according to the following guidelines.

Primary Sightlines: all sight lines originating from State Roads, and County roads within the study area.

Secondary Sightlines: sight lines originating from County roads outside of the study area and sight lines originating from Town roads within the study area.

Cross sections and desciptions were developed for each sight line of primary importance. They depict and describe, respectively, the

existing situation in the field at the time of the study, and are the basis for the impact assessment.

Figure V-2 details the major components of the sightline cross sections.

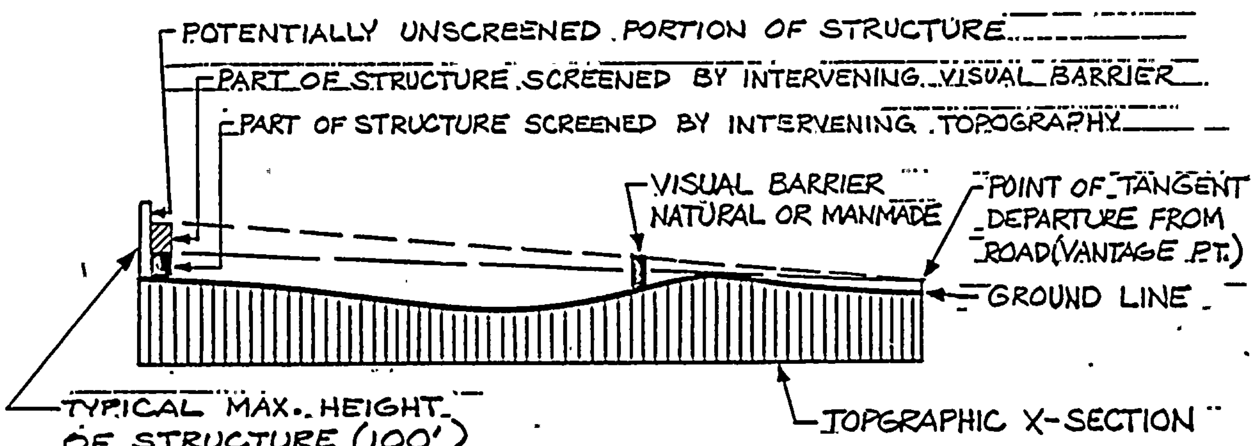
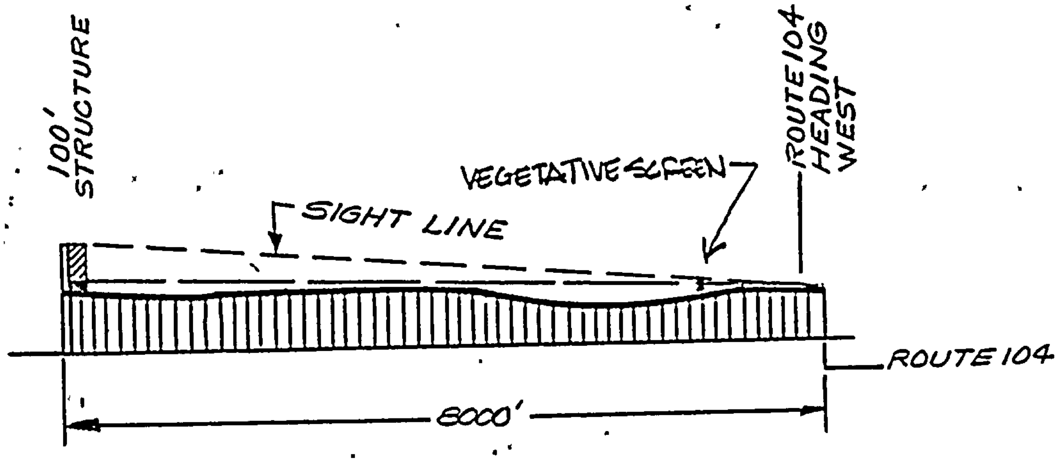
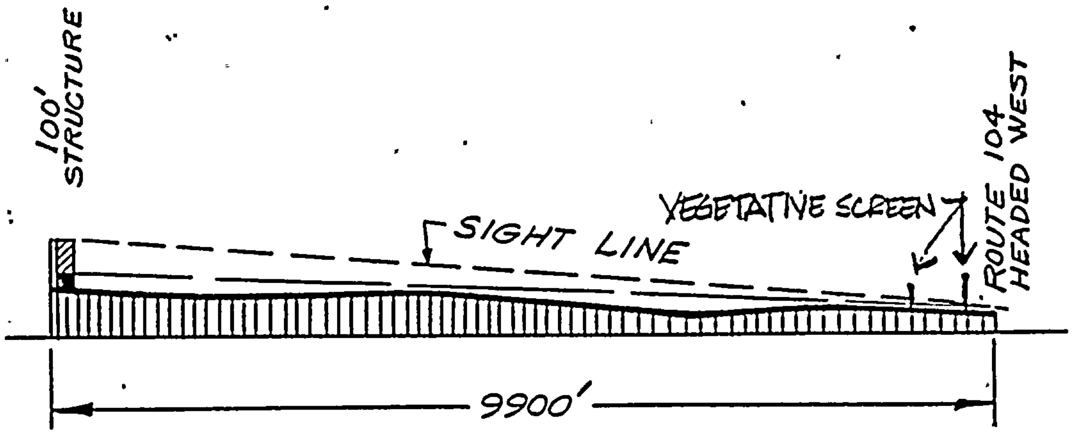


FIGURE V-2



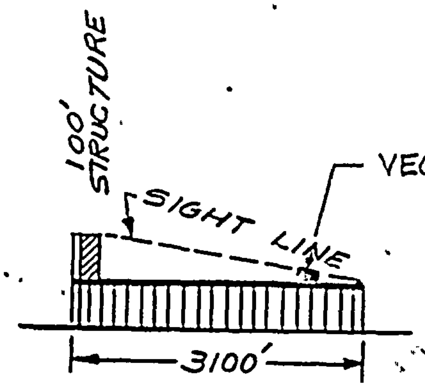
Sight Line #1

A fair screen exists at the end of the road tangent with a good screen on the sides. If a structure were placed directly at the end of the tangent line, it should be screened completely.



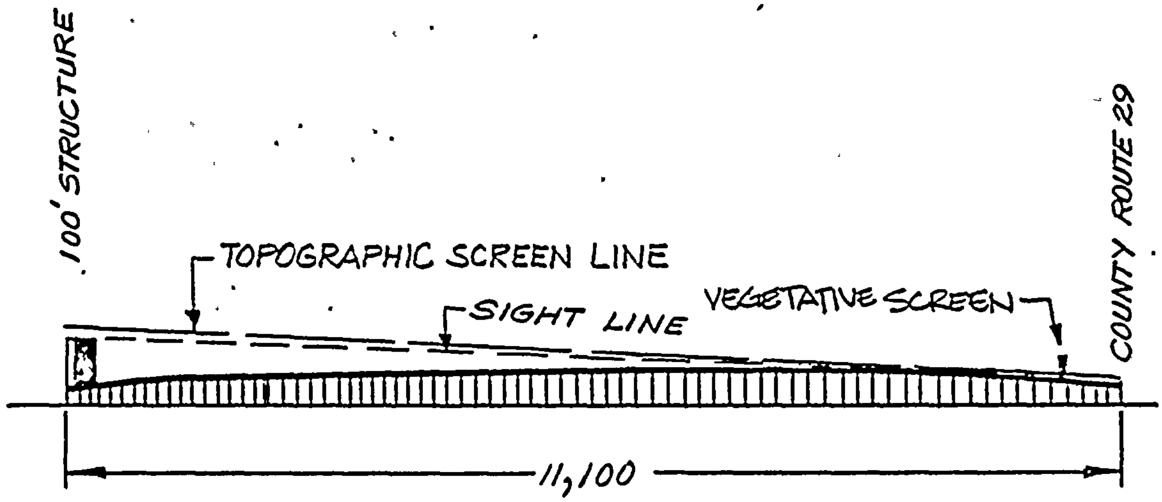
Sight Line #2

An existing vegetative screen of deciduous and coniferous trees provide an excellent screen with little possibility that the line will be visible along this tangent.



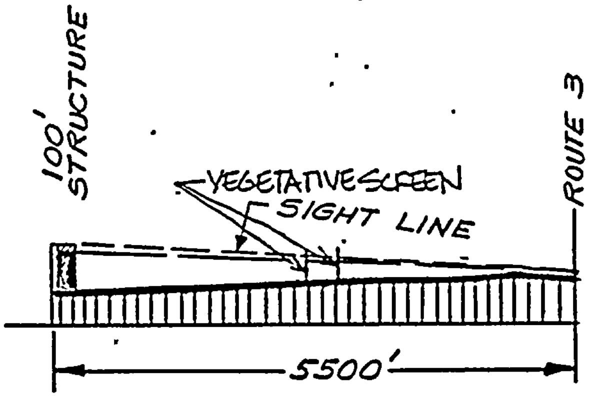
Sight Line #3

The topography south of the Route 29-Route 104 intersection should provide a screen sufficient to block any view of the faility along this tangent.



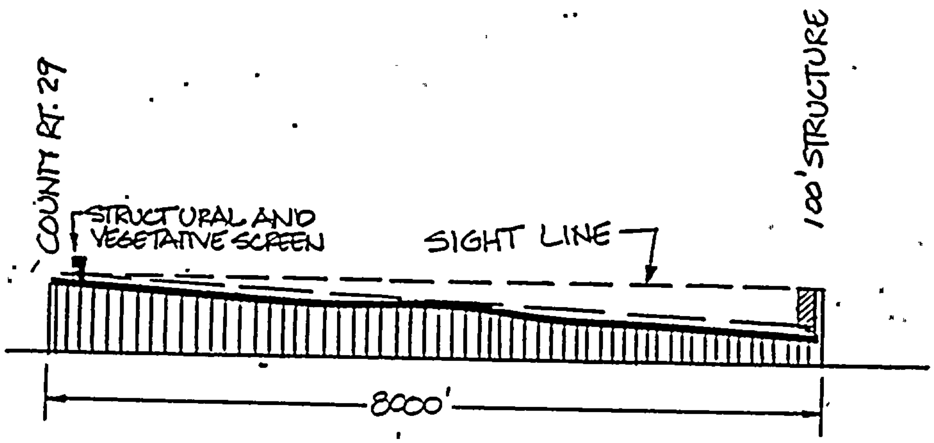
Sight Line #4

The view directly along this tangent is well screened by vegetation. No portions of structures placed on either side of this point should be visible.



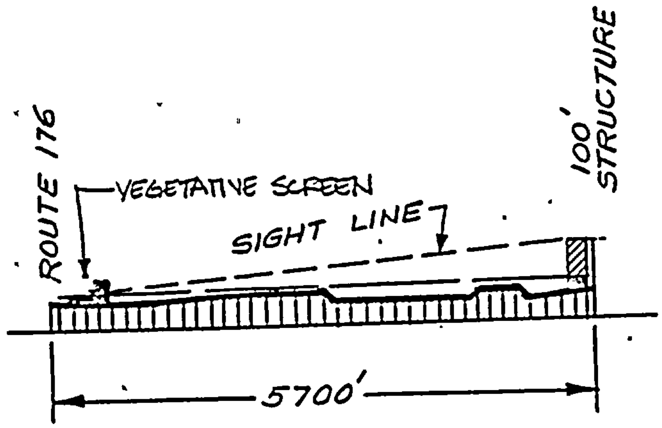
Sight Line #5

Sufficient existing vegetative and topographic screening should preclude views of the new facility along this tangent.

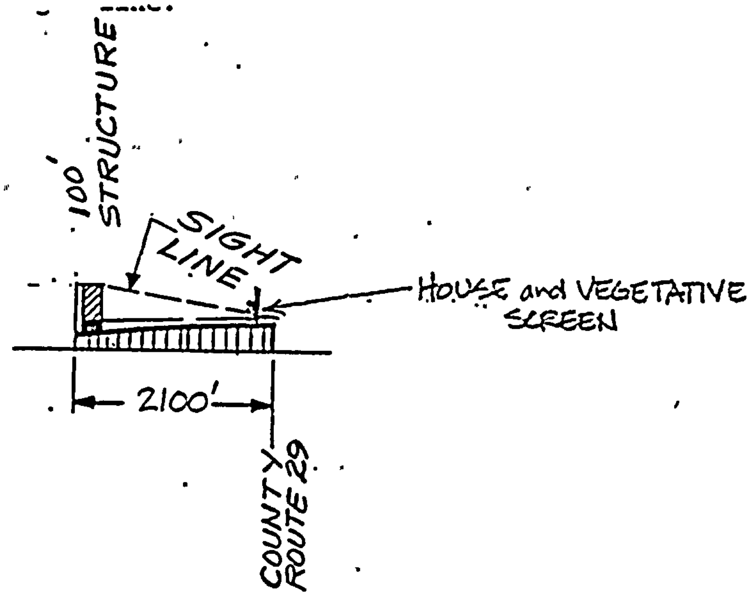


Sight Line #6

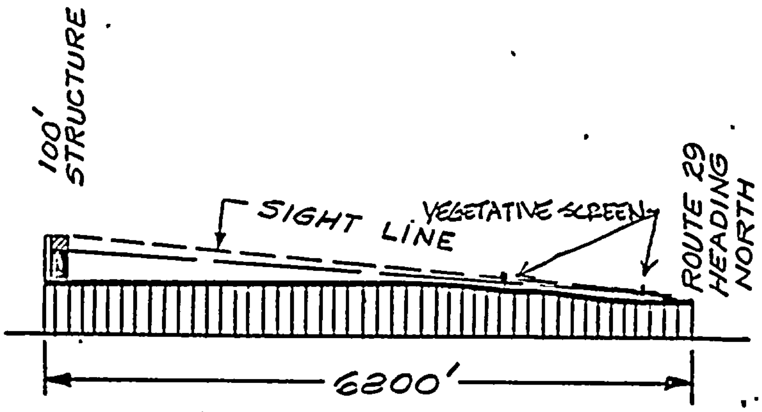
The view along this tangent is well screened along both sides by vegetation and with a home and a number of large deciduous trees at the end of the tangent. Any view of the proposed facility along this tangent is highly improbable.



Sight Line #7
The approach along this tangent has a good screen which would not allow a view of the structures. At the intersection of Hay Fly Road (an extension of Rte. 176) and O'Conner Road, a good screen of deciduous trees exists, which should screen the view of the line.



Sight Line #8
The view along the tangent is well screened by large deciduous trees and a house. The view to the south side of the tangent is reasonably well screened, and a view of the new structures is not expected.

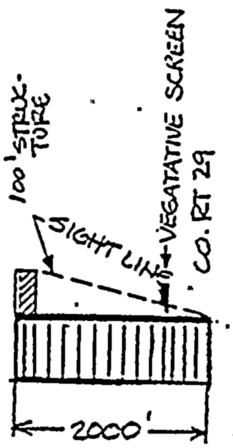


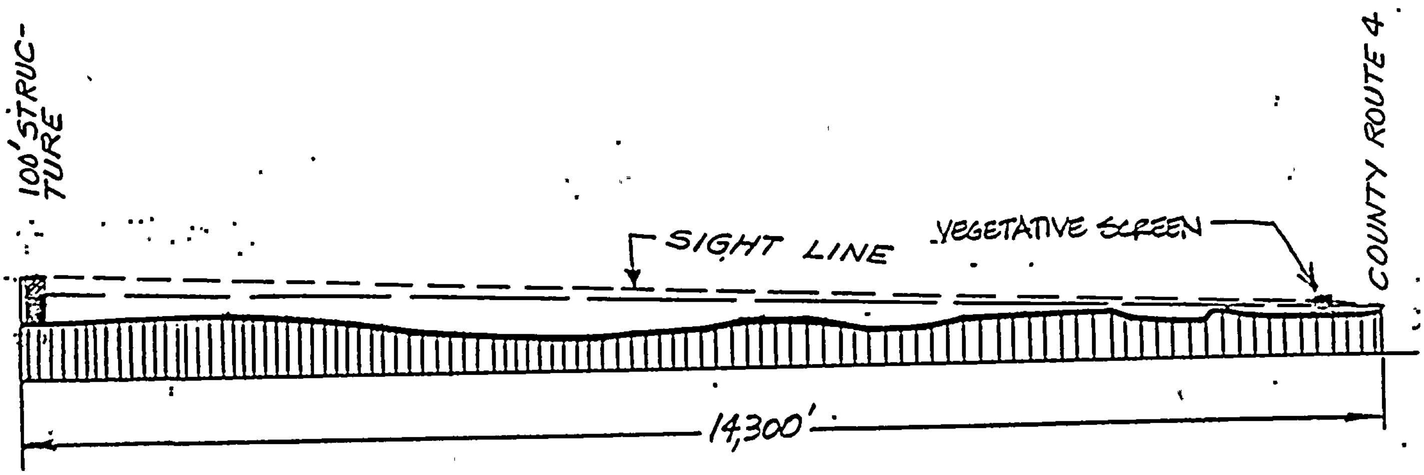
Sight Line #9

The view along this tangent is screened by existing vegetation, especially at the end of the road tangent, where existing coniferous and deciduous trees provide an excellent screen of the line.

Sight Line #10

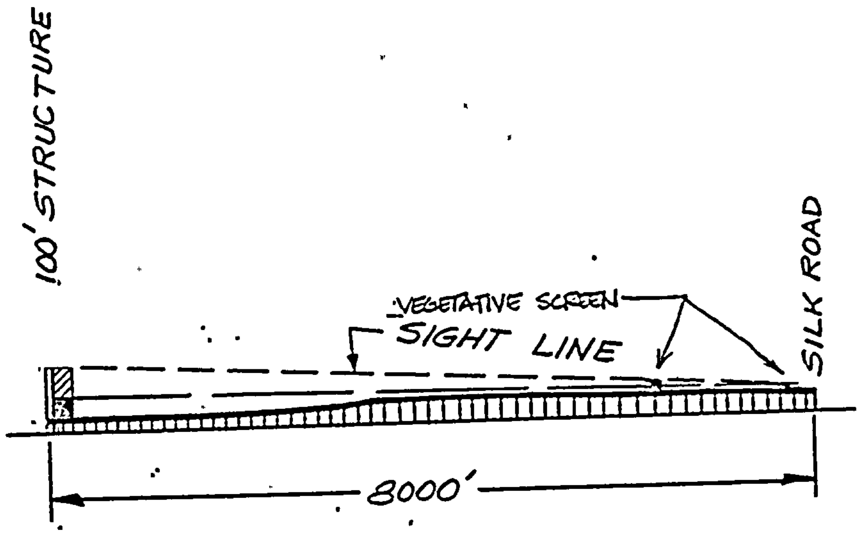
No topographic screening would occur along this sightline, but a group of large maple trees will provide an effective summer screen and a satisfactory winter screen directly along the sight line. Views to the south will be less well screened as described in the Road Assessment section for County Route 29.





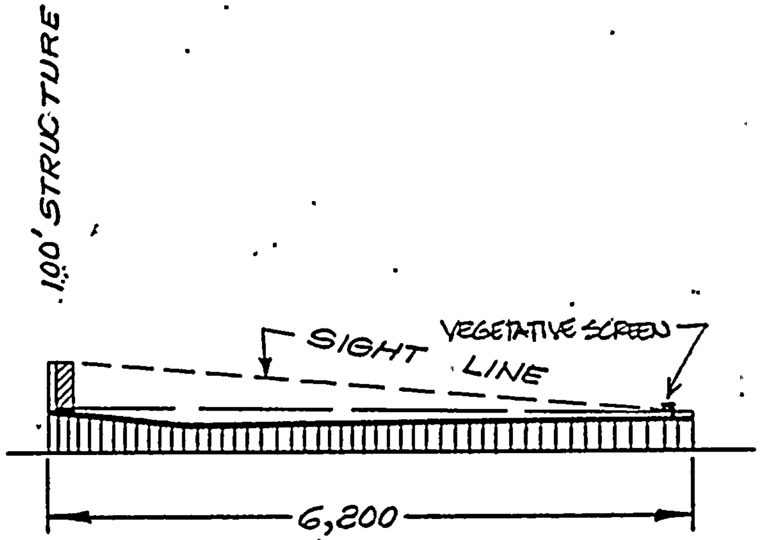
Sight Line #11

The vegetation and topography between a viewer along this road tangent and the proposed facility should completely screen views of the line from that position.



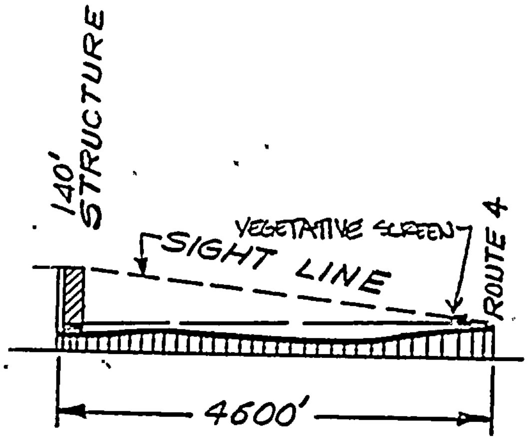
Sight Line #12

The view along the Silk Road tangent will be partially screened by intervening topography with the remaining portions of the structures screened by intervening vegetation. Some small honey-locust trees have been planted along the tangent at the edge of the road which will grow to reinforce the present roadside screen.



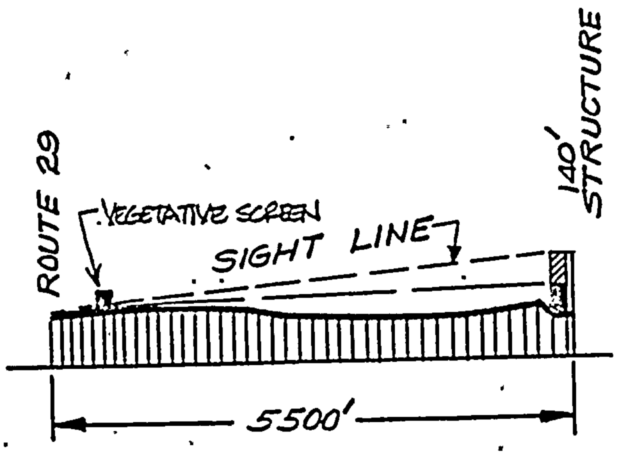
Sight Line #13

The approach along this tangent is fairly well screened with vegetation but there is no intervening topography. At the Silk Road-Route 4 intersection the 20-30' trees provide a good screen to views from this vantage point, resulting in no expectation of the line being visible.



Sight Line #14

Alternative line designs being investigated to cross the muck fields include structure heights approaching 200'. Even with structures of that height at the terminus of this tangent, the existing 20-30' deciduous vegetative screen should effectively minimize views from this vantage point.



Sight Line #15

Large deciduous trees provide a good screen along the approach of this tangent, and at the direct end of the tangent along the road, medium sized deciduous trees provide an additional visual barrier which should preclude views of the new line.

3. ROAD ASSESSMENT - APPROACHES

a. STATE ROUTE 104

From the East:

The right-of-way is well screened and is not visible until one has travelled approximately 500' west of County Route 29. At that point, side views of structures north and south of Route 104 may be seen alongside the existing structures. Roadside vegetation and buildings create intermittent views of the structures thereby reducing the negative visual effect.

From the West:

The right-of-way is well screened by existing vegetation from all points west of the NYSDOT roadside rest area. From that point to the east, very limited and intermittent views of structures north of Route 104 may be seen, but no view of structures south of Route 104 are seen until just west of the Lily Marsh Road intersection. At that point the first set of structures north and south of the right-of-way will be noticeable.

At the Crossing:

At the actual road/right-of-way intersection the view to the south will be fairly well screened on the new right-of-way by existing vegetation and a small rise in elevation. Additionally, the tunnel effect of cleared rights-of-way is terminated by a change in line direction just south of Lily Marsh Road. The view to the north, however, is conspicuously owing to agricultural activities along the north side of the road, and would allow a long distance view of all five transmission lines in the area. The most severe impact would be incurred on traffic coming from the west due to the road making a slight turn to the north in this area. However, this same turn minimizes the impact on the traveller coming from the east.

b. COUNTY ROUTE 1

From the East:

Approaching the right-of-way from the east, the lines are well screened by a combination of vegetation, buildings, and topography. With the exception of some brief glimpses of the tops of two to four structures north of County Route 1 from approximately 3000' east of the right-of-way, the existing screening obsures all views up to a hill just 1500' east of the right-of-way. Even here, only two sets of structures are partially viaible north of Route 1. The introduction of additional structures alongside the

existing ones will have only a slight incremental impact. The tops of structures to the south of Route 1 may become visible from this vantage point upon the construction of the new line due to the clearing required and the slight rise in elevation found at the base of the new structure relative to the existing structure elevators. As one proceeds the remaining 1500' to the right-of-way existing vegetation and buildup provide a good visual screen.

From the West:

The existing topography provides an excellent screen to travellers along Route 1 from the west until they top one hill at the Lakeview Road intersection. As one starts down the hill approaching the right-of-way, only an intermittent view of structures north of Route 1 are apparent. Further down the hill, three sets of structures south of Route 1 become briefly visible due to a break in the vegetative and building screening.

At the Crossing:

At the intersection of County Route 1 and the proposed facility an open view of the right-of-way north to the generating station is possible even though some vegetative screening may be retained on both the north and south sides of the road. The rise in elevation to the south terminates the potential tunnel effect in that direction along the proposed right-of-way.

The existing right-of-way is not as well screened and therefore a view from County Route 1 to the lake will be experienced in the northerly direction. To the south of Route 1, the view will be partially screened by the existing vegetation. Also the rise in elevation tends to minimize the distance for which the existing right-of-way may be viewed thereby minimizing its impact.

c. <u>COUNTY ROUTE 29</u>

County Route 29 generally parallels the proposed facility for a considerable distance, almost its entire length, and therefore a series of exposures need to be evaluated.

From the South:

County Route 29 begins in South Scriba at the intersection of County Route 4. Travelling north from this point, the first important potential exposure occurs approximately 1/2 mile before the road crosses

under the line. The summer view from this point is fairly well obscured due to a clump of large maple trees along the sightline. Winter exposure would be slightly more evident. If these trees were to be removed, a portion of the right-of-way would be visible in a midground to background exposure. Views to the east are screened by existing vegetation until one reaches a point approximately 800-1000' southwest of the right-of-way. At this point the first set of structures south of the road becomes very apparent with no chance for screening. The second set of structures to the south are also visible but not a serious visual impact due to their location approximately perpendicular to a sight line #10.

From the North:

County Route 29 originates at Lake Road approximately one mile east of the Nine Mile Point generating station. From this point south to Lily Marsh Road it generally parallels the proposed transmission facility and no views of the line are presented due to intervening vegetation, topography and buildings. From Lily Marsh Road south to the road/ transmission line right-of-way crossing, the two corridors converge and brief intermittent views of the tops of structures may be possible. As one makes the final turn to the west before crossing under the transmission lines, the tops of the first structures south of Route 29 become apparent above the vegetation. Also a brief view of the second set of structures north of Route 29 may be seen between two houses.

At the Crossings:

At the point where Route 29 crosses under the proposed facility, the line to both the north and south will be visible in the foreground, midground, and background for a short period of time. The view to the south is especially poor because the road is located at a higher elevation which drops off quickly to the elevation of the transmission structures to the south, thereby affording little opportunity for screening.

The view to the north is not as serious because the land rises for a distance and then drops off thereby affording some obscuring of portions of the right-of-way.

d. LILY MARSH ROAD

From the East:

Transmission structures are screened along this approach with the exception of the lattice towers presently used to cross the Oswego-Lighthouse Hill 115kV transmission lines south of Lily Marsh Road.

From the West:

The transmission structures south of Lily Marsh Road are screened by existing vegetation and buildings. Those north of the road are intermittently visible through existing deciduous vegetation.

At the Crossing:

The midground and background views from the Lily Marsh Road crossing are fairly well screened by a number of devices. The southerly exposure is partially screened by a rise in elevation and terminated by an angle in the line. Additionally, some vegetative screening may be able to be retained to screen structures located just south of the road. The foreground view to the north along the proposed right-of-way may be partially screened by the vegetation which will be left between Lily Marsh Road and State Route 104. Other than that possible screening, the view to the north along the existing right-of-way is similar in nature to the Route 104 exposure.

4. HOME ASSESSMENT

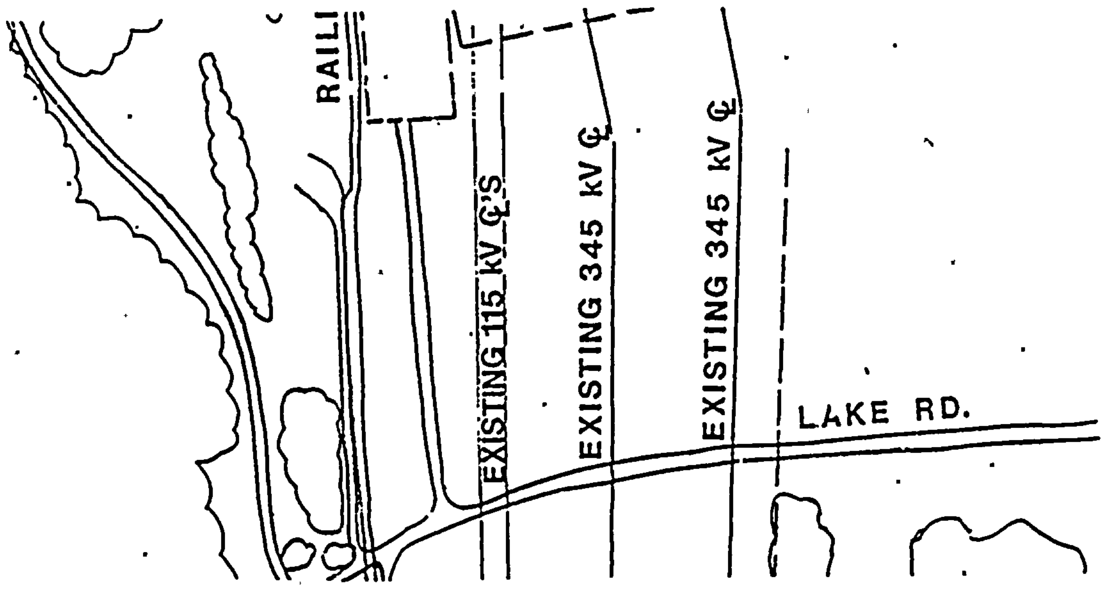
This section is an attempt to identify who would have a continuing exposure to the proposed facility and how serious that exposure would be. One potential problem is that while the assessment may be accurate for the period of time immediately following line construction the long term impact may be completely different. People tend to get used to a lot of things and take them for granted over time. Unless they are constantly reminded of the presence of a transmission facility by noise or some other irritant, the existance of the line alone should, based on other situations and examples, become an accepted part of the lcoal environment.

The following is therefore presented as an assessment of a short term impact unless the situation is aggravated by other factors than the visibility of the line.

The following assessment of the visual impact on homes was done through field observation and survey of the aerial photo derived structure locations shown in the Cultural Resources assessment, sketches A-K, appropriate sections of which are included with each description. Subsequent field evaluation confirmed the data. It should be noted that no assessment was made regarding the orientation of living spaces within the homes with reference to the proposed facility. This factor could be significant in some cases in determining both the immediate and long term visual impacts.

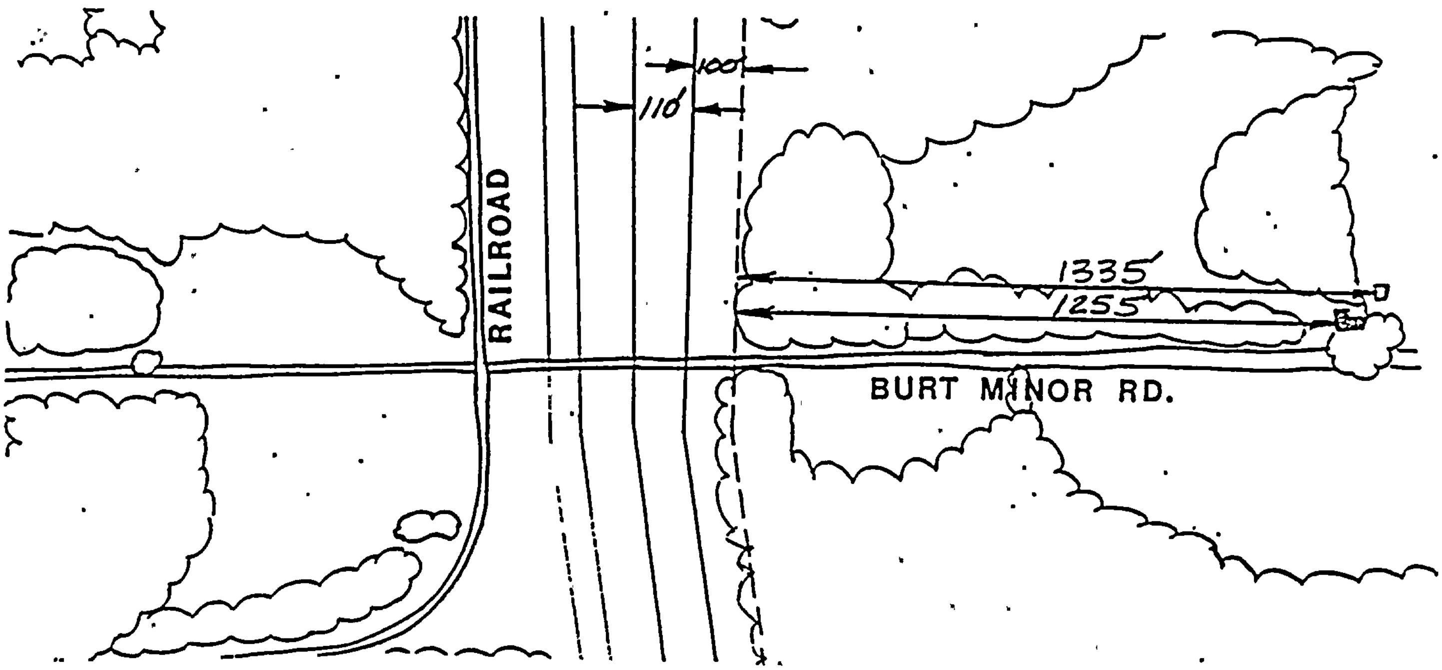
A. LAKE ROAD

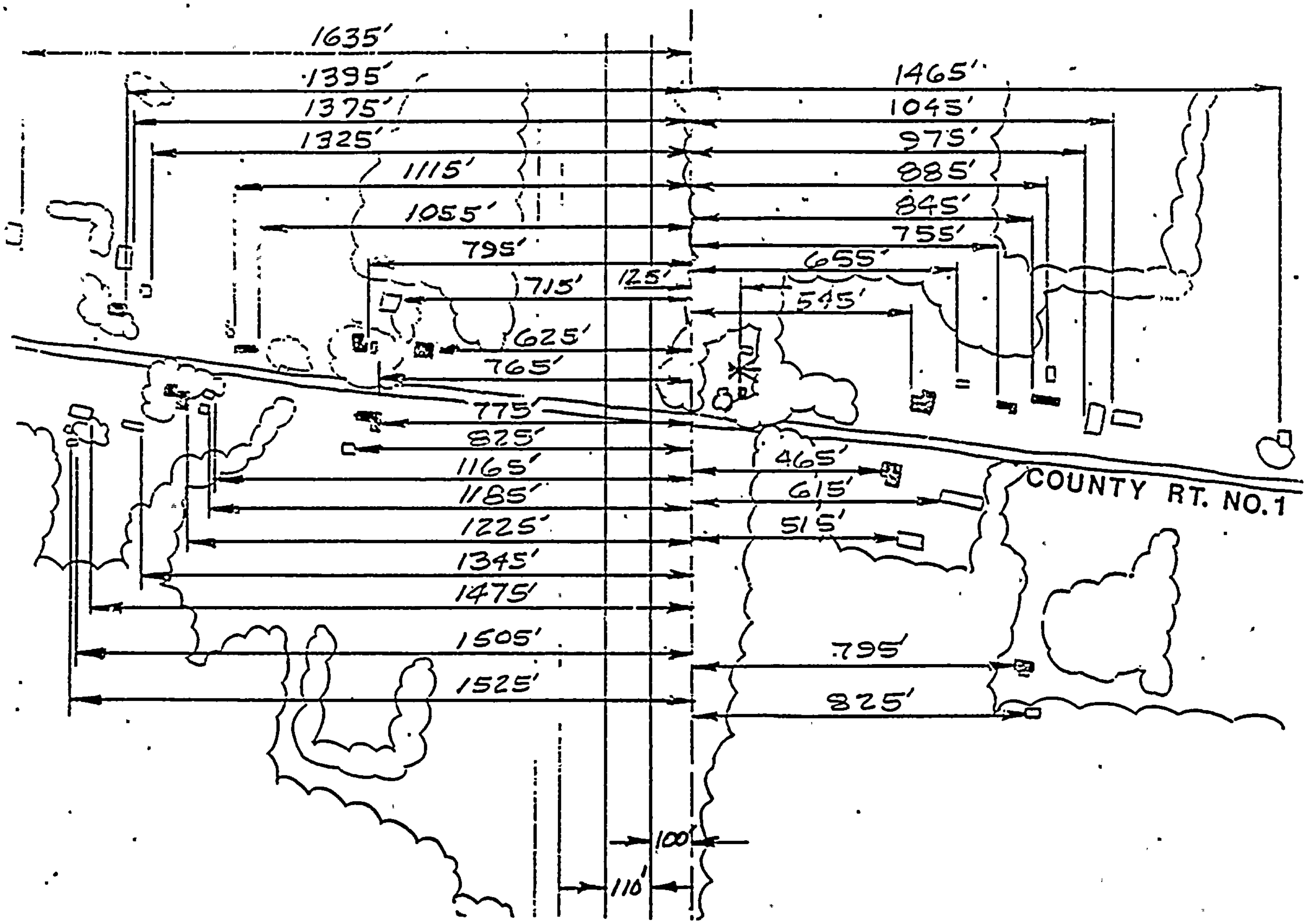
The property surrounding Lake Road is owned by Niagara Mohawk Power Corporation and, therefore, no homes exist in the area.



B. BURT MINOR ROAD

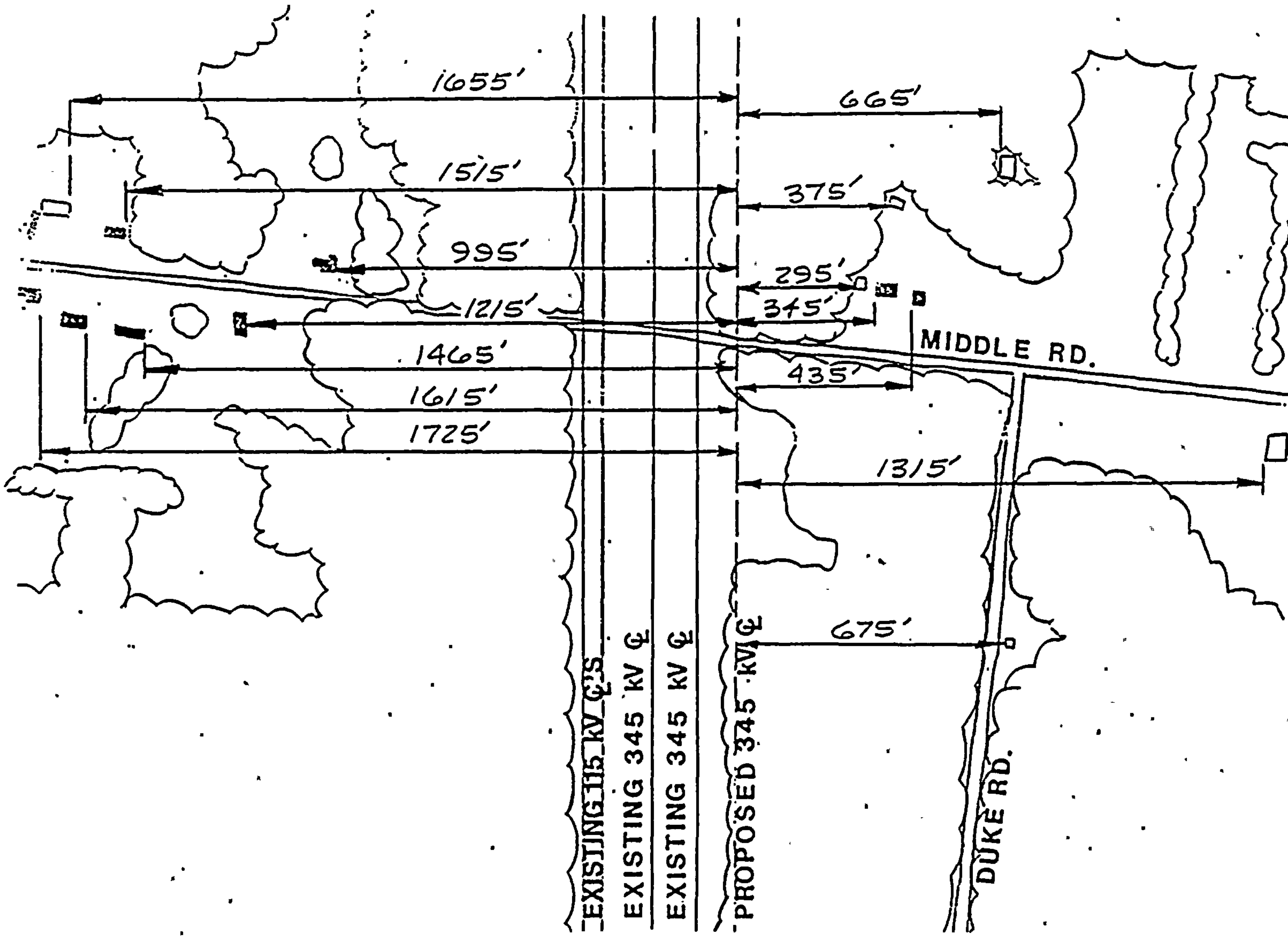
It is not anticipated that the one home on this road in the immediate vicinity of the line, 1,255 feet east, will be exposed to a view of the structures or line.





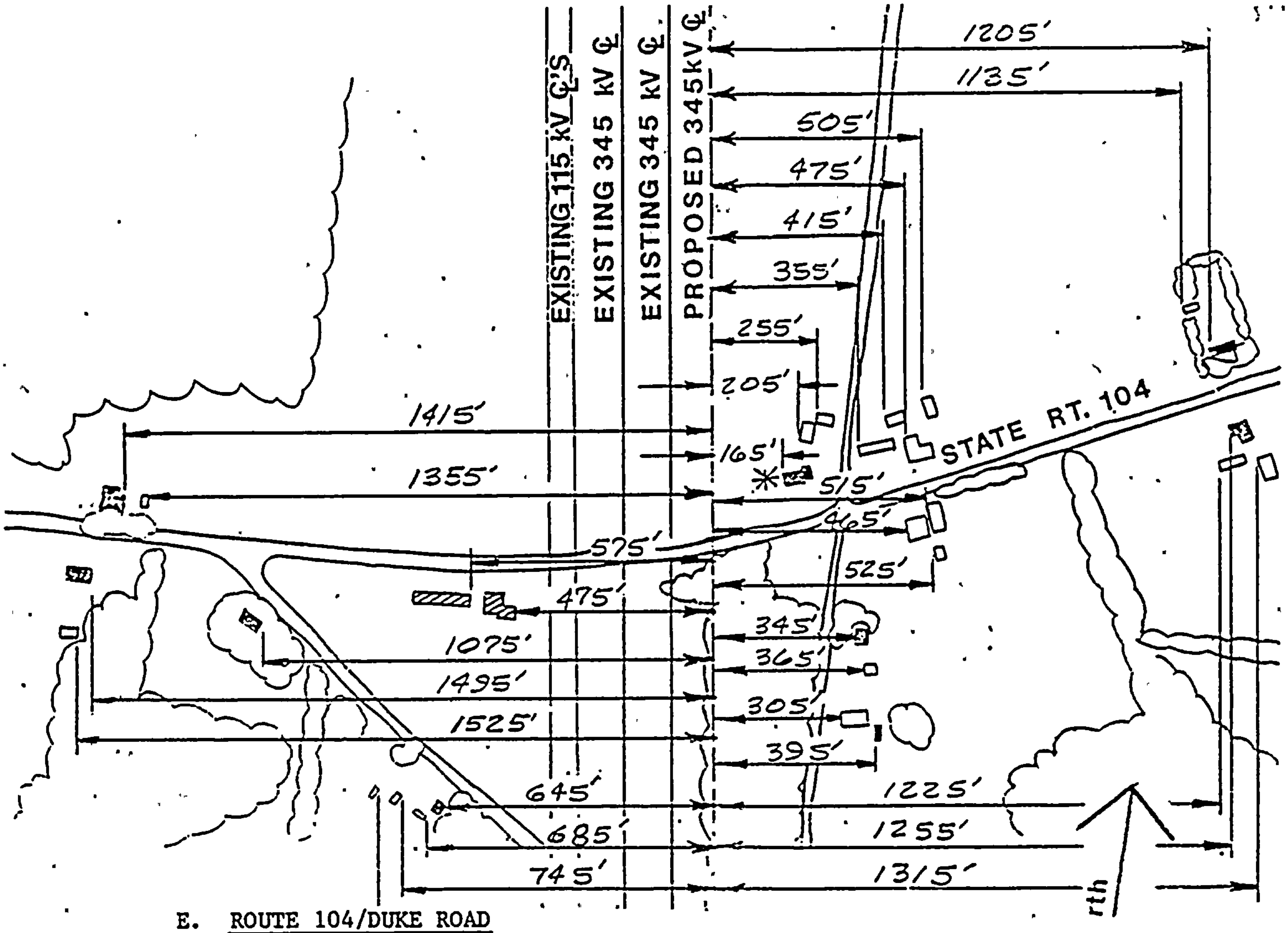
C. <u>COUNTY ROUTE 1</u>

Homes along County Route 1 will incur varying degrees of visual impact. The homes to the east may be exposed to foreground and midground views of the tops of towers and the lines with the lower parts of the towers screened by vegetation. Homes to the west will experience a midground to background view of the towers south of County Route 1 and possible exposure to one set of towers north of County Route 1. The home immediately east of the right-of-way and north of County Route 1 will experience a significant visual effect from the proposed facility.



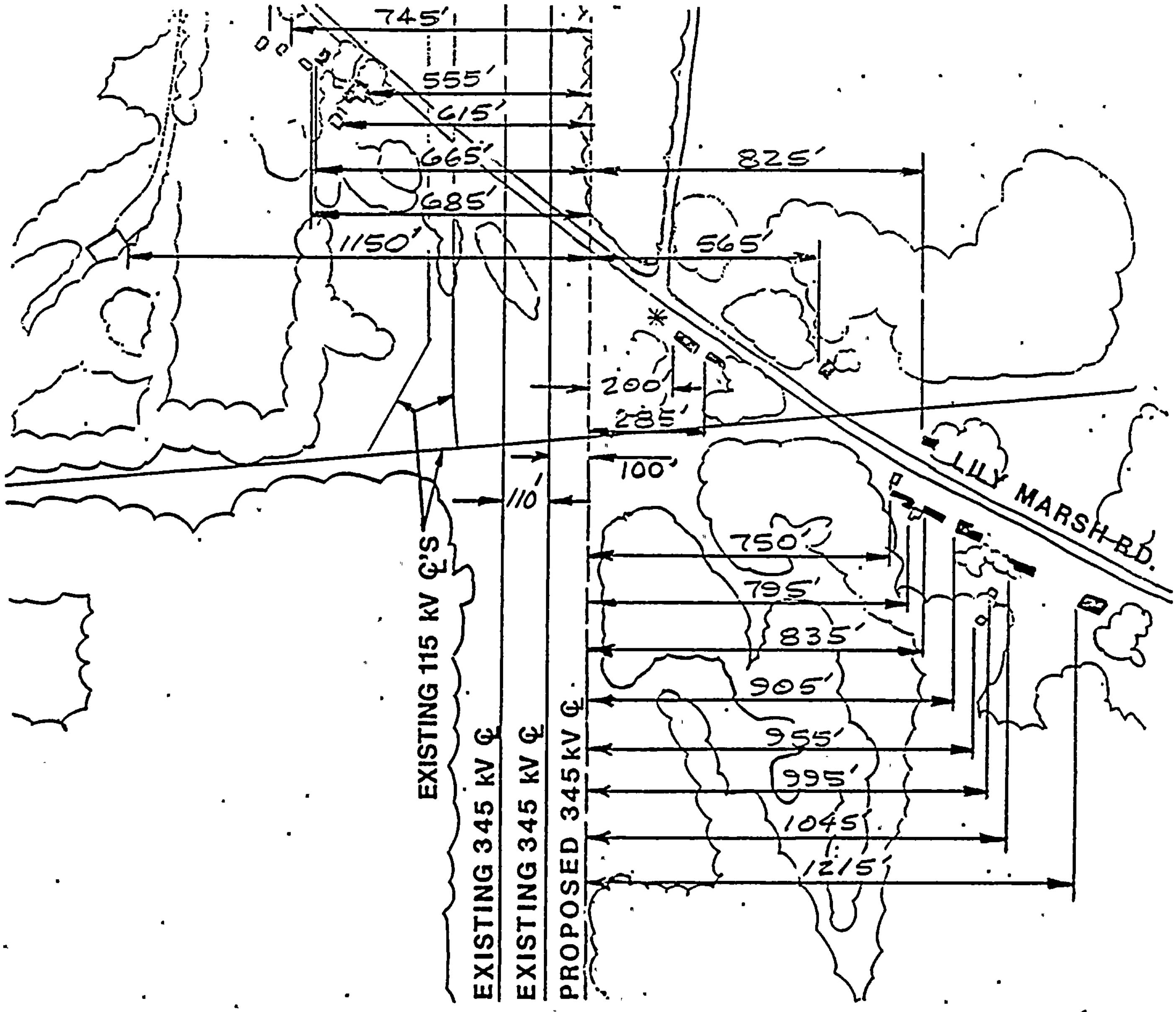
D. MIDDLE ROAD

Two homes to the east of the proposed facility may be exposed to foreground to midground views of the tops of the structures if they are not screened by the vegetation which will remain following clearing. The potential exists for the homes to the west of the facility to have midground to background views of the tops of towers. It is anticipated, however, that the vegetation between the homes and the line will prevent exposures to homes on either side of the right-of-way.



E. ROUTE 104/DUKE ROAD

The home north of Route 104 and west of Duke Road will experience an incremental increase in the visual effect due to the installation of the new facility. Homes east of Duke Road and south of Route 104 may see portions of the new structures but the effect should not be significant due to intervening vegetation and buildings. Other residences along Route 104 may see background views of the new facility within the context of the existing lines.

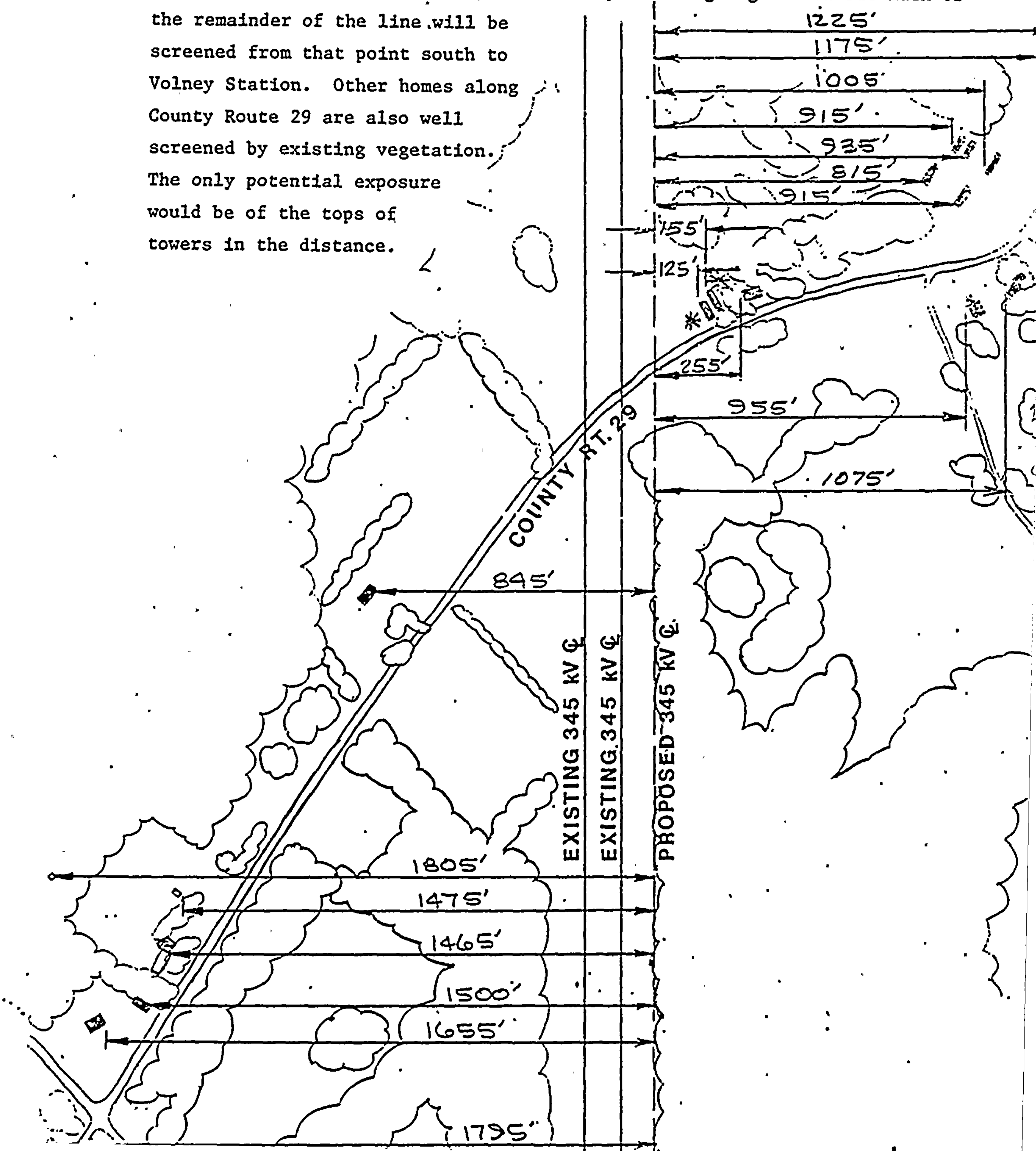


F. LILY MARSH ROAD

Homes on either side of the right-of-way along Lily Marsh Road will be exposed to minor views of the new line. Existing vegetation as well as the adjoining buildings provide screens which result in the potential for limited rather than fully open views of the facilities. The residents of the house 200' east of the easterly existing 345kV transmission line will realize the greatest potential for visual effect from the new line.

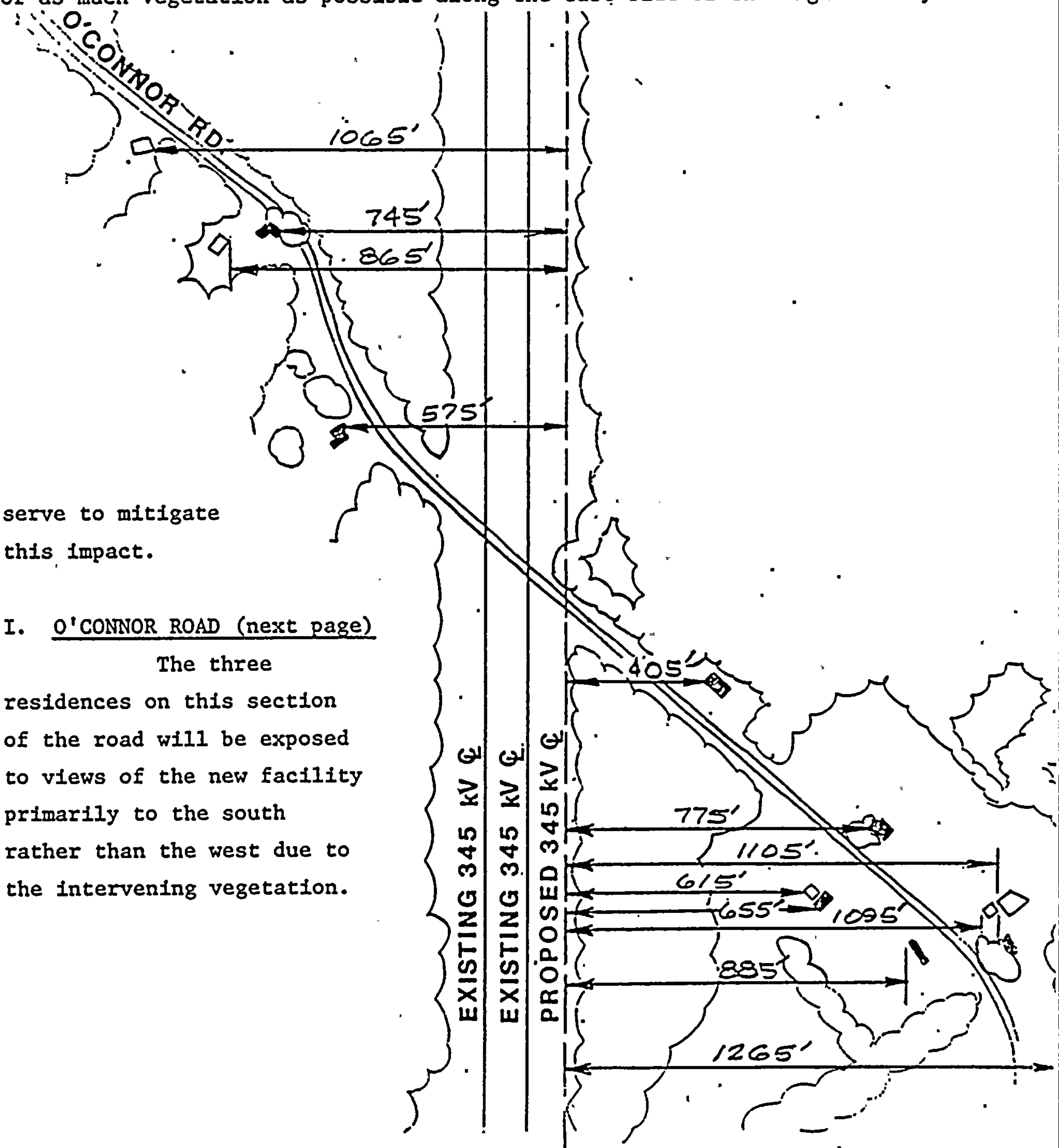
G. COUNTY ROUTE 29

Residents of the homes 255, 155 and 125 feet east of the centerline will be visually exposed to a view of one or two sets of structures on the right-of-way towards the south. The first structure immediately south of Route 29 will only be partially screened by existing vegetation but much of the remainder of the line will be screened from that point south to Volney Station. Other homes along County Route 29 are also well screened by existing vegetation. The only potential exposure would be of the tops of towers in the distance.



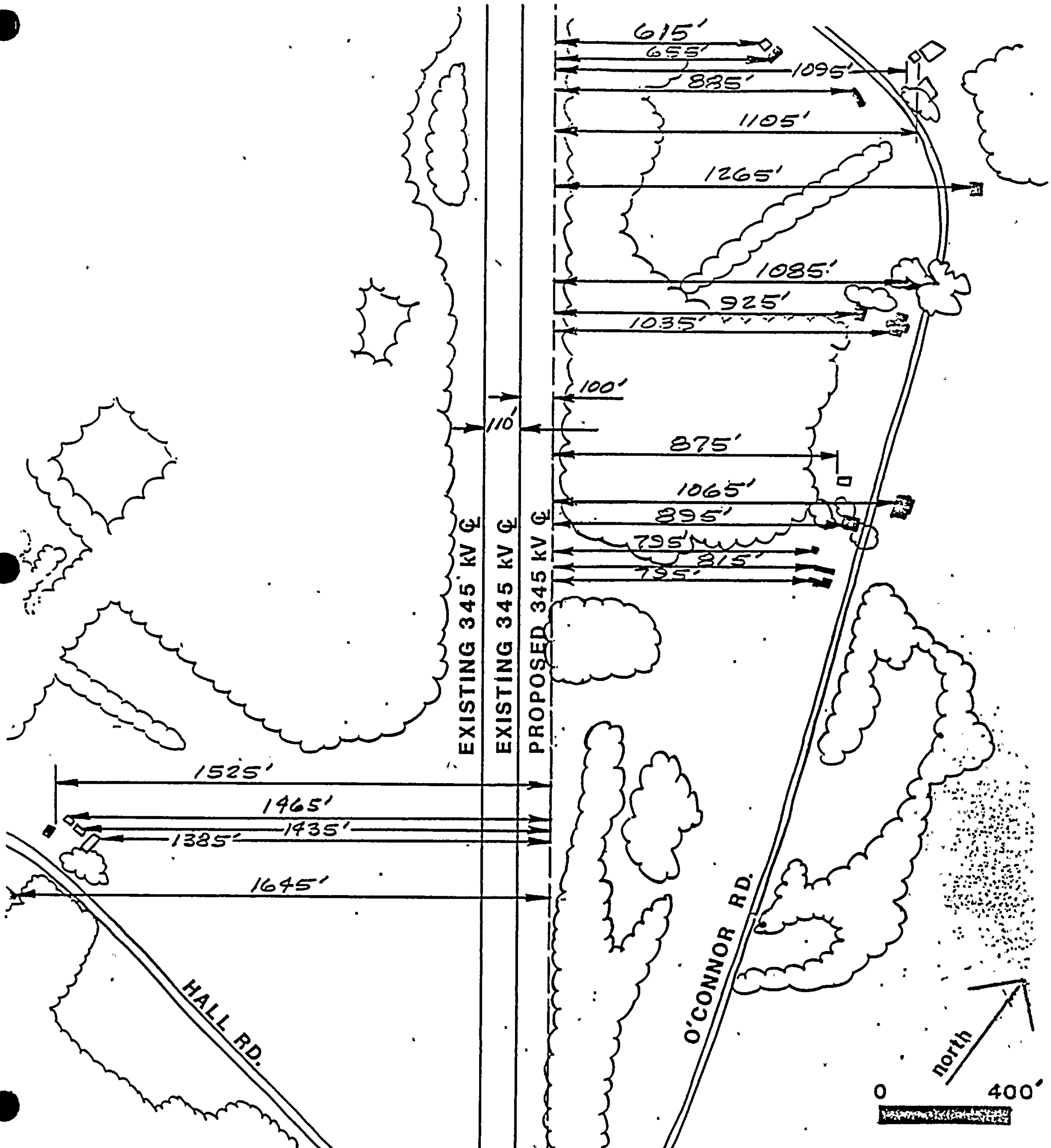
H. O'CONNOR ROAD

Views from residences along this section of O'Connor Road are generally of no more than the tops of structures. Existing vegetation provides a screen of 75-100% of the structures. Consequently, there will only be an incremental impact, with the greatest effect being to the first residence to the east, the right-of-way intersection and north of the road. The retention of as much vegetation as possible along the east side of the right-of-way should serve to mitigate this impact.



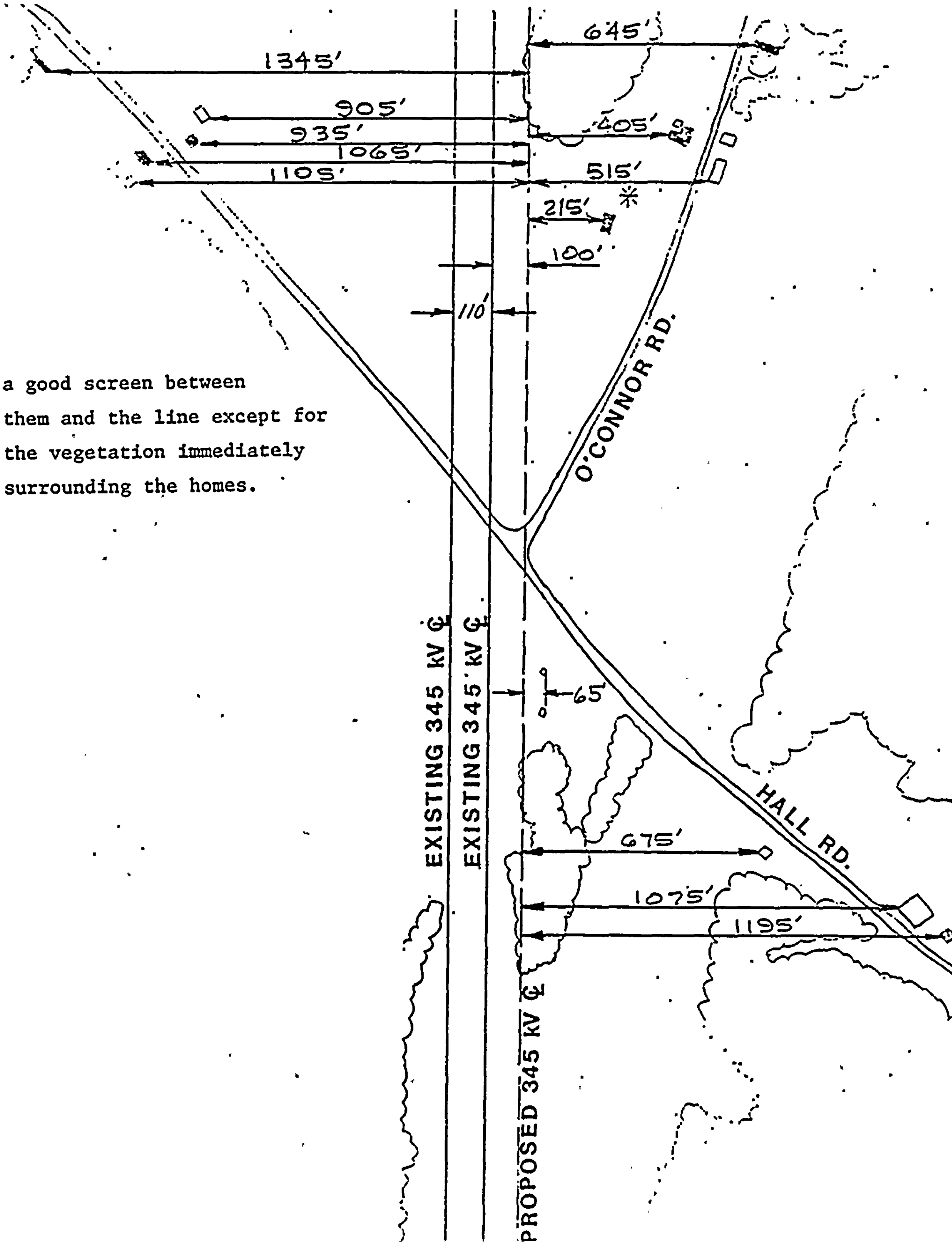
I. O'CONNOR ROAD (next page)

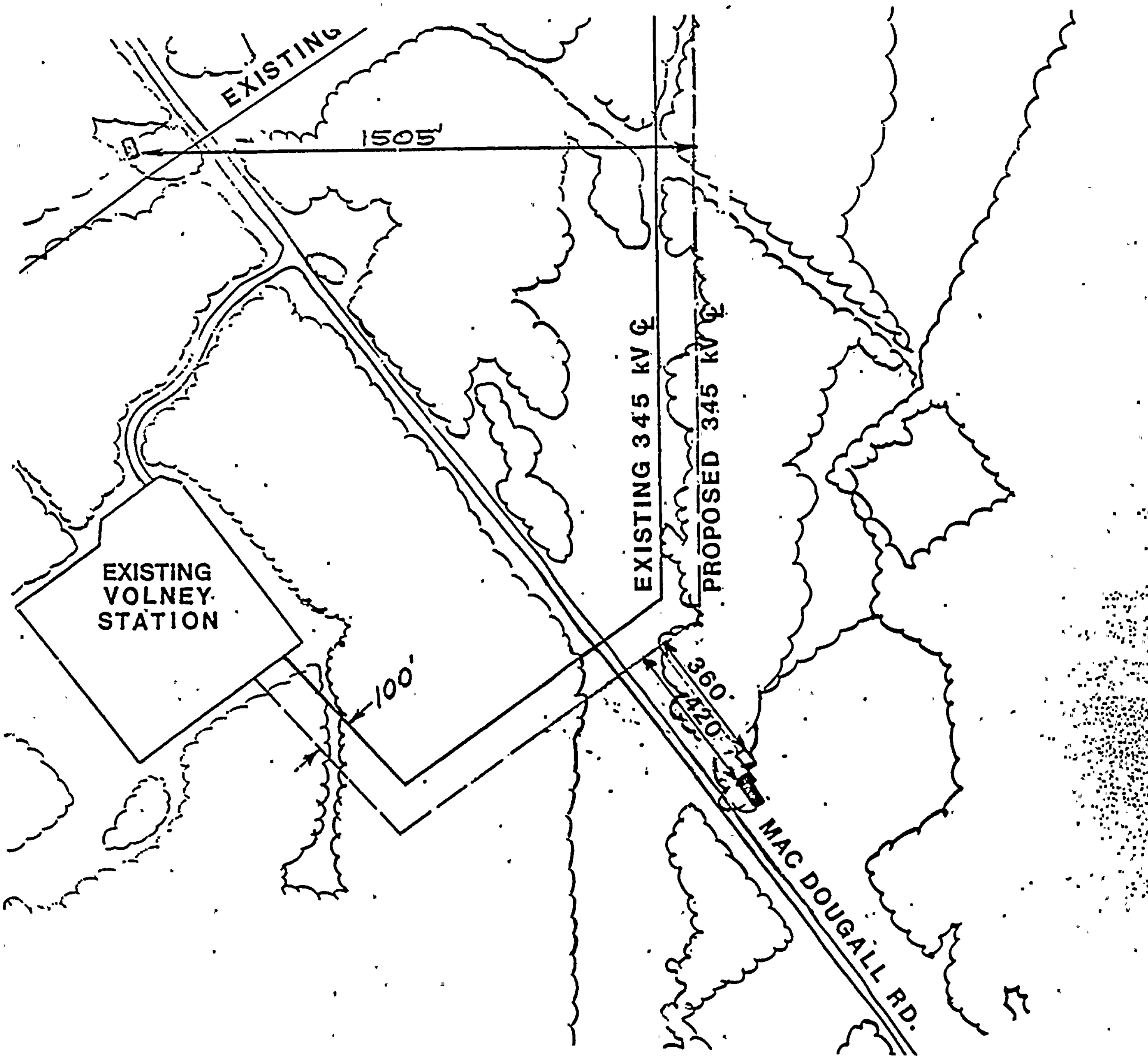
The three residences on this section of the road will be exposed to views of the new facility primarily to the south rather than the west due to the intervening vegetation.


615'
655'
1095'
885'
1105'
1265'
1085'
925'
1035'
100'
110'
875'
1065'
895'
795'
815'
795'
EXISTING 345 kV ℄
EXISTING 345 kV ℄
PROPOSED 345 kV ℄
1525'
1465'
1435'
1385'
1645'
HALL RD.
O'CONNOR RD.
north
0
400'

J. HALL ROAD

Three homes 935 - 1,345 feet distant from centerline may have a midground/background view of the line to the east, northeast, and southeast. The visual impact on these homes could be significant because of the absence of a good screen between them and the line except for the vegetation immediately surrounding the homes.





K. <u>MAC DOUGALL ROAD</u>

The new facility will be located adjacent to the existing facility and will therefore result in only an incremental impact. This assessment is reinforced by the presence of some existing vegetation surrounding the house. The residences west of the line will not experience a visual impact from the new facility.

J. ENVIRONMENTAL ASSESSMENT SUMMARY

The construction and operation of the proposed facility will have a significant impact only on the vegetation which exists within the right-of-way area to be cleared. Some of the individuals of various vegetative species that exist there now will no longer exist following clearing and construction activities. However, new species will pioneer and become established in the disturbed areas.

The projected effect on wildlife will not be as pronounced as the impact on vegetation. Hydrology, topography, and soil have little impact on the land based wildlife unless the water is polluted beyond use or disappears or the soil quality is impaired by extensive erosion. None of these impacts will occur due to construction or operation of the proposed facility. The removal of vegetation will force the wildlife which inhabits the right-of-way area to be cleared to move into other areas. This may cause some temporarily localized overpopulation and the loss of some individuals from the immediate right-of-way area. It is not anticipated, however, that any species will be lost due to the proposed line construction. The species which typically thrive in the right-of-way environment should multiply.

In the course of the visual assessment certain areas were identified where structures would have more impact than others. During line design, attempts to avoid placing structures in these areas will be made. Because of the relative rural nature of this area, the visual impact is not as significant as it might be in a more urban area.

During the environmental assessment preparation, no heavily timbered areas were identified. One major area of natural forest was identified, and the proposed line is routed along the edge of the area rather than through it. The high point in the area is about 1,000 feet west of the proposed facility. Ridge lines and steep slopes were identified, but none were found which posed enough of a problem to line construction or operation to require consideration of line modification.

The proposed facility utilizes an existing right-of-way, thereby consolidating any impacts into a concentrated area rather than splitting up the area with many single corridors. In doing this the overall impact on the natural landscape, the visual awareness of the facility, and present and future land use is minimized.

K. ENVIRONMENTAL MANAGEMENT AND CONSTRUCTION PLANS

Part 86.5 (3) through (9) requires information concerning the environmental impact of construction, restoration and management of the transmission facility. Details will be provided in the Environmental Management and Construction Plan which is prepared and submitted after certification of the route. A discussion that generally addresses the requirements in (3) through (9) follows.

(3) Niagara Mohawk keeps right-of-way clearing to the minimum width necessary for construction, operation and maintenance of the transmission facility. A cleared right-of-way width of 75 feet on each side of centerline has been established by Niagara Mohawk as a standard for 345 kV lines. Clearing boundaries and types of clearing will be identified in the EM & CP.

(4) Niagara Mohawk utilizes a variety of selective clearing and slash disposal methods which are environmentally compatible with each site and consideration is given to soil stability, protection of desirable vegetation and protection of adjacent resources. For more details refer to the pre-filed direct testimony of C. G. Foreback (CGF-2). The EM & CP will show clearing and slash disposal methods on a site-by-site basis.

(5) Niagara Mohawk's established procedures for selective clearing and slash disposal, access route layout, structure laydown site designation and restoration measures protect undisturbed vegetation and topsoil to the extent practical. For more details refer to C. G. Foreback's pre-filed direct testimony (CGF-2 and CGF-6). These concerns are addressed in detail in the EM & CP.

(6) Niagara Mohawk's established procedures for stream protection which includes no equipment access areas, restricted activities areas, clearing and slash disposal methods, stream crossing devices, erosion control and restoration measures and consultation with the Department of Environmental Conservation protects the streams crossed by the transmission line. For more details refer to C. G. Foreback's pre-filed direct testimony (CGF-3). The EM & CP will address these items in detail.

(7) Niagara Mohawk utilizes herbicides in both construction and maintenance of the transmission facility. During construction, while clearing operations are progressing, it is anticipated that a stump herbicide treatment and or basal treatment prior to cutting will be applied. It is further anticipated that a second herbicide treatment will be applied to the vegetation of the right-of-way sometime between its second and fourth full growing season. The actual treatment time and methods for this second treatment will be

determined following a right-of-way inventory, whereby, vegetative and physical conditions of the right-of-way are considered in preparing the treatment plan. It is anticipated that the methods for the second treatment will include stem foliar, basal and cut and stump treatments. However, changing technology could alter application methods of both aforementioned treatments. Therefore, more definite plans will be discussed in the EM & CP. Only those herbicides approved by the U.S. Environmental Protection Agency and the N.Y.S. Department of Conservation will be used. It is anticipated that Picloram, Triclopyr and 2, 4-D herbicides will be utilized; however, at the time of treatment the use of other herbicides may be prudent. Nevertheless, only those herbicides approved by the U.S. Environmental Protection Agency and the N.Y.S. Department of Conservation shall be used. Mixtures, rates and volumes applied will be in accordance with label instructions.

In the maintenance phase, after construction is complete, the transmission line is included in the right-of-way management program for existing lines. In accordance with Niagara Mohawk's PSC approved system wide "Transmission Right-of-Way Management Program", an assessment is conducted four years following the last treatment. The purpose of the assessment is to determine if a maintenance treatment is necessary and if so, to schedule a right-of-way inventory so as to prescribe the appropriate maintenance techniques. The maintenance treatment will occur the year following the right-of-way inventory. The assessments, right-of-way inventories, and treatments will continue throughout the life of the facility. Subsequently, at intervals of from 5 to 8 years or more, vegetation management techniques as described in the PSC approved systemwide "NMPC Transmission Right-of-Way Management Program" and/or in accordance with future PSC approved ROW Management Programs will be utilized as necessary to maintain system reliability. Only approved herbicides will be utilized at mixture rates and volume in accordance with label instructions.

(8) Niagara Mohawk selected structures that are similar in design to others located in the area. The exact location and design of the structures will be provided in the EM & CP. Construction noise and noise sensitive areas will be addressed in the EM & CP.

(9) Niagara Mohawk's clean-up and restoration plans include grading, seeding and fertilizing when required on exposed mineral soil resulting from construction activities. Necessary erosion control measures such as

ditching, water barriers, etc. will be installed during time of construction not to exceed eight work days after initial disturbance. Where initial disturbance occurs in snow or frozen soil conditions, temporary control measures will be installed such as cross ditching and mulching as necessary. Seeding will be initiated as soon as soil conditions are conducive to seeding and germination. For more details refer to C. G. Foreback's pre-filed direct testimony (CGF-6). The EM & CP will provide additional details concerning clean up and restoration.

L. INFORMATIONAL CONTACTS

1. PERSONAL CONTACTS

a. PRIVATE

Mr. Michael Cahill - Curator - Oswego County Historical Society

Ms. Betty Prisch - Rochester Museum and Science Center

Mr. Peter P. Pratt - Pratt and Pratt Archaeological Consultants

b. GOVERNMENTAL

(1) NEW YORK STATE AGENCIES

Department of Environmental Conservation

Mr. Eric Fried - Delmar/Albany
Mr. Lou Concra - Delmar/Albany
Mr. Dick England - Delmar/Albany
Mr. Bradford Griffin - Cortland
Mr. Allen Coburn - Cortland
Mr. Wesley Styles - Cortland
Mr. Randy Vaas - Cortland
Mr. Clifford Creech - Cortland
Mr. Gordon Behn - Cortland
Mr. Stewart Free - Albany
Mr. Gene McCaffey - Delmar
Mr. John Ozard - Delmar

Museum and Science Service - Albany

Mr. Robert Funk - State Archaeologist
Mr. Charles Gillett - Curator
Mr. Charles Sheviak - Curator of Botany
Mr. Stanley Smith - State Botonist
Mr. James Davis - State Geologist
Mr. Robert Dineen - State Geologists Office

Office of Parks and Recreation

Mr. Charles Breuel - Albany
Ms. Mary Callahan - Albany
Mr. Bruce Sherwood - Albany
Mr. Wallace Workmaster - Oswego

Department of Transportation

Mr. Richard Mustard - Syracuse
Mr. Geoffrey Christoff - Syracuse

State University of New York

Dr. John Gannon - Oswego
Mr. Robert Shearer } Rice Creek Biological Field Station - Oswego
Mr. Gerald Smith
Ms. Judity Wellman - Oswego

State University of New York (Continued)

Mr. John Felleman — School of Landscape Architecture, Syracuse

Mr. David Harper

(2) OSWEGO COUNTY

Oswego County Cooperative Extension

Mr. Francis Dellemano

Mr. Dale Young

Oswego County Environmental Management Council

Mr. John Gannon

Mr. Michael Corey

Oswego County Planning Department

Mr. Alman Hawkins - Director

Mr. Thomas Halpin

REGIONAL AGENCIES

Central New York Regional Planning and Development Board

Mr. Walker Banning

Mr. Robert Anderson

Mr. Michael Downey

Mr. Benjamin Manton

St. Lawrence - Eastern Ontario Commission

Mr. Gayle Harder

(3) UNITED STATES AGENCIES

Department of Agriculture - Soil Conservation Service

Mr. Donald Shaklin

Mr. Fred Gilbert

Mr. Terry Reynolds

Mr. Howard Schuster

Mr. Hardle Winkley

Mr. Ronald Kapewicz

Department of Housing and Urban Development

Mr. Jack Seymour

2. PRINTED SOURCES

2. GENERAL INFORMATION

Rice Creek Biological Field Station - Habitat and Wildlife Inventory: Guide to Coastal Zone Lands, Oswego County New York, 1976.

Proceedings of the First National Symposium on Environmental Concerns in Rights of Way Management January 1976.

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Design with Nature, Ian L. McHarg, Natural History Press 1971.

Geography of New York State, John H. Thompson, Editor, Syracuse University Press, Syracuse, N.Y. 1977.

Environmental Geology, Peter T. Flawn, Harper and Row, U.S.A. 1970.

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Visual Impact Analysis Methodology for Transmission Line Planning Corridors, Edaw Inc., November 1975.

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Polulation Projections: Areawide Waste Water Treatment Management Planning Program November 1976

Coastal Zone Management Program Phase 1 Report, February 1976

Environmental Resources Management Handbook, December 1973

Workbook on Soils Limitations

b. NEW YORK STATE

People . Resources . Recreation, New York State Comprehensive Recreation Plan - NYS Office of Parks & Recreation

Forecast of Outdoor Recreation in New York State 1970 - 1990, New York State Wide Comprehensive Recreation Plan, June 1973. NYS Office of Parks & Recreation

Land Use and Natural Resources Inventory of the State of New York 1968 - 1974

Official Compilation of Codes, Rules and Regulations of the State of New York, Conservation Law Books "E" and "C", Articles 14 and 19, Copyright 1967, Forward January 1975 and updated continuously.

Traffic Volume Reports, 196_ - 1976, NYS Department of Transportation

Choosing Transmission Towers, NYS Department of Public Service, August 1975.

c. OSWEGO COUNTY PLANNING

1985 and 2000 Land Use Plan - June 1977

Wetlands Oswego County New York - May 1973

Planning and Development Standards for Oswego County - August 1976

d. UNITED STATES AGENCIES

National Forest Landscape Management, Volume 2 Chapter 1, The Visual Management System, USDA Forest Service, April 1974 Agricultural Handbook #462

National Forest Landscape Management, Volume 2 Chapter 2, Utilities USDA Forest Service, July 1975 Agricultural Handbook #478

A Procedure for Evaluating Environmental Impact, US Department of Interior Geological Survey 1975 Geological Survey Circular 645

Environmental Criteria for Electric Transmission Systems, US Department of Interior, US Department of Agriculture 1970

Interim Soil Survey of Oswego County, US Department of Agriculture Soil Conservation Service 1974

Soil Survey of Oswego County, New York, US Department of Agriculture Soil Conservation Service. Issued 1981

Final Environmental Statement Related to Construction of Nine Mile Point Nuclear Station Unit 2, Niagara Mohawk Power Corporation Docket No. 50-410 . US Atomic Energy Commission June 1973

Resource and Land Investigations (RALI) Program: Considerations in Evaluating Utility Line Proposals, Mitre Corporation under contract to the US Department of Interior Bureau of Law Management, Sept. 1975.

A Review and Analysis of Environmental Impact Assessment Methodologies, R. K. Jain et al Construction Engineering Research Laboratory, Champaign, Illinois, June 1975. (Distributed by NTIS AD-1013-359)

Viewit: Computation of seen areas, slope, and aspect for Land Use Planning US Department of Agriculture, Forest Service General Technical Report PSW-11/1975.

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NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 86

SECTION 86.6 AMENDED EXHIBIT 5

DESIGN DRAWINGS

NINE MILE 2 - VOLNEY 345kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

DESIGN DRAWINGS

§ 86.6 AMENDED EXHIBIT 5

A. GENERAL DESCRIPTION OF THE PROPOSED TRANSMISSION LINE

Niagara Mohawk proposes to construct approximately 9.4 circuit miles of 345 kV construction for the Nine Mile 2 - Volney 345 kV Transmission Facility. Each circuit mile of line will require six (6) miles of power conductor and two (2) miles of overhead ground wire.

The structures will meet uncompromising standards of safety and reliability while causing minimum intrusion on the natural landscape consistent with reasonable cost.

B. STRUCTURE LOCATION

The structure will have typical spans of 700 feet requiring approximately 7 structures per circuit mile. Actual spans will vary in length depending upon topographic considerations, with minimum spacing of perhaps 600 feet and maximum spacing of 1000 feet.

Each structure will be placed to cause minimum reasonable disturbance to the environment - both in the course of construction, and as a permanent fixture on the landscape, within the scope of optimum design and structure utilization.

The centerline of construction for most of the line will be 100 feet east of and parallel to the existing easterly most transmission line (Nine Mile - Volney #9) (See Amended Exhibit 2).

No new right-of-way will be purchased.

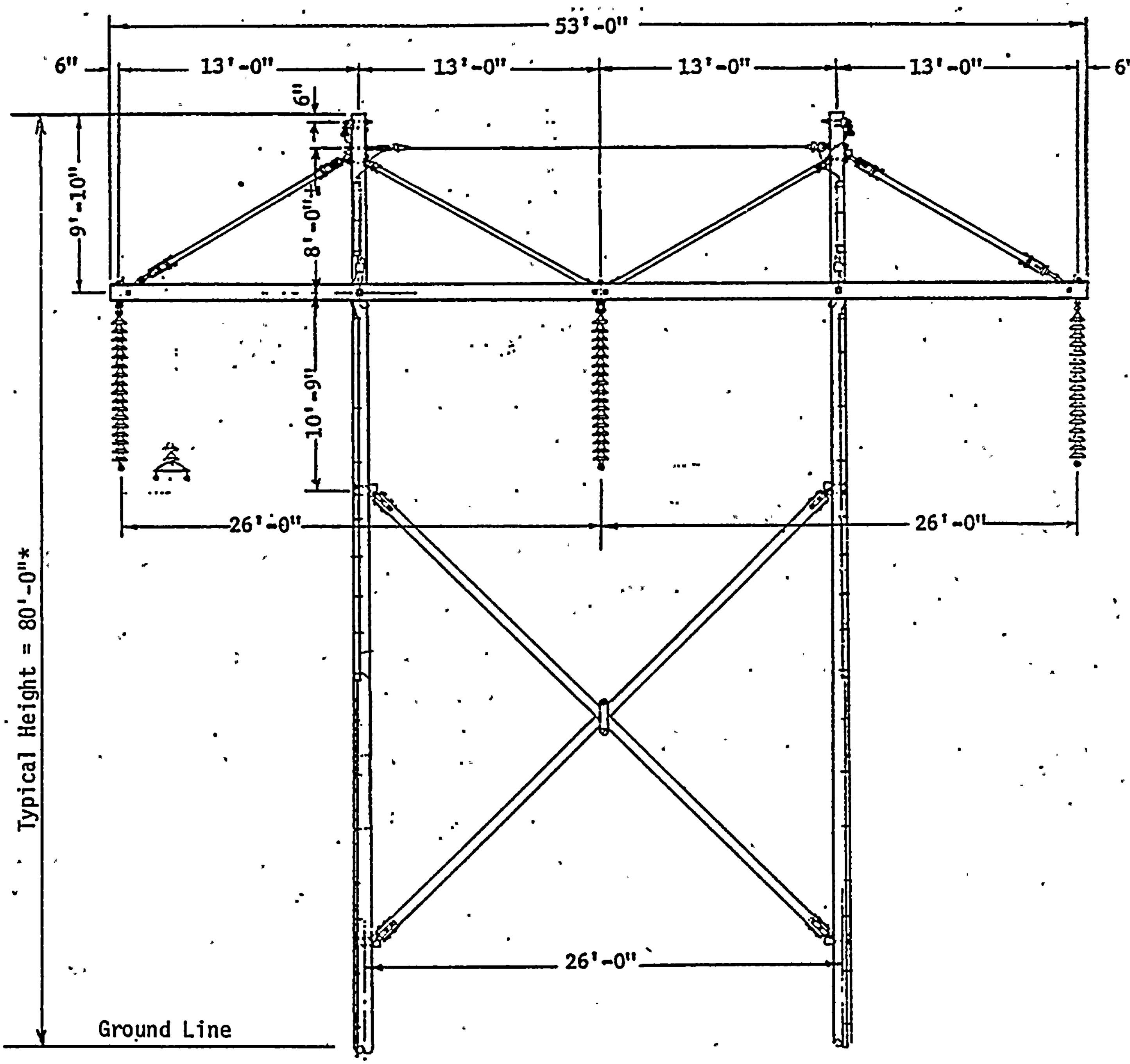
C. STRUCTURE TYPES

The proposed transmission line will be constructed, principally, of two pole, wood H-frame structures. The typical height for a wood pole structure will be 80 feet, with taller poles installed where necessary to maintain required clearances. Wood structures will be treated with pentachlorophenol in heavy petroleum solvent and will be dull brown in color. A sketch of the wood pole H-frame structure type is shown on Page 5-3.

Lattice steel towers will be utilized at angle locations. The typical height for a lattice steel tower will be 90 feet with taller towers installed where necessary. Lattice steel towers will be galvanized and will be

dull gray in color. A sketch of a typical lattice steel tower is shown on Page 5-4. Brown glaze porcelain suspension insulators will be utilized on all wood pole structures to complement their dull brown color. Gray glaze porcelain suspension insulators will be employed on all lattice steel towers to match their dull gray color.

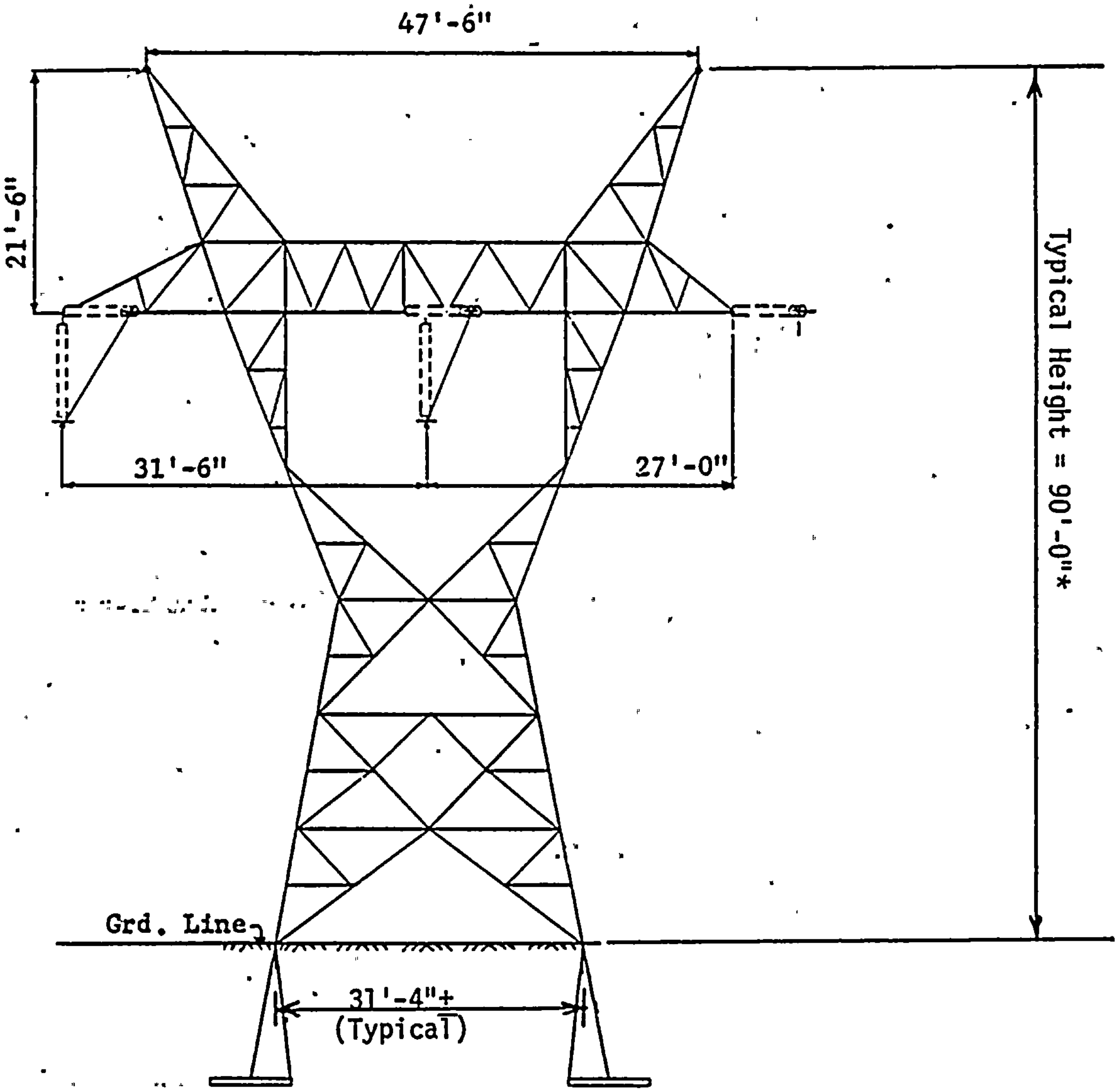
Actual design drawings will be submitted as part of the Environmental Management and Contruction Plan.



TWO POLE TANGENT "H" FRAME
345 KV

*Additional height may be utilized where necessary to maintain required clearance.

**Approximate diameter of wood poles at ground line is 19".



SINGLE CIRCUIT STEEL 60° ANGLE SQUARE BASE D.E. TOWER

345 KV

*Additional height may be utilized where necessary to maintain required clearance.

D. ELECTRICAL FIELD STRENGTHS

Upon installation and operation of the subject transmission lines, the electric field strength measured at one meter above ground at all locations along the eastern edge of the right-of-way will be less than 1.6 kV/m.

In addition the maximum electrical field strength on the right-of-way measured at one meter above ground for the subject transmission line will be less than 7 kV/m over public roads and less than 11 kV/m over all other areas.

NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 86

SECTION 86.7 AMENDED EXHIBIT 6

ECONOMIC EFFECTS OF THE PROPOSED FACILITY

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

ECONOMIC EFFECTS OF THE PROPOSED FACILITY

§ 86.7 AMENDED EXHIBIT 6

The proposed facility will not in itself promote development in the immediate area becuase of the nature of the facility being for major bulk power transfer. It's major development influence will be more regional through its reinforcement of the New York Power Pool electrical grid. The resultant increase in the reliability of the State's power supply should encourage business to locate in New York State.

The local property taxes generated annually by the facility may induce some local economic and physical changes.

NEW YORK STATE
PUBLIC SERVICE LAW
ARTICLE VII CHAPTER 1 PART 86
SECTION 86.8 <u>AMENDED EXHIBIT 7</u>

LOCAL ORDINANCES

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY
Niagara Mohawk Power Corporation

LOCAL ORDINANCES

§86.8 AMENDED EXHIBIT 7

ZONING ORDINANCES

There are no zoning ordinances which, in the opinion of applicant, are either unduly restrictive or could be construed to be unduly restrictive to the construction, operation and maintenance of the proposed transmission line. For informational purposes, the following specification and analysis of zoning ordinances is supplied.

TOWN OF SCRIBA

The Town of Scriba presently does not have a zoning ordinance.

TOWN OF VOLNEY

The zoning ordinance for the Town of Volney permits public utility use in all zoning districts of the town. A pertinent portion of the ordinance applicable to the proposed transmission line and associated facilities is the requirement, present for all zoning districts, that public utility uses be conditioned upon site plan approval by the Planning Board. The Article VII process supplies the opportunity and forum for site plan approval and, as such, Planning Board site approval would be duplicative and unnecessary. The aforementioned section of the zoning ordinance is not considered unduly restrictive, nor is it the subject of a waiver request, since Section 130 of the Public Service Law expressly prohibits the Town of Volney Planning Board's site plan approval function.

NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 86

SECTION 86.9 <u>AMENDED EXHIBIT 8</u>

OTHER PENDING FILINGS

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

OTHER PENDING FILINGS

§ 86.9 AMENDED EXHIBIT 8

The Nine Mile Point Nuclear Generating Station Unit 2 for which the proposed transmission facility is to be constructed, has been granted a construction permit by the Nuclear Regulatory Commission under Docket No. 50-410. An application for an operating license for the subject station is to be filed in January of 1983 with the Nuclear Regulatory Commission. The denial of the application for an operating permit would preclude the need for the subject transmission facility.

Niagara Mohawk Power Corporation knows of no other Federal or State applications or filings regarding this facility, or any facility which would affect the amended Article VII application for the proposed Nine Mile 2 to Volney 345 kV Transmission Facility.

NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 86

SECTION 86.10 AMENDED EXHIBIT 9

COST OF PROPOSED FACILITY

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

COST OF PROPOSED FACILITIES
§ 86.10 AMENDED EXHIBIT 9
1982 DOLLARS

A. COST ESTIMATE FOR
NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

1. NINE MILE 2 - SCRIBA 345 kV TRANSMISSION LINE SEGMENT (0.5 MILES)

A. DIRECT COSTS		
1. Right-of-Way		
a. Purchase		0
b. Acquisition		0
c. Clearing		2,000
d. Access Roads		9,800
e. Stream Crossings		0
f. Restoration		1,000
g. Survey & Aerial Photography		2,200
h. P.S.C. Application		1,000
Right-of-Way Subtotal	$	16,000
2. MATERIAL		
a. Wood Structures (0)		
b. Steel Structures (3)		56,100
c. Power Conductor		22,500
d. Overhead Ground Wire		1,800
e. Insulators & Hardware		17,500
Material Subtotal	$	97,900
3. LABOR		
a. Wood Structures Installation		
b. Steel Structures Installation (3)		102,100
c. Stringing		15,200
d. Engineering Supervision and Inspection		23,500
e. Legal & Environmental		2,000
Labor Subtotal	$	142,800
Direct Costs Total	$	256,700
B. INDIRECT COSTS		
1. Labor Overhead		76,000
2. Sales Tax		6,500
3. Equipment & Transportation		64,500
Indirect Costs Total	$	147,000
C. INTEREST		25,700
D. CONTINGENCIES		20,500
GRANT TOTAL	$	449,900

2/18/82

2. SCRIBA-VOLNEY 345 kV TRANSMISSION LINE SEGMENT (8.9 Miles)

B. DIRECT COSTS	
1. Right-of-Way	
a. Purchase	0
b. Acquisition	5,000
c. Clearing	177,100
d. Access Roads	96,700
e. Stream Crossings	54,200
f. Restoration	19,400
g. Survey & Aerial Photography	45,000
h. P.S.C. Application	20,000
Right-of-Way Subtotal	$ 417,400
2. Material	
a. Wood Structures (63)	286,200
b. Steel Structures (7)	247,000
c. Power Conductor	419,900
d. Overhead Ground Wire	33,000
e. Insulators & Hardware	115,200
Material Subtotal	$ 1,101,300
3. Labor	
a. Wood Structures Installation (63)	254,700
b. Steel Structures Installation (7)	238,300
c. Stringing	284,400
d. Engineering Supervision and Inspection	286,500
e. Legal & Environmental	70,000
Labor Subtotal	$ 1,133,900
Direct Costs Total	$ 2,652,600
C. INDIRECT COSTS	
1. Labor Overhead	606,100
2. Sales Tax	69,300
3. Equipment & Transportation	427,600
Indirect Costs Total	$ 1,103,000
D. INTEREST	265,300
E. CONTINGENCIES	212,200
GRAND TOTAL	$ 4,233,100

2/18/82

B. BASIS FOR COST ESTIMATE

1. The basis for the estimates in subpart A.1. and A.2. on pages 9-1 and 9.2 is actual material and labor costs from transmission line work performed by Niagara Mohawk in connection with the Oswego-Dewitt 345 kV line and the Lafayette-Oakdale 345 kV line. Adjustments were made for actual and anticipated inflation rates.

2. Quotations for any of the materials for the facility for which certification is sought have not yet been solicited.

3. Engineering, Supervision and Inspection is 20% of field labor.

4. Indirect cost:

   a. Labor overhead is 53.22% of labor subtotal.

   b. Sales tax is 7% of Material.

   c. Equipment and transportation is 55% of field labor.

5. Interest is 10% of direct costs total.

6. Contingencies is 8% of direct costs total.

7. Administrative and General Costs which account for the salaries, expenses and office supplies of officers, executives, general office employees and various support departments are fixed costs and were not calculated and are not included in the cost estimates.

NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 88

SECTION 88.1 AMENDED EXHIBIT E-1

DESCRIPTION OF PROPOSED TRANSMISSION LINE

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

DESCRIPTION OF PROPOSED
TRANSMISSION LINE
§ 88.1 AMENDED EXHIBIT E-1

A. GENERAL DESCRIPTION OF NINE MILE 2 - VOLNEY TRANSMISSION LINE

The proposed facilities consist of the following:

1. A 345 kV single circuit transmission line having its northern terminus at the Nine Mile 2 Nuclear Generating Station and its southern terminus at the proposed Scriba Station (Length - 0.5 miles)
2. A 345 kV single circuit transmission line having its northern terminus at the proposed Scriba Station and its southern terminus at the existing Volney Station (Length - 8.9 miles).

These segments will be located parallel to the existing Nine Mile - Volney #9 and Nine Mile - Clay #8 transmission lines. A map showing the approximate location of the proposed facilities may be found in Amended Exhibit 2, LOCATION OF FACILITIES.

B. DETAILED DESCRIPTION OF THE NINE MILE 2 - VOLNEY LINE

1. Operating (and Design) Voltage:
   345 kV
2. Configuration:
   Single circuit, horizontal
3. Total length of Transmission Facility:
   9.4 miles
4. Power Conductors:
   2 - 1192.5 KCM 26/7 ACSR per phase.
   Each subconductor has an overall diameter of 1.302 inches and an ultimate strength of 33200 pounds. Conductor tension will be 10,000 pounds per subconductor under National Electric Safety Code Heavy Loading conditions.
5. Overhead Ground Wire
   2 - 7/16" 7 strand extra high strength galvanized steel. Each ground wire has an overall diameter of 0.435 inches and an ultimate strength of 20,800 pounds. Overhead ground wire tension will be 6000 pounds per wire under National Electric Safety Code Heavy Loading Conditions.
6. Insulators:
   Porcelain suspension insulators with galvanized ferrous integral hardware
   Suspension Assembly:
   18 - ANSI Class 52-3 5 3/4" x 10" units
   M & E Rating - 15,000 lbs
   Strain Assembly:
   40 - ANSI Class 52-8 5 3/4" x 10" units
   M & E Rating - 36,000 lbs
   All insulator design will conform to the appropriate standards of the American National Standards Institute (ANSI). Brown glaze insulators will be used on wood pole structures and gray glaze insulators will be used on the steel towers.
7. Structure Material:
   Wood Pole H-Frames: Treated wood poles with laminated wood crossarms and wood bracing
   Steel Towers: Galvanized structural steel

8. Foundation Material:
Wood Pole H-Frames: Auger dug hole backfilled with crushed stone
Steel Towers: Galvanized structural steel grillages

9. Design Standards:
Design Standards will be equivalent to or exceed the safety rules contained in the National Electric Safety Code (1981 Edition) of the American National Standards Institute, Inc. and published by the Institute of Electrical and Electronic Engineers, Inc. (ANSI C2-1981).

10. Right-of-way Width:
The right-of-way width for the Nine Mile 2-Volney 345 kV Line will be 75' on either side of centerline. The west side of the right-of-way occupies part of the paralleling Nine Mile-Clay #9 345 kV right-of-way.

11. Electrical Field Strengths:
Upon installation and operation of the subject transmission lines, the electric field strength measured at one meter above ground at all locations along the eastern edge of the right-of-way will be less than 1.6 kV/m.
In addition the maximum electrical field strength on the right-of-way measured at one meter above ground for the subject transmission line will be less than 7 kV/m over public roads, less than 11 kV/m over private roads and 11.8 kV/m over all other terrain.

12. Clearances:
The Nine Mile 2-Volney 345 kV transmission facility is to be designed for the following minimum clearances, assuming facility operation at 257° STE Loading:

Minimum clearance over fields -------------28 feet
Minimum clearance over private roads--------28 feet
Minimum clearance over public roads---------28 feet

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SECTION 88.2 AMENDED EXHIBIT E-2

OTHER FACILITIES

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY
Niagara Mohawk Power Corporation

OTHER FACILITIES

§ 88.2 AMENDED EXHIBIT E-2

TABLE OF CONTENTS

OTHER FACILITIES

88.2 AMENDED EXHIBIT E-2

A. GENERAL DESCRIPTION OF OTHER FACILITIES

The other facilities associated with the proposed Nine Mile 2 - Volney 345 kV transmission line are:

1. SCRIBA STATION

   Scriba Station is to be a new 345 kV Transmission Station located at a site just south of the Nine Mile Point #2 Nuclear Generating Station.

2. VOLNEY STATION - 345 kV LINE POSITION

   An existing 345 kV line position at the existing Volney Station is the southern terminus for the Scriba-Volney segment of the proposed Nine Mile 2 - Volney 345 kV Transmission Line.

3. NINE MILE 2 TERMINUS

   A proposed 345 kV line position at the Nine Mile 2 Nuclear Generating Station is the northern terminus for the Nine Mile 2 - Scriba segment of the proposed Nine Mile 2 - Volney 345 kV transmission line.

4. RELOCATION AND RECONNECTION OF NINE MILE - VOLNEY #9 345 kV LINE INTO SCRIBA STATION

   This 345 kV single circuit transmission line construction consists of two segments totaling 0.2 miles, the completion of which will loop the #9 line into the proposed Scriba Station.

The construction of the facilities described in (1) and (4) will improve the reliability of the system. Further information relative to need can be found in Amended Exhibit E-4.

In addition to the facilities described above, the project will also require the installation of miscellaneous equipment at associated existing stations in the New York transmission system.

B. DETAILED DESCRIPTION OF OTHER FACILITIES

The new facilities at the proposed Scriba Station will include five (5) 345 kV line termination structures and associated equipment, eight (8) 345 kV breakers, and all necessary and associated control devices and protective equipment. The estimate of costs is shown on Page E-2-3. Details of the facilities are shown on Pages E-2-7 and E-2-8.

The new facilities at the existing Volney Station will include one (1) 345 kV breaker and associated control devices and protective equipment. The estimate of costs are shown on Page E-2-4. Details of the facilities are shown on Pages E-2-9 and E-2-10.

The new facilities at the Nine Mile 2 Nuclear Generating Station will include four (4) single phase 24.3/350 kV auto transformers (includes one (1) spare) and associated control devices and protective equipment.

The segment necessary to reconnect the Nine Mile - Volney #9 345 kV line into the proposed Scriba Station will be designed in accordance with criteria described in AMENDED EXHIBIT E-1, DESCRIPTION OF PROPOSED TRANSMISSION LINE, Page E-1-2. The estimate of cost for the line segment is shown on Page E-2-5. The location of this facility is shown on the maps which are part of AMENDED EXHIBIT 2, LOCATION OF FACILITIES and which are included with this application in the binder pocket.

C. COST ESTIMATES OF OTHER FACILITIES (1982 dollars)

1. SCRIBA STATION

A. DIRECT COSTS

1. Land Cost		
a.	Site Purchase	0
b.	Acquisition	0
c.	Fill, Site Preparation	537,000
d.	Landscaping	66,000
	Land Subtotal	$ 603,000
2. Material		
a.	345 kV Equipment	3,887,000
b.	Control Equipment	1,214,000
c.	Foundations	333,000
d.	Control Building	121,000
e.	Rental & Miscellaneous	289,000
	Material Subtotal	$ 5,844,000
3. Labor		
a.	Install 345 kV Equipment	570,000
b.	Install Control Equipment	679,000
c.	Install Foundations	405,000
d.	Install Control Building	13,000
e.	Engineering, Supervision and Inspection	864,000
f.	Legal & Environmental	8,000
	Labor Subtotal	$ 2,539,000
	Direct Costs Total	$ 8,986,000

B.	INDIRECT COSTS	
	1. Labor Overhead	1,486,000
	2. Sales Tax	409,000
	3. Equipment & Transportation	480,000
	Indirect Costs Total	$ 2,375,000
C.	INTEREST	$ 889,000
D.	CONTINGENCIES	$ 1,348,000
	GRAND TOTAL	$13,608,000

2. VOLNEY STATION - 345 kV LINE POSITION

A. DIRECT COSTS		
1. Land Cost		
a. Site Purchase		0
b. Acquisition		0
c. Fill, Site Preparation		0
d. Landscaping		0
Land Subtotal		0
2. Material		
a. 345 kV Equipment		299,000
b. Control Equipment		158,000
c. Foundations		9,000
d. Miscellaneous		89,000
Material Subtotal	$	555,000
3. Labor		
a. Install 345 kV Equipment		56,000
b. Install Control Equipment		128,000
c. Install Foundations		7,000
d. Install Miscellaneous Equipment		38,000
e. Engineering, Supervision and Inspection		103,000
f. Legal & Environmental		3,000
Labor Subtotal	$	335,000
Direct Costs Total	$	890,000
B. INDIRECT COSTS		
1. Labor Overhead		178,000
2. Sales Tax		39,000
3. Equipment & Transportation		57,000
Indirect Costs Total	$	274,000
C. INTEREST	$	89,000
D. CONTINGENCIES	$	134,000
GRAND TOTAL	$	1,387,000

3/1/82

3. RELOCATION AND RECONNECTION OF NINE MILE - VOLNEY # 9 345 kV LINE INTO SCRIBA STATION

A. DIRECT COSTS

1. Right-of-Way		
a. Purchase		0
b. Acquisition		0
c. Clearing		0
d. Access Roads		4,100
e. Stream Crossings		0
f. Restoration		500
g. Survey & Aerial Photography		1,100
h. P.S.C. Application		400
Right-of-Way Subtotal	$	6,100
2. Material		
a. Wood Structures (1)		5,100
b. Steel Structures (2)		73,700
c. Power Conductor		11,500
d. Overhead Ground Wire		900
e. Insulators & Hardware		18,600
Material Subtotal	$	109,800
3. Labor		
a. Wood Structures Installation		7,400
b. Steel Structures Installation		68,100
c. Stringing		7,800
d. Removal		14,700
e. Engineering, Supervision and Inspection		19,600
f. Legal & Environmental		900
Labor Subtotal	$	118,500
Direct Costs Total	$	234,400

B. INDIRECT COSTS

1. Labor Overhead		63,100
2. Sales Tax		7,400
3. Equipment & Transportation		53,900
Indirect Costs Total	$	124,400
C. INTEREST		23,400
D. CONTINGENCIES		18,800
GRAND TOTAL	$	401,000

2/23/82

D. BASIS FOR COST ESTIMATE

1. The basis for the estimates in subpart C.1., C.2., and C.3. on pages E-2-3, 4 and 5 is actual material and labor costs from station work performed by Niagara Mohawk in connection with the Lafayette, Elbridge and Volney Stations. The basis for the estimate in subpart C.3. on Page E-2-5 is actual material costs from transmission line work performed by Niagara Mohawk in connection with the Dewitt-Lafayette, Oswego-Dewitt and Lafayette-Oakdale 345 kV lines. Adjustments were made for actual and anticipated inflation rates.

2. Quotations for any of the materials for the associated facilities described on Page E-2-1 have not yet been solicited.

3. Engineering, Supervision and Inspection is 20% of field labor.

4. Indirect cost:

   a. Labor overhead is 53.22% of labor subtotal.

   b. Sales tax is 7% of Material.

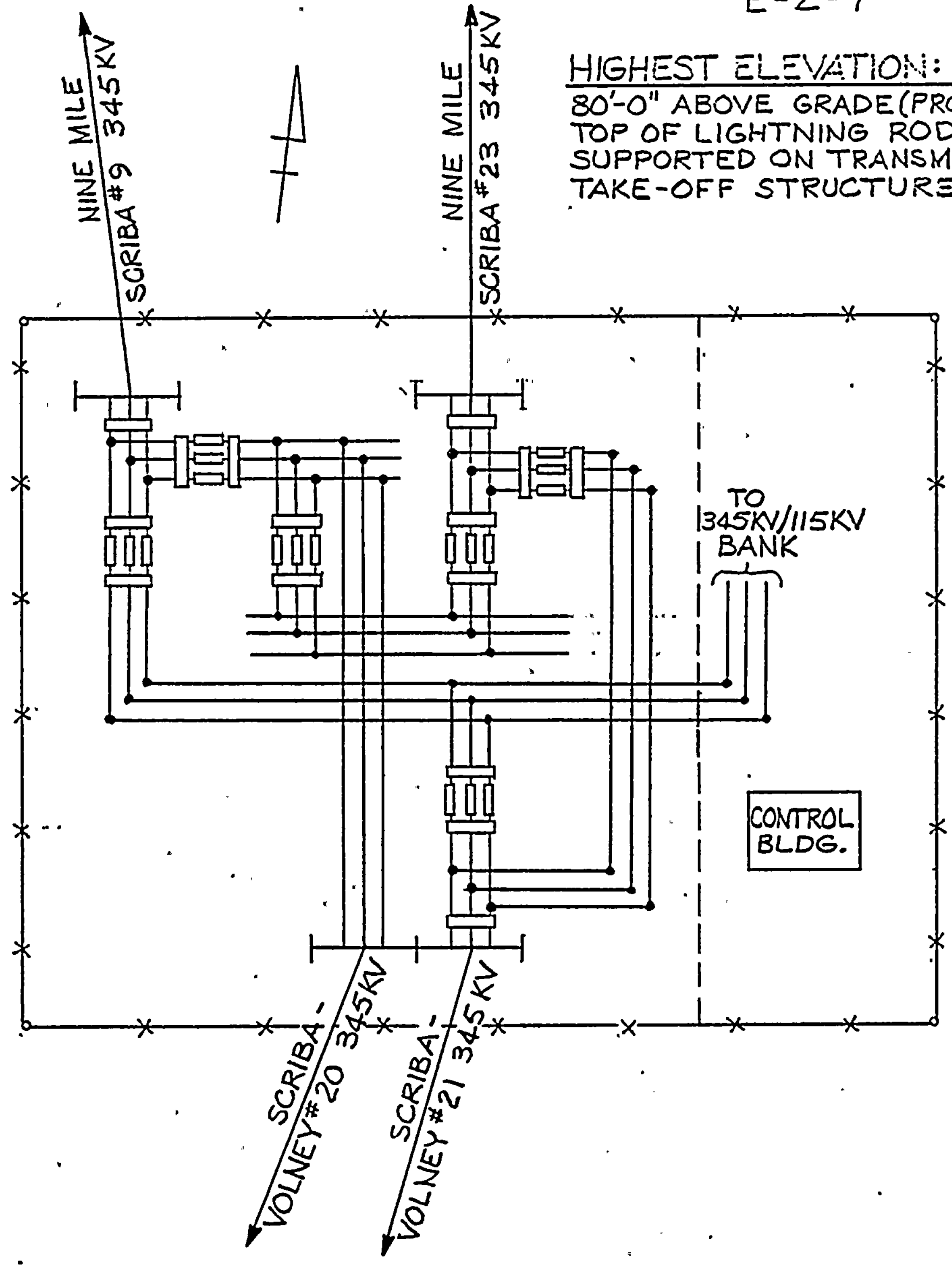
   c. Equipment and transportation is 55% of field labor.

5. Interest is 10% of direct costs total.

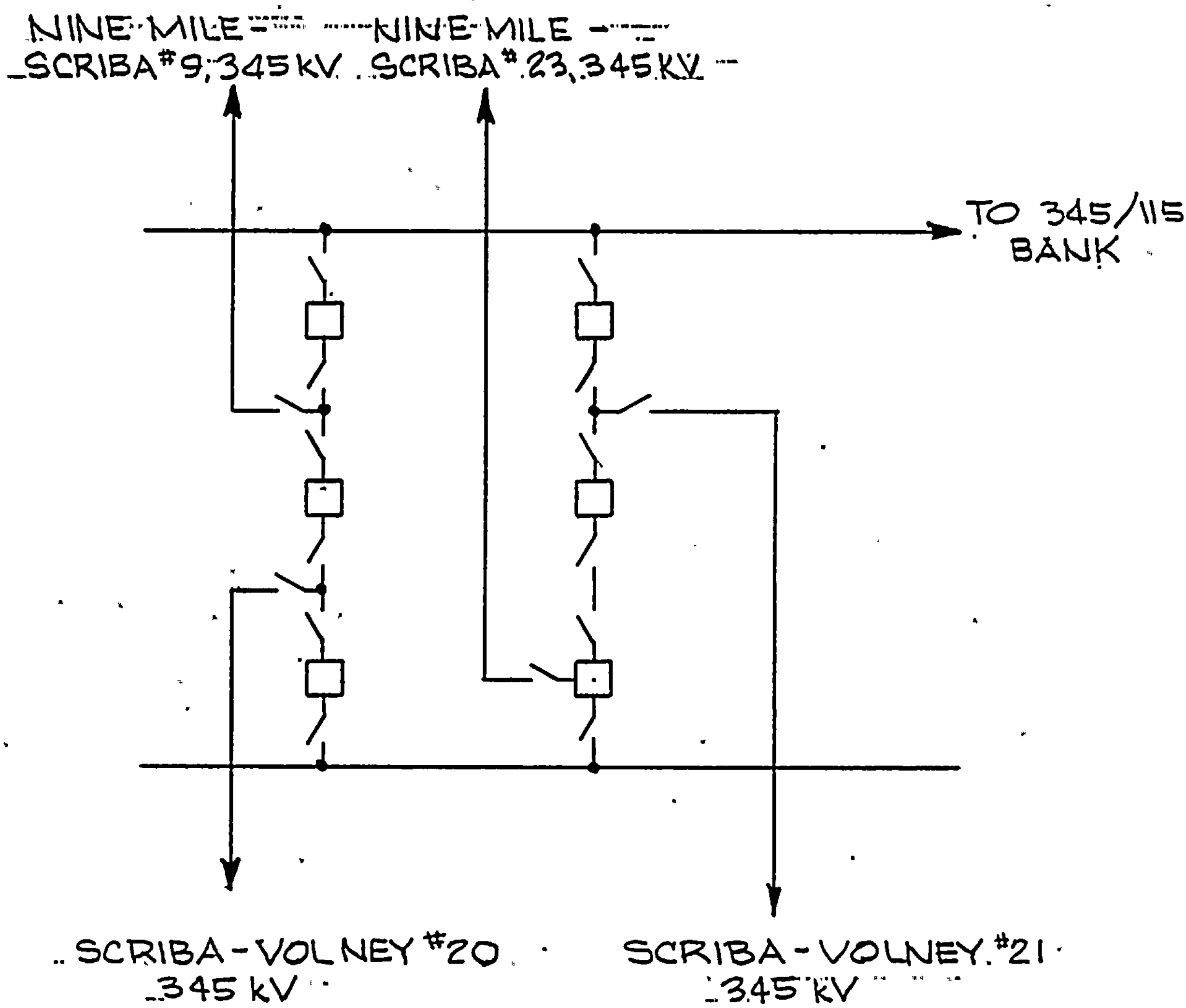
6. Contingencies is 15% of direct total costs for Pages E-2-3 and E-2-4 and 8% of direct total costs for Page E-2-5.

7. Administrative and general costs which account for the salaries, expenses and office supplies of officers, executives, general office employees and various support departments are fixed costs and were not calculated and are not included in the cost estimates.

HIGHEST ELEVATION:
80'-0" ABOVE GRADE (PROPOSE
TOP OF LIGHTNING ROD
SUPPORTED ON TRANSMISSIO
TAKE-OFF STRUCTURE

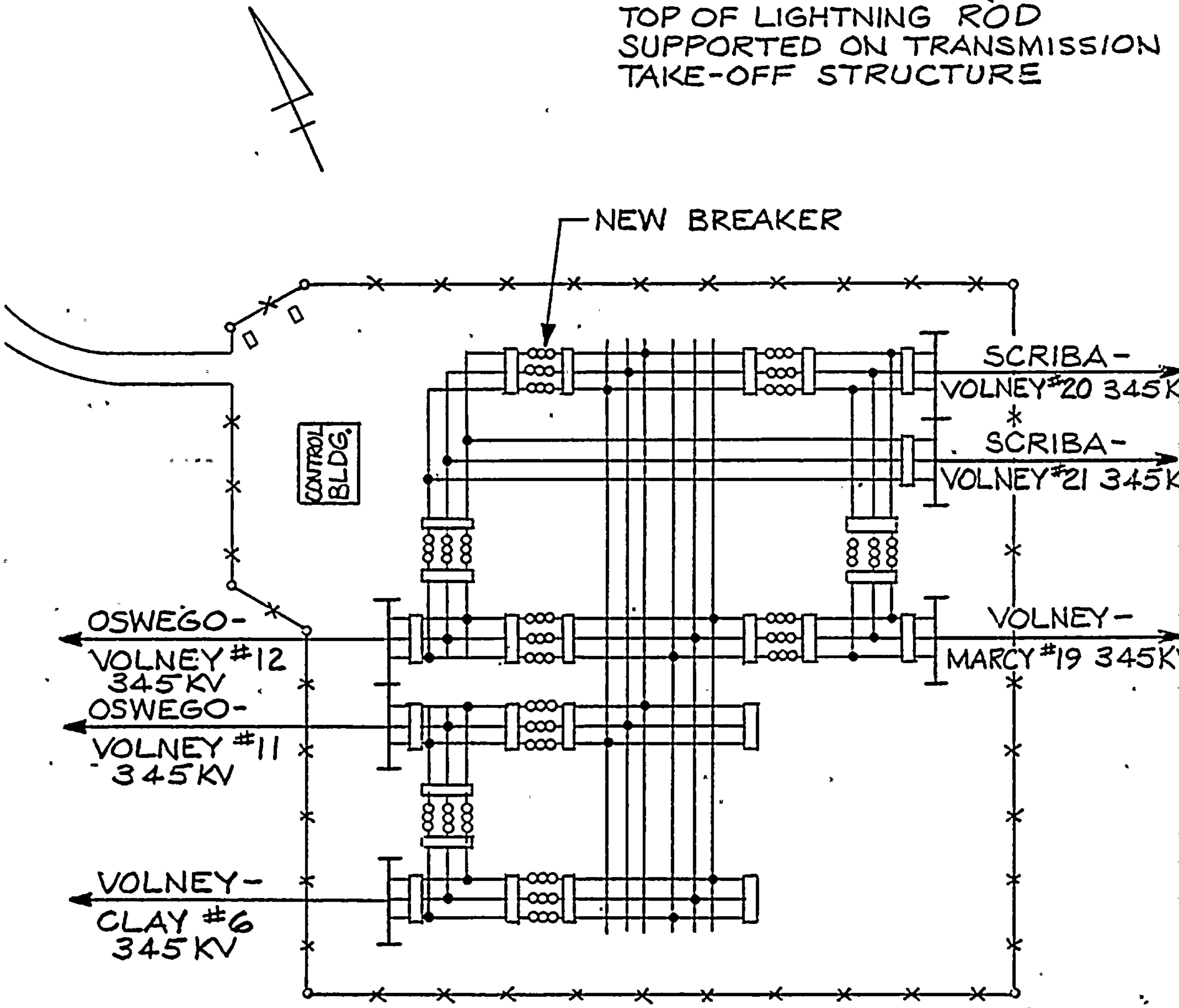


SCRIBA STATION
LOCATION OF FACILITIES
SCALE: 1"=120"

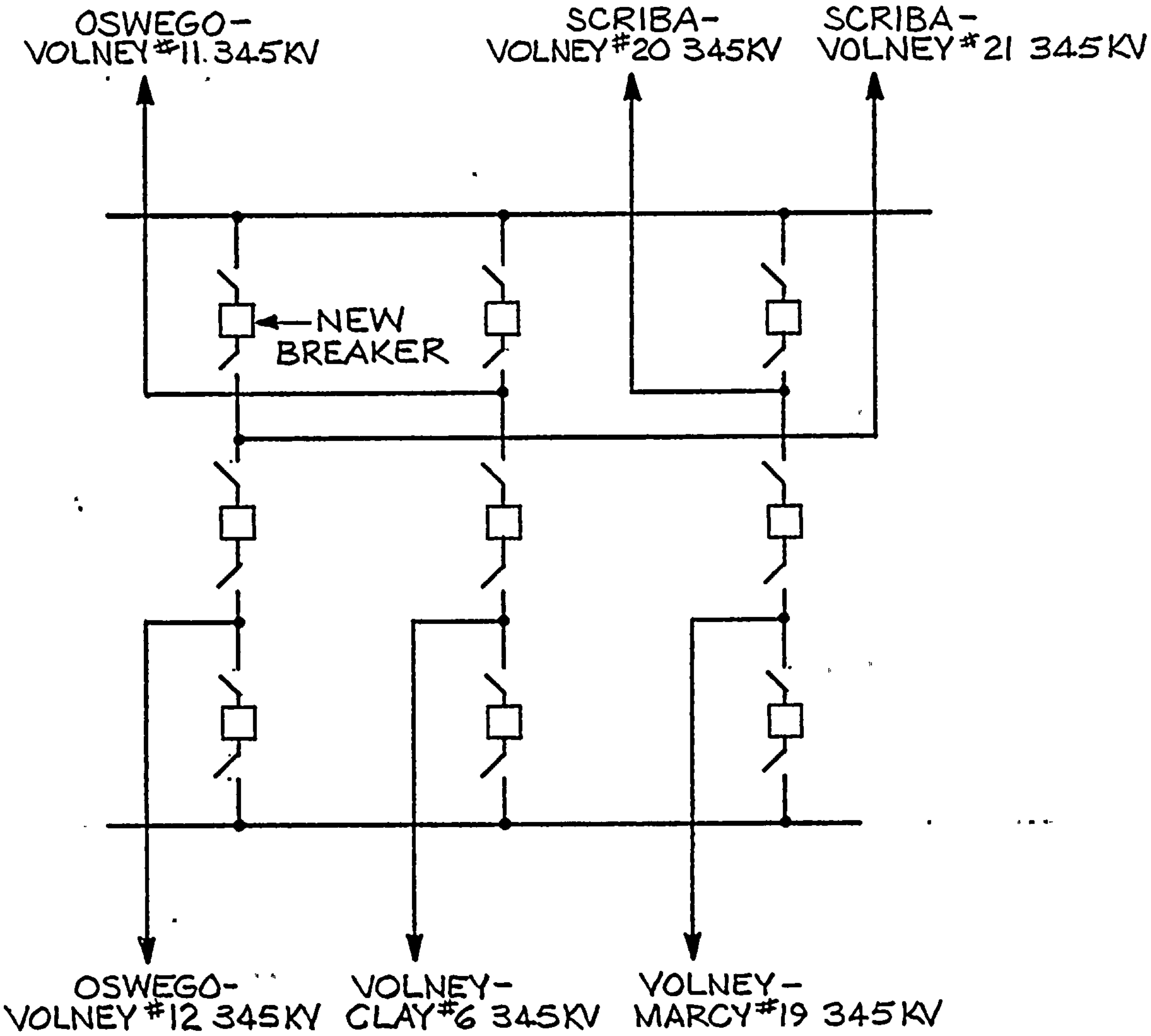


SCRIBA STATION
SINGLE LINE DIAGRAM

HIGHEST ELEVATION:
80'-0" ABOVE GRADE (EXISTING) TOP OF LIGHTNING ROD SUPPORTED ON TRANSMISSION TAKE-OFF STRUCTURE



VOLNEY STATION
LOCATION OF FACILITIES
SCALE: 1" = 120'



VOLNEY STATION
SINGLE LINE DIAGRAM

I. ENVIRONMENTAL ASSESSMENT OF OTHER FACILITIES

1. SCRIBA STATION

The location of Scriba Station is shown in Amended Exhibit 2 on the Location of Facilities Map. The northern boundary of Scriba Station will be located approximately 300 feet south of the east-west section of the railroad spur leading to the Fitzpatrick Nuclear Generating Station. The western boundary of the station will abut the cleared right-of-way of the Nine Mile-Clay #9 345 kV transmission line. The Scriba Station site is owned by Niagara Mohawk.

Present land use of the site is woodland consisting of cover types of hardwoods and hardwood-conifers. Species composition is primarily white ash, aspen, beech, hemlock, and red maple in the sapling-pole timber age class. The site also contains light to medium density of woody shrubs. There are no streams, drainage areas, nor wetlands within the site boundary. The site is not within the 100 year flood hazard area. The area is well drained and the soils have a high bearing capacity rating, a slight to moderate water erosion rating and depth to bedrock is over 5 feet.

There are no known natural or cultural constraints relative to the site. Visual exposure is low because of the isolation of the site from public view and the existing woodlands which screen views from residences and public roadways.

The Scriba Station site was chosen over two alternate locations. One location was situated north of Lake Road within the Nine Mile Point Complex and the other south of Lake Road just north of the railroad spur. The site within the Nine Mile Point Complex was rejected primarily because of the present use of the site for storage of materials, its uses as a construction laydown area, the existence of electrical lines in the area, and the potential use of the site for future expansion of the Nine Mile Point Facilities. The site south of Lake Road was rejected primarily because of hydrological effects. This site functions as a retention pond with the capability of storing the entire volume of the 100-year storm within the respective drainage area. Location of the station at this site would result in significant storage volume loss causing changes to the present 100-year flood drainage system as well as effecting the entire flow system associated with the Nine Mile Point Nuclear Generation Complex.

2. RELOCATION AND RECONNECTION OF NINE MILE-VOLNEY #9 345 kV LINE

Relocation of the subject transmission line into and out of Scriba Station is shown in Amended Exhibit 2 on the Location of Facilities Map. The No. 9 line will utilize primarily existing right-of-way for the

580 foot relocated section from Nine Mile 2 to Scriba Station. Exiting Scriba Station, the No. 9 line will utilize new right-of-way for about 540 feet of its approximated 620 feet length. The balance will be an existing right-of-way.

Land use for the relocated #9 line consists of existing transmission rights-of-way for a distance of about 770 feet and woodlands for a distance of about 430 feet. The southern exit passes through a section of woodland designated as Scriba Woods for a distance of approximately 270 feet.2/ This section of woods consists of hardwood cover type with a light density of a sapling age white ash, red maple and aspen. A medium density of arrowwood, hawthorne and apple is prevalent in this area.

There are not streams, drainage areas nor wetlands crossed by the facility. No cultural resource sites are known to exist on this route. The visual exposure is not significantly different than the existing facility that is to be relocated.

Feasible alternatives to the proposed relocated No. 9 route are not practical because of the fixed points of the Nine Mile 2 Generating Station, the Scriba Station, and the No. 9 line; and, the short distance from the No. 9 line to the proposed Scriba Station; and, the required electrical configuration and physical arrangement of the station.

2/ Exhibit 36 (JdWM-2) "Transmission Corridors in the Vicinity of Scriba Woods" Case 70068 Nine Mile 2 - Volney 765 kV Transmission Facility. See Exhibit 3 page 3-9 for a description of Scriba Woods.

NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 88

SECTION 88.3 AMENDED EXHIBIT E-3

UNDERGROUND CONSTRUCTION

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

UNDERGROUND CONSTRUCTION
§ 88.3 AMENDED EXHIBIT E-3

The following is a description of the facilities included in the undergrounding estimate prepared by Niagara Mohawk for this project:

The underground facilities would consist of three (3) parallel 10.75 inch O.D., grade A steel pipes, coal tar coated, each installed in a separate 5 feet deep X 30 inch wide trench. The trenches would be located ten feet apart. One circuit consisting of three (3) 1/C 345 kV 2500 KCMIL copper high pressure oil filled cables would be installed in each pipe. The three circuits would be operated in parallel. The system would be rated at 1900 amps (100% Load Factor) and would be designed so that normal operation can continue with any one cable out of service.

At each of the four terminal points, (one at Nine Mile 2, two at Scriba Station and one at Volney Station) an area approximately 200 feet square would be required for the installation of riser and switching structures, pumping plants and/or reactors. (Series reactors will be required in the Scriba-Volney 345 kV circuit and will be located at the Scriba terminal). Four pumping plants will be required. Two plants, each with 3,000 gallon storage tanks, will be located at each of the terminals in the Nine Mile 2 - Scriba 345 kV line. Two plants, each with 30,000 gallon tanks, will be located at each of the terminals in the Scriba-Volney 345 kV line. The oil system is the non-circulating type. Either pumping plant will maintain pressure in either line in the event of a failure of the other pumping plant. This will provide the reliability necessary to maintain operation without a separate, second system.

Four riser and switching structures will be required, one at each of the four terminals. At each riser structure, each phase conductor will be terminated in a single conductor 345 kV pothead.

Splices will be required every 2,000 feet and will be made in a concrete manhole.

The underground construction costs estimated for this project using the above scenarios are as follows:

Nine Mile 2 - Scriba 345 kV (.5 miles)	$ 4,293,900.
Scriba-Volney 345 kV (8.9 miles)	$ 41,209,800.

Construction of the proposed facility underground was rejected by Niagara Mohawk because it is not a method which will fulfill the energy requirements with comparable costs, because its cost would be prohibitive, and because of the minimal environmental impacts of constructing such facilities overhead in the area and along the right-of-way owned by Niagara Mohawk.

NEW YORK STATE

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ARTICLE VII CHAPTER 1 PART 88

SECTION 88.4 AMENDED EXHIBIT E-4

ENGINEERING JUSTIFICATION

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

ENGINEERING JUSTIFICATION

88.4 EXHIBIT E-4

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Figures.

A. INTRODUCTION

Niagara Mohawk's original Article VII Application submittal to the Public Service Commission on April 13, 1978, requested approval of, and certification for, a 765 kV facility. Since that time transmission requirements have changed requiring a 345 kV facility. The Nine Mile Point Nuclear Generating Station Unit #2 is scheduled for commercial operation in November 1986. The Nine Mile 2 - Scriba and Scriba-Volney 345 kV Transmission Facilities are proposed for in service in November 1985 and June 1986, respectively, to provide an outlet for Nine Mile Point #2, connecting it to the existing Volney Station 9.4 miles south and, thereafter, to the cross state EHV bulk power system.

B. NINE MILE 2 - VOLNEY TRANSMISSION REQUIREMENTS

Since the initial Article VII filing for the Nine Mile 2 - Volney Transmission Facilities, the generation expansion plan of the New York Power Pool (NYPP) has undergone significant changes. For example, a comparison of the 1978 version of the 149b filing with the 1981 5-112 filing indicates the following changes:

Generation	149b 1978 Filing	5-112 1981 Filing
Somerset	850MW in 1983	625MW in 1984
Sterling	1150MW in 1986	Cancelled
Lake Erie #1	850MW in 1987	850MW in 1991
Lake Erie #2	850MW in 1989	Not Scheduled
NYSEG #1 (New Haven)	1250MW in 1991	Not Scheduled
NYSEG #2 (New Haven)	1250MW IN 1993	Not Scheduled
Nine Mile Pt. #3	1300MW in 1996	Not Scheduled

This substantial change in scheduled generation additions made it desirable to re-examine the transmission plans for serving Nine Mile Point #2. Transmission alternate evaluations considered:

- economics associated with capital cost, transmission losses, and replacement power costs resulting from transmission unavailability.
- transmission system thermal and stability performance.

The system assumed constant for comparative analysis purposes is shown on Figure E-4-0. Three methods of bringing Nine Mile Point #2 generation into the bulk power system are shown in figures E-4-1, E-4-2 and E-4-3.

- Figure E-4-1, the recommended configuration, includes a new 345 kV circuit from Nine Mile #2 to Scriba to Volney and a new 345 kV station in the vicinity of Lake Road (Scriba).

- Figure E-4-2 includes a radial 345 kV generator lead from Nine Mile Point #2 to Volney.
- Figure E-4-3 includes a radial 765 kV generator lead from Nine Mile Point #2 to East Volney and associated 765 kV to 345 kV autotransformers at East Volney and at Marcy. This configuration is the one which was recommended in the initial Article VII filing when, in addition to Nine Mile Point #2, Sterling and other new generation were proposed.

C. SYSTEM PERFORMANCE

All of the alternate configurations perform satisfactorily with respect to system thermal loadings and stability performance. Figures E-4-4 and E-4-5 show typical and peak generation power flows, respectively, in the area following construction of the recommended facilities.

Figures E-4-6 and E-4-9 demonstrate two contingency conditions with and without the Scriba to Volney portion of the recommended facilities in service. For thermal loading, these figures indicate unsatisfactory performance without this facility and satisfactory performance with this facility in service.

Figures E-4-10 and E-4-11 indicate stable system operation for the recommended configuration.

There are differences in the resulting economic operation of the alternates when capital cost differences, increased system losses, and production cost penalties associated with lost generation output are considered. To properly analyze these differences, an overall economic analysis was performed.

D. ANALYSIS OF ALTERNATES

Figure E-4-12 is an economic comparison of 765 kV versus 345 kV. It compares the configuration of Figure E-4-1 with that of Figure E-4-3 considering the following:

- the capital cost difference between configurations.
- the increased losses associated with transmitting power at 345 kV instead of 765 kV.
- production cost penalties associated with the radial 765 kV generator lead of Figure E-4-3.

The range, or bandwidth, of annual expense was calculated based on the historic fact that new equipment has a higher than average failure rate during the first few years of service. For Figure E-4-12 the bottom curve

includes an estimate of this effect and the next curve, for comparative purposes, ignores this effect. Since 765 kV does not break even economically, it is not recommended.

If, in the future (beyond present planning expectations), plans evolve for additional generation in the Oswego area, such that 765 kV is warranted, the Volney-Marcy circuit would be energized at 765 kV. This is consistent with the certification for Volney-Marcy (Case 26251) which indicated that Volney-Marcy would be constructed as a 765 kV circuit but initially operated at 345 kV until system conditions warrant 765 kV operation.

E. RELIABILITY

The configuration of Figure E-4-2 has deficiencies which the configuration of Figure E-4-1 corrects:

a. Whenever the Nine Mile #2 Volney radial generator lead is forced out of service while Nine Mile Point #2 generator is running, generation is lost. For permanent circuit outages, requiring 24 hours to repair and 100 hours additional to restore Nine Mile Point #2 generation to full output, 53,000 MWhrs of nuclear generation must be replaced with higher cost generation.

b. Even for a temporary outage of the radial generator lead, which restores within a minute, 40,000 MWhrs of nuclear generation are lost, due to the restarting characteristics of the nuclear generation plant.

c. Whenever the Nine Mile - Volney #9 is taken out of service for maintenance, it is necessary to restrict the combined output of Mine Mile Point #1 and J. A. Fitzpatrick to 1200 MW (versus a combined capability of approximately 1400 MW).

d. For loss of a substation - a possible but improbable contingency (PBI) - more generation is lost for the configuration of Figure E-4-2 than for Figure E-4-1. For Figure E-4-2, Oswego 5 and 6 (1700 MW) and Nine Mile Point #2 (1080 MW) would be lost for loss of Volney Station. Total lost generation would be 2780 MW. For Figure E-4-1, the maximum lost generation for loss of a station would be 1700 MW. (Oswego 5 and 6 for loss of Volney Station).

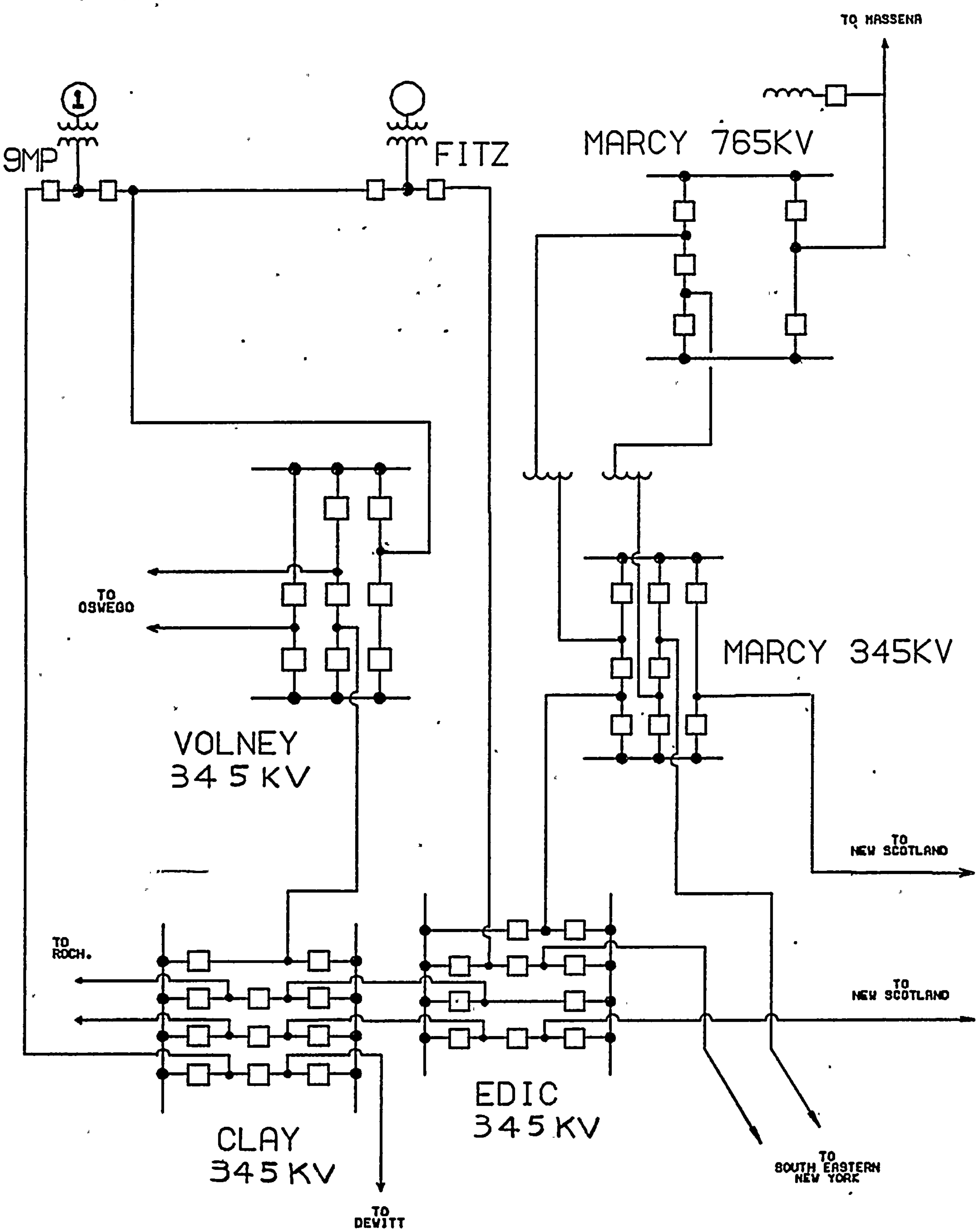
The above factors make the building of the station desirable with respect to operating flexibility and reliability. Also, Figure E-4-13 demonstrates that in consideration of system losses and items "a" and "b" above, the station is justified--breaking even economically within 0 to 13

years. The range, again, reflects consideration of higher than average failure rates during the first few years of service life. In this case, the bottom curve ignores the effect and the next curve includes it.

Considering all factors including the economic evaluations of Figures E-4-12 and E-4-13, the condiguration of Figure E-4-1 is recommended.

F. IMPACT OF DELAY IN COMPLETION OF FACILITIES

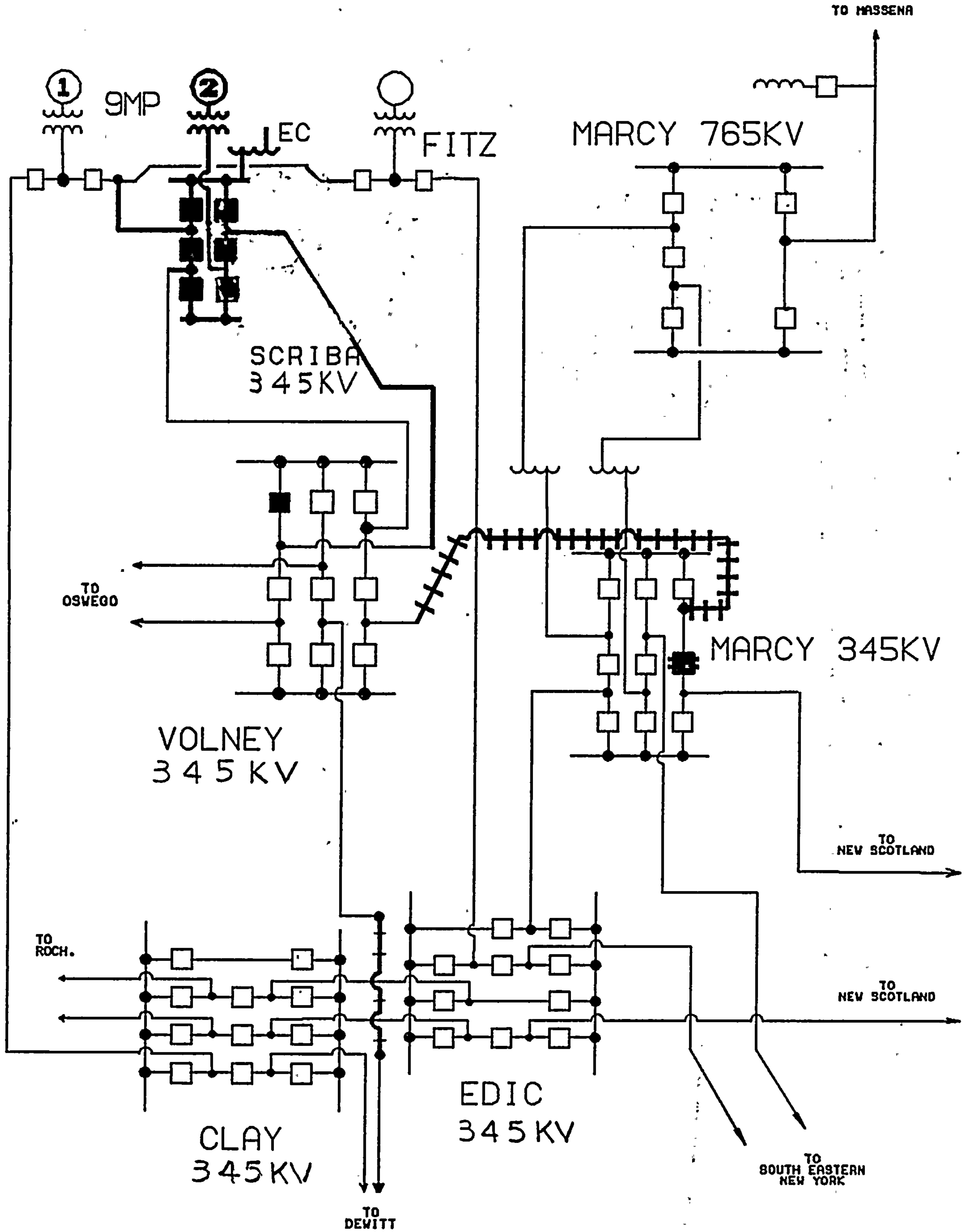
The proposed facilities; the 345 kV circuit from Nine Mile 2 to Scriba Station is scheduled for service in November 1985. The Scriba to Volney Transmission Line and the Scriba Station are scheduled for service in June 1986 to allow adequate time for generator power testing, transmission line and generator step-up bank relay testing. Delay in completion of the facilities will result in delaying the commercial in-service date of the unit.



SYSTEM
ASSUMED FOR COMPARATIVE ANALYSIS

FIG. E-4-Ø

CAD 0289.1

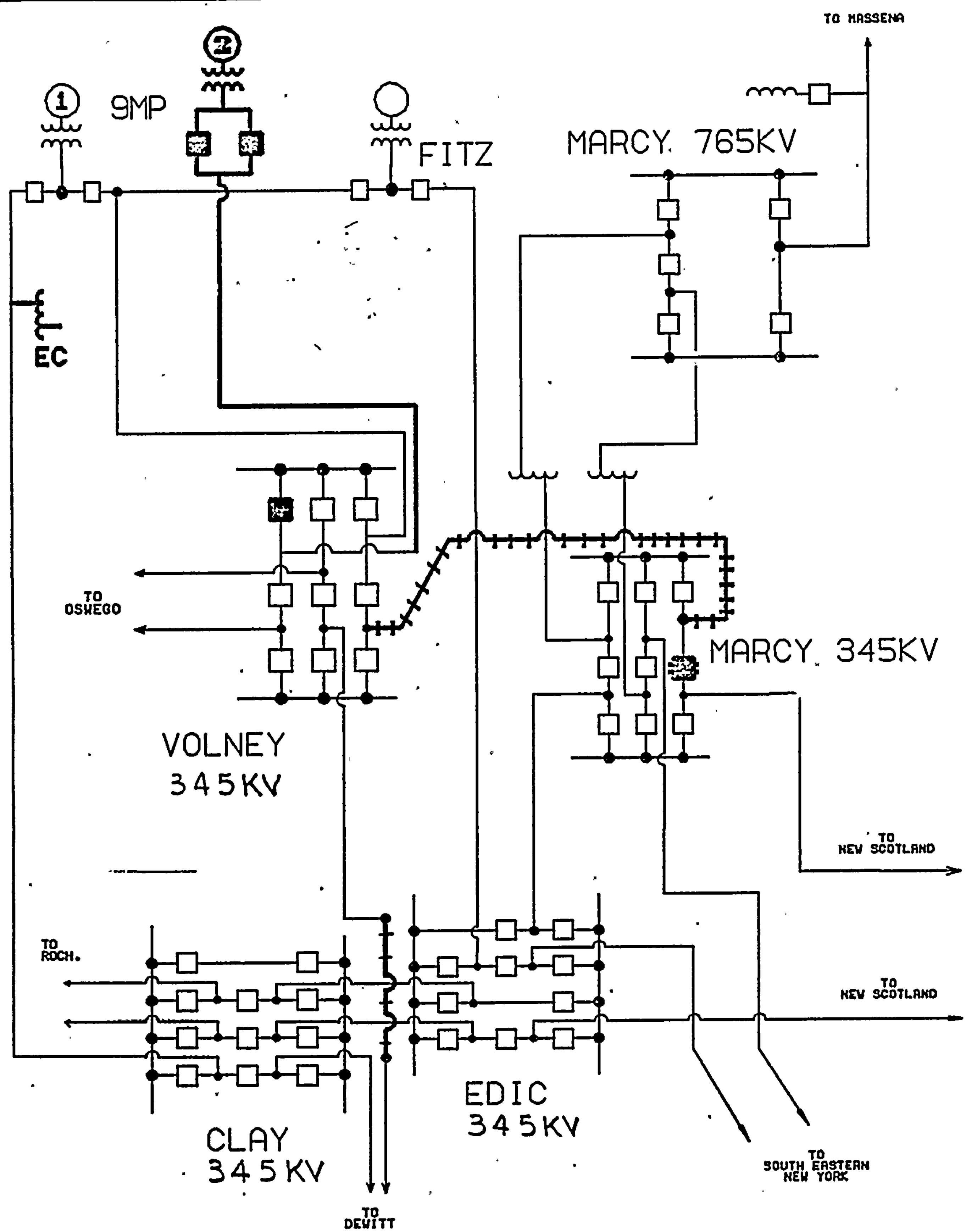


RECOMMENDED CONFIGURATION

FIG. E-4-1

EXISTING
PROPOSED BY THIS APPLICATION
OTHER FACILITIES ADDED

CAD 0289.2

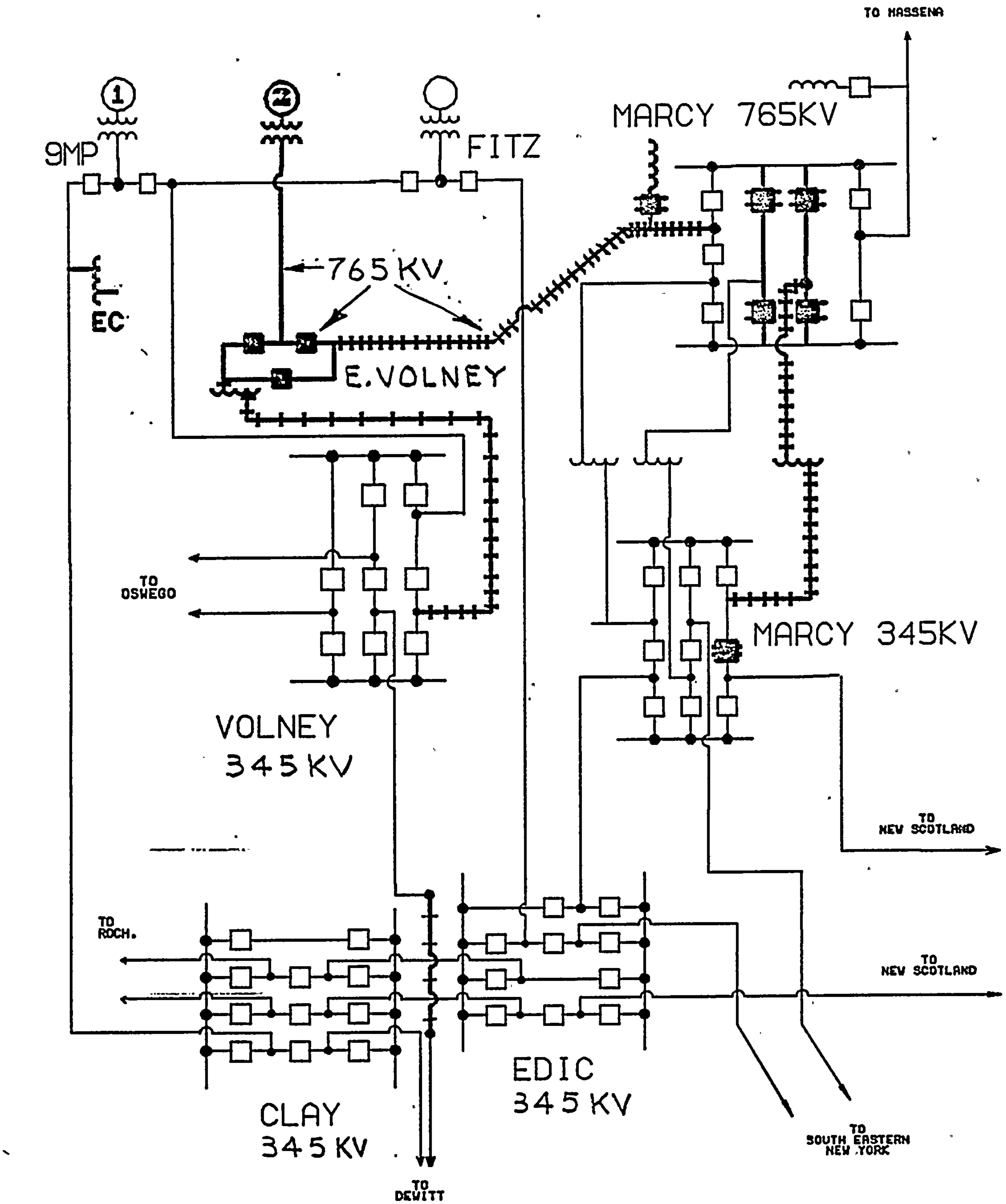


RADIAL - ALTERNATE CONFIGURATION

FIG. E-4-2

EXISTING
PROPOSED BY THIS APPLICATION
OTHER FACILITIES ADDED

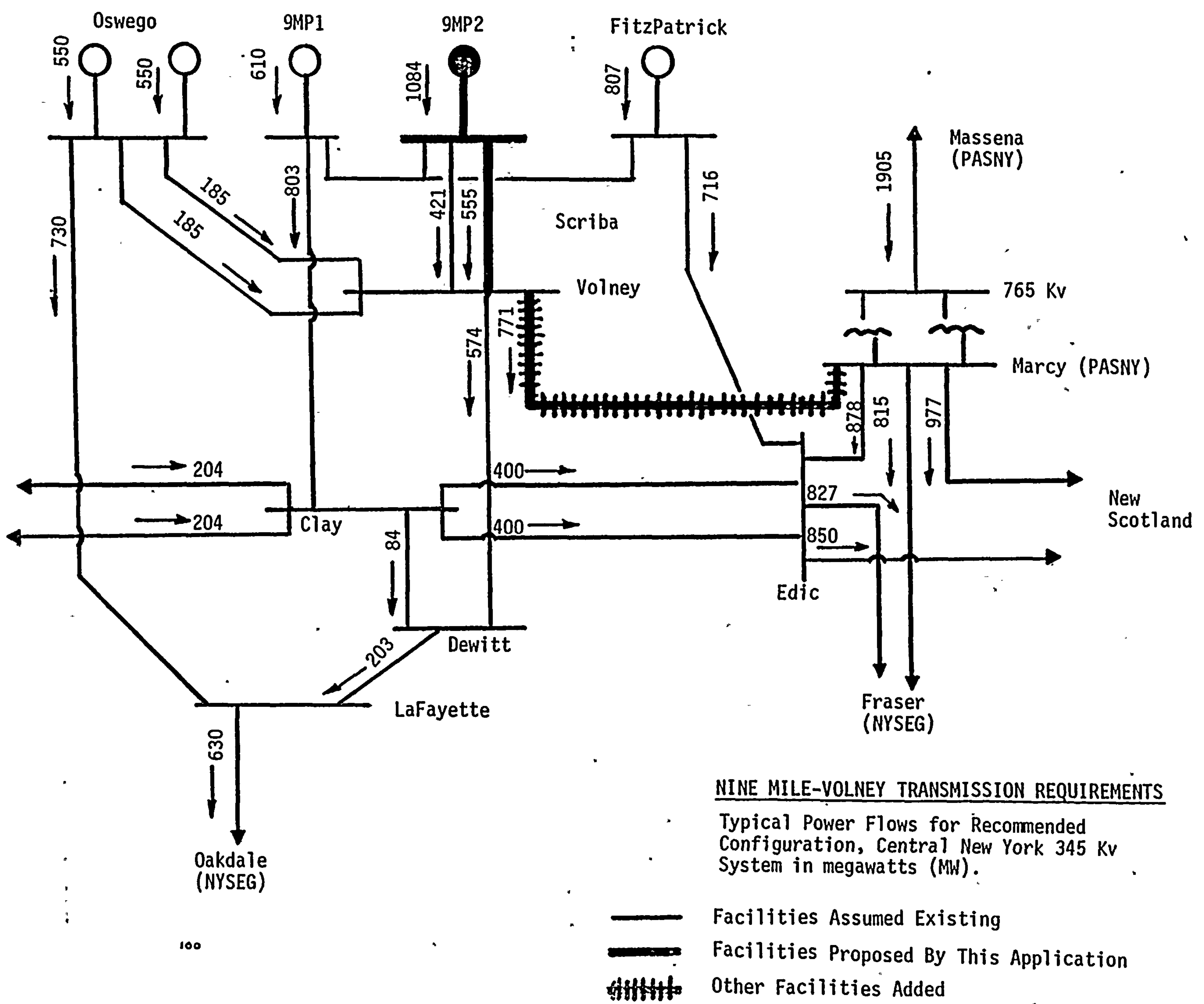
CAD 0289.3



765KV ALTERNATE CONFIGURATION FIG. E-4-3

EXISTING
PROPOSED BY THIS APPLICATION
OTHER FACILITIES ADDED

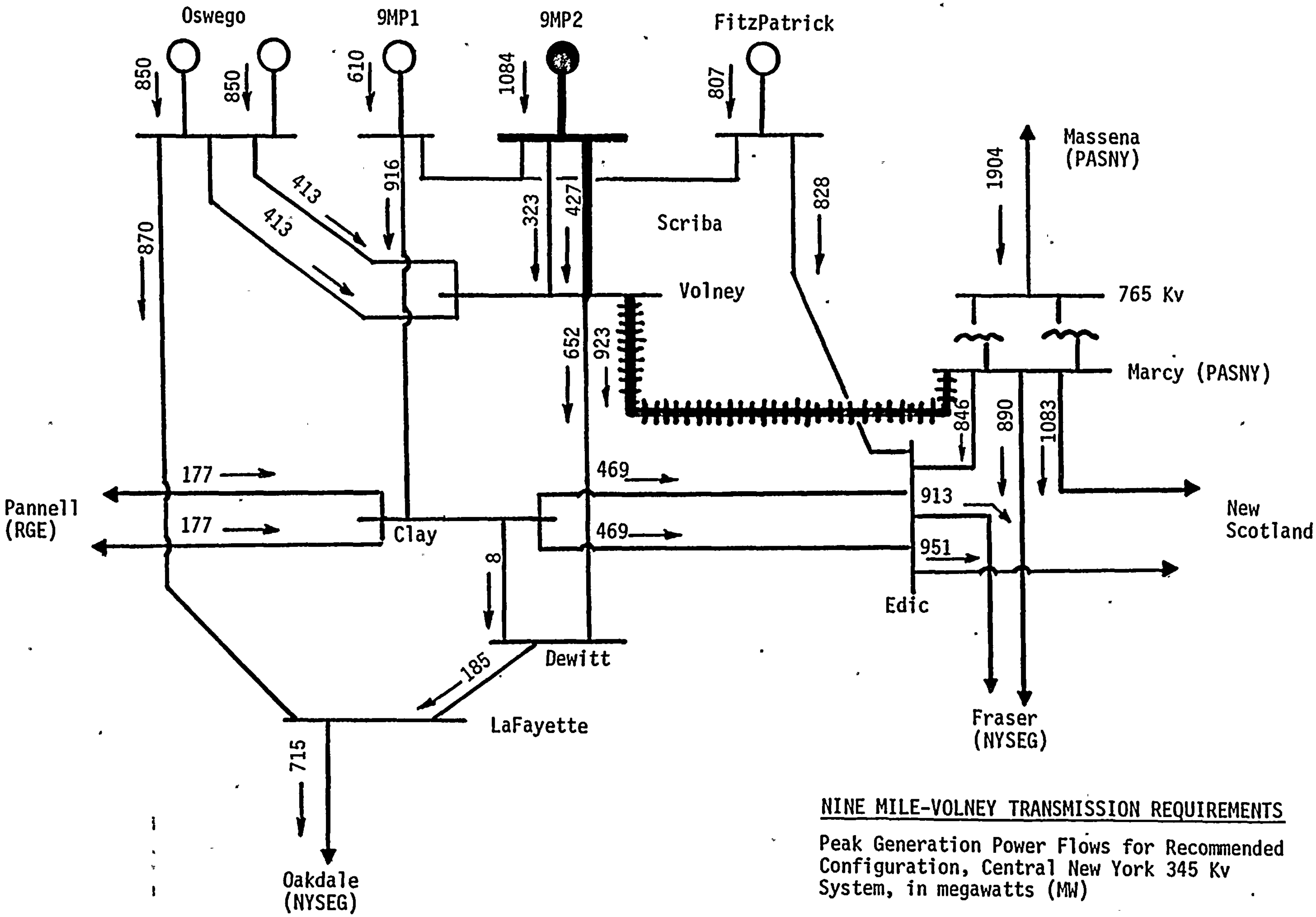
CAD 0289.4



NINE MILE-VOLNEY TRANSMISSION REQUIREMENTS

Typical Power Flows for Recommended Configuration, Central New York 345 Kv System in megawatts (MW).

Figure E-4-4



NINE MILE-VOLNEY TRANSMISSION REQUIREMENTS

Peak Generation Power Flows for Recommended Configuration, Central New York 345 Kv System, in megawatts (MW)

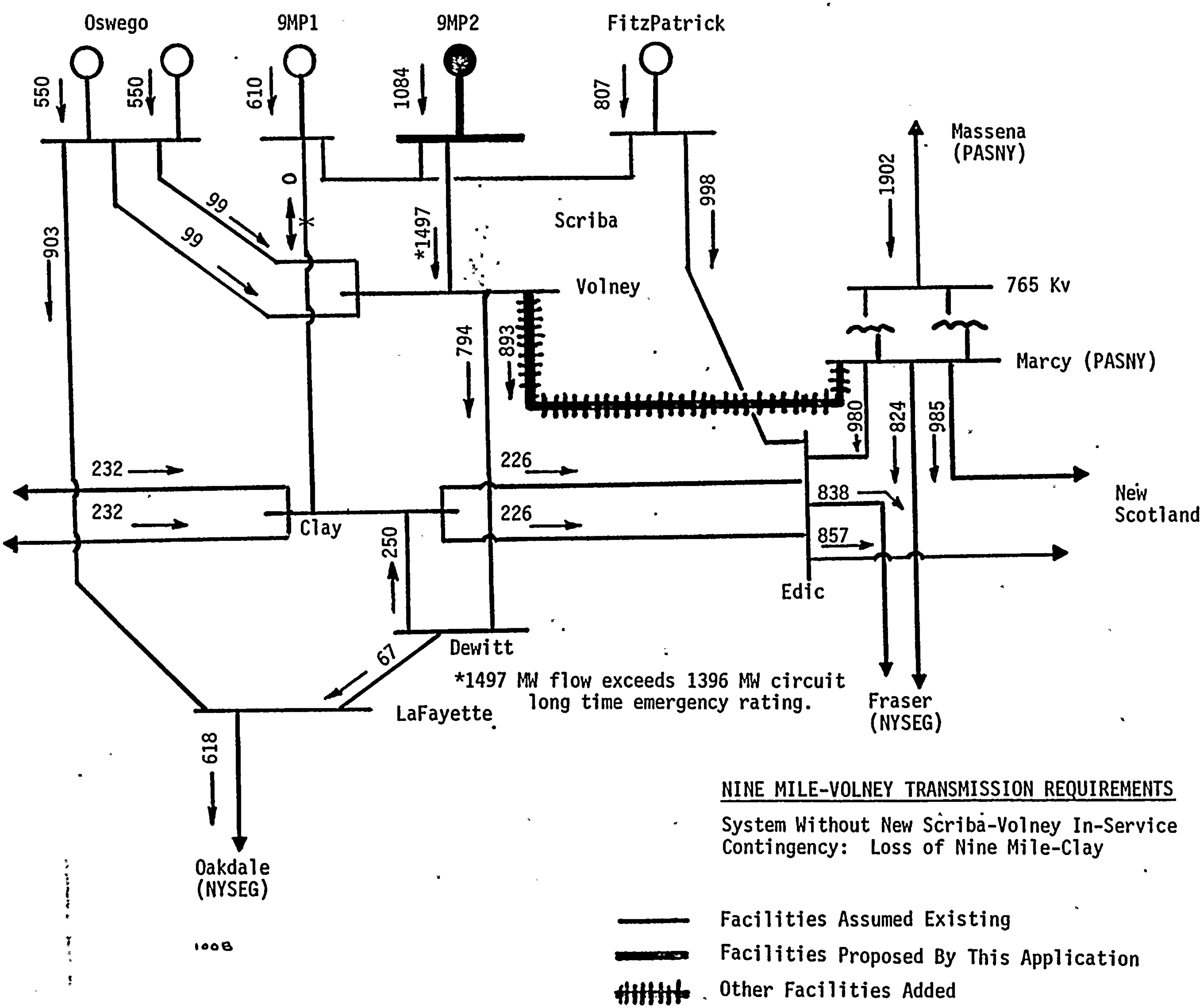
Facilities Assumed Existing

Facilities Proposed By This Application

Other Facilities Added

Figure E-4-5

105

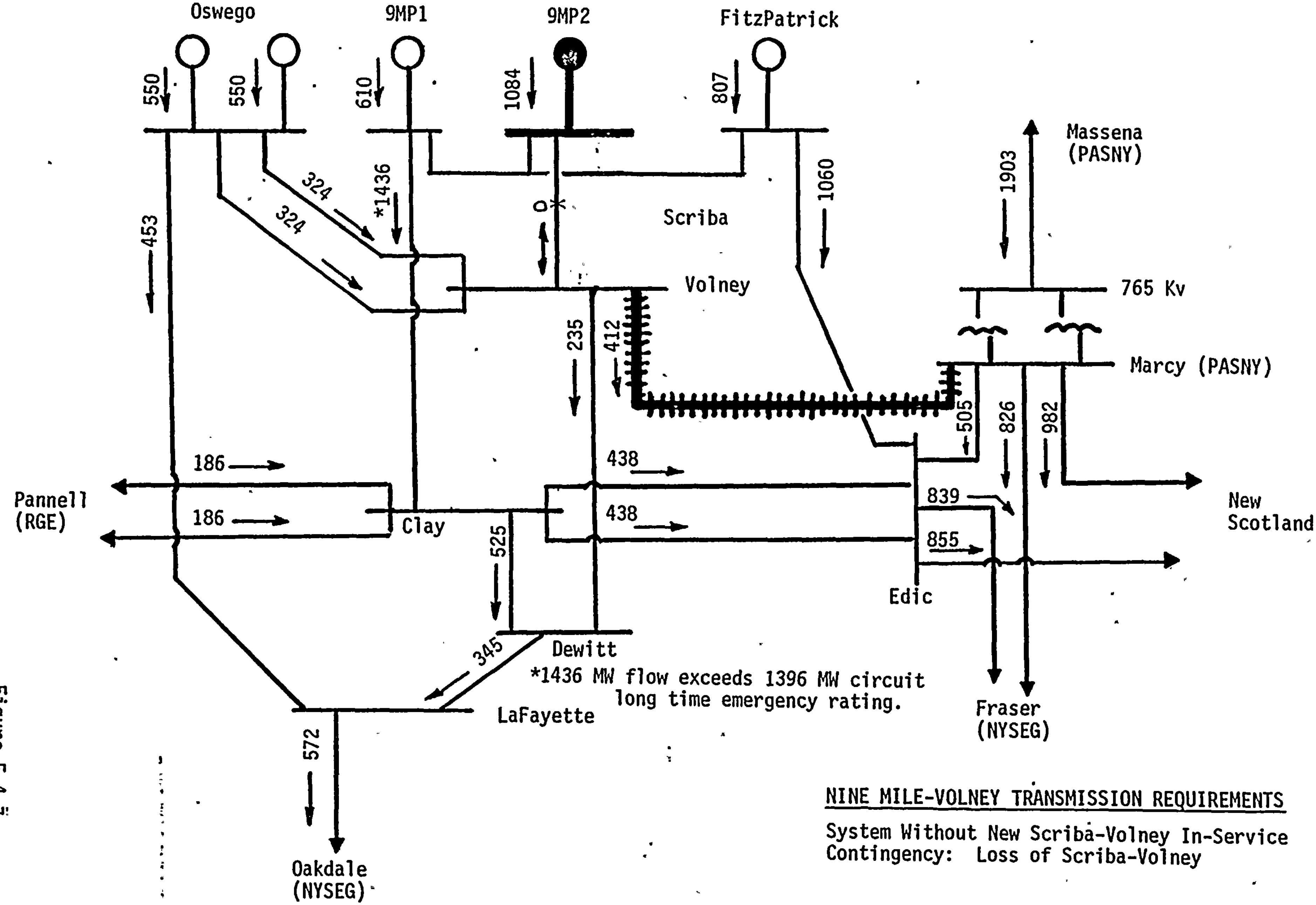


NINE MILE-VOLNEY TRANSMISSION REQUIREMENTS

System Without New Scriba-Volney In-Service
Contingency: Loss of Nine Mile-Clay

Figure E-4- 6

1008



NINE MILE-VOLNEY TRANSMISSION REQUIREMENTS

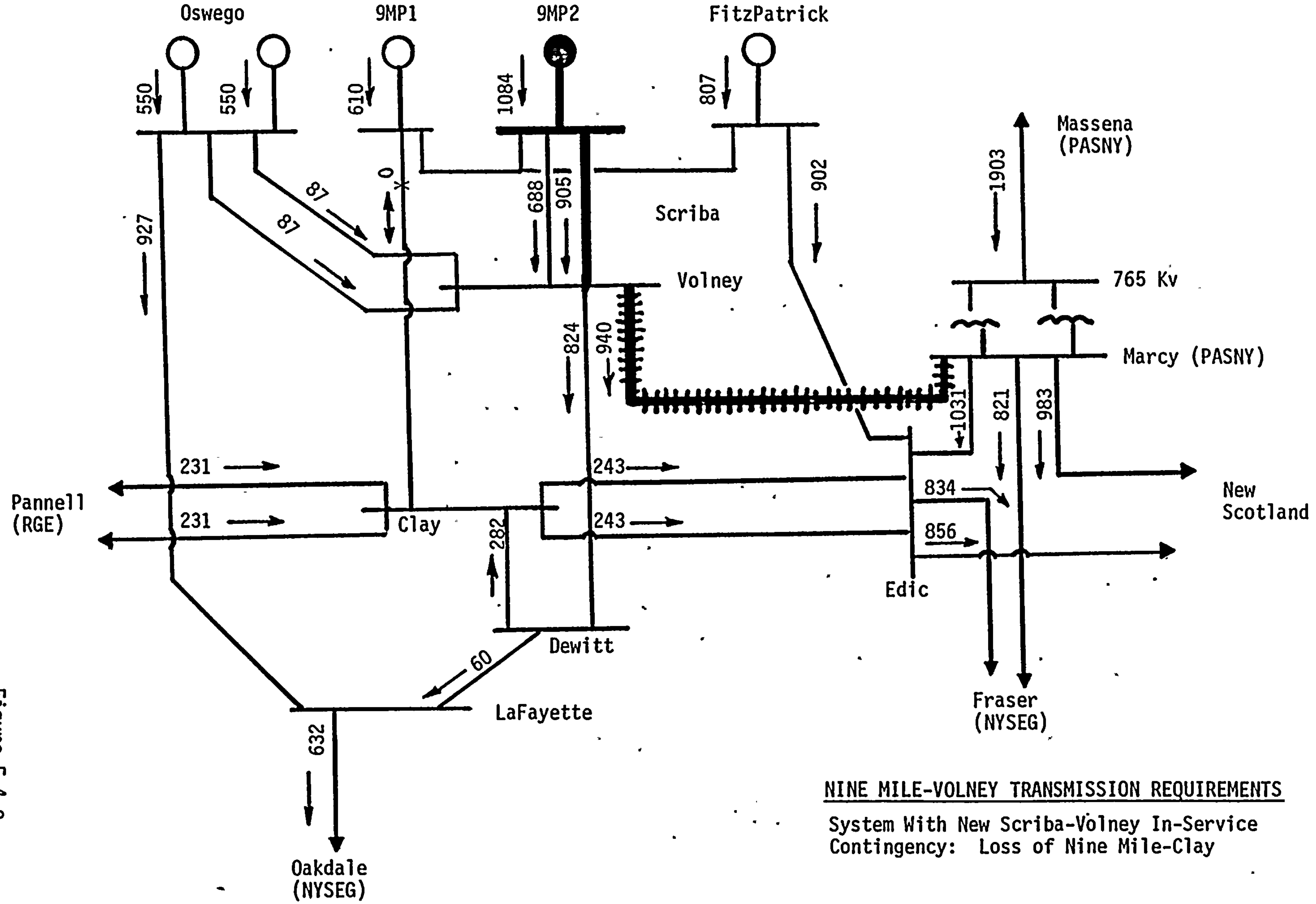
System Without New Scriba-Volney In-Service
Contingency: Loss of Scriba-Volney

Facilities Assumed Existing

Facilities Proposed By This Application

Other Facilities Added

Figure E-4-7



NINE MILE-VOLNEY TRANSMISSION REQUIREMENTS

System With New Scriba-Volney In-Service
Contingency: Loss of Nine Mile-Clay

Facilities Assumed Existing

Facilities Proposed By This Application

Other Facilities Added

Figure E-4-8

1000

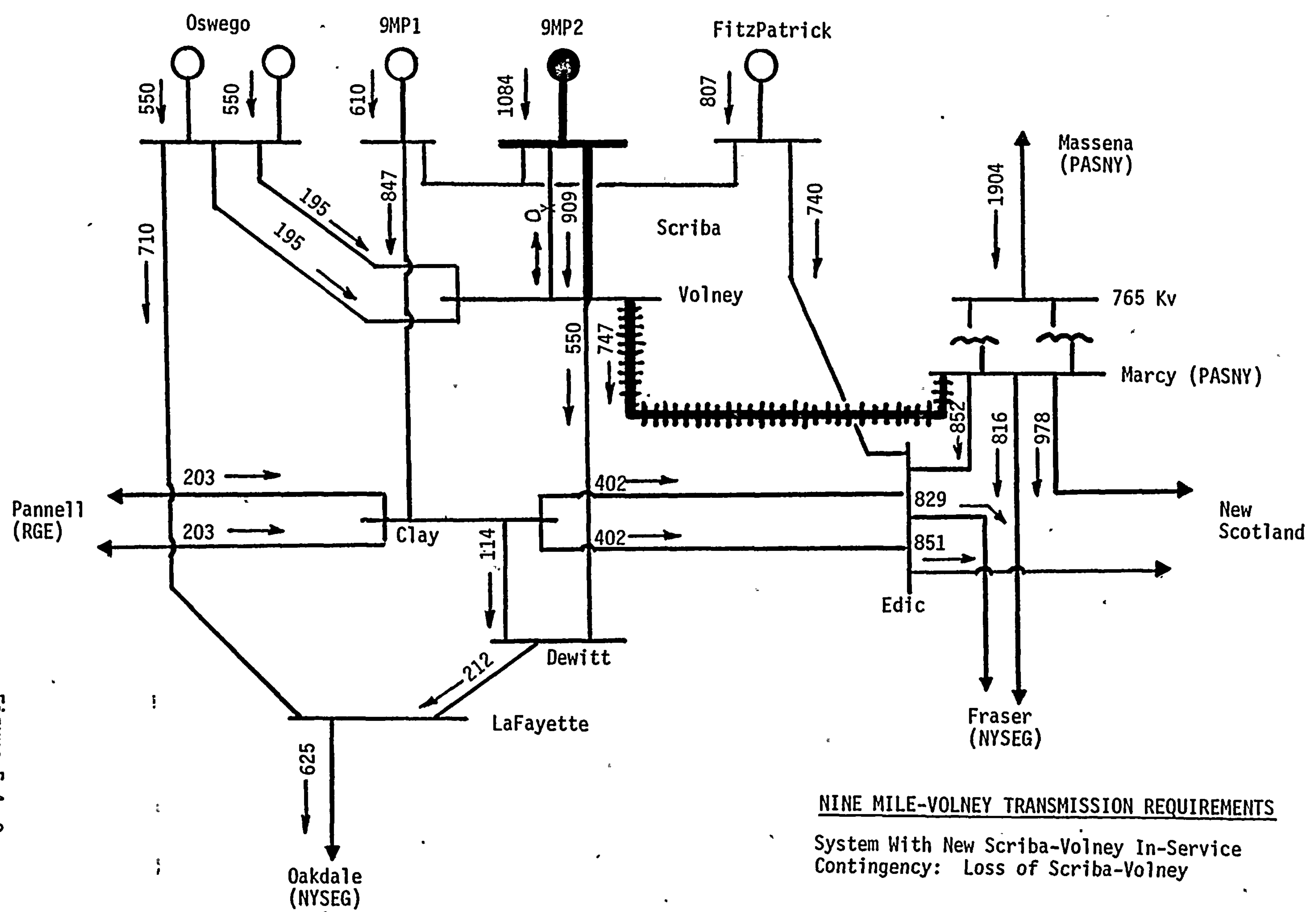


Figure E-4-9

NINE MILE-VOLNEY TRANSMISSION REQUIREMENTS

System With New Scriba-Volney In-Service
Contingency: Loss of Scriba-Volney

Facilities Assumed Existing
Facilities Proposed By This Application
Other Facilities Added

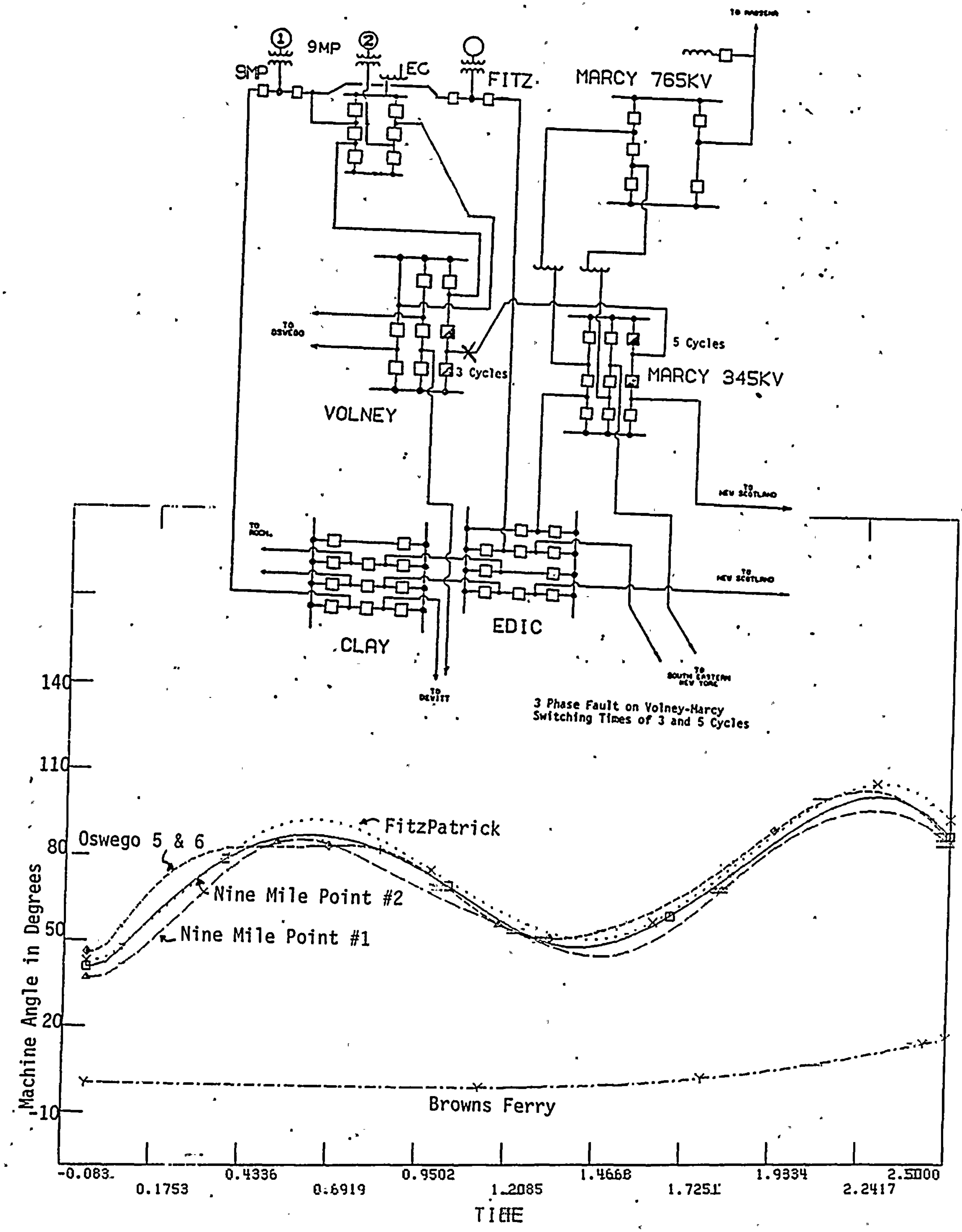

9MP
8MP
EC
FITZ
MARCY 765KV
TO OSWEGO
3 Cycles
5 Cycles
MARCY 345KV
VOLNEY
TO NEW SCOTLAND
TO ROCH.
CLAY
EDIC
TO DEWITT
TO SOUTH EASTERN NEW YORK
3 Phase Fault on Volney-Marcy
Switching Times of 3 and 5 Cycles
140
110
80
50
20
10
Machine Angle in Degrees
Oswego 5 & 6
FitzPatrick
Nine Mile Point #2
Nine Mile Point #1
Browns Ferry
-0.083
0.1753
0.4336
0.6919
0.9502
1.2085
1.4668
1.7251
1.9334
2.2417
2.5000
TIME

FIGURE E-4-10

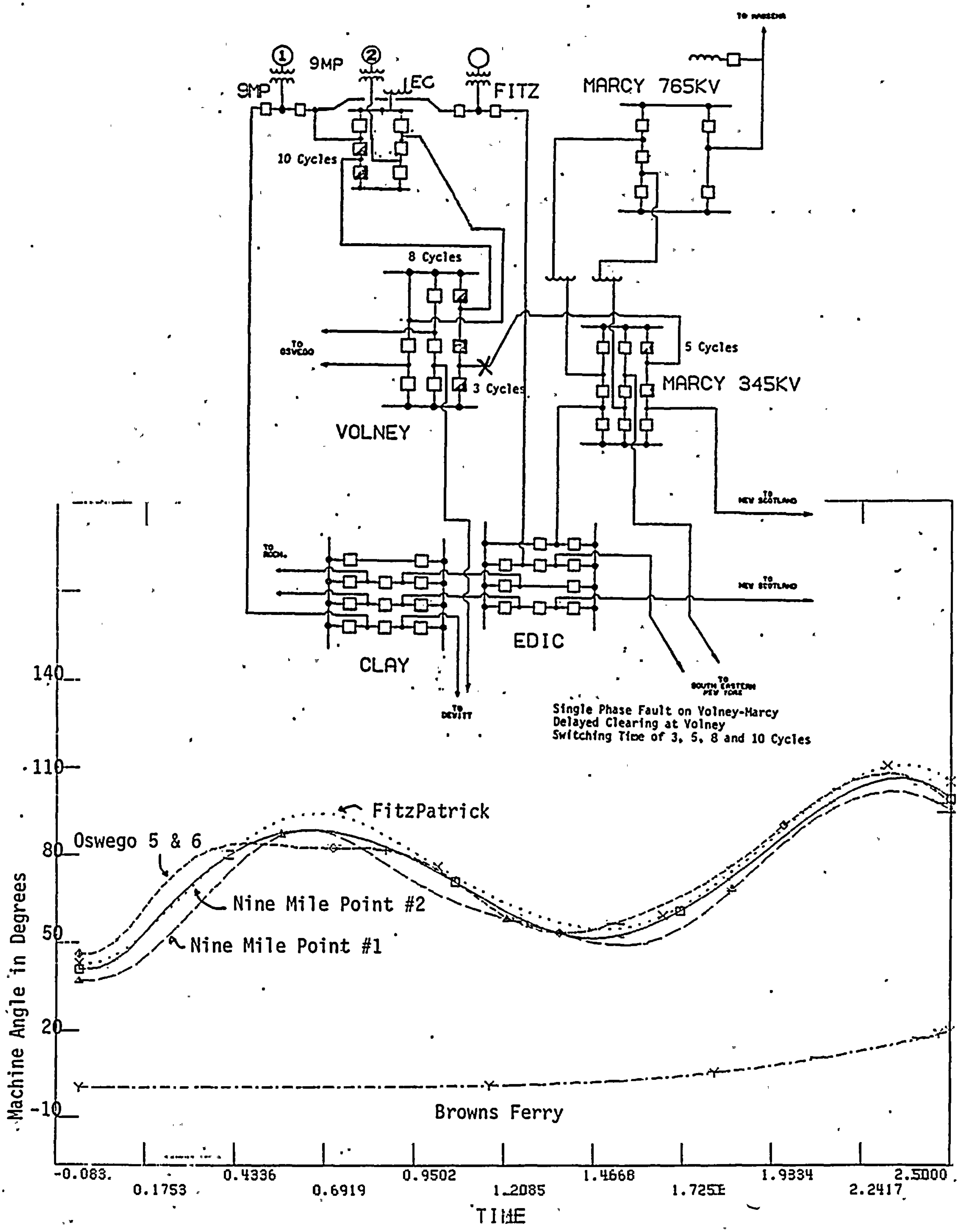

9MP
9MP
FITZ
MARCY 765KV
10 Cycles
8 Cycles
TO OSWEGO
5 Cycles
MARCY 345KV
3 Cycles
VOLNEY
TO NEW SCOTLAND
TO ROCH.
TO NEW SCOTLAND
CLAY
EDIC
TO SOUTH EASTERN NEW YORK
TO DEWITT
Single Phase Fault on Volney-Marcy
Delayed Clearing at Volney
Switching Time of 3, 5, 8 and 10 Cycles
140
110
80
50
20
-10
Machine Angle in Degrees
FitzPatrick
Oswego 5 & 6
Nine Mile Point #2
Nine Mile Point #1
Browns Ferry
-0.083
0.1753
0.4336
0.6919
0.9502
1.2085
1.4668
1.7251
1.9834
2.2417
2.5000
TIME

FIGURE E-4-11

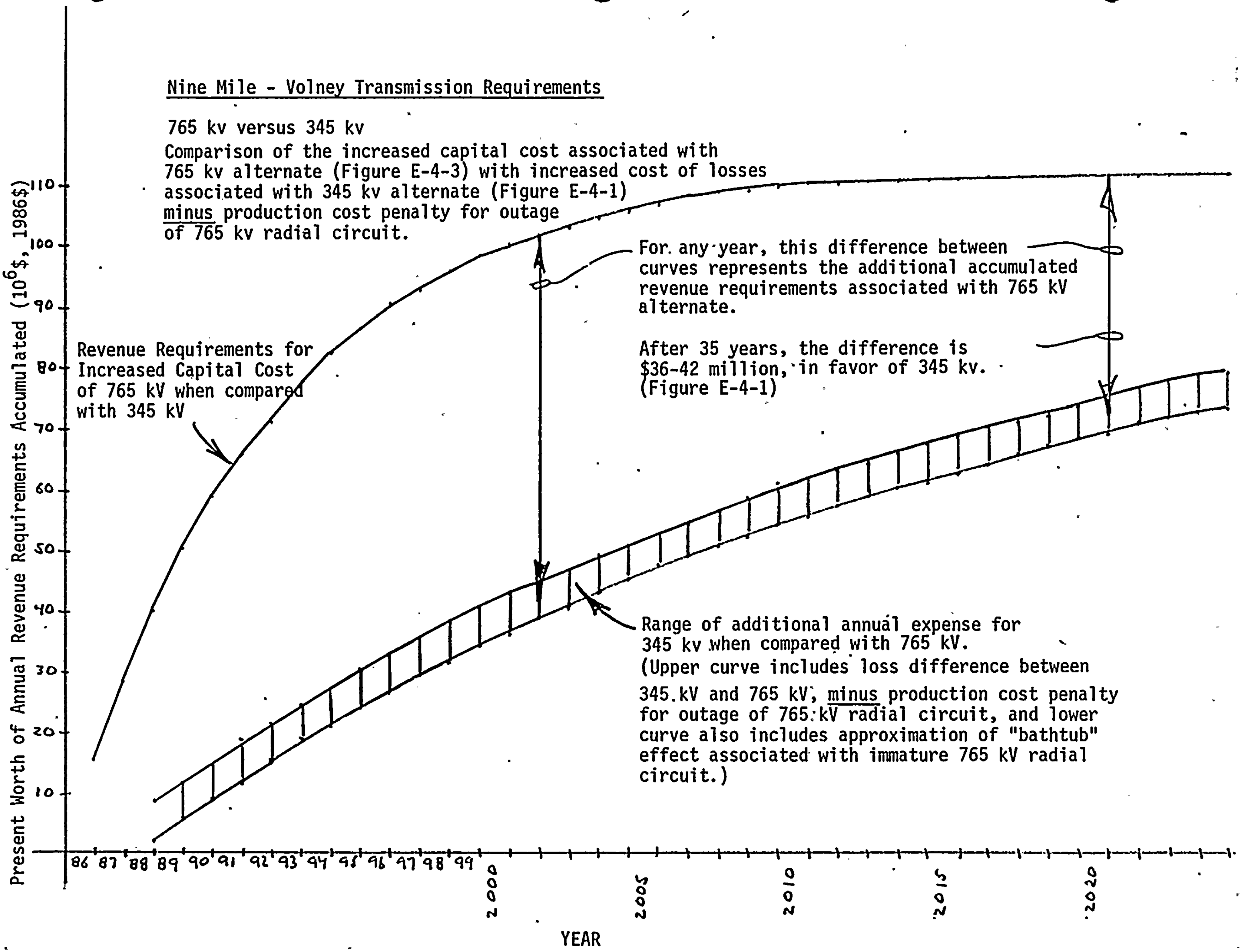

Nine Mile - Volney Transmission Requirements
765 kv versus 345 kv
Comparison of the increased capital cost associated with 765 kv alternate (Figure E-4-3) with increased cost of losses associated with 345 kv alternate (Figure E-4-1) minus production cost penalty for outage of 765 kv radial circuit.
For any year, this difference between curves represents the additional accumulated revenue requirements associated with 765 kV alternate.
After 35 years, the difference is $36-42 million, in favor of 345 kv. (Figure E-4-1)
Revenue Requirements for Increased Capital Cost of 765 kV when compared with 345 kV
Range of additional annual expense for 345 kv when compared with 765 kV.
(Upper curve includes loss difference between 345 kV and 765 kV, minus production cost penalty for outage of 765 kV radial circuit, and lower curve also includes approximation of "bathtub" effect associated with immature 765 kV radial circuit.)
Present Worth of Annual Revenue Requirements Accumulated (10^6$, 1986$)
110
100
90
80
70
60
50
40
30
20
10
86
87
88
89
90
91
92
93
94
95
96
97
98
99
2000
2005
2010
2015
2020
YEAR

Figure E-4-12

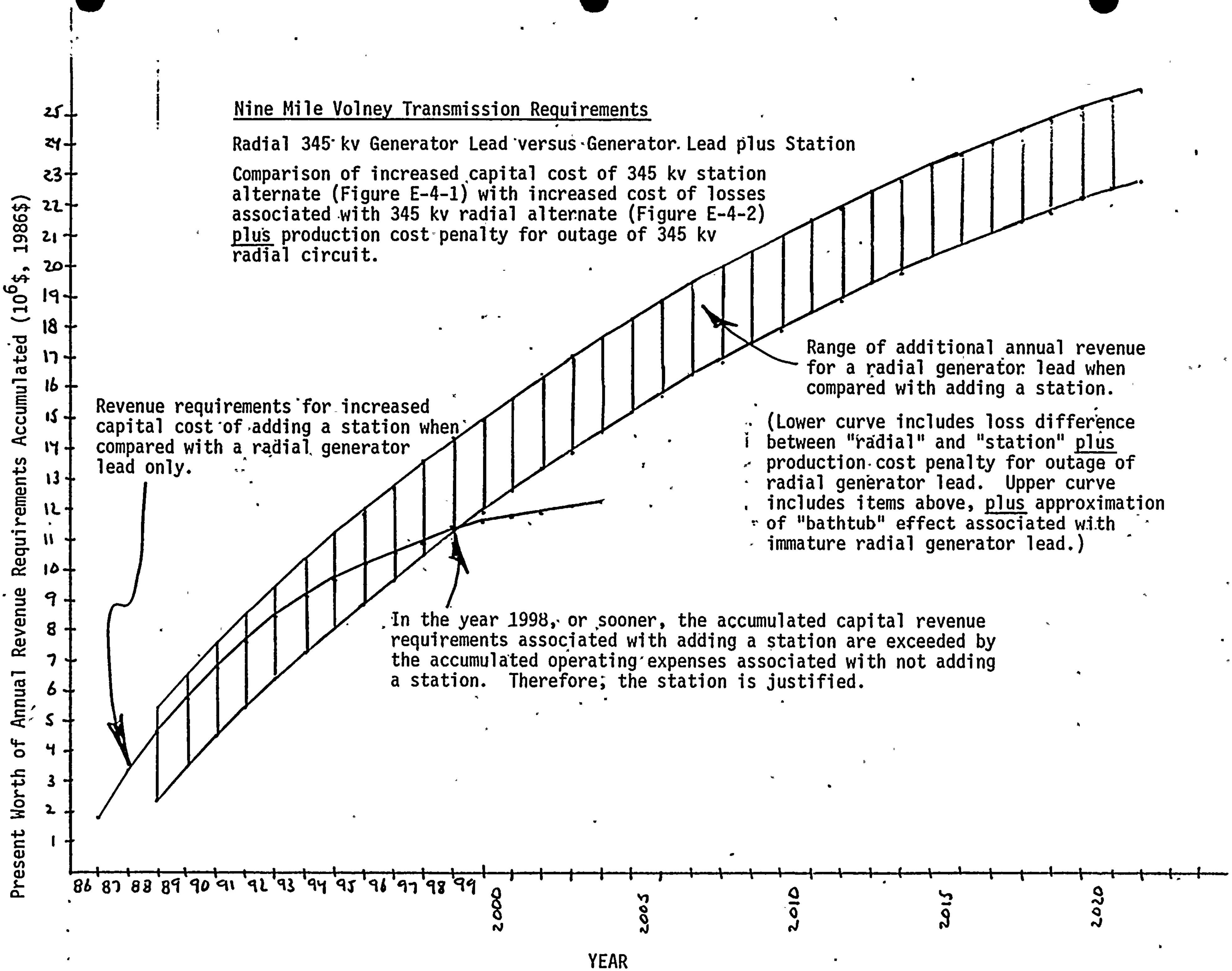

Nine Mile Volney Transmission Requirements
Radial 345 kv Generator Lead versus Generator Lead plus Station
Comparison of increased capital cost of 345 kv station alternate (Figure E-4-1) with increased cost of losses associated with 345 kv radial alternate (Figure E-4-2) plus production cost penalty for outage of 345 kv radial circuit.
Range of additional annual revenue for a radial generator lead when compared with adding a station.
(Lower curve includes loss difference between "radial" and "station" plus production cost penalty for outage of radial generator lead. Upper curve includes items above, plus approximation of "bathtub" effect associated with immature radial generator lead.)
Revenue requirements for increased capital cost of adding a station when compared with a radial generator lead only.
In the year 1998, or sooner, the accumulated capital revenue requirements associated with adding a station are exceeded by the accumulated operating expenses associated with not adding a station. Therefore, the station is justified.
Present Worth of Annual Revenue Requirements Accumulated (10^6\$, 1986\$)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
86
87
88
89
90
91
92
93
94
95
96
97
98
99
2000
2005
2010
2015
2020
YEAR

Figure E-4-13

NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 88

SECTION 88.5 AMENDED EXHIBIT E-5

EFFECT ON COMMUNICATIONS

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

EFFECT ON COMMUNICATIONS
§ 88.5 AMENDED EXHIBIT E-5

The applicant's experience with 345 kV lines having a conductor diameter, configuration and right-of-way width as proposed, is that there should be no adverse effects to any existing radio, television, telephone, microwave or other communications systems which are not correctable.

If the construction or operation of the proposed transmission line results in interference levels which pose a problem to radio and television reception, the applicant will perform tests to evaluate the grade of reception, effect measures to eliminate the interference and restore reception to its original quality.

There are no A.M. radio stations in the project area whose radiation patterns may be changed by the proposed line.

NEW YORK STATE

PUBLIC SERVICE LAW

ARTICLE VII CHAPTER 1 PART 88

SECTION 88.6 AMENDED EXHIBIT E-6

EFFECT ON TRANSPORTATION

NINE MILE 2 - VOLNEY 345 kV TRANSMISSION FACILITY

Niagara Mohawk Power Corporation

EFFECTS ON TRANSPORTATION
§ 88.6 AMENDED EXHIBIT E-6

In the region affected by the primary route, the principle transportation facilities are the road and railroad networks. The road, railroad, and air transportation system in this region will experience no adverse effect due to the proposed transmission line and related facilities.

Existing transmission lines in the vicinity of the proposed transmission line have had no adverse effect on past development of transportation systems in the region and the proposed transmission line and related facilities will not adversely affect any future development of such systems.

Applicant intends to comply with all regulations set forth by governing bodies regarding the crossings of railroads and highways and the Federal Aviation Agency (FAA) regulations pertaining to the construction of transmission lines in the vicinity of airports.

Applicant has taken into consideration the location of the right-of-way to the end that the proposed facilities will have no adverse effect upon airports, railroads, and other transportation systems.

NINE MILE 2 - VOLNEY

345kV TRANSMISSION

FACILITY

ARTICLE VII APPLICATION

DIRECT TESTIMONY

prepared by
Niagara Mohawk Power Corporation
April 1982

Q. Would you please state your name, position, business affiliation and address?

A. My name is Frederick J. Lange. I am presently employed by Niagara Mohawk Power Corporation as Manager of Engineering Planning. My business address is 300 Erie Boulevard West, Syracuse, New York 13202.

Q. What are your responsibilities in your present position as they pertain to the instant proceeding?

A. In my present position, I direct the investigation, evaluation, and justification of proposed capital projects relating to the corporate energy supply and delivery systems. For this particular proceeding, the planning studies performed and included in Amended Exhibit E-4, Exhibit ______ were done under my direction and supervision.

Q. Would you set forth your educational background and professional experience prior to your having assumed your present position?

A. I received a Bachelor of Science Degree in Electrical Engineering from Clarkson College in 1966. Subsequently, I received a Master of Science Degree in Electrical Engineering from Clarkson College in 1968. My initial assignment with Niagara Mohawk in 1967 was in the Engineering System Studies section where I participated in the planning of the Company's transmission expansion program. In 1973, I became Supervisor, Electric System Transmission Engineering section and I held

that position until 1975, at which time I became Supervisor of the Generation and Transmission Planning Section. I held this position until 1981, at which time I became Manager of Engineering Planning.

Q. Are you a member of any industry committee?

A. Yes. I am presently serving as Chairman of the Transmission Planning Advisory Subcommittee of the New York Power Pool and have taken part in task force activities associated with this committee since 1973.

Q. Have you testified previously either in this or in other Article VII proceedings?

A. I have not heretofore rendered sworn testimony in this proceeding. I am now rendering testimony and sponsoring an exhibit pertaining to the need for the Nine Mile 2-Volney 345 kV transmission facility. Previously, I had sponsored testimony pertaining to the need for the Wellsville-Andover 115 kV transmission facility, PSC Case Number 26729.

Q. Would you briefly describe the need for the 345 kV transmission facility and associated equipment which is the subject of this application?

A. The proposed 345 kV transmission facility and associated Scriba Station are necessary to provide a means to interconnect the Nine Mile 2 generator (scheduled for service in November, 1986) with the cross-state transmission system. This will allow the delivery of energy from this new generator to customers in a reliable and economic manner and will provide

increased operating flexibility with respect to the other, existing generators in the area.

Q. Why was the existing Volney Station chosen as the southerly terminus of the transmission facility?

A. Volney Station was selected as the southerly terminus of the 345 kV transmission facility which is the subject of this application because it is the nearest tie-in to the cross-state transmission system.

Q. How does the proposed facility fit into the transmission plans of the New York Power Pool?

A. The proposed facility will adequately provide for delivery of all presently planned generation in the Oswego area to the cross-state transmission grid. The present transmission (and generation) plans of the New York Power Pool do not include any additional generation in the vicinity of Nine Mile within the next 15 years, therefore, no additional transmission is planned.

If in the future it becomes desirable to add additional generation in the area, the proposed facility and scheduled, associated facilities can be integrated into a transmission expansion plan. That plan will depend upon the size and location of the generation being added.

Q. Prior to amending its application in this proceeding, what had been the type of generator lead being proposed to deliver energy from Nine Mile 2 to the power grid?

A. Prior to amending the instant application, Niagara Mohawk proposed a 765 kV radial "generator lead" between Nine Mile 2 and a new East Volney Station, approximately nine miles south of Nine Mile 2 and adjacent to our existing Volney station. The proposal was to install auto-transformers at East Volney and at Marcy station (near Utica) so as to provide interconnections between the developing 765 kV system and the major cross-state 345 kV system. This plan would have provided service for the Nine Mile 2 generator as well as the Sterling generator, both scheduled for service in the mid-eighties. It would also have been the first step of a transmission plan to serve additional generating stations scheduled for the early nineties.

Q. Have any events transpired since the initial filing of the application for a 765 kV facility which changes the need for a generator lead from Nine Mile 2 either in terms of the type of facilities being proposed or the schedule for the installation of same?

A. Yes. Recent events have affected both the type of facility required and its scheduled in-service date. Since the original application was filed, the long range generation addition plans of the member companies of the New York Power Pool have undergone significant changes. Previously, Nine Mile 2 was scheduled to be in service in 1983. It is now scheduled to be in service in November 1986.

In addition, the 1150 MW Sterling and the two 1250 MW New Haven units previously scheduled for service in 1993 or before have been postponed indefinitely. These are the primary changes which led us to re-evaluate the transmission plans for serving the presently planned generators in the area.

Q. Were alternative generator leads studied and reviewed?

A. Yes. A radial 345 kV generator lead between Nine Mile 2 and the Volney Station nine miles to the south was investigated as was the 765 kV "generator lead" which was proposed in the original application.

Q. What was the result of this study and review process?

A. Niagara Mohawk has determined, in terms of reliability, operating flexibility and economics, that the best transmission reinforcement plan, given the present generation schedule within the New York Power Pool is the one now proposed, that is, the installation of a 345 kV transmission line between Nine Mile 2 and Volney Station. In addition, Niagara Mohawk proposes to install a new station in the vicinity of Nine Mile 2 which will increase the reliability of the interconnection of the three major generating stations, Nine Mile 1, Nine Mile 2 and FitzPatrick, which are located within one mile of each other. This transmission station is known as Scriba Station.

Q. What exhibit(s) are you sponsoring?

A. I am sponsoring Amended Exhibit E-4, Exhibit ______ entitled "Engineering Justification".

Q. Which former witness of Niagara Mohawk's do you succeed?

A. I succeed Mr. P.D. Raymond who was the sponsor of the original Exhibit E-4 Engineering Justification.

Q. Please state your name, business affiliation and address?

A. My name is Curtis G. Foreback. I am employed by Niagara Mohawk Power Corporation, the business address being 300 Erie Boulevard West, Syracuse, New York 13202.

Q. In what capacity are you presently employed?

A. I work in Niagara Mohawk's Environmental Affairs Department as an Associate Senior Environmental Analyst.

Q. What are your duties and responsibilities in that position as they pertain to the instant proceeding?

A. My particular responsibilities in this proceeding concern Environmental Management and Construction Plan considerations, facility routing and the updating and evaluation of information pertinent thereto.

Q. Are you a member of any industry committee(s)?

A. Yes, I am a member of the following committees and associations:

a. New York Power Pool (NYPP) Land Use Subcommittee
b. NYPP Coal Combustion Residue Task Force
c. NYPP Land Use Subcommittee, Task Force on Herbicide Residue and Mobility Study
d. NYPP Land Use Subcommittee, Task Force on Herbicide Effectiveness Study
e. NYPP Coal Combustion Residue Task Force, Study Group on

toxicity of coal combustion residues

f. West Virginia Vegetation Management Association

g. Northeastern Weed Science Society

h. Mountain Lake ROW Management Council

i. Soil Conservation Society of America

Q. Have you testified previously either in this or in other Article VII proceedings?

A. I have previously testified in this proceeding, Case 70068; the Adirondack 115 kV Transmission Facility proceeding, Case 26923; and the Coffeen St.-West Adams 115 kV Transmission Facility proceeding, Case 70073.

Q. Will you describe the nature of your testimony for the Nine Mile 2-Volney 345 kV transmission line and associated equipment?

A. My testimony pertains to the evaluation and updating of the environmental routing and assessment information initially gathered for the 765 kV Nine Mile 2-Volney Article VII application, so as to evaluate and relate the data to the proposed amended application for construction of a 345 kV transmission facility.

In addition, my testimony explains NMPC's procedures and practices concerning environmental protection measures taken during the planning, construction and management of the 345 kV transmission

facilities which are the subject of this proceeding.

Q. Which exhibit(s) are you sponsoring in the amended application?

A. I am sponsoring the following exhibits:

- o Amended Exhibit 1, Exhibit , General Information Regarding the Applicant
- o Amended Exhibit 2, Exhibit , Location of Facilities
- o Amended Exhibit 3, Exhibit , Alternatives
- o Amended Exhibit 4, Exhibit , Environmental Assessment
- o Amended Exhibit 6, Exhibit , Economic Effects of the Facility
- o Amended Exhibit 7, Exhibit , Local Ordinance
- o Amended Exhibit 8, Exhibit , Other Pending Filings
- o Amended Exhibit E-2, Exhibit , Subsection D. "Environmental Assessment of Other Facilities"
- o Amended Exhibit E-6, Exhibit , Effects on Transportation

Q. Would you explain your approach to the preparation of Amended Exhibit 3 "Alternatives", Exhibit , and Amended Exhibit 4, "Environmental Impact", Exhibit , upon the major utility transmission facility's having been changed from a 765 kV to a 345 kV design?

A. First I will address my approach to preparing Amended Exhibit 3,

"Alternatives", Exhibit . Because the proposed 345 kV facility has the same beginning and termination points as the initially proposed 765 kV facility, my approach was to review the corridors chosen for the 765 kV facility. The review indicated that the four corridors initially chosen for evaluation were complete and appropriate for 345 kV; namely, the Nine Mile-Volney Corridor, the Fitzpatrick-Lighthouse Hill Corridor, the Fitzpatrick-Edic Corridor and a new corridor.

The next step was to review the options within each corridor. The review showed that the options chosen for the 765 kV facility remained applicable to the 345 kV facility. Certain data characteristic to 345 kV construction required revisions as are depicted in the option assessment table on page 3-5 of Exhibit 3 "Alternatives", Exhibit . The revised data was then reviewed. It was concluded that the 765 kV preferred corridor from Nine Mile to Volney was also preferred for the proposed 345 kV facility.

My approach to preparing Amended Exhibit 4, "Environmental Assessment", Exhibit , was to revise the initial detailed environmental analysis of the study area. Included in this area were the Nine Mile to Volney Corridor and its associated options, namely the preferred route East Option; the West; West/East and

East/West Options.

Revisions of Exhibit 4 required contacting various agencies and institutions for updating the original resource maps and related data. Construction at 345 kV allows for smaller structures and narrower right-of-way than 765 kV construction, so updating of maps, sketches and related evaluations was required. In-field evaluations were also required to update certain sections of the assessment.

Q. Would you please name the agencies and institution contacted for updating of information for Amended Exhibit 4, Exhibit , and briefly describe the information provided?

A. The following is a listing of agencies contacted along with a brief description of the changes that occured since 1978. These changes are reflected in the narrative and on resource maps in the "Environmental Assessment" section, Amended Exhibit 4, Exhibit .

1. Department of Environmental Conservation (DEC):
   The DEC indicated that there have been no reclassifications of streams or ponds within the study area. They provided the most recent flood hazard area information (Flood Insurance Rate Maps). Since the initial survey, the DEC stated that no unique or sensitive wildlife or wildlife areas have been identified.

2. Museum and Science Service - Albany:
The Curator of Botany reported that he was unaware of any rare or unique vegetation along the proposed Nine Mile 2-Volney transmission line and the additional clearing required should be okay.

3. State University of New York (Oswego):
Personnel of the Rice Creek Biological Field Station stated that they were not aware of any further unique or sensitive vegetation or wildlife concerns regarding the study area.

4. Oswego County Environmental Management Council (EMC):
The EMC provided their revised wetland inventory maps showing designated wetlands in the study area.

5. Central New York Regional Planning and Development Board:
The Regional Planning Board provided information concerning the Flood Insurance Rate Maps.

6. U.S. Department of Agriculture - Soil Conservation Service (SCS)
The SCS in Syracuse provided a copy of the final soil survey. The Oswego Field Office provided updated and amended soils information which included new soils symbols and soil interpretation sheets.

Q. What sections of the "Environmental Assessment", Exhibit ,

required in-field evaluations?

A. The Vegetative/Land Use section, the Visual Section and a portion of the Cultural Resource section pertaining to location of residences and related buildings required in-field evaluations to verify and update the previously gathered data.

Q. What sections of the "Environmental Assessment", Exhibit , were most affected by the change in structure size and right-of-way width?

A. The Visual Assessment was most affected because the assessment was mainly based on structure size. A change in the visual sketches and the narrative assessment was required.

Q. How was the Amended Exhibit 4, Exhibit information mapped?

A. The original base map was prepared using NYS DOT topographic quadrangles at a scale of 1:24000. The updated environmental resource data was entered on these original base maps which were reproduced for the Exhibit "Environmental Assessment", "Amended Exhibit 4".

Q. Was a visual analysis of the Nine Mile 2-Volney 345 kV transmission line performed?

A. Yes.

Q. How was the visual analysis performed?

A. The procedure for determining visual impact of the 345 kV facility remained unchanged from the procedure used in the original 765 kV transmission line analysis. However, updating of the evaluation was required as explained as follows: Location of the Road Assessment-Site Lines as shown on the visual impact map p. 4-85 and on the sketches pp. 4-63 thru 4-69 in Amended Exhibit 4, Exhibit , remain unchanged. The structure heights on the sketches were changed from 200 feet to 100 feet to reflect the general height of the 345 kV structures. The natural and manmade visual barriers were field checked to assure the accuracy of the sketches and related evaluations.

The Road Assessment Approaches pp. 4-70 to 4-73 were field checked and re-evaluated taking into consideration the 345 kV structure heights and visual barriers. In the Home Assessment section, pp. 4-75 to 4-84, the sketches were revised to reflect the change in the 345 kV centerline. The location of homes in the vicinity of the proposed line were field checked and sketches were revised to reflect changes.

Q. What is your assessment of the visual impact of this facility?

A. The revised visual assessment in Amended Exhibit 4, Exhibit , discusses the visual impact in detail. Overall, the analysis

indicates that the impacts are reduced from the ones described in the visual analysis of the 765 kV facility because of reduced structure height and reduced right-of-way width.

Q. Were economics a consideration during the revised environmental analysis?

A. Economics were not considered in revising the environmental analysis of the alternative routes in the Nine Mile to Volney corridor. However, economics played a role in determining the design of structure types in the section from Scriba Station to Burt Minor Road. Wood H-frame structures are proposed along-side the existing 345 kV lattice structures in this section. Wood pole H-frame structures are proposed not only because they are the least expensive, but because two 115 kV wood H-frame lines already occupy the west side of the corridor and the Administrative Law Judge in his Recommended Decision for the 765 kV transmission line recommended H-frame steel structures (RD, p. 38).

Q. Do you believe that environmental factors relative to corridor selection and facility routing have been given due consideration along with engineering, economic and scheduling factors?

A. Yes. Niagara Mohawk adhered to the Commission's Rules of Procedure set forth in 16 NYCRR Parts 85, 86 and 87 in preparing

the amended Application for the Nine Mile 2-Volney 345 kV transmission facility. In doing so, the aforementioned factors have been duly considered.

Q. Based on your review of the proposed transmission facility, are the design, route location, and Scriba Station site consistent with the minimization of adverse environmental impact?

A. Referencing for documentation the detailed studies conducted in the preparation of the instant application and described within the various exhibits of the application, my answer is yes.

Q. Will you discuss how NMPC proposes to minimize the environmental impact of construction of the proposed Nine Mile 2-Volney 345 kV transmission line and associated equipment?

A. NMPC will take all practical measures to minimize environmental impact during and following construction and will prepare an Environmental Management and Construction Plan (EM&CP). The EM&CP is initiated after certification and during the establishment of centerline of the transmission facility's right-of-way. The EM&CP will set forth the methods NMPC will follow in minimizing the environmental impact of facility construction.

Q. Will you explain the general purpose of the Environmental Management and Construction Plan?

A. The purpose of the EM&CP is to analyze and evaluate the existing conditions of the land and land uses within and adjacent to the right-of-way so as to develop a construction plan for the proposed facility that minimizes impact to the existing environment. The Environmental Management and Construction Plan is made up of the main document and aerial mosaics. The main document describes existing right-of-way conditions and sets forth measures to minimize construction impact on the existing conditions. An important part of the main document is the site-by-site analysis forms which summarize existing conditions and recommendations on a site-by-site basis. These forms are closely correlated with information appearing on the aerial mosaics. The main document also sets forth the philosophy, methodology, and procedures for developing the Environmental Management and Construction Plan. The aerial mosaics illustrate existing conditions on the right-of-way, protection measures to be implemented and location of work to be performed during construction of the facility.

Q. Will you describe how the EM&CP is initiated?

A. Niagara Mohawk's Environmental Affairs Department, with the cooperation of other departments, conducts a detailed field site-by-site analysis of the proposed transmission line right-of-way. The

site-by-site analysis is described in (CGF-1) Exhibit .

Q. With respect to clearing of the right-of-way and slash disposal, what methods does Niagara Mohawk propose to use to minimize the environmental impact of the transmission facility?

A. Niagara Mohawk utilizes a variety of selective clearing and slash disposal practices which are environmentally compatible with each site. The various clearing and slash disposal types are indicated on site analysis forms and aerial mosaic maps. The clearing and slash disposal policy, objectives and procedures are discussed in the guidelines appearing in (CGF-2) Exhibit .

Q. How will right-of-way clearing impact the Scriba Woods?

A. The proposed 345 kV facility, except at the exit from Scriba Station, will be located 100 feet easterly from the centerline of the existing Nine Mile to Volney #9 line. In this section, selective clearing of a 75' strip of trees from the edge of Scriba Woods will be required. The proposed Nine Mile-Volney 345 kV line and the relocation of the #9 line will require selective clearing for a distance of about 400 feet through the northwest corner of Scriba Woods.

Q. Has right-of-way clearing in the Scriba Woods been minimized to the extent practicable?

A. Considering engineering constraints such as required right-of-way widths for 345 kV lines and separation distances from the existing 345 kV transmission facilities, the answer is yes. NMPC has not exceeded the separation distances or width requirements. Furthermore, the mere fact that NMPC is proposing a 345 kV line rather than the initially proposed 765 kV line, minimizes clearing by reducing the required cleared strip from about 200 feet to 75 feet. Relative to the proposed Nine Mile 2-Volney and the relocated #9 Nine Mile-Volney 345 kV lines as they exit Scriba Station on the southern end, both lines were turned and routed back toward the existing corridor as quickly as engineering constraints would allow, thus minimizing clearing.

Q. What methods of wetland protection will be incorporated into the Environmental Management and Construction Plan?

A. During the field site-by-site analysis survey, wetlands will be analyzed. Data and recommendations will be summarized on forms entitled Site-by-Site Analysis for Wetlands. Examples of these forms as well as wetlands protection measures utilized by Niagara Mohawk are presented in (CGF-4) Exhibit .

Q. With respect to stream crossings, what methods does Niagara Mohawk propose to use in order to minimize the potential for

environmental impact of the transmission facility?

A. During the field site-by-site analysis, perennial and intermittent streams will be appraised. The first consideration will be to avoid crossing streams or other water bodies by surveying potential alternate access or to mitigate stream crossing impacts by implementation of stream protection measures. Niagara Mohawk's stream protection measures are described in (CGF-3) Exhibit .

Q. How does Niagara Mohawk propose to minimize the environmental impact of access road construction activities?

A. The primary goal of access road construction will be to provide access to each structure or tower along the project with minimum road construction and environmental impact. During the field site-by-site analysis survey, access routes will be laid out and plotted on field maps. Improvements to the route such as construction of earth, gravel and/or corduroy roads will be recommended according to existing site conditions. Niagara Mohawk's general procedures for developing access routes are discussed in (CGF-6) Exhibit . Existing access roads are available on the adjacent transmission lines rights-of-way. These existing roads will be utilized to the maximum extent practical. New access roads will be constructed where necessary.

Q. With respect to public highway crossings, what is Niagara Mohawk's policy for minimizing visual impact at these crossings?

A. Each public highway will be evaluated as to screening potential of existing vegetation during the site-by-site analysis survey. Clearing and slash disposal types will be chosen to provide minimum visual impact. Type II clearing, which involves removing tall growing trees and retaining low growing trees and shrubs that do not have the potential for growing into the wire security zone is generally chosen where dense desirable species exist and their retention will provide right-of-way screening. Type III clearing, which involves cutting only those species presently in or having the potential of reaching the wire security zone within five years, will be chosen where saplings and shrub species presently growing at these locations will provide screening of the right-of-way. Type IV clearing, which allows for trimming, is sometimes chosen in areas where removal of existing undesirable type vegetation would destroy the screening potential.

Q. Would you explain how Niagara Mohawk proposes to minimize effects on agricultural areas traversed by the proposed transmission line?

A. During the field site-by-site analysis agriculture land use will be

noted. Data will be collected concerning the agriculture areas crossed and protection measures will be recommended to minimize construction effects. Niagara Mohawk's protection measures for agricultural lands are explained in (CGF-5) Exhibit .

Q. In particular, how does Niagara Mohawk plan on minimizing the effects on Mr. Strano's muck field?

A. Mr. Strano's muck field, which is located just south of Hall Road is approximately 1850 feet in length at the location of the proposed transmission line crossing. The field is presently crossed by the Nine Mile-Volney #9 and the Nine Mile-Clay #8 345 kV 2 pole, wood "H"-frame lines. The proposed Nine Mile 2-Volney 345 kV line will parallel the #9 line to the east side on fee owned right-of-way purchased by Niagara Mohawk in 1965. Proposed plans are to match the new 2 pole wood "H"-frame structures with the structures of the #9 and #8 lines. In order to accomplish this, placement of two new structures in the muck field will be required. Final structure location will be determined during the EM&CP preparation at which time Mr. Strano's specific structure location concerns will be considered.

When preparing the EM&CP the U.S. Soil Conservation Service Personnel, the U.S. Agriculture Extension Agent and Mr. Strano

will be consulted concerning drain tile location, planting time, harvest time and general farm operatons, the purpose being the minimization of disruption to farming activities during construction of the line. The structures will be installed in such a manner to alleviate the need for gravel access roads. This can be accomplished by utilizing tracked or flotation tired vehicles. The use of these vehicles will also minimize compaction of the muck soil. Following construction, the site will be restored and farmer utilization of the right-of-way will be allowed to continue as is the case presently with the existing two transmission lines.

Following construction, the presence of two additional structures in the muck field could exacerbate muck farm operational constraints. However, considering the cost of alternative routing and design, and the fact that additional right-of-way was initially purchased for construction of additional facilities, in my opinion, the exacerbation of farming constraints around the additional transmission structures is not unreasonable.

Q. Would you describe the boundaries of construction sites and what measures are taken to avoid environmentally sensitive areas?

A. Construction activities will be restricted to the right-of-way except at construction headquarters, marshalling yards, off right-of-way

access, and areas of danger trees. Line construction work on the right-of-way will be restricted to the designated access route, structure assembly sites, and wire stringing sites. Stringing equipment will be allowed to travel the centerline except in "No Equipment Access Areas". Stringing equipment operators will use caution and be instructed to avoid as much desirable vegetation as possible. Structure assembly sites and wire stringing sites will be laid out during the field site-by-site analysis so as to minimize damage to the site. Attempts will be made to avoid streams and other water bodies, wetlands, agriculture fields, dense desirable species, road screens, steep slopes and other environmentally sensitive areas. Some sensitive areas can be avoided by shifting the construction site or by adjusting the configuration of the construction boundaries. At times, the only way to avoid a sensitive area is by moving the structures. When this situation occurs, the feasibility of moving the structure to a more desirable location will be reviewed. Economics, engineering design standards and environmental concerns are considered in the review. If site sensitive areas cannot be entirely avoided, measures will be recommended to minimize effects on the site.

Q. Recognizing that erosion control and restoration are major

considerations in protecting the environment from potential impact of construction activities, what programs does Niagara Mohawk propose concerning this matter?

A. Erosion control and restoration measures will be initiated in each phase of construction activity. Erosion control techniques utilized by NMPC are described in (CGF-6) Exhibit , "Access Roads" under Erosion Control Techniques. Exposed mineral soil resulting from construction activities will be graded, seeded and fertilized. Where initial disturbance occurs in snow or frozen soil conditions, temporary erosion control measures will be installed, such as cross ditches and mulching, as necessary. Seeding will be initiated on a site-by-site basis immediately following construction and grading, assuming soil conditions are conducive to seeding and germination. Necessary erosion control devices will be installed during time of construction and within eight work days after initial disturbance. Each phase of construction has specific restoration requirements. During road construction, all exposed soil areas will be graded and seeded with the exception of the road surface. The road surface will be regraded, if necessary, and seeded after completion of all line construction activities. During installation of fords and culverts, all exposed soil areas will be graded,

seeded and stabilized. During right-of-way clearing, excessively rutted areas will be graded and seeded. During line construction operations, all exposed soil areas and previously restored areas that are disturbed will be graded and seeded. Diversion ditches will be installed where necessary to divert water around tower construction and wire stringing sites. After construction roads are no longer needed for line construction purposes, the road will be regraded if necessary and seeded. Drainage facilities will be cleared of debris and be in operating order before construction crews leave a completed section of line. Construction debris will be collected and disposed of at a proper disposal area to be designated prior to beginning construction activities.

Q. What considerations are given to the wildlife of the area?

A. Selective clearing to be utilized on the proposed right-of-way will retain species which have varying degrees of usefulness to wildlife. Slash disposal methods to be used will consist generally of collect and pile in drier sites and drop and lop in wet or high density desirable species areas. These methods provide cover for small wildlife species. The NYS Department of Environmental Conservation will be consulted for updated information during EM&CP preparation concerning wildlife use of the area and for evidence of any rare,

endangered or threatened wildlife species. If special wildlife habitats exist, such as designated deer wintering areas, clearing will be kept to a minimum by retaining some undesirable species that would normally be cut. If rare, endangered or threatened wildlife species are known to inhabit the area, the NYS Dept. of Environmental Conservation will be consulted concerning protection measures.

Q. How does Niagara Mohawk propose to protect potential archaeological sites that might be discovered during construction?

A. A literature search has been performed by Pratt and Pratt Archaeological Consultants and the report is included in Amended Exhibit 4, Exhibit , of the application for certification of the proposed facility. A field archaeological survey will be conducted upon approval of the transmission route. The State Archaeologist would be notified of any discoveries of apparent significance resulting from the field survey. During construction, the Company, upon any discovery by its employees or contractors of archaeological resources of apparent significance, will notify the State Archaeologist of the discovery, and attempt to develop a plan, acceptable to the State Archaeologist, to salvage or protect those resources. Any unresolved differences between Niagara Mohawk and the State

Archaeologist are to be referred to the Commission. The financial responsibility of Niagara Mohawk for salvaging archaeological values in these circumstances shall be specified by the Commission with reference to the conditions peculiar to each case.

Q. What precautions will be taken to avoid spillage of fuels, oil, chemicals or similar substances?

A. Care will be taken at all times to avoid spillage of fuels, chemicals, or similar substances, and none of these materials will be stored beneath trees or in the vicinity of any wetland, river, stream or other body of water. This shall be accomplished through imposition of the following restrictions on both contractors and company personnel. Extreme caution shall be exercised when handling fuel and, while refueling, to avoid spillage. As much equipment as possible shall be fueled at the marshalling yards and the contractor work headquarters. Any equipment which must be refueled in the field will be fueled from tanks carried to the work site by truck. No equipment refueling shall be done in the vicinity of streams or other sensitive areas, i.e., intermittent streams, wetlands or beneath trees.

Fuels, oils, chemicals, etc., will be stored at designated marshalling yards and at the contractor's work headquarters.

Should a heavy fuel or oil spill occur, the contaminated soil will be removed from the worksite and disposed of in an appropriate landfill. Dry powder and any other material appropriate for use in oil spill cleanup shall be stored at the contractor's work headquarters, the marshalling yard and at other convenient locations that may be designated.

Q. What measures will be taken to ameliorate construction noise effects?

A. Reasonable judgment is to be exercised on the part of the individual in charge of construction to insure minimum noise impact. Existing equipment mufflers and noise suppressors shall be maintained and any faulty noise suppressors shall be repaired or replaced. Equipment shall not be left running unnecessarily. Restriction of construction work hours will be considered during the EM&CP preparation.

Q. Would you describe how Niagara Mohawk assures that environmental commitments are honored during construction of the facility?

A. The Environmental Management and Construction Plan which is developed by the Environmental Affairs Department and approved by the Public Service Commission is a major part of the construction specifications provided to each prospective bidder on

the transmission facility. During the pre-bid meeting, contractual requirements, construction specifications and environmental constraints are fully explained. After the contract is awarded, a pre-construction meeting is held just prior to beginning activities to review all requirements. The meeting is attended by various contracting company representatives and Niagara Mohawk personnel involved in the project. A representative of the Environmental Affairs Department participates to explain and emphasize the importance of strict compliance with all environmental provisions. In the event that Niagara Mohawk crews are assigned to construct the facility, a pre-construction meeting is held with personnel to review specifications and explain the environmental commitments. To insure compliance with environmental commitments during construction by contract or company crews, an environmental forester is assigned to the project. He is responsible for the environmental supervision of right-of-way clearing, access road construction, line construction and site restoration as described in the EM&CP. Any change in the EM&CP, which normally occurs because of variances in field conditions during time of construction, requires notification to and approval of the Environmental Affairs Department which in turn notifies the Public

Service Commission. All major and significant changes are forwarded to the PSC for final approval.

Q: Would you state Niagara Mohawk's policy and goals concerning long-range right-of-way management?

A. Niagara Mohawk's right-of-way management policy is to provide for the safe, reliable transmission of electric energy in an economic manner which is compatible with the environment. The right-of-way management goals have three major components; the first being the management of the right-of-way in a manner to assure the integrity of the transmission facility. The vegetation is to be maintained in a condition to keep the transmission facility free of interruptions caused by trees and brush. The natural and man-made features are to be maintained in a stable condition to assure environmentally compatible access for routine monitoring of right-of-way conditions, sound vegetation management planning and implementation of the appropriate vegetation control techniques.

The second component relative to right-of-way management goals is management of the right-of-way vegetation to encourage natural low growing plant communities and to foster natural vegetative buffers compatible with visually and aquatically sensitive areas. Management of the vegetation in a way to foster the natural

development of native low growing plant communities is primarily accomplished through prescription of the proper application of approved herbicides, in a manner which is appropriately selective for a given site, to retain desirable growth to the extent practical while effectively eradicating tall growing undesirable species. Management of the vegetation in a way which is compatible with areas of high visual sensitivity is accomplished through the fostering of natural vegetative buffer zones at high use road crossings and other areas of public use sensitivity. Management of the vegetation in a way which is compatible with areas of aquatic sensitivity is accomplished through the fostering of natural vegetative buffer zones at rivers, significant streams, and other sensitive water bodies. The remaining component is management of the right-of-way in harmony with existing and multiple use practices, i.e. agricultural, recreational, industrial, residential and wildlife uses. Management of the right-of-way in a way to create greater diversity of vegetative communities, thereby further improving the wildlife benefits of the right-of-way, is usually accomplished through a series of treatments leading to the eradication of tall growing species, thus making this space available for spreading of existing low growing plants and invasion of others. The right-of-way will additionally be

managed in a way which is harmonious with existing land use practices. This is accomplished by permitting extension of adjacent land use practices onto the right-of-way as long as the use is compatible with the reliable, safe operation of the transmission line.

Q. How would the requirements you have outlined above affect compatible, multiple uses of the right-of-way?

A. Niagara Mohawk would entertain and seriously consider any reasonable request from a grantor or abutting owner who desired to use all or a portion of the right-of-way on a case-by-case basis. Generally, if it were found that the use was reasonable, did not affect construction procedure or line operation and maintenance, and did not constitute a nuisance to other abutting owners, the corporation, by written agreement, would permit the use.

Q. Will you generally describe the procedures by which Niagara Mohawk. meets their goals of managing vegetation?

A. Niagara Mohawk utilizes herbicides in both construction and maintenance of the transmission facility. During construction, while clearing operations are progressing, it is anticipated that a stump herbicide treatment and/or basal treatment prior to cutting will be applied. It is further anticipated that a second herbicide treatment

will be applied to the vegetation of the right-of-way sometime between its second and fourth full growing season. Additional information is provided on page 4-87 in Amended Exhibit 4, "Environmental Assessment", Exhibit .

Q. Who is responsible for the implementation of the right-of-way management program?

A. The System Forester is responsible for administering and implementing the right-of-way management policy, goals, and programs for NMPC. He is assisted by three Division Foresters. The Division Foresters are responsible for planning and implementing vegetative management programs for each of their respective divisions.

Q. Will an EM&CP be prepared for the Nine Mile 2-Volney 345 kV transmission line and associated equipment?

A. Yes. The usual procedure is to prepare the EM&CP following certification of the route and the surveying of the centerline of the transmission facility.

Q. Does this conclude your additional direct testimony?

A. Yes.

Exhibit

Niagara Mohawk Power Corporation

SITE ANALYSIS SURVEY

After establishment of center line and tentative structure location, Niagara Mohawk conducts a site-by-site analysis survey of land to be traversed by the proposed facility. The purpose of the site-by-site analysis is to collect and analyze site data so as to prepare the Environmental Management & Construction Plan (EM&CP) for the proposed transmission line facility. During the survey, site characteristics are entered on "Site Analysis" field forms for each site. (See sample form, page 3) The right-of-way is divided into areas and each area is assigned a number. Area numbers change with a change in land use, cover types and/or sensitive areas. Land use is noted on the Site Analysis form along with geographic, topographic and vegetative characteristics. Clearing and slash disposal methods are recommended, based on the site data collected. Also noted is merchantability of timber, potential danger trees and estimated slash accumulation. Remarks are entered concerning brush treatment, restoration measures and treatment of sensitive areas. Siting of uncommon vegetation, wildlife and habitats are noted. Features such as fences, dwellings, man-made ponds, etc., are also noted in remarks.

Field maps are an integral part of the site analysis survey. Indicated on these maps are area boundary lines; clearing and slash disposal types; structure laydown areas; access route layouts, including areas of earthen, gravel and/or corduroy road construction; culvert and stream ford placement; off right-of-way access routes; restricted activity areas; no equipment access areas; and

other pertinent information. This information is later transferred to aerial mosaics which also show transmission line design information, ownership of land, profile of line and profile of terrain. The aerial mosaics are included in the construction bid document.

- SAMPLE FORM -

SITE ANALYSIS

Date ____________
Observer ____________

Project ____________ Segment ____________

Area No. ________

Area Width ________ Length ________ Acres ________

Site Characteristics:

Slope 0-5___ 5-10___ 10-20___ 20-30___ 30+___

Soil Texture: Sand___ Silt___ Clay___ Muck___ Peat___ Other___

Topo-Location: Ridge top___ Upper slope___ Middle slope___ Lower slope___ Bottom___ Other___

Water: Stream___ Pond___ Swamp___ Marsh___ Bog___ Other___

Drainage: Free___ Impeded___ Excessive___

Land Use ____________

Vegetation: **Overstory**

Cover Type ____________

Canopy Cover % 10___ 25___ 50___ 75___ 100___

Age Class Density--Sapling (5 in.)___ Poletimber (5-12 in.)___ Sawtimber (over 12 in.)___ Stand Density ________

Most Abundant Species _____ _____ _____ _____ _____

Less Abundant Species _____ _____ _____ _____ _____

Understory Shrub Layer

Cover % 10___ 25___ 50___ 75___ 100___

Most Abundant Shrub Species _____ _____ _____ _____ _____

Less Abundant Shrub Species _____ _____ _____ _____ _____

Desirable Species Density ____________

Undesirable Trees in Shrub Layer
Stems/A. 600___ 1200-2400 2400-4800 4800___

Most Abundant Tree Species _____ _____ _____ _____ _____

Less Abundant Tree Species _____ _____ _____ _____ _____

Danger Trees (off R/W estimate) ____________

Estimated Slash: Light______ Medium______ Heavy______
Depth______ Depth______ Depth______

Merchantable Timber Yes___ No___

Recommendations:
Clearing type__________ Justification__________
Slash Disposal type__________ Justification__________
Brush Treatment__________ ______
Restoration__________

Sensitive Areas: ____________
____

Treatment of Sensitive Areas:

Remarks:

3

Exhibit

Niagara Mohawk Power Corporation

RIGHT-OF-WAY CLEARING PROGRAM

SELECTIVE CLEARING

AND

SLASH DISPOSAL

SITE-BY-SITE ANALYSIS FOR CLEARING AND SLASH DISPOSAL

During the site analysis survey, clearing and slash disposal methods are determined and entered on "Site Analysis" field forms (see sample form p. 26). The Definition of Clearing Methods, page 3, the Definition of Slash Disposal Methods, and Analysis of Slash Disposal Methods, pages 5-14, are criteria used to determine clearing procedures. Information from the "Site Analysis" field forms is summarized on "Site-by-Site Analysis" tabular forms (see sample form p. 27).

~~Desirable species are retained in all clearing types with the exception of Type I, which is used at construction sites and on access routes. A list of species considered as desirable is presented on pages 17-19.~~

Desirable low growing tree and shrub species that do not have the potential of reaching the wire security zone are retained in all clearing types with the exception of Type I, which is used at construction sites and on access routes. A typical list of species considered as desirable is presented on pages 17-19.

Clearing and slash disposal methods are also noted by area on field maps. This information is later transferred to aerial mosaics, which are part of the construction bidding documents.

THE NMPC RIGHT-OF-WAY CLEARING PROGRAM SELECTIVE CLEARING AND SLASH DISPOSAL

I. Policy for Initial Clearing of Electric Transmission Rights-of-Way

Niagara Mohawk shall employ selective clearing and slash disposal practices when clearing a new right-of-way, utilizing techniques which are consistent with the safe, reliable transmission of electric energy in an economic manner, and which are compatable with the environment.

II. The Objectives of the Initial Clearing Program

1) To initially clear the right-of-way in such a manner that it shall be free from interruptions from trees and brush, and so that the right-of-way is reasonably accessible for various line construction activities.

This objective is accomplished through the utilization of sound clearing and slash management techniques, the utilization of sound vegetation control techniques, and by keeping abreast of new and improved techniques.

2) To selectively retain compatible, low growing tree and shrub species, which tend to be self-sustaining over long periods of time and thereby tend to foster the natural development of "tight", relatively stable plant communities, wherever such species exist in sufficient quantity to economically warrant retention.

This is accomplished through the proper application of clearing and slash disposal techniques, in a manner which is appropriately selective for a given site, so as to maximize the retention of desirable growth to the extent practicable.

(A) As a secondary objective, to clear the right-of-way in a selective manner so as to maximize vegetation diversity on the right-of-way, thereby improving the total wildlife benefits of the right-of-way.

This is accomplished through the selective retention of compatable low growing species, as described above and where such retention is reasonably practicable.

3) To clear the right-of-way in a manner which is compatable with environmentally sensitive areas, or areas of high visual sensitivity, so as to maintain aquatic and aesthetic values to the extent practicable.

This is accomplished through the selective retention of vegetative buffer zones at rivers, significant streams, other sensitive water bodies, high use road crossings, scenic areas, potential softwood shelters, etc., and through the application of selective slash management techniques designed to minimize environmental or aesthetic impacts.

4) To clear the right-of-way in a manner which is harmonious with other land use activities, such as active agriculture, residential, recreational, and other multiple-use activities.

This is accomplished through the application of selective clearing techniques designed to eradicate undesirable growth while retaining those low growing species which are compatable with the facility and ongoing land use activities, to the extent practicable; and through the selective application of slash disposal techniques in a manner which is harmonious with the environmental ongoing use, so as to maintain or improve the overall public or private enjoyment of the right-of-way.

5) To utilize the wood resource generated by the clearing activities, to the extent practicable and in accordance with sound environmental management techniques.

This is accomplished through the application of appropriate slash disposal techniques, through coordination with outside logging concerns, and through cooperation with the previous landowner and/or the general public.

III. Procedure for Accomplishing the Objectives of Initial Clearing

1) Procedure for selective clearing; the utilization of sound clearing and slash disposal techniques.

NMPC recognizes and considers the use of four (4) clearing and eight (8) slash disposal techniques, as defined below. Utilizing the potential combinations of these clearing and disposal methods, the Company shall conduct a detailed site-by-site analysis of the right-of-way, to select the appropriate management technique for each site. A set of detailed drawings shall be prepared which show the location and extent of work for each area of the right-of-way requiring clearing.

A. Definition of Clearing Methods

Type I clearing shall consist of clearing the designated areas of all woody plant growth, including desirable species. All growth shall be cut as close to the ground as practicable, but not to exceed 6 inches above ground line.

Type I clearing shall be utilized where woody plant growth would hinder access and construction activities, i.e. for clearing access roads, structure work areas and wire pulling sites.

Type II clearing shall consist of clearing the designated areas of all undesirable tall growing tree species and only those desirable low growing tree and shrub species which have the potential for growing into the wire security zone. All growth shall be cut as close to the ground as practical, but not to exceed 6 inches above ground line.

Reasonable care shall be taken, in so far as is practical, to retain desirable species found within Type II clearing zones. The Right-of-Way Manager will make a field determination as to whether retention would impose an unreasonable burden on clearing and/or construction activities.

Type III clearing shall consist of selectively clearing the designated areas, removing only those species which have invaded or can be expected to invade the wire security zone* within 5 years. Additionally, based on conductor/ground clearances and species characteristics, "young" trees will be temporarily retained, in the absence of sufficient densities of desirable vegetation. When an adequate, desirable, vegetative cover is established on the site, the tall growing species will be removed.

The growth removed shall be cut as close to the ground as practical, but not to exceed 6" above ground line.

Type IV clearing shall consist of selectively removing and/or trimming, in the designated areas, those species which have invaded or can be expected to invade the wire security zone with 5 years. Any tree with more

*The wire security zone is described on page 4.

than 25% of the crown within the wire security zone* will be removed unless otherwise designated on the drawings.

Considering line reliability, the physiological characteristics of the tree, and the densities of more compatible vegetation, trees with less than 25% of the crown within the wire security zone*will be trimmed whenever these trees will provide a direct environmental or aesthetic benefit.

All growth removed shall be cut as close to the ground as practical, but not to exceed 6 inches above ground line.

B. Trimming Procedures

When trees are specified to be topped or trimmed, the specified portions shall be removed in such a way to prevent excessive broken limbs or other serious damage to the portion of the trees left in place or to adjacent or nearby trees and shrubs. After removal of limbs and branches, the exposed cut ends of the trees, one inch in diameter or greater, shall be liberally painted with an approved wound paint.

All trimming shall be done in accordance with recognized tree surgery practices. Limbs and branches shall be cut using the "drop-crotch" technique. Cuts shall be flush at the union with the branch or limb, or with the trunk.

C. Selective Removal Procedures

Trees shall be felled in such a manner as to minimize damage to adjacent or nearby trees and shrubs. Where directed, trees shall be taken down in pieces.

D. The Wire Security Zone

So far as the removal or retention of shrub, low growing tree or tall growing tree species is concerned, the Company shall remove, or top in areas of high sensitivity, any species which has the potential for growing into the wire security zone under normal growing conditions. The wire security zone is defined as the air space around the conductor which must be free of all plant growth to insure reliable continuity of service. The following are the minimum conductor to vegetation clearances, or wire security zones, for various transmission voltage classes.

115KV	15 feet
over 115KV-345KV	20 feet
over 345KV-765KV	25 feet

This distance is measured from the conductor at 257°F final sag and at the 30° blow-out position. (c.f. the Figure #1 and #2 illustrations on the following page)

E. Definition of Slash Disposal Techniques

Type A slash disposal consists of separating, tree length skidding, and yarding the merchantable timber in designated areas along the right-of-way. Where, in the opinion of the R/W Clearing Supervisor, a site may be damaged by the tree length skidding, the timber will be bucked into logs.

The Applicant will separate and yard merchantable logs along the right-of-way whenever the following conditions are met:

A. Soil and terrain conditions will allow mechanized collection and skidding, without creating severe rutting or seriously increasing the erosion potential; and

B. Sufficient merchantable volume exists on a site to make economic utilization practical; and

C. Adequate log-hauling access roads exist between the highway and the yarding area on the right-of-way or when yarding directly to a highway is desirable and economically feasible. The load-bearing capacity of the access road and/or potential restoration costs may become limiting factors on merchantability.

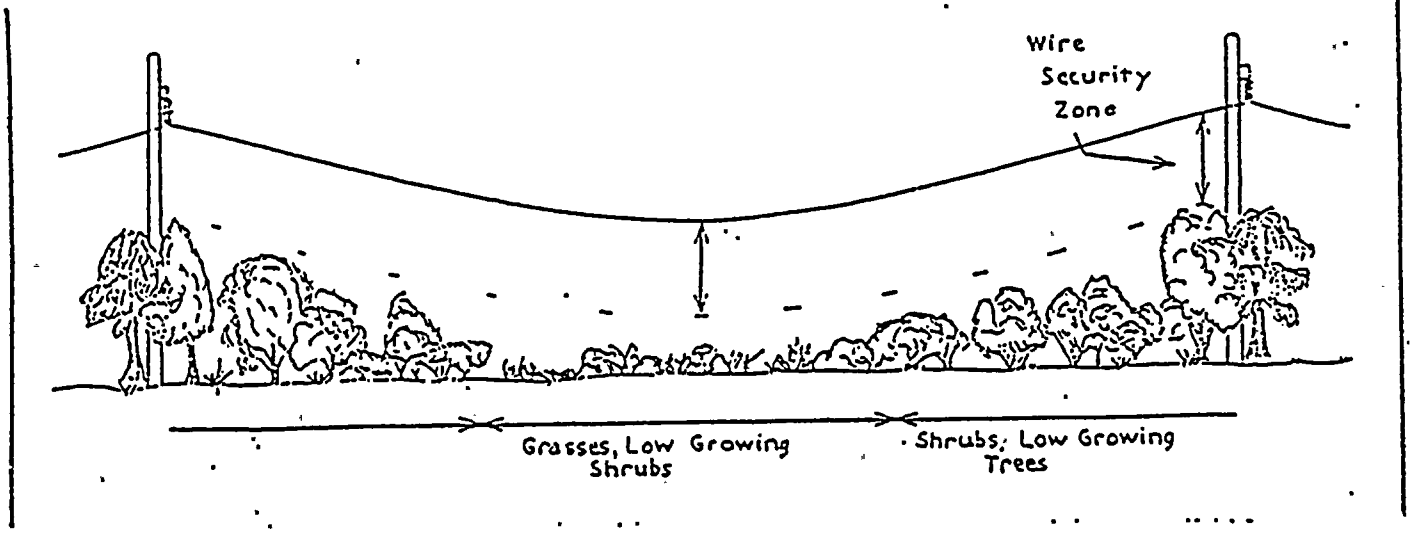


Figure #1

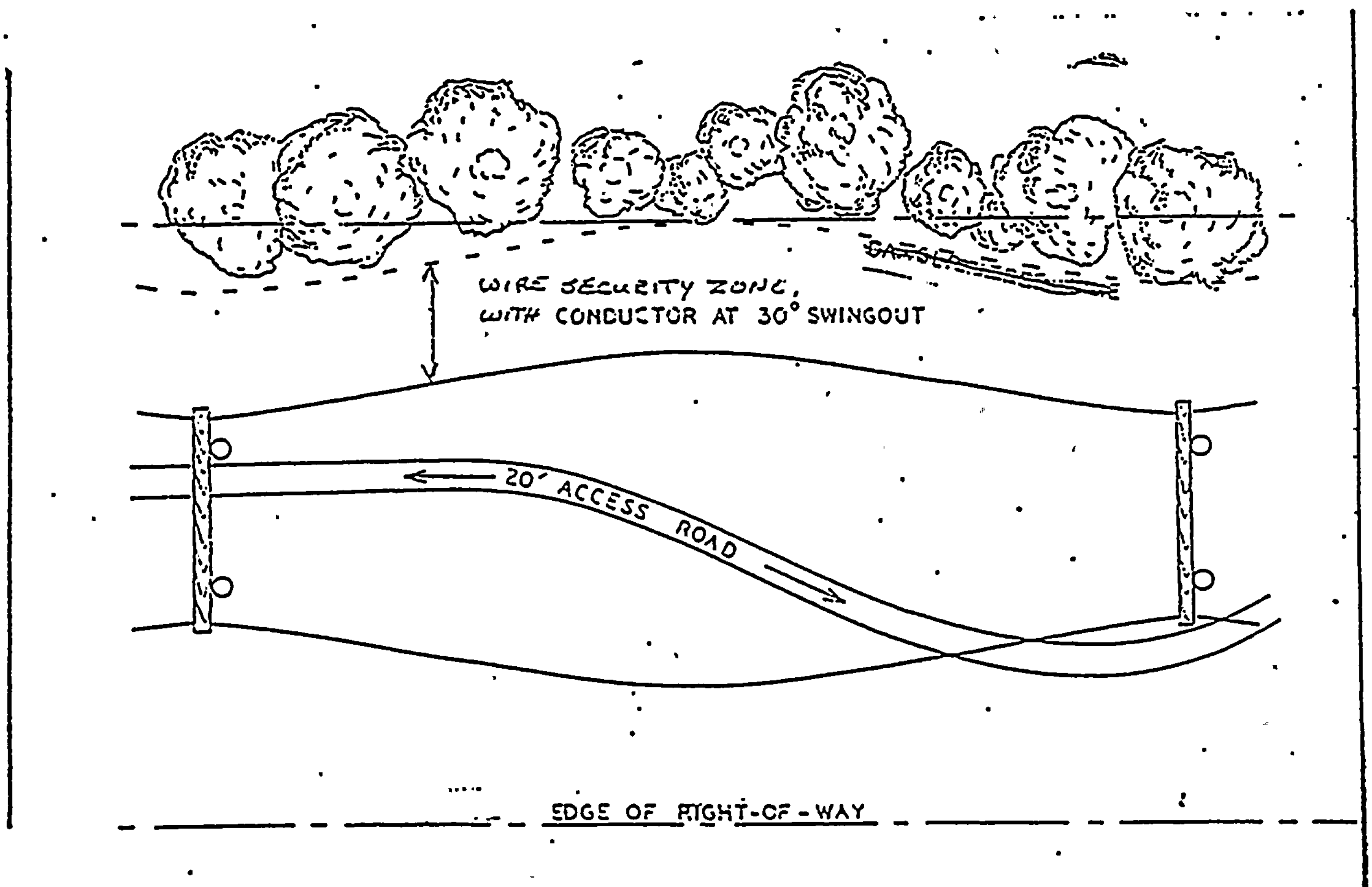


Figure #2

ANALYSIS OF TYPE A SLASH DISPOSAL

FACTOR	EFFECT
Air Quality	None
Aesthetics	Low
Noise	Low
Revegetation	Low or none, due to very low stem count of desirable species in merchantable timber stands, few of which can survive release to full sunlight.
Soil Scarification	Moderate to severe; method not selected if soil and/or slope conditions could lead to severe rutting and/or erosion.
Humus	Disturbed, but not destroyed.
Stream Pollution Potential	Low; method not selected for sites with stream polluting potential or for stream buffer zones.
Erosion Risk	Low; application limited to non-erosible sites and/or where erosion preventative measures are implemented in conjunction with construction.
Slash Volume	Potentially large, but removed from site.
Slash Placement	Yarding areas as designated on drawing or directed by Right-of-Way Clearing Supervisor.
Wildlife Hazard	Low

Type B slash disposal consists of collecting and piling the slash in areas designated on the drawings. In this case, the slash consists of all unmerchantable wood (less than 6 to 8 inches in diameter at the large end) such as tops, limbwood and saplings.

Type C slash disposal consists of collecting and piling all unmerchantable wood larger than 6 to 8 inches in diamater at the small end, in designated areas. Unless otherwise directed by the R/W Clearing Supervisor, the logs will be piled adjacent to the access road in such a way that piles will not interfere with construction activities.

The collect and pile methods will generally be selected whenever the following conditions are met:

A. The accumulation of slash is sufficiently removed from public view so as to minimize visual impacts; and

B. Slash accumulations of the drop and lop technique would be greater than one (1) foot, thereby hindering construction and/or future maintenance operations; and

C. Soil and terrain conditions are such that mechanical collection could occur without creating a serious erosion potential.

ANALYSIS OF TYPES B AND C SLASH DISPOSAL

FACTOR	EFFECT
Air Quality	None
Aesthetics	Low, due to selection of method for low impact sites only.
Noise	Low
Revegetation	Retards revegetation on Type B pile sites, little or no adverse effect elsewhere due to limitation of application to low-impact sites.
Soil Scarification	Moderate; methods not selected if soil and/or slope conditions would result in severe rutting and/or erosion.

ANALYSIS OF TYPES B AND C SLASH DISPOSAL

FACTOR	EFFECT
Humus	Disturbed, but not destroyed.
Stream Pollution Potential	Low; methods not selected for sites with stream polluting potential or for stream buffer zone.
Erosion Risk	Low; application limited to non-erosible sites and/or where adequate erosion control measures will be implemented in conjunction with construction.
Slash Volume	Type B piles mechanically crushed if necessary to maintain heights of 10 to 12 feet less; if large volumes accumulate, windrows will be avoided be leaving frequent gaps in the pil to allow unimpeded wildlife movement.
Slash Placement	Type B material, along edge of right-of-way or as directed by the Right-of-Way Clearing Supervisor; Type C material, along access road for potential firewood usage.
Wildlife Hazard	Low; placement of Type B slash pile concentrates potential fuel and compaction insures high moisture retention.

Type D slash disposal consists of lopping all downed material so that it lays as close to the ground as practical, but not to exceed 4 feet in height.

The drop and lop method will be selected whenever one or more of the following four site conditions is met:

A. Brush densities are such that the drop and lop method would generate less than one (1) foot of slash accumulation over a significant area of the right-of-way and this accumulation of slash is sufficiently removed from public view so as to minimize visual impact.

B. Or, any mechanized attempt to collect or remove slash would seriously damage or destroy large numbers of desirable species and this accumulation of slash is sufficiently removed from public view so as to minimize visual impact.

C. Or, soil and terrain conditions are such that removal of the slash would create a serious rutting and/or erosion potential and this accumulation of slash is sufficiently removed from public view so as to minimize visual impact.

D. Or, portions of a coniferous plantation must be clearcut and this accumulation of slash is sufficiently removed from public view so as to minimize visual impact.

ANALYSIS OF TYPE D SLASH DISPOSAL

FACTOR	EFFECT
Air quality	None
Aesthetics	Low, due to selection of method fo low impact sites.
Noise	Low
Revegetation	None to low adverse effect; method insures minimal site disturbance.
Soil Scarification	None
Humus	None
Stream Pollution From Run-Off	None; application of method requires no vehicle access.
Erosion Risk	None
Volume of Slash	One (1) foot or less of slash accumulation except 3 to 4 feet on sites where method was selected to minimize adverse effects on desirable species, streams and soils; 3 to 4 feet in coniferous stands where method is selected to minimize wildfire hazard.
Placement of Slash	Lopped in place or moved by hand or winch line to corduroy access road.
Wildfire Hazard	Low to moderate; slash accumulatio of one foot or less present a low hazard at worst; accumulations of up to 3 or 4 feet may present a temporary moderate fire hazard in periods of drought before wood decomposition has started; however the small areas where such accumul ations are expected to occur alleviates the hazard considerably

Type E slash disposal consists of burning the slash within designated areas after collecting and piling. Slash larger than approximately 6 inches in diameter at the small end will be stacked along the access road for potential firewood utilization.

A. The slash accumulations of "pile and leave" would become so large that the pile would create an impediment to construction and/or future maintenance, thereby escalating those costs beyond the initial cost of burning, and terrain conditions would permit mechanical collection without creating severe ruts or a serious erosion risk;

B. The slash piles would tend to form a continuous, 10-12 ft. wall, or windrow of brush along a considerable length of the right-of-way, becoming a potential detriment to wildlife movement, and terrain conditions would permit mechanical collection without creating severe ruts or erosion risk;

C. A significant fire hazard would exist as a result of selecting the "pile and leave" or "drop and lop" methods, and terrain conditions would permit mechanical collection without creating severe ruts or a serious erosion risk;

D. When slash accumulations, adjacent to a high use recreational area are such that removal for aesthetic reasons is a necessity, and the impact of burning on potential receptors can be minimized by timing the burn to coincide with low-use or non-use periods, and terrain conditions would permit mechanical collection without creating severe ruts or a serious erosion risk.

E. When slash accumulations at feuse rows, hedge rows, and edges of fields would require moving to another site.

ANALYSIS OF TYPE E SLASH DISPOSAL

FACTOR	EFFECT
Air Quality	Locally and temporarily adversely affected by wood smoke; potential receptors will be avoided by carefully selecting days with appropriate wind direction and velocity; smoke plume will be reduced by maintaining a hot fire to insure complete and rapid combustion.
Aesthetics	Moderate, temporary impact in localized areas.
Noise	Low.
Revegetation	Burn sites will quickly revegetate with typical pioneer plant species; little or no adverse effect elsewhere due to limitation of application to low impact sites.

ANALYSIS OF TYPE E SLASH DISPOSAL

FACTOR	EFFECT
Soil Scarification	Moderate; method not selected if soil and/or slope conditions would lead to severe rutting or erosion.
Humus	Destroyed at burn sites; disturbed but not destroyed elsewhere
Stream Pollution Potential	Low; method not selected for sites with stream polluting potential for stream buffer zones.
Erosion Risk	Low; application limited to non-erosible sites and/or where adequate erosion control measures will be implemented in conjunction with construction.
Slash Volume	Type B material to be burned; Type C material to be left stacked. (See Method 2)
Slash Placement	Burn piles to be placed so as to facilitate ease of loading but away from desirable vegetation and the right-of-way edge; logs to be stacked along access road for firewood utilization.
Wildfire Hazard	Low; due to concentration of fuel; combustion under controlled conditions.

Type F slash disposal consists of chipping the slash on site, in designated areas.

The Applicant will elect to chip slash on the right-of-way sites where one or more of the following conditions is met:

A. For aesthetics reasons, any slash accumulation would create a negative visual impact upon residents and/or travelers.

B. The volume of slash to be disposed of is small and construction, environmental or aesthetic constraints are limiting as to on-site disposal.

C. Chipping will cost less than hauling and disposal at off right-of-way locations.

ANALYSIS OF TYPE F SLASH DISPOSAL

FACTOR	EFFECT
Air Quality	None
Aesthetics	Very low impact, especially where slash volumes are small.
Noise	Moderate
Revegetation	Low, or none, due to low slash volume.
Soil Scarification	None
Stream Pollution	None
Erosion Risk	None
Slash Volume	Very low; less than 4" of chips spread evenly over site.
Slash Placement	Scattered on-site.
Wildfire Hazard	None

Type G slash disposal consists of removing slash from the site which is less than 6 inches in diameter at the large end, such as tops, limbwood and saplings. Slash 6 inches or more in diameter may be scattered or piled on the site. In many instances, the small diameter slash will be removed to nearby site on the right-of-way where the designated slash removal method is other than Types G or H.

Type H slash disposal consists of removing all slash debris from the right-of-way. In many instances, this material will be removed to a nearby site on the right-of-way where the designated slash disposal method is other than Type G or H.

The Applicant will elect to haul slash from the site whenever one or more of the following conditions is met:

A. Aesthetical considerations suggest that any slash left on the site would create a negative impact.

B. If the slash were chipped, more than 4 inches of chips would result over much of the site.

C. On-site disposal would adversely impact existing agricultural uses.

D. Species toxic to livestock must be removed from pastures in use.

E. Slush piled in stream buffer zones could potentially wash into stream channel during high water flow.

ANALYSIS OF TYPES G&H SLASH DISPOSAL

FACTOR	EFFECT
Air Quality	None
Aesthetics	Positive
Noise	Low; moderate if slash is chipped and hauled
Revegetation	None
Soil Scarification	None
Humus	None
Stream Pollution Potential	None
Erosion Risk	None
Slash Volume	None
Slash Placement	To be removed
Wildfire Hazard	None

2) Procedures for Danger Tree Removal

A danger tree is a tree outside the clearing limits of the right-of-way which represents a hazard to the normal operation of the transmission line.

Danger trees shall be removed as follows:

(A) Trees whose branches extend into Type 1,2, or Type 3 clearing areas, but whose trunks are outside such areas. Danger trees whose branches extend into a Type IV clearing area shall be trimmed or removed as necessary to insure reliability.

(B) Any tree, based on the observed conditions of disease, lean, unstable soils, weak variety, or other conditions which may cause the tree to fall within the wire security zone.

In so far as practical, all danger trees shall be removed at the time of initial clearing and as part of the normal clearing activities. The slash from these danger trees shall be disposed of in accordance with the slash disposal technique designated for the adjoining section of right-of-way.

3) Procedure for Herbicide Application; the Utilization of Sound Vegetation Management Techniques

The Company shall utilize approved herbicides, applied in accordance with sound right-of-way management principles. The Company shall primarily apply herbicides using the stump treatment technique during the initial clearing phase. However, where conditions warrant, either the basal technique or the selective ground foliar technique may be utilized to more effectively control scattered or light densities of small undesirable growth. All herbicide applications shall be made in accordance with the NMPC Herbicide Training Manual, the procedure manual "The NMPC Right-of-Way Clearing Program, Chemical Vegetation Maintenance", and the rules and regulations of NYS Department of Environmental Conservation, Bureau of Pesticides.

4) Procedure for Selective Retention of Shrub and Low Growing Tree Species

The following is a list of typical shrub and low growing tree species which might be considered to be compatible with the operation of the line. Unless otherwise directed by the System Forester/Right-of-Way Manager, these species shall be retained, to the extent practicable, as they occur along the right-of-way. The appropriate clearing and slash disposal techniques shall be selected and designated for each site on the detail drawings, so as to maximize the retention of these compatible species. The personnel employed for the clearing operation shall be fully informed of these vegetation retention requirements, and directly supervised by a person(s) capable of identifying all compatible species native to the area of the right-of-way.

TYPICAL LIST OF SMALL TREES AND SHRUBS TO BE PRESERVED

SHRUBS

	SCIENTIFIC NAME	COMMON NAME	AVERAGE HEIGHT
1.	Alnus rugosa	Speckled alder	25'
2.	Amelanchier Bartramiana	Oblong-fruited juneberry	7'
3.	A. stolonifera	Running shadbush	6'
4.	Cephalanthus occidentalis	Buttonbush	15'
5.	Comptonia peregrina	Sweetfern	3'
6.	Cornus alternifolia	Pagoda dogwood (alternate leaf)	30'
7.	C. amomum	Silky dogwood	10'
8.	C. racemosa	Gray dogwood	15'
9.	C. stolonifera	Redosier dogwood	10'
10.	Corylus americana	American hazlenut	15'
11.	C. cornuta	Beaked hazlenut	15'
12.	Diervilla lonicera	Bush honeysuckle	3'
13.	Gaylussacia spp.	Huckleberry	3'
14.	Hamamelis virginiana	Witch-hazel	25'
15.	Ilex verticillata	Common winterberry	15'
16.	Kalmia spp.	Mountain laurel	10'
17.	Lindera benzoin	Spicebush	15'
18.	Lonicera canadensis	Fly honeysuckle	4½'
19.	L. tatarica	Tartarian honeysuckle	10'
20.	Rhododendron spp.	Rhododendron	20'
21.	Rosa spp.	Wild rose	10'
22.	Rubus spp.	Brambles	6'
23.	Salix spp.	Low willow	25'

SHRUBS

SCIENTIFIC NAME	COMMON NAME	AVERAGE HEIGHT
24. Sambucus spp.	Elderberry	12-24'
25. Smilax spp.	Greenbriar	
26. Spiraea alba	Narrow-leaf meadow sweet	5'
27. S. latifolia	Broad-leafe meadow sweet	5'
28. S. tomentosa	Steeplebush	5'
29. Vaccinium spp.	Blueberry	15'
30. Viburnum acerifolium	Maple-leaf viburnum	6'
31. V. alnifolium	Witch-hobble	10'
32. V. cassinoides	Witherod	12'
33. V. lentago	Nannyberry	30'
34. V. recognitum	Arrowwood	15'

SMALL TREES

SCIENTIFIC NAME	COMMON NAME	Average Height*
1. Acer pennsylvanicum	Striped maple	
2. Amelanchier arborea	Shadbush	
3. Betula populifolia	Gray birch	
4. Carpinus caroliniana	American hornbeam	
5. Cornus florida	Flowering dogwood	
6. Crataegus spp.	Hawthorne	
7. Morus rubra	Red Mulberry	
8. Ostrya virginiana	Hop hornbeam	
9. Prunus pennsylvanica	Pin Cherry	
10. Pyrus Malus	Wild apple	

SMALL TREES

SCIENTIFIC NAME	COMMON NAME
11. Rhamnus cathartica	Common Buckthorn
12. Rhamnus Frangula	Glossy buckthorn
13. Rhus vernix	Poison sumac
14. Prunus americana	Wild plum
15. Rhus spp.	Sumac, except poison sumac

Scientific nomenclature according to Gray's Manual of Botany, 8th Edition (M. L. Fernald)

*These trees mature at a height between 35 and 45 feet.

5) Procedure for Minimizing Potential Adverse Environmental or Visual Impact

Due to the lineal dimension of a transmission line right-of-way, any given line is likely to traverse areas of significant environmental and/or visual sensitivity. While the selective retention procedure previously discussed will effectively minimize environmental and/or visual impacts in most areas of the right-of-way, dependent upon species composition, these normal clearing procedures may not be adequate in areas with potentially high sensitivity and sparse densities of compatible vegetation. Therefore, special consideration and greater selectivity may be necessary to maintain environmental and/or aesthetic values. Included within the techniques for minimizing impacts in these areas are the retention of screens or buffer zones, and the tapering of the edge of the right-of-way.

(A) <u>The Tapered Edge</u>

The concept of "tapering" the edge of the right-of-way is based on the principle that, while certain low growing tree and shrub species may grow tall enough to intrude upon the wire security zone at midspan, the same species may be retained along the edges of the right-of-way or near the structure without endangering wire security. The selective retention of these taller shrub and small tree species near the structure, and particularly towards the edge of the right-of-way, tends to taper this edge and effectively soften the visual impact of the transmission corridor. Figure #3 illustrates the "box" effect of the grassed right-of-way, and Figure #4 illustrates the tapered effect which can be created when desirable species exist in the appropriate locations on the right-of-way.

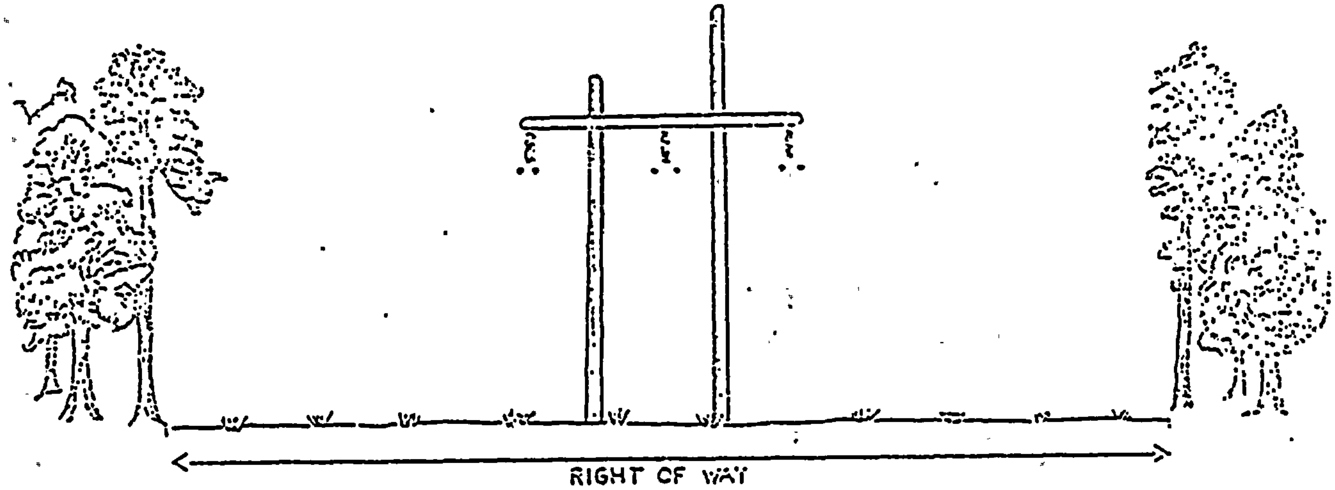


Figure #3

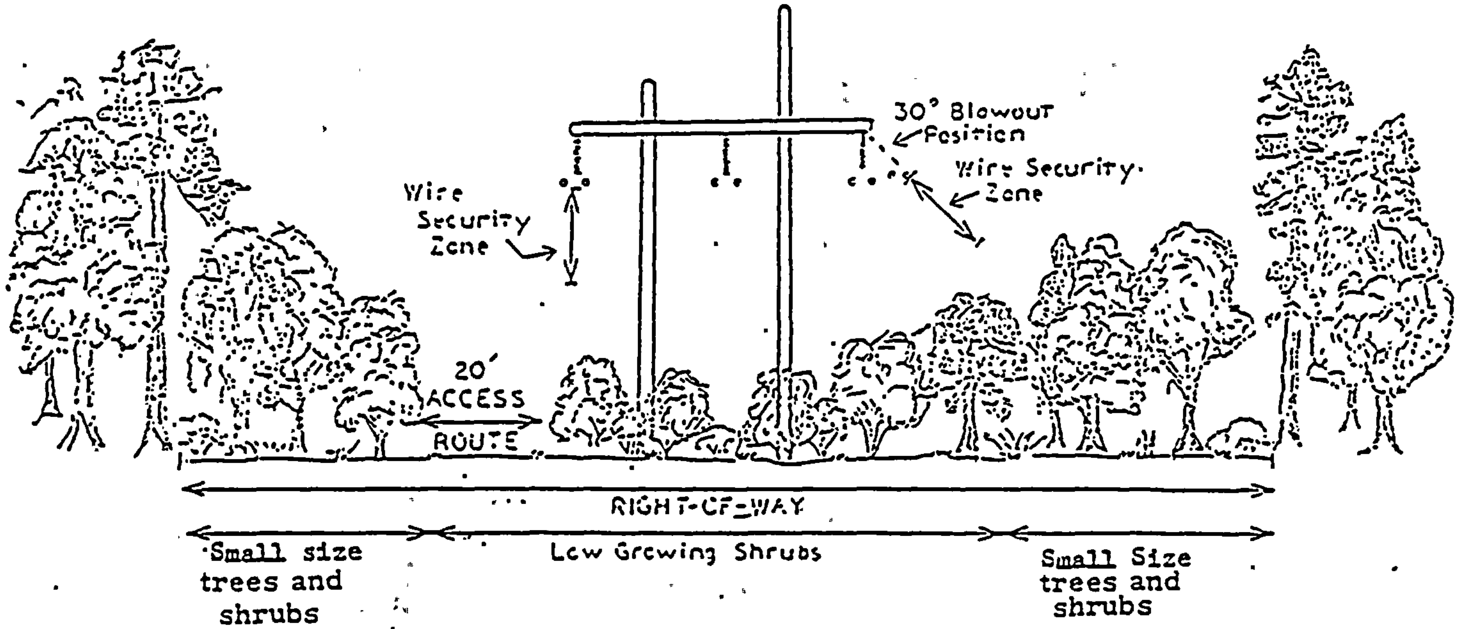


Figure #4

(B) Screens or Buffer Zones

Within areas with a potentially high environmental or visual sensitivity such as streams, high use road crossing, scenic areas, etc., the density of compatible vegetation may be too sparse, or too small to provide effective screening if all the tall growing trees are removed. Therefore, to minimize the potential adverse impacts which may be associated with right-of-way clearing of these sensitive areas, the Company shall utilize Type III or Type IV selective clearing techniques to retain an effective screen of small or topped undesirable species. Future maintenance activities shall be directed at thinning out and removing these tall growing species as compatible low growing vegetation invade the site.

Dependent upon specific site conditions, slash shall be disposed of in an economical manner and in accordance with the recognized parameters of slash disposal so as to minimize visual or environmental impact. Large slash accumulations should not remain in areas of high visual sensitivity, and slash shall not remain in the streambed area of significant streams.

6) Procedures for Clearing in Harmony with Existing Land Use Activities. Dependent upon the type and intensity of the land use activity encountered, the Company shall designate a clearing method which is appropriately selective so as to minimize any potential impacts. All slash shall be disposed of in an economic manner, utilizing the appropriate disposal technique, so as to prevent conflicts with such ongoing land uses as agriculture, gardening, existing multiple use activities, etc. Where necessary, slash should be removed to another portion of the right-of-way to minimize adverse impacts.

7) Procedure for Utilization of the Wood Resources

The Company shall designate the locations on the right-of-way where significant volumes of merchantable timber exists. On fee owned rights-of-way where the timber is reasonably accessible to logging equipment, the merchantable timber shall be separated and piled tree length. The Clearing Supervisor shall work with the Materials Handling Department of NMPC to coordinate a timber sale. On easement rights-of-way, the merchantable timber shall be piled where appropriate and the Clearing Supervisor shall work with the property owner to insure satisfaction of NMPC's environmental commitment if the landowner wishes to utilize or market the sawlogs.

Where reasonable access exists, the Clearing Supervisor shall also coordinate the salvage of "unmerchantable" timber. Interested landowners shall have first opportunity for removal of this material in an environmentally acceptable manner. Those portions of fee owned rights-of-way where the landowner does not want the wood, or does not make a reasonable effort to remove same, shall be opened to the general public on a first come basis.

Firewood removal shall be coordinated through the revokable NMPC Firewood Permit form, with a cover letter explaining the conditions of the permit, examples of which are shown on the following pages.

NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

Western Division
P. O. Box 517
Olean, New York 14760

To: All firewood permit holders

Date: 6/20/77

The attached permit shall become effective as of June 24, 1977 and shall expire August 15, 1977. The only exception to this period is location number 8, off Copper Hill Road, which shall be open from July 8, to August 15, 1977.

The following locations only shall be open for the purpose of firewood collections:
1) Access off Route 16, approximately one half mile south of Route 16 and Worden Road, Delevan.
2) Bryant Hill Road access to the north.
3) Bryant Hill Road access to the south only as far as the fifth new structure from the blacktop road which is just past the top of the hill where the new line crosses the existing steel tower line. Any wood past this point belongs to the landowner.
4) Holland Road access to the north.
5) Holland Road access to the south.
6) Drake Road access to the north.
7) Drake Road access to the south.
8) Cooper Hill Road access (After July 8, 1977).

The issuance of this permit shall be subject to the following conditions at all times:
1) All vehicles must remain on the access road. Any wood that is not close to the access road must be hand carried to the vehicle. No winching of logs will be allowed.
2) Vehicles may be turned around at pole sites only.
3) Littering is strictly prohibited.
4) Gates shall be kept closed and secured except when passing through.
5) Adequate time should elapse following heavy rain showers before attempting to travel on the access roads in order to avoid rutting.

Any permit holder who does not adhere to all of the above restrictions or whose actions cause any embarrassment to Niagara Mohawk shall immediately have his permit revoked.

Environmental Forester
N.M.P. Corp.

FIREWOOD PERMIT

Subject to the attached conditions and conditions hereinafter recited, NIAGARA MOHAWK POWER CORPORATION hereby grants permission to ______________________________ ______________________________("Grantee") to utilize the premises of Niagara Mohawk Power Corporation located at Dunkirk-Falconer No. 160 transmission area(s) No.______________________________formerly property of ______________________________ ______________________________in the Town of ______________________________, Chautauqua County, New York, for the sole purpose of removing designated downed wood at said location for firewood usage. Such permission is subject to revocation by Niagara Mohawk Power Corporation at any time by oral or written notice.

In consideration for the granting of this permission, Grantee agrees to utilize the subject premises at his own risk and agrees to indemnify, defend and hold harmless Niagara Mohawk Power Corporation from any and all claims or damages incurred by Niagara Mohawk Power Corporation due to his utilization of the subject premises.

Said permit expires on ______________________________unless terminated sooner as hereinabove provided.

Dated:______________________________

______________________________ NIAGARA MOHAWK POWER CORPORATIO
Grantee

______________________________ By______________________________
Street Address Forester

____
Town, State, Zip Code

Phone:______________________________

SITE ANALYSIS

Date ______________
Observer ______________

Project ______________ Segment ______________

Area No. ________

Area Width ________ Length ______ Acres ________

Site Characteristics:

Slope	Soil Texture	Topo-Location	Water	Drainage
0-5___	Sand_____	Ridge top___	Stream___	Free___
5-10___	Silt_____	Upper slope___	Pond___	Impeded___
10-20___	Clay_____	Middle slope___	Swamp___	Excessive___
20-30___	Muck_____	Lower slope___	Marsh___	
30+___	Peat_____	Bottom___	Bog___	
	Other_____	Other___	Other___	

Land Use ______________________

Vegetation: Overstory

Cover Type ______________________

Canopy Cover % 10___25___50___75___100___

Age Class Density--Sapling (5 in.)___ Poletimber (5-12 in.)___ Sawtimber (over 12 in.)___ Stand Density__________

Most Abundant Species _____ _____ _____ _____ _____

Less Abundant Species _____ _____ _____ _____ _____

Understory Shrub Layer

Cover % 10___25___50___75___100___

Most Abundant Shrub Species _____ _____ _____ _____ _____

Less Abundant Shrub Species _____ _____ _____ _____ _____

Desirable Species Density ______________________

Undesirable Trees in Shrub Layer
Stems/A. 600___1200-2400___2400-4000___4800___

Most Abundant Tree Species _____ _____ _____ _____ _____

Less Abundant Tree Species _____ _____ _____ _____ _____

Danger Trees (off R/W estimate) ______________________

Estimated Slash: Light________Medium________Heavy________
Depth________Depth________Depth________

Merchantable Timber Yes___ No___

Recommendations:
Clearing type ______________ Justification______________
Slash Disposal type ______________ Justification______________
Brush Treatment ______________________
Restoration ______________________

Sensitive Areas: ______________________

____

Treatment of Sensitive Areas:

Remarks:

TABULAR FORM

SITE-BY-SITE ANALYSIS FOR CLEARING AND SLASH DISPOSAL TECHNIQUES

SITE IDENTIFICATION		SITE ANALYSIS										SITE RECOMMENDATIONS			
AREA NUMBER	LOCATION	ESTIMATED ACREAGE	LAND USE	COVER TYPE	AGE CLASS	UNDESIRABLE SPECIES	DENSITY	DESIRABLE SPECIES	DENSITY	MERCHANTABILITY	SENSITIVE AREAS	CLEARING TYPE	SLASH DISPOSAL	JUSTIFICATION	REMARKS

(CGF-3)

Exhibit

Niagara Mohawk Power Corporation

PROTECTION MEASURES
FOR CROSSING STREAMS

Site-by-Site Analysis Survey

During the field site analysis survey, determinations to cross or not to cross streams are made. Perennial and intermittent streams are surveyed. Where perennial streams are proposed to be crossed by access roads, data is entered on the "Stream Crossing Data: field forms (see p. 7) Information includes channel characteristics, gradient and flow, bottom material, vegetation, land use, and resource value. Type of crossing devices are determined and are indicated on field maps. Also noted on field maps are "Restricted Activities Areas", "No Equipment Access Areas", and clearing and slash disposal methods. Information on field maps is later transferred to aerial mosaics and becomes part of the construction specifications. Protection measures for all perennial and intermittent streams are identified on the "Site-by-Site Analysis" tabular forms under "Site Recommendations" (see p. 6) Protection measures for high resource streams are entered on "Trout and Water Supply Streams" forms (see p. 8).

PROTECTION MEASURES

Protection measures taken into account when streams and other bodies of water are encountered include: (1) no equipment access areas, (2) restricted activities areas, (3) stream crossing data, (4) clearing and slash disposal methods, (5) stream crossing devices, (6) erosion control and restoration, (7) Resource value of streams, (8) consultations with the Department of Environmental Conservation. The following is an explanation of each.

No Equipment Access Areas

The first consideration is to avoid crossing streams or other water bodies by surveying potential alternate access. If available and practical, alternate access is used and the stream channel or water body is designated "No Equipment Access", whereby mobilized equipment is prohibited. These areas are delineated on aerial mosaics and are identified on site-by-site analysis tabular forms.

Restricted Activities Area

A buffer zone is established where the transmission line right-of-way traverses streams and other bodies of water and is referred to as "Restricted Activities Area". These areas are delineated on aerial mosaics, and are identified on site-by-site analysis tabular forms. Restrictions are as follows:

- (a) no deposition of slash within stream channel;
- (b) no accumulation of construction debris within restricted area;
- (c) herbicide restrictions in stream area as noted on container label instructions;
- (d) no degradation of stream banks;
- (e) no equipment washing or refueling within restricted area; and
- (f) no storage of any petroleum or chemical material.

Clearing and Slash Disposal Methods

Clearing methods are chosen so as to leave a buffer zone of existing vegetation along streams. The objective is to protect streams by minimizing their disturbance. This is accomplished by choosing clearing methods that retain certain vegetative species to provide shading and stabilization of existing soils and choosing slash disposal methods that

minimize disturbance of stream banks and existing vegetation. Type III clearing is generally chosen and consists of selectively cutting only tall growing species presently in or having the potential of reaching the wire security zone within five years. In areas where sufficient desirable shrub type vegetation exists to maintain an adequate screen, Type II clearing may be designated. This consists of removing tall growing tree species while retaining woody shrub species. Depending on slash volume, terrain and/or soil stability, slash may be lopped up on site to minimize scarification, or may be removed to prevent potential channel blockage or washing downstream.

Stream Crossing Data

Stream characteristics are surveyed on site as an initial step in protecting perennial streams that must be crossed. When it is decided that equipment will cross the stream, the following data is collected and entered on the field "Stream Crossing Data Form".

(a) Channel characteristics: width, water depth, stream cross section, slope steepness, bank height;

(b) stream gradient and flow: gradient/slope, velocity, flow;

(c) channel bottom material;

(d) stream bank vegetation;

(e) surrounding land use; and

(f) resource value.

Consideration of the above data is necessary in choosing the proper stream crossing devices, methods of clearing and slash disposal, location of access routes, and any special restoration measures. This data also serves as a documentation of stream characteristics which justifies the selection of stream protection measures.

Stream Crossing Devices

Proper stream crossing devices are necessary in providing protection of streams to be crossed. In choosing proper stream crossing devices, consideration is given to:

(a) type of equipment that will be using the device and anticipated number of crossings (intensity of use)

(b) device which will give least stream disruption during installation and use;

(c) permanence of the device; and·

(d) the capability of the device to maintain the flow capacity of the existing channel. (Stream crossing data is necessary in making above judgements.)

Culverts are generally used in streams of well contained flow channels and high, steep sloped banks. Under these conditions, a culvert installation usually minimizes stream bank disruption. Culverts are also used to equalize drainage in wet areas where construction roads are built up by gravel and/or gravel and corduroy. Culvert sizes are arrived at through field observations, type of culverts presently being used in the vicinity on a particular stream, channel characteristics, containment of flow, volume of flow, velocity of stream. Fords are generally used to cross streams where there is a solid approach and exit, slight grade on either side, low banks, and stable channel bottom. Fords without sills are normally selected for streams of low velocity, stable channel bottom and low resource value. Fords with sills are normally selected for streams of high velocity, stable or unstable channel bottom, and high resource value. Fords and culverts used by Niagara Mohawk are described in CGF6-Exhibit ___, Access Roads on page 22 through 33. Locations of fords and culverts to be installed are indicated on the aerial mosaics.

Erosion Control and Restoration

Access routes on downgrade approaches to streams are located in a manner to minimize erosion, thereby minimizing potential turbidity and sedimentation effects. On long downgrade approaches slight turns are designed in the route to eliminate channeling of surface water towards the stream. Water bars and other water diversion devices are installed during construction to divert surface drainage into filter strips prior to reaching the stream. Access routes are designed to cross stream channels perpendicularly which reduces the amount of stream bank disturbance. (See Erosion Control Techniques, pages 14 to 25, CGF-6 Exhibit ____, "Acess Roads").

Erosion Control and restoration measures are initiated in each phase of construction activity which includes road construction operations, installation of stream crossing devices, right-of-way clearing operations, and line construction operation. Exposed soil areas are regraded, seeded, fertilized, and mulched where appropriate. Necessary erosion control devices are installed within eight work days of initial disruption.

Resource Value of Streams

Resource value of streams are initially determined by referring to the New York State Department of Conservation Classification of Streams. High resource streams such as trout and water supply streams traversed by the transmission line right-of-way are identified on "Trout and Water Supply Streams" forms (see p. 8). Listed are stream location and stream classification. Protection measures are described on the forms, such as clearing type, slash disposal type, restricted activities areas, equipment or no equipment access, type crossing installation, and other protection measures.

Consultation with Department of Environmental Conservation

A personal contact is made with appropriate DEC personnel to review streams being traversed by the transmission facility. The resource value of the streams and protection measures to be taken are reviewed.

- SAMPLE FORM -

SITE ANALYSIS

Date ____________

Observer ____________

Project ____________ Segment ____________

Area No. ________

Area Width ________ Length ______ Acres ______

Site Characteristics:

Slope 0-5 ___ 5-15 ___ 15-25 ___ 25-35 ___ 35+ ___

Soil Texture Sand ___ Silt ___ Clay ___ Muck ___ Peat ___ Other ___

Topo-Location Ridge top ___ Upper slope ___ Middle slope ___ Lower slope ___ Bottom ___ Other ___

Water Stream ___ Pond ___ Swamp ___ Marsh ___ Bog ___ Other ___

Drainage Free ___ Impeded ___ Excessive ___

Land Use ____________

Vegetation: Overstory

Cover Type ____________

Canopy Cover % 10 ___ 25 ___ 50 ___ 75 ___ 100 ___

Age Class Density--Sapling (5 in.) ___ Poletimber (5-12 in.) ___ Sawtimber (over 12 in.) ___ Stand Density ________

Most Abundant Species ____ ____ ____ ____ ____

Less Abundant Species ____ ____ ____ ____ ____

Understory Shrub Layer

Cover % 10 ___ 25 ___ 50 ___ 75 ___ 100 ___

Most Abundant Shrub Species ____ ____ ____ ____ ____

Less Abundant Shrub Species ____ ____ ____ ____ ____

Desirable Species Density ____________

Undesirable Trees in Shrub Layer
Stems/A. 600 ___ 1200-2400 ___ 2400-4800 ___ 4800 ___

Most Abundant Tree Species ____ ____ ____ ____ ____

Less Abundant Tree Species ____ ____ ____ ____ ____

Danger Trees (off R/W estimate) ____________

Estimated Slash: Light ______ Medium ______ Heavy ______
Depth ______ Depth ______ Depth ______

Merchantable Timber Yes ___ No ___

Recommendations:
Clearing type ____________ Justification ____________
Slash Disposal type ____________ Justification ____________
Brush Treatment ____________ ______
Restoration ____________

Sensitive Areas: ____________

Treatment of Sensitive Areas:

Remarks:

- SAMPLE FORM -

STREAM CROSSING DATA FORM

Project: ______________________ Segment: ______________

Observer: ______________________ Date: ______________

Steam Name: ______________________________________

Crossing No. ______________________ DEC Class. ______________

Between ______________________ and ______________

Approximate date of crossing installation: ______________

I. FIELD WORK

A. Channel Characteristics

1. Width, approx. ________ ft.
2. Water depth, approx. ________ ft.
3. Typical cross section (sketch)
4. Slope Steepness (both sides of stream)
   ________% slope
   ________% slope
5. Bank height (both sides of stream)
   ________ft.
   ________ft.

B. Stream Gradient and Flow

1. Gradient/Slope ________
2. Velocity:
   Low ____ Med ____ High ____
3. Flow:
   Small ____ Med ____ Large ____

C. Channel Bottom Material

1. Bedrock _____
2. Boulder & rubble _____
3. Gravel _____
4. Sand _____
5. Silt _____
6. Soil _____

D. Stream Bank Vegetation (within 50' of either side of stream)

1. Hardwoods, approx. _____%
2. Softwoods, approx. _____%
3. Mixed, approx. _____%
4. Shrubs, approx. _____%
5. Crop farming _____%
6. Open field _____%
7. Impervious _____%

E. Downstream Drainage Basin Data

1. Land Use ______________
2. Water bodies ______________
3. Sensitive areas ______________
   ____

F. Surrounding Land Use

1. Types ______________
2. Aesthetics/Visibility _____
   ____

H. Resource Value

1. Recreation:
   Fishing: ______________
   Swimming: ______________
   Canoeing: ______________
2. Drinking water ______________

- SAMPLE FORM -

Niagara Mohawk Power Corporation

TROUT AND WATER SUPPLY STREAMS

STREAM	LOCATION	CLASSIFICATION	CLEARING TYPE	SLASH DISPOSAL	RESTRICTED ACTIVITY	EQUIPMENT ACCESS	CROSSING INSTALLATION	STREAM PROTECTION MEASURES

Exhibit

PROTECTION MEASURES

FOR WETLANDS

Site-by-Site Analysis Survey

During the field site analysis survey, wetlands are analyzed as to land use, vegetative cover, age class, desirable species density, merchantability of timber, and type of wetland. Clearing and slash disposal methods are determined. Construction road types, layout and drainage procedures are determined for wetlands that must be crossed, and are indicated on field maps. Also shown on fields maps are designated "Restricted Activities Areas", designated "No Equipment Access Areas", and clearing and slash disposal types. Field map information is later transferred to aerial mosaics and becomes part of construction specifications. The wetland analysis is summarized on "Site-by-Site Analysis, for Wetlands" forms (see page 3)

Protection Measures

Protection measures taken into account when wetlands are encountered include: (1) no equipment access areas; (2) restricted activities areas; (3) clearing and slash disposal methods; (4) type of access through wetlands; and (5) consultation with the Department of Environmental Conservation. The following is an explanation of each.

(1) No Equipment Access Areas

The first consideration is to avoid crossing wetlands by surveying potential alternate access. If available and practical, alternate access is used and the wetland is designated "No Equipment Access". This designation prohibits motorized equipment from entering these areas. These areas are delineated on aerial mosaics and are identified on site-by-site analysis tabular forms.

(2) Restricted Activities Areas

Wetlands traversed by the right-of-way are identified and protection measures are initiated. Wetlands designated as "Restricted Activities Areas" are noted on aerial mosaics, and are identified on site-by-site analysis forms. Restrictions are as follows:

(a) no deposition of slash within identifiable stream channels;
(b) no accumulation of construction debris within restricted area;
(c) herbicide restrictions at stream crossings as noted on container label instructions;

(d) no degradation of stream banks;

(e) no equipment washing or refueling within the restricted area; and

(f) no storage of any petroleum or chemical materials.

(3) Clearing and Slash Disposal

Type II clearing is normally chosen in wetlands. This clearing type consists of selectively removing tall growing tree species while retaining woody shrub species. Type D slash disposal is generally recommended, which consists of manually lopping all downed material so it lays as close to the ground as possible. These procedures minimize disruption to the wetland and to numerous wetland shrub species.

Occasionally, Type B, C slash disposal, consisting of collecting and piling is utilized. This method is used when soil and terrain conditions are such that mechanical collection could occur without creating serious erosion and rutting and when slash accumulations of drop and lop technique would be greater than one foot.

(4) Access Through Wetlands

The means of avoiding or crossing each wetland is noted in the remarks column of the "Site-by-Site Analysis for Wetlands" tabular forms. If access to a structure from off right-of-way or from the other direction along the right-of-way is not practical or available, the wetland is thoroughly checked for the best possible access layout. Skirting around edges, utilizing highest ground, and crossing the most narrow portion of wetland is considered. Use of corduroy and/or gravel is recommended where needed to stabilize the road surface (see CGF Exhibit "Access Roads"). Where the roadway is built up and impoundment of water is likely, equalization culverts are recommended to maintain the natural water levels on each side. Access road layout and drainage structures are located and identified on the enclosed aerial mosaics.

(5) Consultation with the Department of Environmental Conservation

A personal contact is made with appropriate DEC personnel to review wetlands being traversed by the transmission facility. It is determined if the facility crosses or is near any designated freshwater wetlands. If so, construction measures are reviewed and protection measures are discussed.

SAMPLE FORM

TABULAR FORM

SITE-BY-SITE ANALYSIS FOR WETLANDS

SITE IDENTIFICATION		SITE ANALYSIS								SITE RECOMMENDATIONS			
AREA NUMBER	LOCATION	ESTIMATED ACREAGE	LAND USE	COVER TYPE	AGE CLASS	UNDESIRABLE SPECIES DENSITY	DESIRABLE SPECIES DENSITY	MERCHANTABILITY	SENSITIVE AREAS	CLEARING TYPE	SLASH DISPOSAL	JUSTIFICATION	REMARKS

(CGF-5)

Exhibit

NIAGARA MOHAWK POWER CORPORATION

PROTECTION MEASURES FOR AGRICULTURAL LANDS

During the field site analysis survey (see form page 5), , land use is noted, of which agriculture is a major land use category. The status of the agriculture land, either active or abandoned, is noted. Also noted are features such as streams, ponds, springs, drainage ditches, drain tile, fences, dwellings, type of crops, restoration measures, etc. Field maps are an integral part of the site analysis survey. Indicated on these maps are area boundary lines; clearing and slash disposal types; structure laydown areas; access road layout; placement of stone, gravel, and corduroy; culvert and ford placement; off right-of-way access routes; restricted activities areas; no equipment access areas; and other pertinent information. This information is later transferred to aerial mosaics and becomes a part of the construction specifications.

Measures to Minimize Construction Effects

Measures to minimize line construction effects on agriculture land traversed by the transmission facility include: (1) clearing and slash disposal methods; (2) location of access routes; (3) installation of fences and gates; (4) location of tower construction and wire stringing sites; (5) restricted activities areas and no equipment access areas; (6) restoration measures; and (7) consultation with the Agriculture Extension Service and the Soil Conservation Service. The following is an explanation of each.

(1) Clearing and Slash Disposal Methods

During the site-by-site analysis, clearing and slash disposal methods are determined. Areas generally requiring clearing in agricultural lands include: (a) hedgerows, (b) wooded areas at the edge of fields, and (c) farm wood lots. Disposal of slash from the clearing operation is performed in such a manner so as to minimize interference with normal farming activities. The following is a description of slash disposal methods for various wooded areas where clearing is required.

(a) Hedgerows: the objective is to clean up slash resulting from clearing the hedgerow. Type E - burning, or Type H - hauling, is normally recommended. At wide hedgerows where piling would not interfere with farm operations or where slash volumes are

low, Types B and C (collect and pile) may be recommended.

(b) Wooded areas at the edge of fields: the objective is to dispose of slash in a manner that would not hinder potential expansion of fields and to utilize any usable wood material. Type B - collect and pile slash less than 6 inches in diameter, Type C - collect and pile logs over 6 inches in diameter, and/or Type E - burning, may be recommended. If merchantable logs are apparent, Type A - separating merchantable logs, would also be recommended.

(c) Farm wood lots: the objective is to handle the slash in a manner that provides for the utilization of merchantable or usable wood. Type A - separating merchantable logs, Type B - collect and pile slash under 6 inches in diameter, Type C - collect and pile unmerchantable logs over 6 inches in diameter, are normally recommended.

(2) <u>Location of Access Routes</u>

In agricultural areas, the roadway is routed to minimize impact on active farm fields. This is accomplished by routing the access road along existing farm roads, edges of fields, or along hedgerows where reasonably practical. When crossing farm fields, the existing surface may or may not support the construction equipment. This would depend on soil stability, seasonal conditions and the type of equipment required. If the surface does not or will not support equipment and rutting becomes excessive, it may become necessary to remove the topsoil and construct an earthen road on the subsoil. The unstable topsoil is then piled at the sides of the road for replacement once construction is complete. When the subsoils are unable to support equipment or are poorly drained, it may become necessary to construct gravel roads which will remain following construction. Again, careful consideration is given to the location of the road so as to minimize the impact upon the agricultural lands.

(3) <u>Installation of Fences and Gates</u>

Fences and their condition are noted during the site-by-site analysis. During construction, when it becomes necessary to remove or alter portions

of existing fence, new fence is installed. Gates are installed where movement of equipment is required through existing fences.

(4) Location of Tower Construction and Wire Stringing Sites

During the site-by-site analysis, tower construction areas and wire stringing sites are selected giving consideration to construction needs along with site protection measures. Active agricultural fields are avoided to the extent practical by utilizing adjacent woodlands or brushlands when available. Streams and water sensitive areas such as springs, seeps, swales, etc., are also avoided when possible. Some sensitive areas can be avoided by shifting the construction site or by adjusting the configuration of the construction boundaries. If sensitive areas cannot be entirely avoided, measures to protect their integrity are evaluated on a site-by-site basis and protection measures are recommended.

(5) Restricted Activities Areas and No Equipment Access Areas

Environmentally sensitive areas such as streams, drainage ditches, springs, ponds, etc., are noted during the site-by-site analysis. These sensitive areas are protected in various manners, one of which is designating the area "No Equipment Access", whereby motorized equipment is prohibited. Another method is designating the area as a "Restricted Activities Area." Restrictions include: (1) no deposition of slash within stream channels; (2) no accumulation of construction debris within restricted areas; (3) herbicide restrictions as noted on container label instructions; (4) no degradation of stream banks; (5) no equipment washing or refueling within restricted areas; and (6) no storage of any petroleum or chemical material. Where streams are to be crossed, installation of culverts or fords are proposed. Culverts are generally used in streams of well contained flow channels and high, steeply sloped banks. Fords are generally used across streams where there is a solid approach and exit, a slight grade on either side, low banks and stable channel bottom.

(6) Restoration Measures

During the site-by-site analysis, any special restoration measures that are not covered by normal restoration procedures are noted. Normal restoration procedures on construction sites are as follows:

"Exposed mineral soil resulting from construction activities will be graded, seeded, and fertilized. Necessary erosion control devices will be installed during time of construction, not to exceed eight work days after initial disruption. Where initial disturbance occurs in snow or frozen soil conditions, temporary erosion control measures will be installed, such as cross ditches and mulching as necessary. Seeding will be initiated as soon as soil conditions are conducive to seeding and germination."

In agriculture fields where the topsoil is stable and supports the construction equipment, the areas are backbladed and reseeded if necessary. In agriculture fields where excavation to subsoil is necessary, the excavated topsoil is replaced, regraded and seeded. In fields where a gravel road is necessary, because of unstable subsoil conditions, the gravel road will remain in place. Careful consideration is originally given to the road location, so the impact of the gravel road is minimized. Tower construction sites located in agriculture fields are regraded and seeded. Any excavated material is also replaced, graded and seeded. The seed mixture is made up of grasses and/or legumes that are suitable for hayland and pastureland uses.

(7) Consultation with Agriculture Extension Service and Soil Conservation Service

The local Agriculture Extension Service and/or the Soil Conservation Service is consulted during the development of the Environmental Management and Construction Plan for the proposed facility. Soils and agricultural uses are discussed as they relate to construction of access roads, clearing of vegetation, construction of the transmission line, erosion control, and restoration. General concepts regarding transmission line impacts on the particular soils and agricultural types are discussed, as well as particular mitigating actions which might be taken to minimize construction operation and maintenance impacts.

SITE ANALYSIS

Date ____________

Observer ____________

Project ____________ Segment ______________

Area No. ________

Area Width ________ Length ______ Acres ________

Site Characteristics:

Slope 0-5___
5-10___
10-20___
20-30___
30+___

Soil Texture
Sand_____
Silt_____
Clay_____
Muck_____
Peat_____
Other_____

Topo-Location
Ridge top____
Upper slope____
Middle slope____
Lower slope____
Bottom____
Other____

Water
Stream____
Pond____
Swamp____
Marsh____
Bog____
Other____

Drainage
Free____
Impeded____
Excessive____

Land Use ______________________

Vegetation: Overstory

Cover Type ____________________

Canopy Cover % 10___25___50___75___100___

Age Class Density--Sapling (5 in.)___ Poletimber (5-12 in.)___ Sawtimber (over 12 in.)___ Stand Density__________

Most Abundant Species _____ _____ _____ _____ _____

Less Abundant Species _____ _____ _____ _____ _____

Understory Shrub Layer

Cover % 10___25___50___75___100___

Most Abundant
Shrub Species _____ _____ _____ _____ _____

Less Abundant
Shrub Species _____ _____ _____ _____ _____

Desirable Species Density ____________________

Undesirable Trees in Shrub Layer
Stems/A. 600__1200-2400__2400-4800__4800__

Most Abundant
Tree Species _____ _____ _____ _____ _____

Less Abundant
Tree Species _____ _____ _____ _____ _____

Danger Trees (off R/W estimate) ____________________

Estimated Slash: Light_______ Medium_______ Heavy_______
Depth_______ Depth_______ Depth_______

Merchantable Timber Yes___ No___

Recommendations:
Clearing type______________ Justification __________
Slash Disposal type__________ Justification __________
Brush Treatment____________________
Restoration____________________

Sensitive Areas: ____________________

____

Treatment of Sensitive Areas:

Remarks:

-1a-

SAMPLE FORM

Exhibit

Niagara Mohawk Power Corporation

ACCESS ROADS

1. CONSIDERATIONS

The primary goal of access road construction is to provide environmentally acceptable access to each structure or tower along the project. The access road must be capable of supporting the various types of equipment needed to construct the line. Therefore,the degree of sophistication needed in the road construction effort will in part be a factor of the type of equipment being used to construct the line, i.e., tracked equipment requiring less sophistication than equipment mounted on rubber tires.

Other considerations which influence the type of road constructed and the location of the access road include:

1. Grade
2. Land use patterns
3. Soil conditions
4. Vegetative condition
5. The location of streams, wetlands, and other water bodies.
6. The type of construction activity which will take place within an area, etc.

2. Road Grade

The maximum grade of the access road may vary greatly from project to project, depending upon terrain and soil conditions, the credability of the soils encountered and the type of equipment necessary to construct the line. As a rule of thumb, the road grade should be kept to 20% or less wherever practicable. However, when alternate access or off right-of-way access are unavailable, it may be necessary to exceed the 20% guideline in order to gain access. Those grades in excess of 20% should be kept as short as practicable so as to minimize the added stabilization and erosion control costs.

3. Environmental Sensitivity and Road Location

Priority must be given to construction needs and routing the road so as to provide adequate access to each work area. Unless there are overriding environmental considerations (wetlands, streams, desirable plant communities, etc.), or road construction/restoration problems (gradient, rock outcrops, steep slopes, stumps, which would require grubbing, etc.),

the access road should stay as close to centerline as practicable so as to facilitate wire stringing activities and future maintenance programs.

4. Stream Crossings

When it is reasonably practicable to avoid crossing a significant stream by either utilizing access back along the right-of-way from the next highway crossing or by using existing off right-of-way side access, the alternate access should be selected and the stream area shall be designated "No Equipment Access". A significant stream is defined as one which carries a year round flow and/or supports aquatic life.

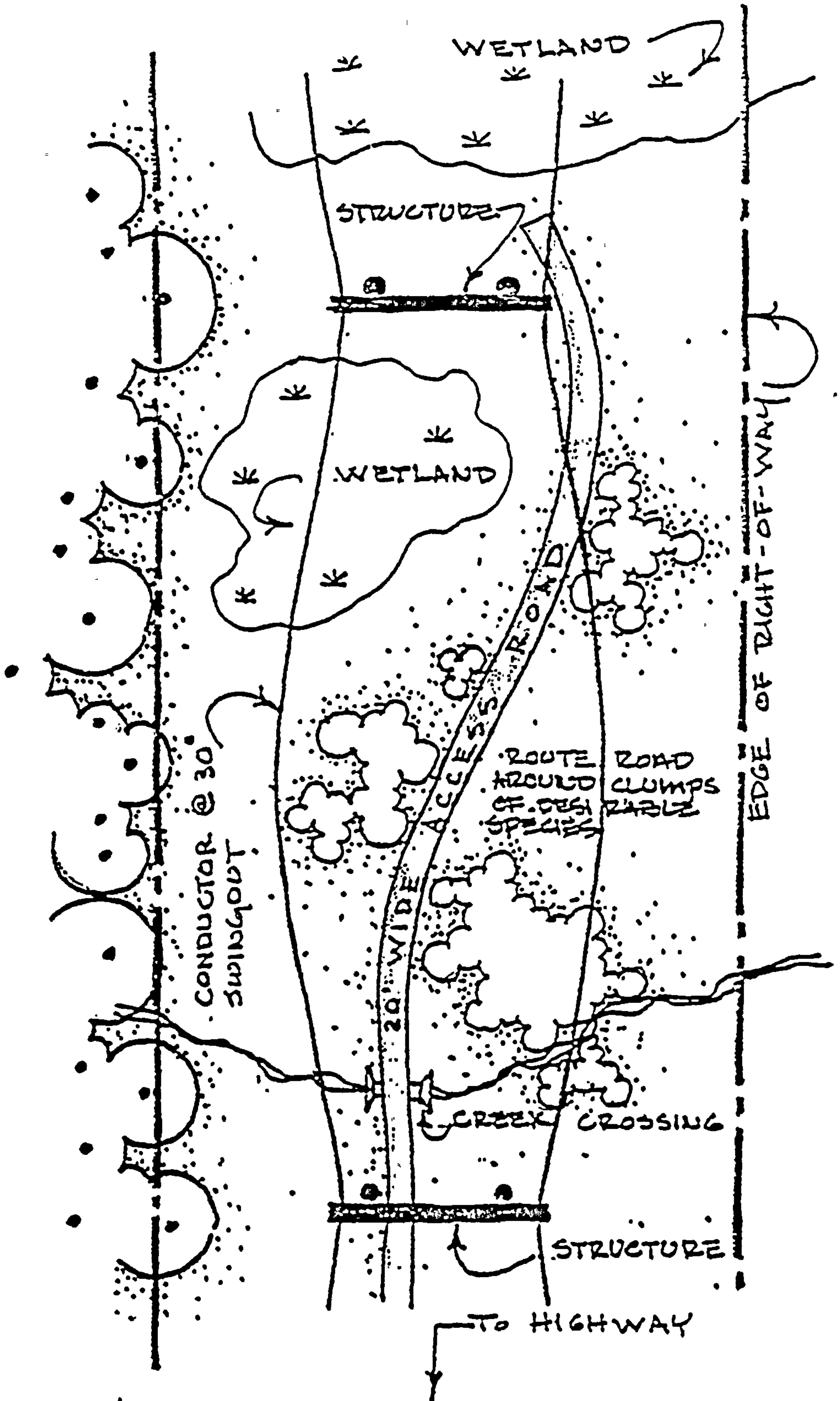
In crossing an intermittent stream, or a significant stream where alternate access is not available, the road crossing should be made perpendicular to the stream channel, at a point which will cause minimum disturbance to the stream bottom, banks, and stream bank vegetation. The appropriate crossing device shall be installed prior to moving equipment across the stream.

All access through the stream and its associated stream buffer zone shall be restricted to the designated roadway.

5. Wetlands

When it is reasonably practicable, access through a wetland should be avoided by routing the road to higher ground around the wetland, or terminating access on one side of the wetland and coming back along the right-of-way from the next highway to the other side of the wetland. Access into or through a wetland generally entails more sophisticated road construction techniques than are required in drier soils, including the use of corduroy and gravel if appropriate material is available, or a floatation fiber such as mirafi and gravel if corduroy is not available. A corduroy road without gravel topping may serve as an adequate road on certain lines if tracked equipment is used for construction.

When access is required to reach a structure within the wetland, the route should enter from the edge of the wetland closest to the structure, to provide the shortest distance to structure, thereby minimizing impact on the wetland and the distance of the more sophiticated, more expensive road. If corduroy is to be used, the road should be as close to centerline as



SECTION OF R/W SHOWING TYPICAL ACCESS ROUTING
NO SCALE

practicable so as to minimize the winching distance required to get corduroy material from the edges of the right-of-way to the roadbed.

6. Desirable Plant Communities

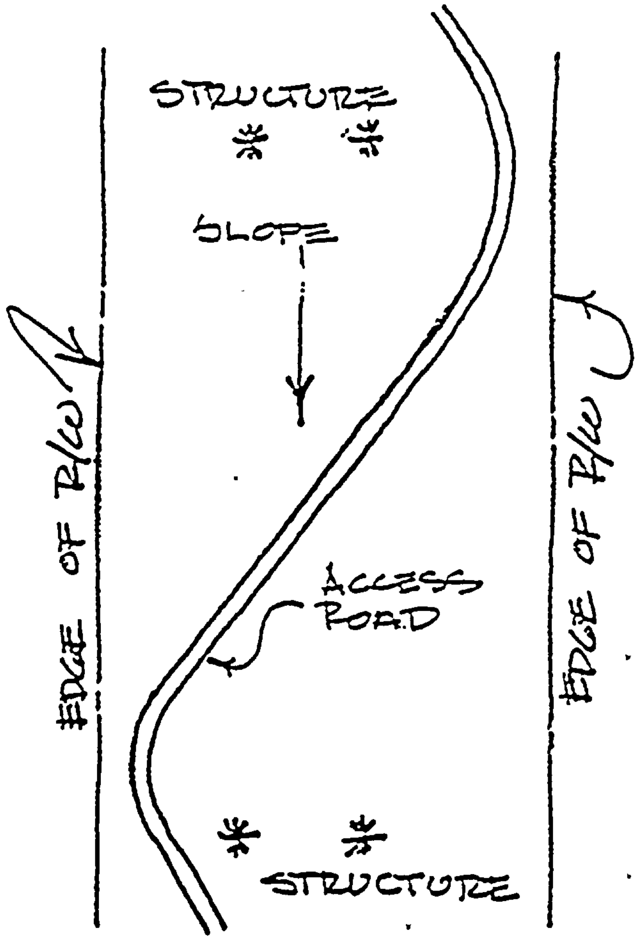
Given a condition of scattered or light brush along the right-of-way, and within the constraints of acceptable soil and terrain conditions, the access road should be routed around the edges of desirable plant communities as much as practicable. When the right-of-way contains moderately dense species over much of the area, the road should be routed through those portions of the right-of-way where the desirable growth is somewhat lighter, attempting to maintain the denser growth areas.

7. Slope

1. Ideally, given the alternative of routing the access road on flat terrain, (0-5%), or a side slope, when both conditions exist along a given segment of right-of-way, and assuming comparable soil conditions with each capable of supporting construction equipment, the access road should be routed on the flatter terrain to minimize road construction costs.

2. In gentle terrain (5-10% slopes) the access road can be constructed as close to centerline as practicable after considering any environmental factors, such as those discussed above.

3. Under moderate terrain conditions (10-20%), it may be necessary to sweep the access road gradually from one edge of the right-of-way to another in order to minimize the road grade, cutting diagonally across the slope rather than traveling straight up the slope.



In steep terrain, where the slope exceeds 20%, it may be necessary to sweep off right-of-way for short distances in order to utilize gentler terrain and provide viable access. When laying out and constructing roads in such terrain, curves should be made on naturally occurring terraces, whenever such terrace conditions exist. The turning radius of all curves in the access road should be gradual enough to enable hauling or skidding poles into the designated work areas.

The diagonal crossing of slopes, as described above, will facilitate the erosion control effort by enabling easy cross ditching or waterbarring. The gentler grade created by this diagonal crossing, will also requira fewer water bars than would the steeper route of traversing straight up the slope.

8. Stumps

Grubbing stumps from the roadway can be a costly, time consuming job which causes major disruption of existing soils. Therefore, when laying out and constructing earthen roads, the road should be routed so as to minimize the amount of stump grubbing required. This can be accomplished by staying along the edges of fields when they are present, or routing the road along the edge of the existing right-of-way, if the line is being built parallel to another line.

Where it is necessary to grub stumps, they may be turned upside down and used to stabilize the low side of a sidehill cut.

When constructing a gravel road into a wetland or similar soft soil condition, the flushed cut stumps should not be grubbed. Left in place and filled over, the root systems of larger stumps will tend to provide "flotation" for the road.

9. Land Use Patterns

The location of the access road, and the type of access road constructed should take land use activities into consideration.

In agricultural areas, the roadway should be routed so as to minimize the impact on active fields. This can be accomplished by routing the road along existing farm roads, or the edges of fields, or along hedgerows where reasonably practicable. When crossing farm fields, depending on soil stability, seasonal conditions, type of equipment requiring access, the type of agricultural use, etc., the existing surfaces may or may not support the construction equipment. If the surface does not, or will not support equipment and rutting becomes excessive, the unstable topsoil should be "windrowed" or piles at the sides of the road for replacement once construction is complete. This assumes a stable subsoil, with adequate drainage, (i.e., earthen road), which is capable of supporting the construction equipment.

When the subsoils are unstable or poorly drained, it may be necessary to construct a gravel road which will remain following construction. Careful consideration should be given to the location of the road if this is the case, so that the impact on agricultural uses might be minimized to the extent practicable.

Other land uses requiring consideration when routing the access road include, residential development, recreational use, forestry or logging operations, etc.

10. Road Construction: Types of Access Roads

Width of Road: For most clearing and construction activities, the traveled portion of the road shall be a minimum of 12 feet wide, with greater widths at curves and turnouts. However, dependent upon the equipment to be used by the construction forces it may be necessary to provide 14 feet nominal width for the access road.

10.1 The Undeveloped Roadway

Terrain Conditions: Relatively flat to gently sloping

Soil Conditions: Shallow to moderate top soil with stable subsoil

If access is required during winter or summer time construction periods, no road improvement should be required in most cases. Under wetter soil conditions, as might be experienced during spring and fall construction seasons, it may be necessary to excavate the softer topsoil, enabling traffic to travel on the more stable subsoil. Note that the topsoil should not be excavated if proper road drainage cannot be provided. Such excavation without adequate drainage can only result in impounding water in the road. In this situation of wet or saturated topsoil with stable subsoil, minor rutting is considered acceptable provided a continuing effort is made to prevent water from pocketing in the ruts and causing further breakup of the roadway.

Dependent upon seasonal subsoil conditions and the type of construction equipment to be used, it may be possible to excavate the wet, unstable topsoil in actively cultivated fields, stockpiling or "wind rowing" the spoil beside the access route. This will enable traffic to travel on the stable subsoil for construction. At the time of final restoration, the topsoil would be replaced, returning the roadway to active agriculture. When unstable subsoils are encountered, which will not support construction equipment, it may be necessary to construct a gravel road across an active field. When this is necessary, the road shall remain as a permanent feature following construction.

In other areas, when due to seasonal conditions, the native soil will not support traffic and the topsoil must be excavated to subsoil, the soil should be spread beside the road and bladed to blend with surrounding contours. (For more detail, see this page, Earthen Roads.)

The appropriate erosion control measures shall also be initiated as the road is constructed. (See page 14,. Erosion Control Techniques.)

Note that in flat terrain, excepting wetlands, it is often difficult, if not impractical to provide adequate drainage by ditching the access road. In this situation, it is recommended that a minimal road construction effort be made, simply smoothing out rough spots. The use of tracked equipment to clear and construct might be advisable to avoid the cost of gravel road in marginal stable soils or wet construction season.s

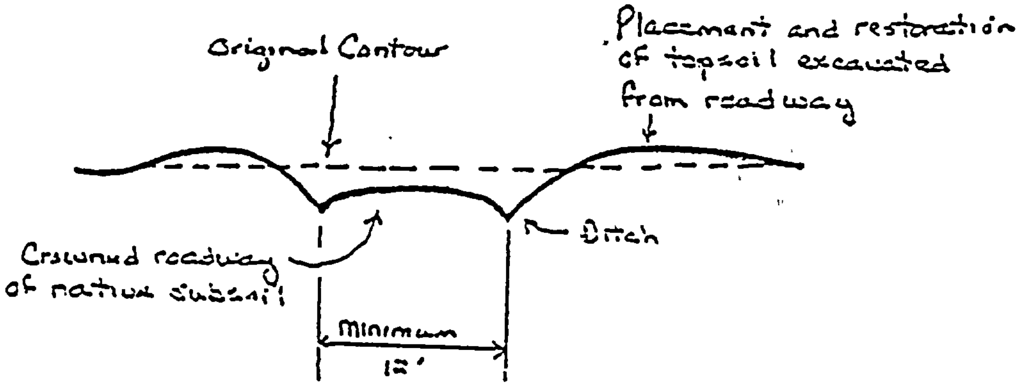
10.2 <u>Earthen Roads</u>

Terrain Conditions:	Predominantly used in moderate to steep sidehill; during wetter seasons may also be used in gentle terrain.
Soil Conditions:	Shallow to moderate top soil with stable subsoil.

10.2.1 <u>Perpendicular to the Contours:</u> In gently sloping terrain the access road may frequently be oriented perpendicular to the slope to facilitate construction. In woodland situations, where stumps must be grubbed, when the ground is rough to broken with numerous small "mounds and pockets", and under seasonably unstable surface conditions it will be necessary to remove the surface layer of topsoil, spoiling and dressing off this material at the sides of the road. In this way the more stable subsoil can be crowned to provide a firm driving surface. The necessary ditching and waterbars should be installed at the time of initial road construction, if seasonably practical, so as to provide long term stability. (See illustration next page). If, due to seasonal conditions ditching and waterbar installation are impracticable, temporary stabalization measures, as discussed under Erosion Control Techniques, shall be initiated so as to prevent erosion of the road surface and spoil.

The following diagram is a simplified illustration of how a crowned and ditched earthen road, constructed perpendicular to the slope, would

appear in cross section.



10.2.2 Side-slopes, (where the road crosses the slope on a diagonal): In moderate to steep terrain, where it is necessary to cross the slope on a diagonal, thereby reducing the grade to improve accessability, it will be necessary to create a side hill cut. A sidehill cut may also be necessary in gently sloping terrain when due to an orientation of the right-of-way, the road may need to cross the slope parallel to the countours.

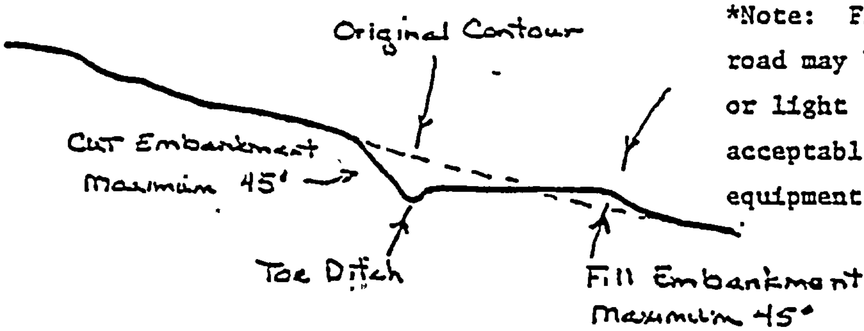
All stumps shall be grubbed from sidehill cuts, and the topsoil shall be excavated to the subsoil, creating a firm, stable road surface capable of supporting the construction equipment. All spoil shall be placed on the embankment at the low side of the road, and spoil shall not be used as fill material for the low side of the road surface unless bank run gravel or similar subsoils are encountered. Subsoils of high clay contents, as found in clay/shale hard pan regions, may take a long time to settle into a drivable surface. Following a rain, rubber tired vehicles may sink into this material when it is used as fill, possibly leading to serious accidents should a vehicle sink in enough on the low side of the road to begin rolling over. Topsoil spoil shall not be used as fill in any portion of the driving surface.

The cut embankment shall be backbladed to a maximum 45^{o} slope in soils, unless a retaining wall is constructed to stabilize this embankment.

In rock, the cut embankment may be left vertical, provided the rock is not easily erodable as "crumbly shale would be. A toe ditch should be installed on the cut embankment side of the road unless the road is outsloped, with frequent ditch relief through waterbars, broad base dips, etc.

The fill embankment shall be bladed to a maximum slope of 45^{o}. A toe ditch may also be created below the fill slope when this slope is extensive or unstable, to trap silt until vegetation can become established. Other techniques would include lining the base of the slope with stumps, haybales or logs, mulching the slope, and/or rip rapping the slope with slash.

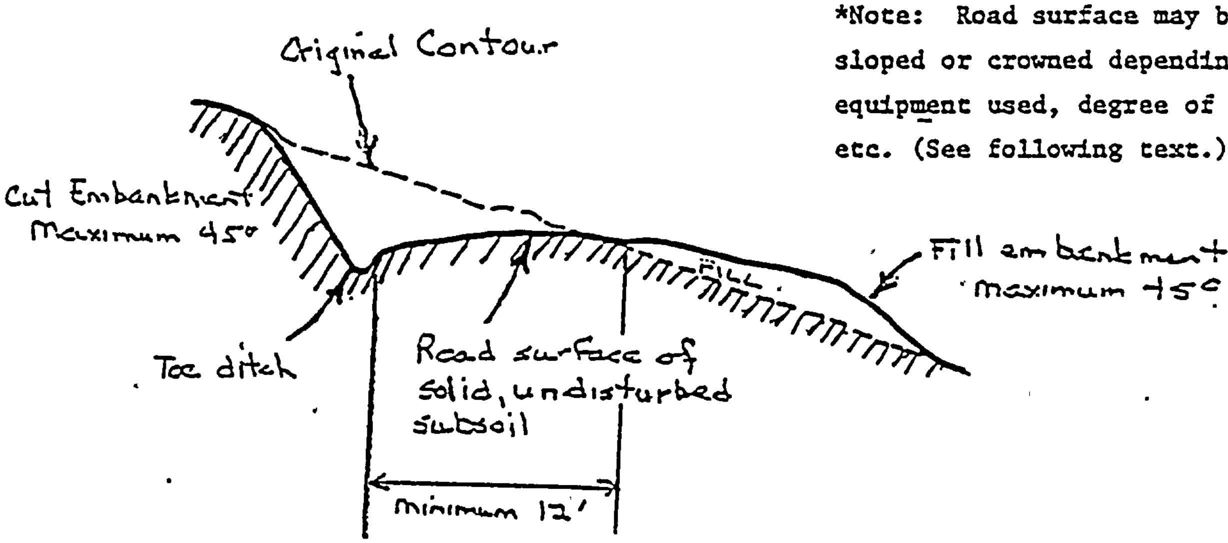
Cross section of side hill cut in gentle terrain.



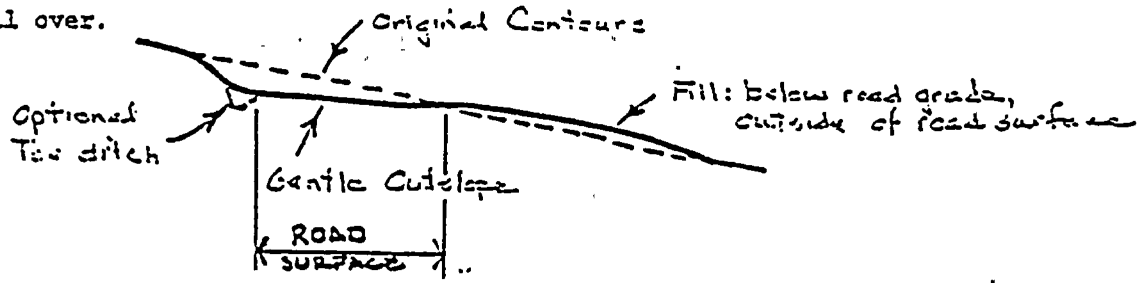
*Note: Fill in the low side of road may be acceptable if tracke or light equipment is used; unacceptable if heavy rubber tired equipment is used.

Side hill cut in moderate to steep terrain

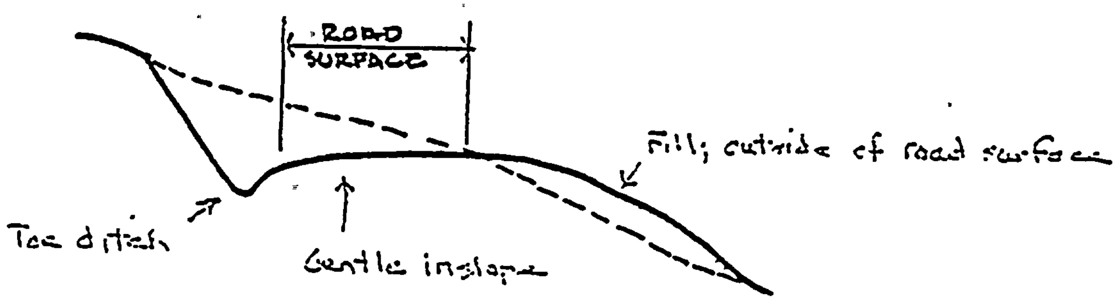
*Note: Road surface may be insloped or crowned depending on equipment used, degree of slope, etc. (See following text.)



10.2.2.1 Outsloping Side hill Cuts: When tracked vehicles and/or light rubber tire vehicles will be used to construct the line, the road surface may be gently outsloped to provide cross drainage, rather than installing a toe ditch. This technique, combined with appropriate waterbar spacing will help to minimize sheet and rill erosion of the road surface during construction and before it can be vegetated. However, when large rubber tired vehicles are used, such as the rubber tired cranes, out sloping cannot be used. Following a rain there may be a tendency for these larger pieces of equipment to slide sideways off of the road if the road is outsloped. If the crane were to slide off the road, into the soft spoil of the fill embankment, it might settle in this soft material and roll over.



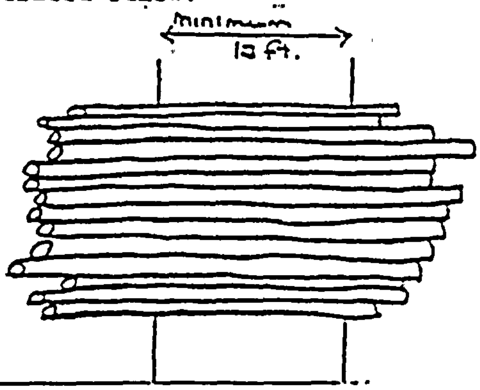
10.2.2.2 Insloping Side Hill Cuts: In the steeper sidehill situations, and when larger, rubber tired construction equipment is used, the road should be gently insloped, toward the cut embankment. This tends to minimize sheet and rill erosion by confining runoff waters to the toe ditch at the base of the cut bank. Frequent ditch relief will be needed, as water bars or broad base dips, to provide cross drainage and divert water across the road and out of the ditches. Flow barriers will be required in the longer ditches, where cross drainage cannot be provided, to slow the force of run off waters and prevent ditch erosion. (See Erosion Control Techniques, page 14. In this case, if the crane were to slide off the road, it would slide into the cut embankment, without the danger of rolling.



10.3. <u>Gravel Roads, Corduroy Roads, Corduroy and Gravel Roads, Mirafi and Gravel Roads</u>

Soil and Terrain Conditions: predominantly used in flat to gentle terrain with poorly drained and/or unstable subsoil; during wetter seasons gravel may also be required in steeper terrain where unstable soils result from poor drainage.

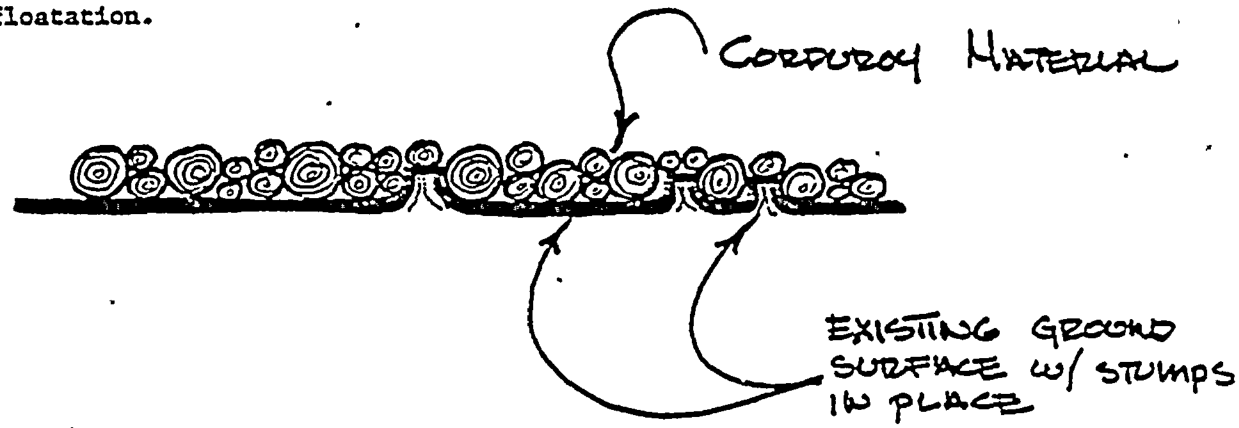
10.3.1 Corduroy Roads: Under wetter, unstable soil conditions where clearing is necessary and tracked vehicles will be used for construction, a corduroy road may be sufficient for access. The corduroy material shall include whatever material is made available by the clearing operation, including the small diameter slash. Logs, over 4 inches in diameter which are used for corduroy shall be oriented parallel to each other and across the access road, as illustrated below.



Random length logs placed across access road

When necessary, small diameter slash may also be used as corduroy by randomly placing ~~this small~~ material in the roadway and crushing it with a D-6 bulldozer, or equivalent, so as to create a "dense mat" of slash.

All corduroy shall be placed on the undisturbed soil surface, as illustrated below. Where stumps exist within a section requiring corduroy road they shall remain beneath the corduroy surface to provide additional road floatation.



10.3.2 Corduroy and Gravel Road

When access is required by rubber tired vehicles which cannot be operated on the corduroy road surface, the corduroy road shall be overlain by a minimum of 12 to 18 inches of gravel, depending upon the type and size of equipment requiring access.

10.3.3 Flotation Fiber and Gravel Roads

When corduroy material is not available, or when soil conditions do not warrant the flotation provided by corduroy, either a gravel road, or a flotation fiber and gravel road may be constructed.

The purpose of the fiber is to provide gravel road flotation under slight to moderate soil moisture conditions, and prevent the mixing of fine soil particles of the native soil with the gravel. A minimum of 12 to 18 inches of gravel shall be spread over the fiber, so as to provide stable access for the type of construction equipment to be used.

The fiber should not be used under conditions of high soil moisture and/or highly unstable soil since this material tends to "sink" under these conditions. Furthermore, the flotation sheet should not be used where clearing has resulted in numerous small stubs, since these tend to puncture the fiber, thereby decreasing its flotation properties and allowing fine soil particles to mix with the gravel.

10.3.4 Gravel Roads

Gravel roads should be used in slight to moderately wet conditions where gravel alone can provide stability. If soil conditions permit, the softer, surface soils should be excavated and replaced with gravel. Generally, 12 to 18 inches of gravel will be required depending on subsoil conditions and the type of construction equipment to be used.

In severe wetland conditions, where the flotation fiber would fail and corduroy is unavailable, it may be necessary to place great quantities of gravel in the road, to a depth of 2 to 3 feet or more, in order to provide a stable road surface. Additional stability may be achieved with less material by using specially ordered gravel with a high content of large cobbles. As much as practicable, the access road should be routed to avoid these severe wetlands. When these severe wetlands must be entered or

crossed, the road should be kept to shortest distance practicable to minimize gravel costs. It may be necessary to install equalization culverts to maintain similar water levels on each side of the road.

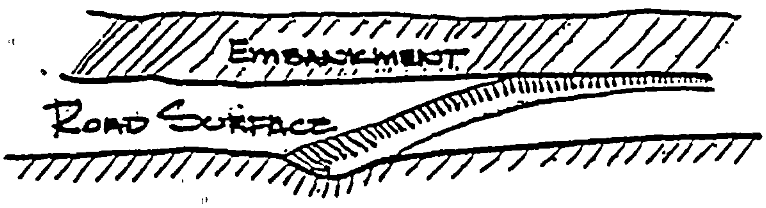
11 Erosion Control Techniques

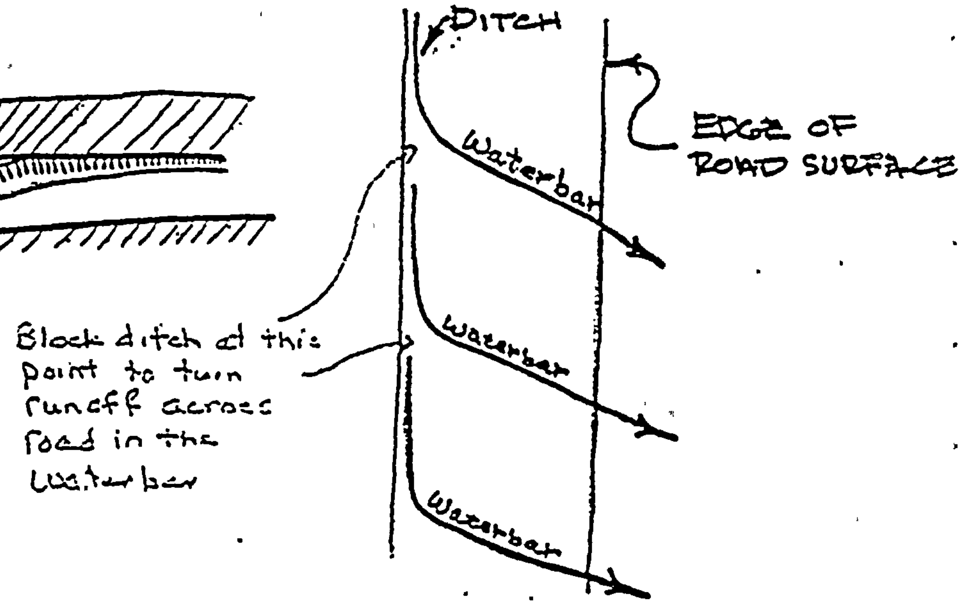
11.1 Waterbars: While the placement of waterbars is a highly variable factor, influenced by such factors as height of surrounding embankments, natural topography, the presence of desirable vegetation, the road surface material and its tendency to erode, man-made features such as structure or tower locations, etc., the following table should serve as a guide to waterbar placement on various slopes.

WATERBAR SPACING

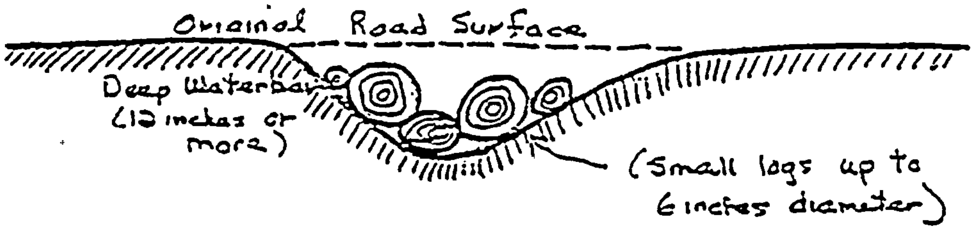
Road Grade (percent)	Spacing (feet)
2%	250'
5%	135'
10%	80'
15%	60'
20%	45'

Ideally, waterbars should be placed on a diagonal, across the road at about 30° to 45°, in order to gradually turn the water out of the ditch and across the road. However, this may vary due to terrain conditions, and drainage requirements. The water bars should be excavated below the original road grade, blading the spoil to blend with surrounding contours beside the road.

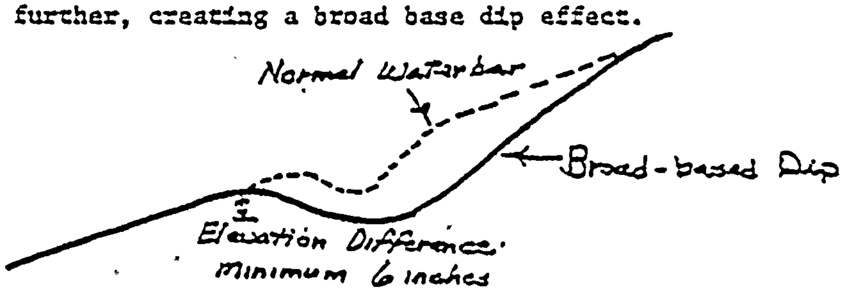




The waterbar should be excavated deep enough to provide drainage, and yet shallow enough to permit access, generally 6 to 12 inches. When access through the deeper waterbars is a problem, or break up of the waterbar is occurring, a few 3 to 6 inch logs may be laid in the waterbar to reinforce it and permit smoother access. As noted in the illustration below, the top of the logs should remain a few inches below the top of the waterbar to prevent overflow and failure. This technique can also be used to help stabilize waterbars, which tend to break up under construction traffic.



On steeper slopes, or where the access requirements of the equipment used for construction necessitate gentler waterbar, the "normal" waterbar can be excavated further, creating a broad base dip effect.

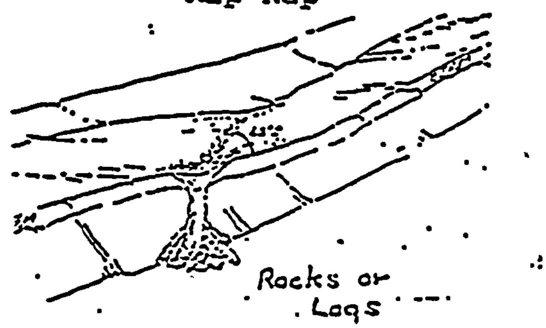


The outflow end of the waterbar should be carried into a vegetated area, where runoff can be filtered through established grasses where practical. When this cannot be done, one of the following techniques might be employed.

1. The waterbar can be directed so that it empties into a slash pile or an area of heavy drop and lop slash.

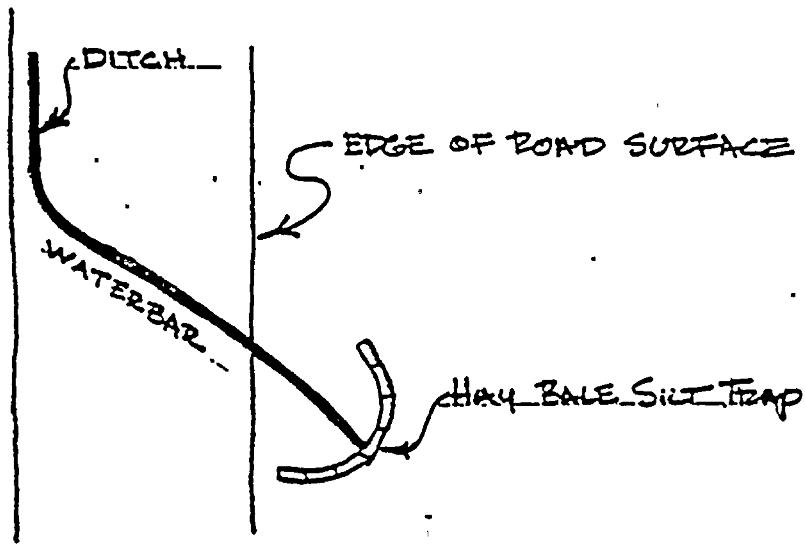
2. The end of the waterbar may be rip-rapped with slash, logs, or stone as illustrated below, when the soil or road embankment is erodable.

Rip Rap

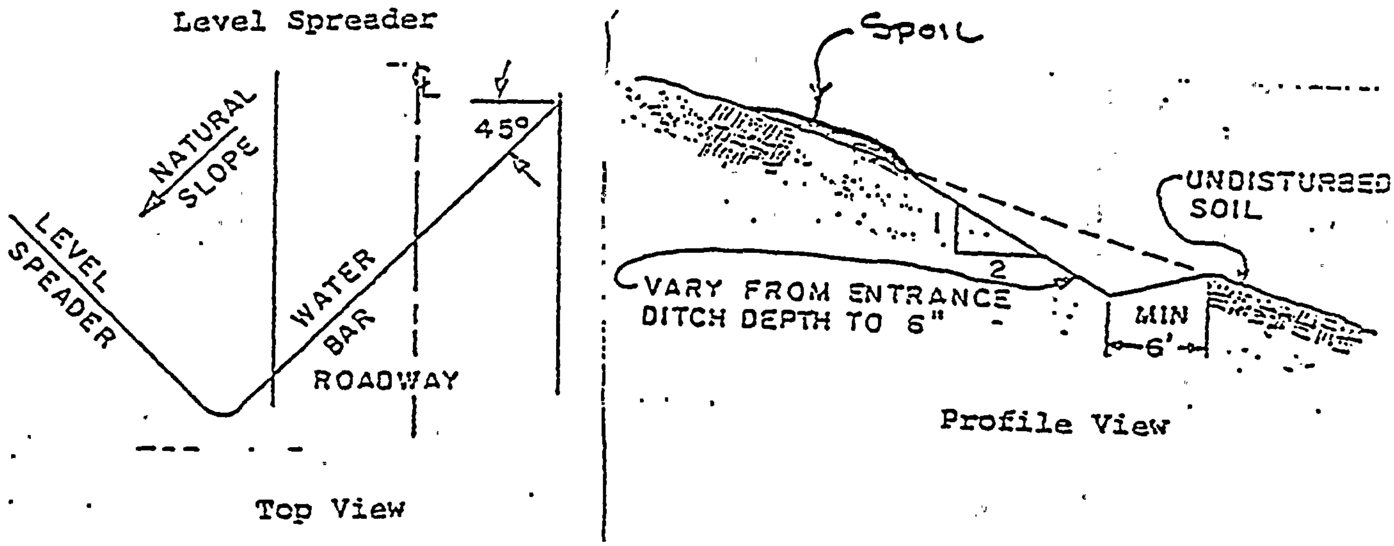


A settleling basin may be excavated at the end of the waterbar, to trap sediment carried by runoff before the runoff can enter sensitive stream areas. These may be particularly effective prior to the revegetation of the embankments, ditches, waterbars, etc. The low side of these setting basins may be lined with hay bales to further trap and filter out sediments.

The use of haybales as illustrated below may be sufficient to filter out silt when near sensitive stream areas.



Level spreaders may be installed at the end of the waterbar, as illustrated below, to capture silt and spread the runoff waters over a larger area. The level spreader is installed by ditching parallel to the natural contour, and the spoil should be spread on the uphill side of the level spread so as to create an undisturbed outflow area.



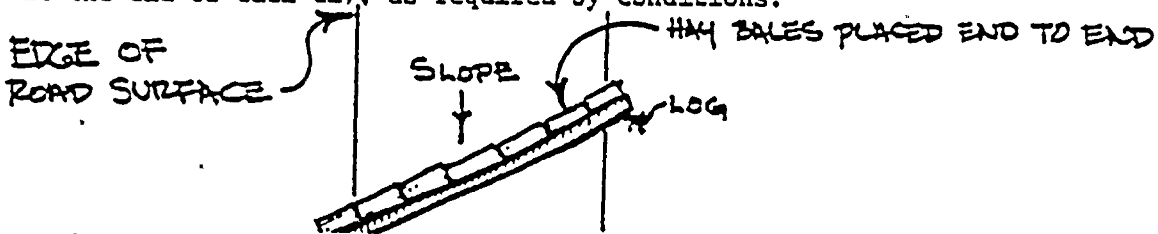
While the length of a level spreader will vary with terrain conditions, vegetative conditions, soil erodability, etc., the following lengths are presented as a guide.

Length of Spreader (feet)	Drainage Area (acres)
15	1.5
20	1.5 to 4
26	4 to 6
34	6 to 9
44	9 to 14

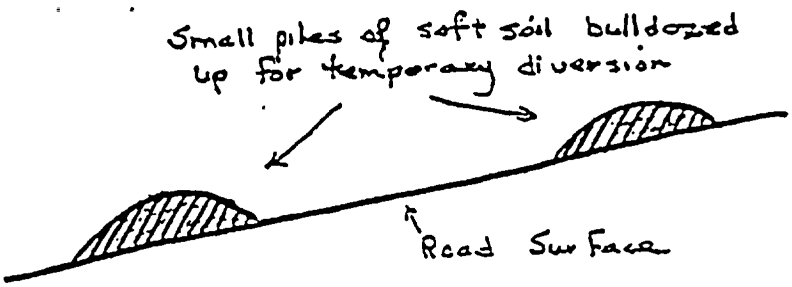
11.2 Temporary Water Diversion

At certain times of the year, such as periods of deep frost, during spring break up and during periods of prolonged rain, it may be impossible or impractical to construct waterbars as the road is constructed or once it is completed. In order to maintain effective runoff control and prevent significant erosion, the following temporary techniques might be employed until such time as effective, stable waterbars might be installed.

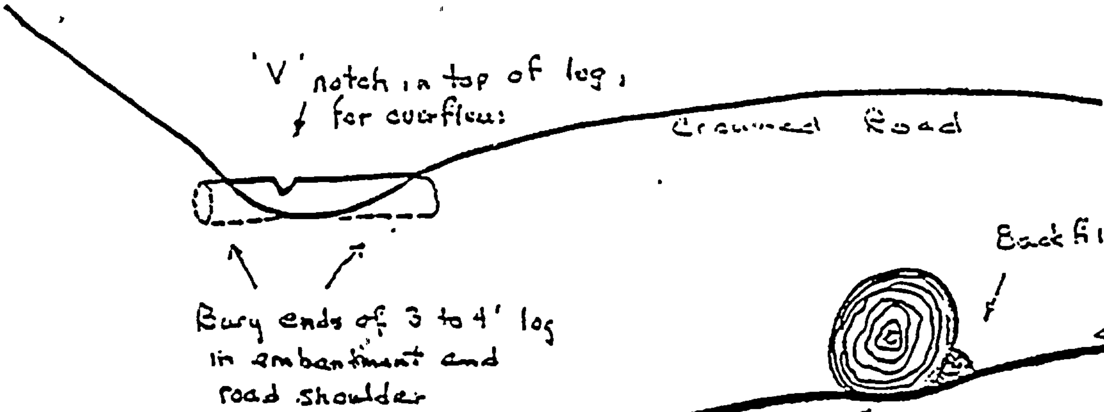
1. Hay bales and/or logs can be placed diagonally across the road to divert runoff. When logs alone are used, the upper side of the log should be backfilled with a few inches of soil to prevent undermining and failure. When bales of hay are used in combination with a log across the road, the hay bales should be placed end to end on the uphill side of the log to act as a trap for sediments as well as a water diversion. (See illustration). If regular access is required along the road, the log can be omitted, and the haybale diversion used by itself. The bales of hay can be set off to the side to permit traffic to pass, and returned as the vehicle goes through or at the end of each day, as required by conditions.

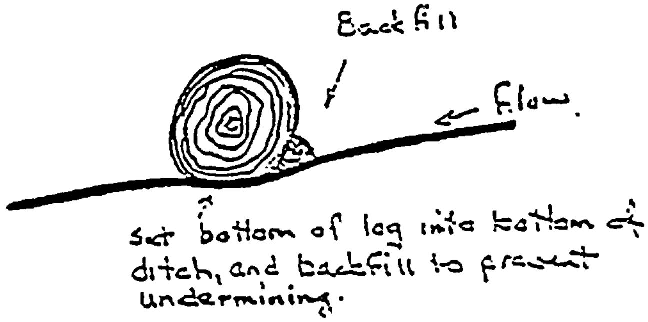


2. When regular use is not required along a section of road, particularly during the spring break up period or prolonged rainy periods, the softer surface soil can be pushed up into small berms in the road. While such soil may not be stable enough to support traffic, it will provide an adequate diversion which can be quickly installed with a small bulldozer.



Flow Restrictions for Long Ditches

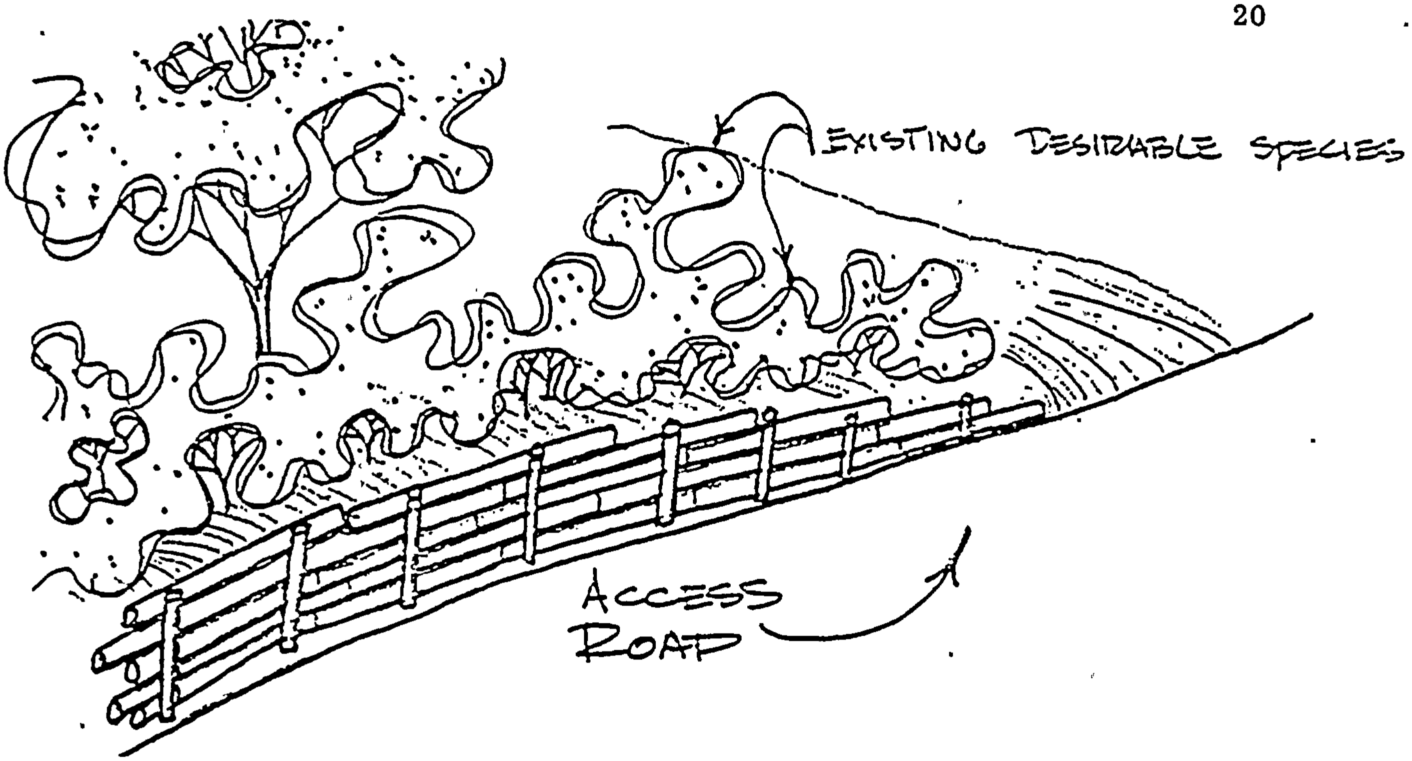




Due to terrain conditions it may not be possible to install waterbars for ditch relief at the recommended intervals. As a result, runoff waters may travel long, interrupted distances in the roadside ditches before being turned off the road, resulting in accelerated ditch erosion. In order to interrupt this flow and minimize ditch erosion, small, 4" to 8" diameter logs, 2 to 3 feet long may be placed across the ditch to act as flow restrictions. (See illustration). The short pieces should be anchored by burying the ends in the embankment and the shoulder of the road. The bottom of the log must set into the bottom of the ditch, and an inch or so of soil should be packed against the base of the upstream side of the log to prevent undermining and failure. A small 'V' shaped notch should be cut into the top of the log to provide overflow relief. The empoundment of water behind the log "dam" slows runoff waters, thereby minimizing ditch erosion until grasses can germinate and permanently stabilize the ditch.

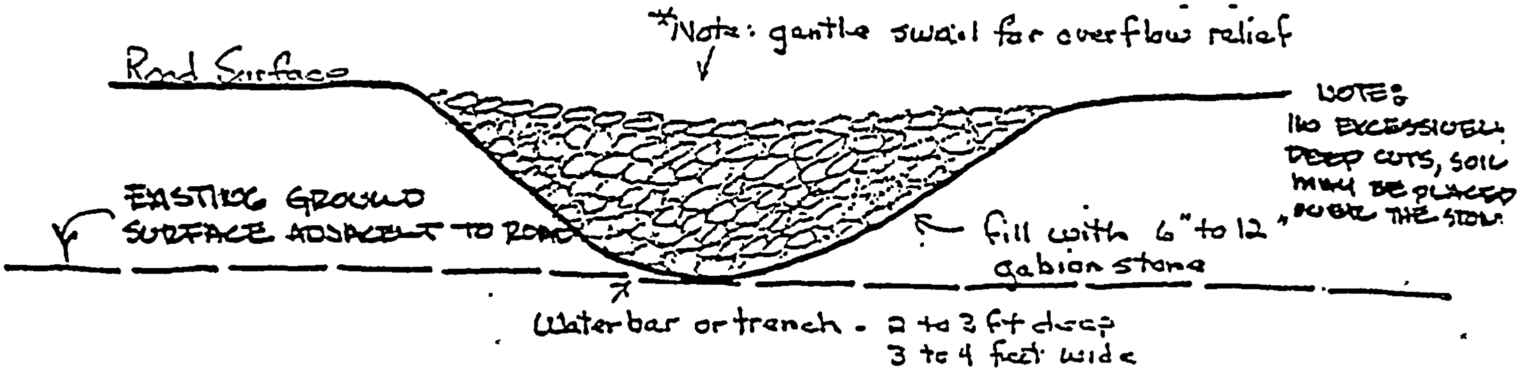
11.3 Embankment Stabilization; Log Retaining Walls

A log retaining wall may be constructed, using available material, to stabilize extensive sidehill cut embankments, where backblading the embankment to a 45° slope would cause extensive scarification and/or loss of desirable vegetation. Vertical posts, 12" or more in diameter and preferably of hemlock, should be set 3 to 4 feet into the ground at approximately 8 to 12 foot intervals, at the base of the cut embankment. Once the verticals have been set, available logs are placed between the posts and the embankment, filling the retaining wall to a height even with the top of the embankment.

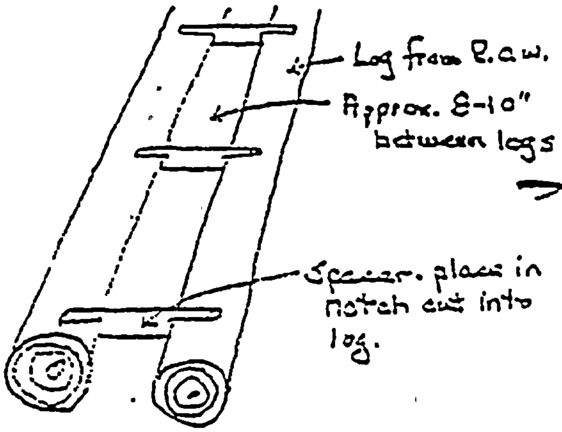


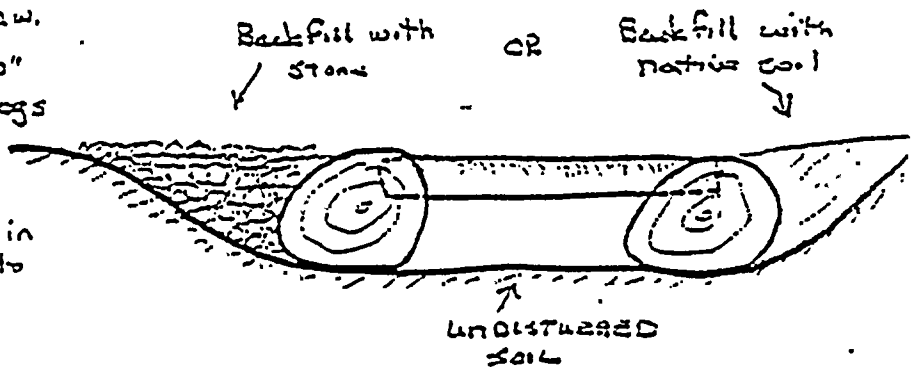
12 Stream Crossing and Equalization Devices

12.1 French Drains: French drains can be successfully used for equalization of standing water levels across the access road when the road way is built up and extends into a wetland, or for the relief of moderate spring seepage across the access road in hilly terrain. To construct a french drain, a trench is excavated across the access road to a depth matching the existing ground surface on each side of the roadway. This deep trench is then filled with gabion stone (6" to 12" stone), leaving a gentle swail or depression across the road so as to contain possible overflow relief across the center of the stoned area. (See illustration)



12. <u>Log Culverts</u> The open top log culvert can be utilized for equalization of moderate flow, as well as for ditch relief when higher or continuous ditch flows might be expected. Log culverts should be installed across the road on an oblique angle, utilizing available 10" to 14" diameter logs. The logs should be set into the road so that the top of the log is even with or slightly below the road surface. The logs should be set about 8 to 10 inches apart, so as to provide easy traffic flow over the surface and yet allow for periodic cleaning with a shovel. The logs should be held apart by spacers of 2 x 4 dimension lumber or similar material (use pieces of small diameter, 3 to 4 inch slash if available.) The logs should be notched so that the space material sets approximately even with the top of the log culvert. The spacers should be anchored to the logs using large spikes, such as No. 20D





After the log culvert has been constructed, native soil and/or stone can be used to backfill around the outside of the culvert.

The log culvert may work best for construction during dry periods. During wetter times of the year theroad surface approaches to the installation may rut and break up. When this road failure occurs the culvert may end up higher than the driving surface (i.e., the bottom of the ruts) becoming a barrier to access. A problem with this technique, for transmission construction purposes, is often the use of backfill soils which, once excavated, will not easily compact and support heavy construction equipment. This problem becomes readily apparent in clay soils where all season access is required. The log culvert might prove more successful in gravelled type soils.

12.3 Corregated Steel Culverts

Corregated, galvanized steel pipes may be used to cross intermittent creeks and significant streams where through access is required and prior field review has determined that a culvert is the appropriate crossing technique. (See Illustration, p. 26)

The crossing shall be made at a point where satisfactory approaches to the stream can be constructed so as to cause minimum stream and stream bank disturbance. The road shall cross the stream at a right angle to the direction of stream flow, where practicable, and the pipe shall be aligned so that water enters and exits the existing stream channel.

In hard bottom streams, the bottom of the culvert shall be set flush with the bottom of the stream with a minimum of excavation, so as to have no water impoundment above the culvert and no "waterfall" effect as the water exits the culvert. In soft bottom channels, the soft material shall be excavated and replaced with stone to the extent necessary to provide a firm bed for the culvert and stable access once constructed. The bottom of the culvert shall be set as noted above, so as to maintain material stream elevation at the inlet and outlet of the culvert.

The culvert shall be backfilled with select borrow, approved by the Corporation, which is free of large rocks, hard lumps, frozen particles, sod, cinders, or earth with a high percentage of organic materials. Culverts 12" or less in diameter shall be filled to a depth of 12 inches, 18" to 24" culverts to a depth of 18 inches, and culverts 30" and greater to a depth of 24" of fill over the pipe.

At the intaka and outlet sides of the culvert, the stream bed shall be lined with stone for a distance of up to 5 feet above and below the culvert, as required to maintain a stable channel. Additionally the soils around the intake and outlet of the pipe shall be lined with a protective layer of stone, to create stable head walls and minimize the potential of erosion at peak flow periods. Cobblestone, or large flat stones which are available on site should be used wherever practicable to minimize these costs.

Except where protected by stone, all embankments associated with the stream crossing and culvert installation shall be seeded and mulched at the

time of installation.

A copy of Niagara Mohawk's "Typical Stream Crossing with Culvert" sketch is attached.

Culverts twenty feet long are normally installed, as noted in the specification drawings. Due to the depth of fill associated with culverts of 30 inches and larger, it is often difficult to maintain stable road shoulders at an acceptable embankment grade and still maintain the minimum driving surface of 12 feet. In order to provide the necessary road width, without greatly escalating culvert costs, a log may be placed over each end of the pipe, in the shoulder of the road, to retain the embankment. These logs should be oriented parallel to the road, and they should be long enough that they can be anchored into the stream bank at each end.

12.4 Stream Fords

Stream fords shall be used to cross intermittent creeks and significant streams where through access is required for construction and prior field review has determined that a stream ford is appropriate.

The crossing shall be made at a point where satisfactory approaches to the stream can be constructed so as to minimize stream and streambank disturbances. Where practicable, existing crossings should be improved and utilized.

Dependent upon stream bottom conditions, one of the following types of streamfords shall be installed. (See Illustrations, p. 27 to p. 33)

12.4.1 Stream Bottom of Bedrock

When the streambottom at the point of the road crossing consists of bedrock, improvement of the streambottom to support construction equipment is not necessary. The only required improvement will involve streambank stabilization. (See Illustration, page 27)

The streambanks shall be excavated to an acceptable grade, pushing the spoil up and away from the stream and blending it beside the access road, outside the immediate stream area. Special attention should be given to the maintenance of streambank vegetation outside the road area, so as not to disturb vegetation compatible with construction activity. Depending upon soil stability, the approaches shall then be covered with 4 to 6 inches of No. 3 or 4 crushed stone or wire mesh and 4 to 6 inches of stone. This stone

approach should continue far enough to provide an effective "filter strip", to trap sediments. As a minimum the filter strip should extend 25 feet on either side of the stream.

A waterbar may be installed upslope of the stream crossing to additionally divert road runoff before it reaches the stream. The waterbar may empty into a settling pond or haybale silt trap if needed. Undisturbed vegetation between the outlet of the waterbar and the stream may be sufficient to trap sediments carried by runoff.

12.4.2 <u>Streambottom of Firm Native Soil</u>

When the streambottom consists of relatively firm, stable native soil, and/or cobble size rock, it will not be necessary to excavate the stream bottom material, however, a sill shall be installed and filled behind with No. 3 or 4 crushed stone. (See Illustration, p. 28).

The sill shall consist of a log, preferably hemlock, which is set into the streambed and anchored by burying the ends in either bank. The sill should be recessed into the stream bottom so as not to change the bottom elevation more than 6 inches, where practicable. After burying the ends of the sill in each embankment, the sill shall be further reinforced by driving 6' long, 5/8" steel reinforcing rods through the sill, into the stream bed at 2 foot intervals. The ends of the reinforcing rods shall be bent over towards the downstream side of the sill. When the backfill, which is placed over the buried ends of the sill may be subject to erosion during flood conditions, this material should be further stabilized by rip-rapping with a foot or more of gabion stone.

A wire mesh, approved by the Corporation, shall then be securely fastened to the sill as shown in the drawings. When more than one section of wire mesh is required, it shall be placed so as to overlap other sections approximately 12 to 18 inches. If required for approach stabilization the wire mesh should be run continously across the stream and up the embankments. No. 3 or 4 crushed stone is then spread 4 to 6 inches thick through the stream ford and up the access approaches.

The approach filter strip should be long enough to effectively separate silt from runoff waters.

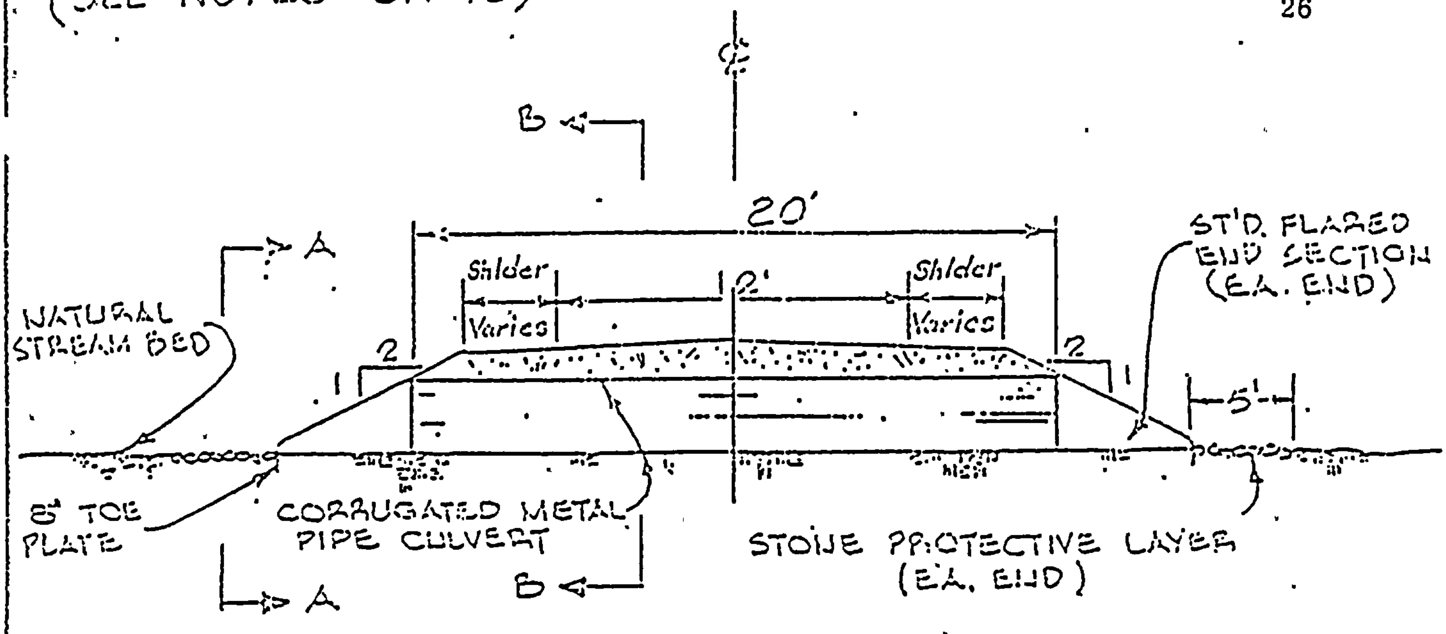
Where available, native stone may be substituted for No. 3 or No. 4 crush stone in fords with gravel or stony bottoms. This native stone should be placed so as to create a continuous layer of stone 4 to 6 inches deep in the traveled portion of the road.

The embankments outside the traveled portion shall be seeded and mulched at the time of ford construction.

12.4.3 Streambottom with Soft, Unstable Soils

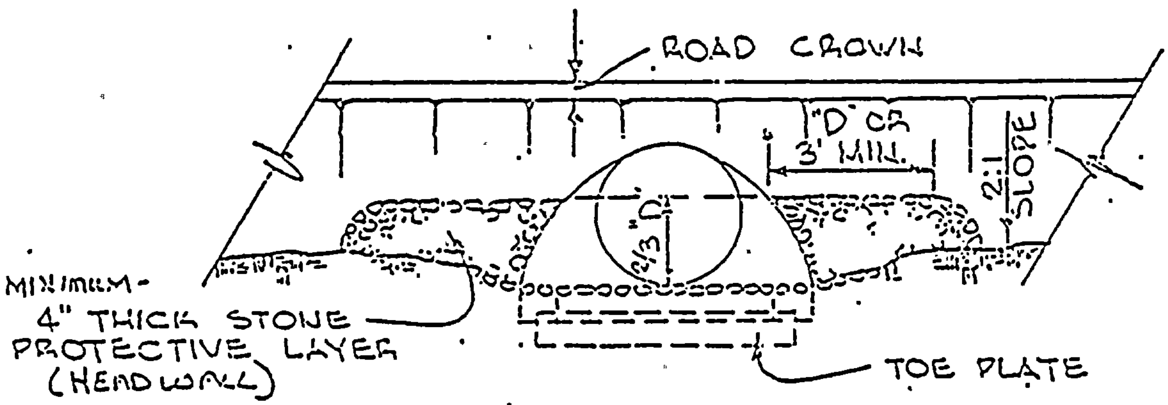
Where the streambottom consists of soft, unstable soils, this unstable soil shall be excavated to firm subsoils or to such a depth as to provide a stable bed once filled with stone. The spoil from this excavation shall be removed from the immediate stream area and spread beside the road. Once excavated, the streambottom shall be brought back to contour by filling with gabion stone (6 to 12" stone). The sill shall then be set and the wire mesh attached to the sill. A floatation or filter fiber shall then be spread through the stream and up the embankments, and the No. 3 and 4 crushed stone shall be spread through the stream and over the approaches. As discussed earlier (page 23 and 24), the filter strip in the approach should be long enough to provide effective separation of silt from runoff waters. (See illustrations 30 through 33).

(SEE NOTES SK-1b)



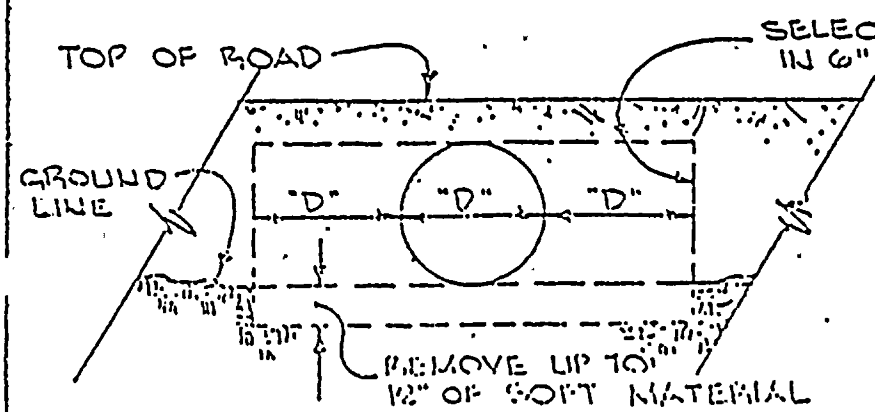
CROSS SECTION

TYPICAL STREAM-CROSSING WITH CULVERT



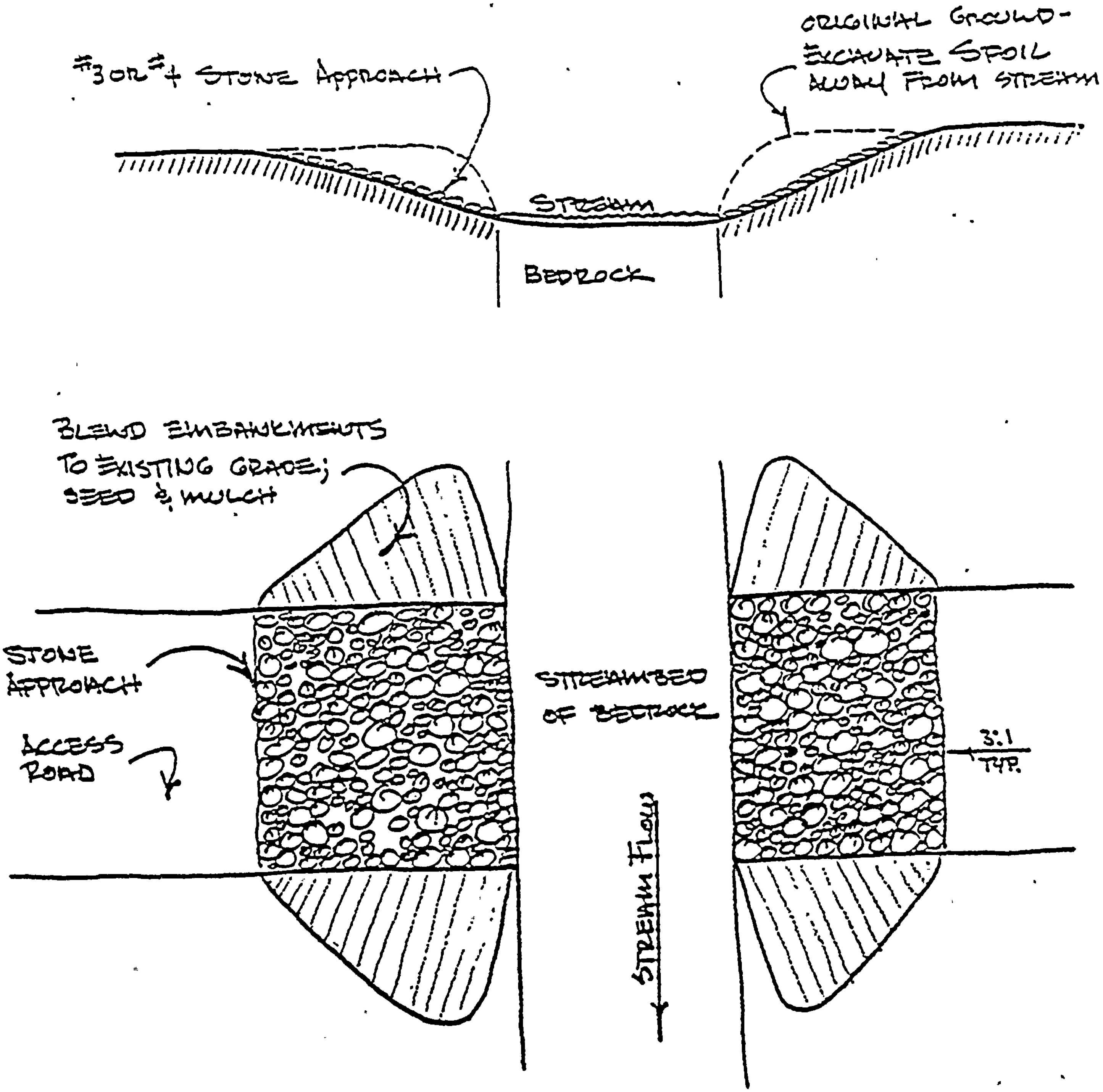
SECTION A-A

(SAME BOTH ENDS)

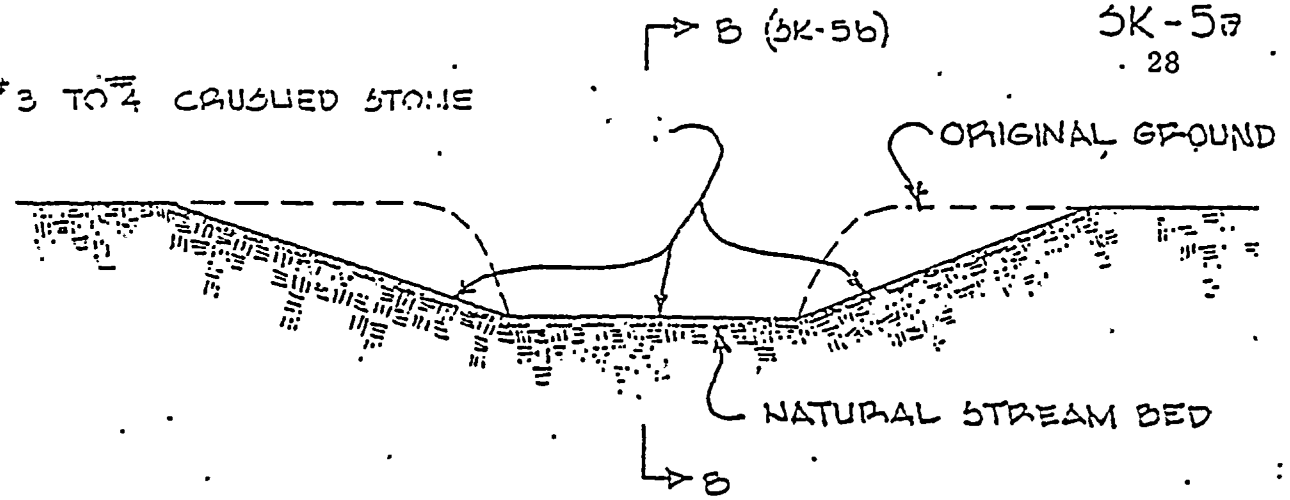


TYPICAL CULVERT INSTALL

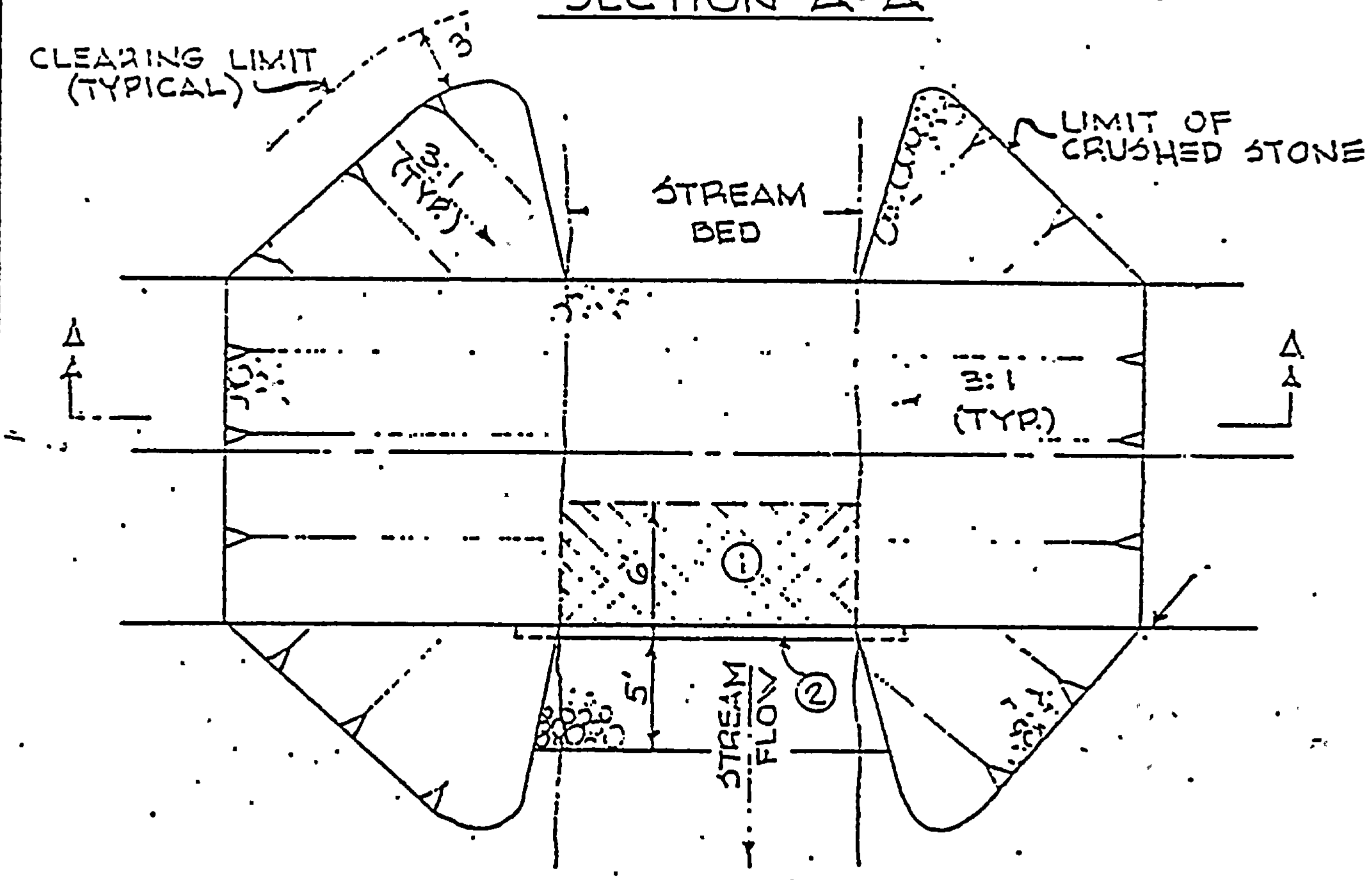
NIAGARA MOHAWK POWER CORP.



TYPICAL STREAMFORD WITHOUT SILL - NO SCALE



SECTION A-A



PLAN - TYPICAL STREAM FORD - TYPE 1

WHERE LESS THAN 6" SOFT MATERIAL ON BED

NOTE: SEE SK-5b FOR NOTES

KEY

1. GALV. STEEL, 14 GAUGE MESH, 1½" MAX. OPENING
2. SILL - CUT BACK INTO STREAM BANK EACH END ⅕ WIDTH OF STREAM BED

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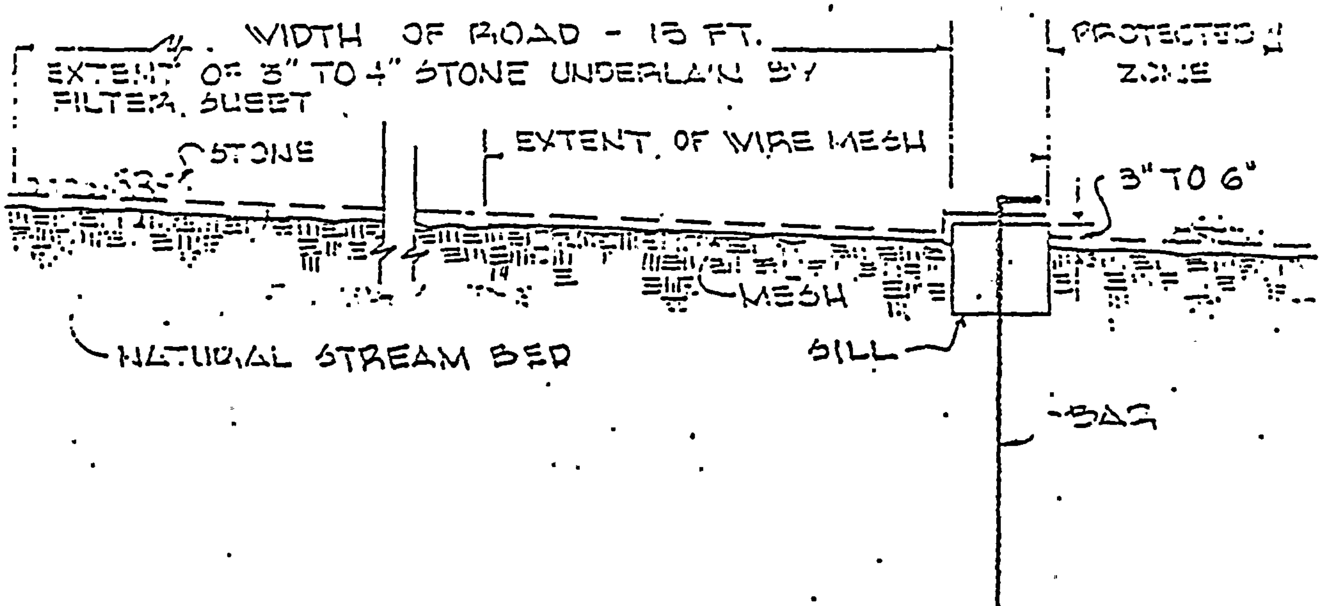
STREAM FORD - TYPE 1

SHEET 1 of 6



SECTION B-B (SK-5a)

NOTES:

1. Sill to be 12 x 12 timber or equally substantial pole.

   Prior Corporation approval required for all sill material.

2. Bars to be new steel, 3/4"Ø driven to refusal or 6 ft. max. on 2 ft. ctrs., with tops bent downstream and offering positive support to sill.

3. Wire mesh must be securely fastened to sill. Where more than one section of wire mesh is required, individual sections shall be secured with a continuous 12 ga. galv. spiral wire.

4. Stone to be ASTM C-33, 3-1/2" to 1-1/2", from source approved by Corporation.

5. Filter sheet shall be cloth woven polypropylene monofilament yarn, not less than 18 mils thick, weighing not less than 7.35 ounces per square yd., positively secured with pins, staples, and/or rods, as obtainable from Carthage Mills, Inc., Cleveland, Ohio. Filter sheet not required where subsoil is coarse granular or rock.

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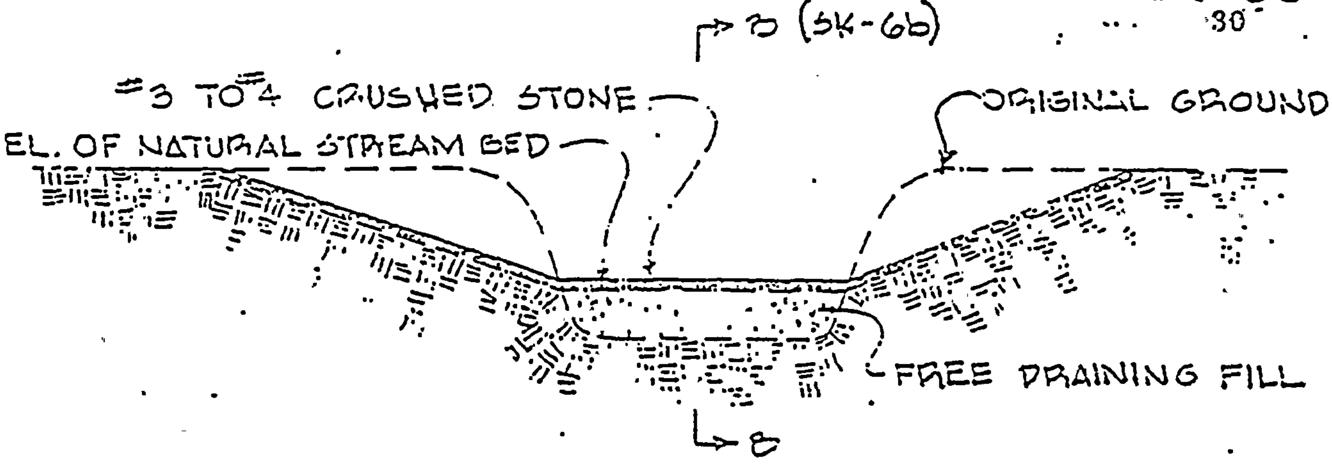
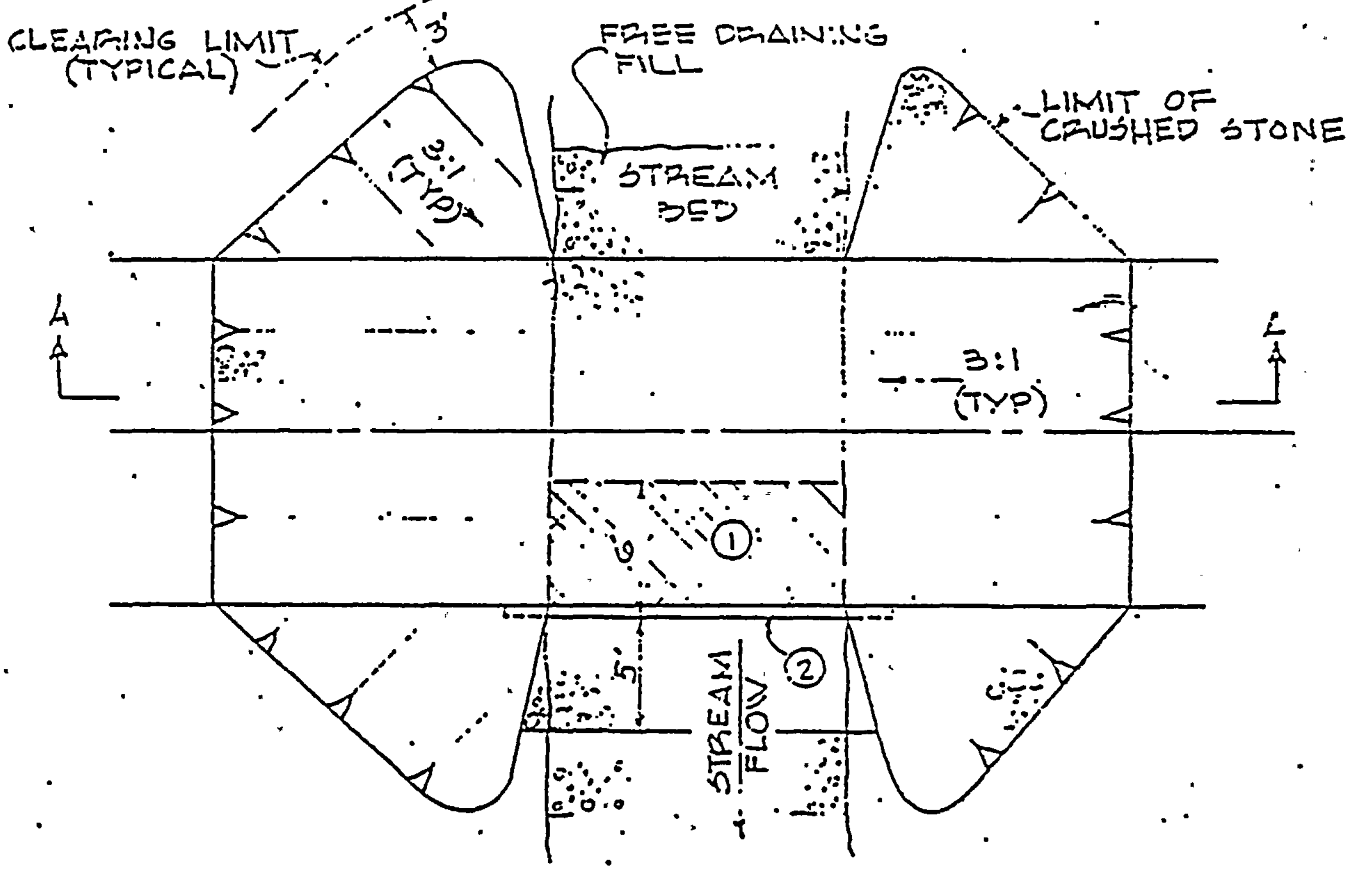
SYRACUSE, N.Y.

STREAM FORD-TYPE 1

SHEET 2 of 6



SECTION A-A



PLAN - TYPICAL STREAM FORD - TYPE 2

WHERE BETWEEN 6" AND 3' SOFT MATERIAL ON BED

NOTE: SEE SK-6b FOR NOTES

KEY

(1) MESH - (SEE SK-5a)

(2) SILL - (SEE SK-5a)

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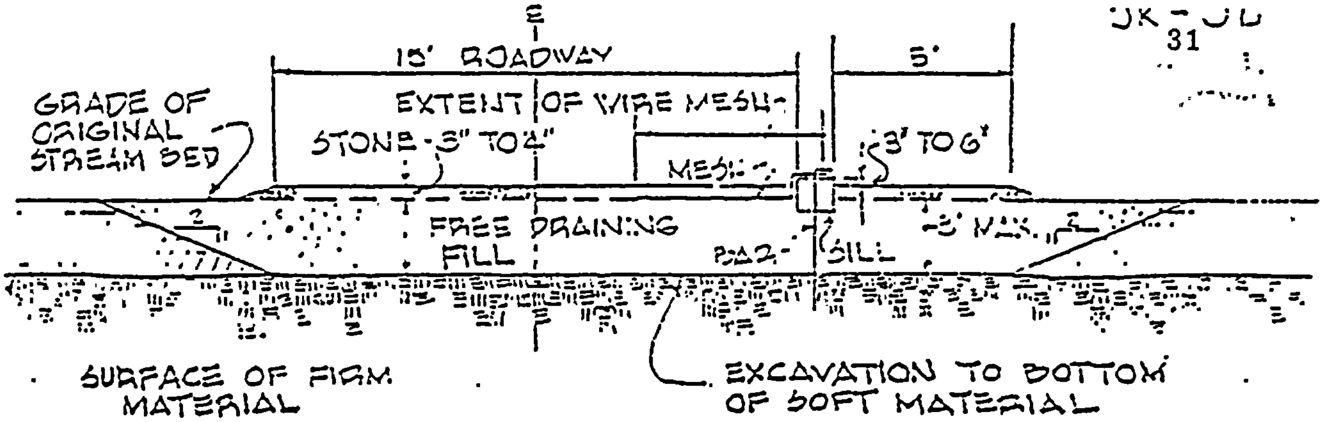
STREAM FORD - TYPE 2
SHEET 3 of 6



SECTION B-B (SK-6a)

NOTES:

1. Sill - see Note 1. SK-5b
2. Bars - see Note 2. SK-5b
3. Mesh - see Note 3. SK-5b
4. Stone - see Note 4. SK-5b
5. Free draining fill to be any sand, sand-gravel mixture or crushed stone having less than seven percent passing 200 mesh sieve, from source approved by Corporation.
6. Roadway stone in riverbank cut shall be underlain by filter sheet if subsoil is soft. For filter sheet see Note 5-SK 5b.
7. Dispose of excavated soft material away from stream bed and beyond limits of protected slopes with minimum environmental disturbance and Corporation approval.

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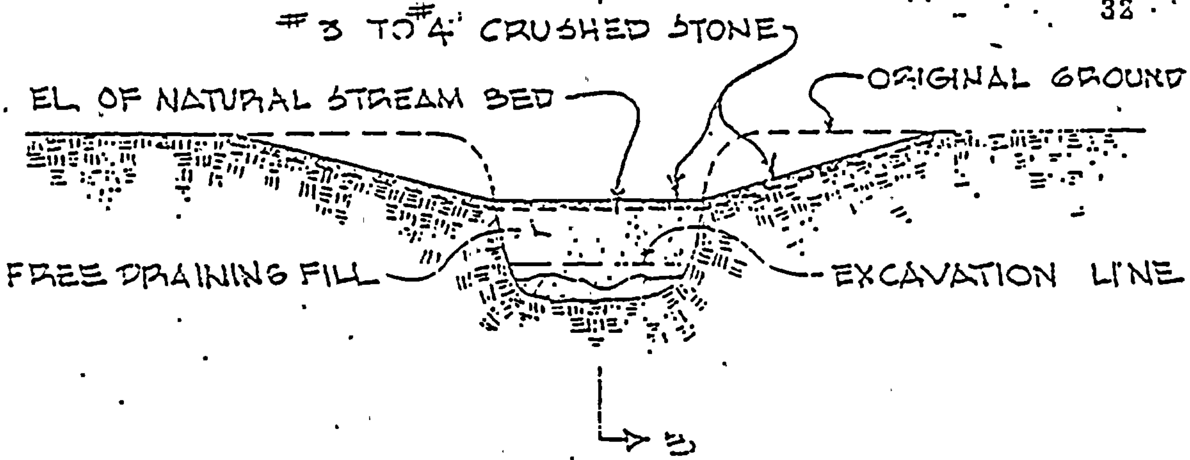
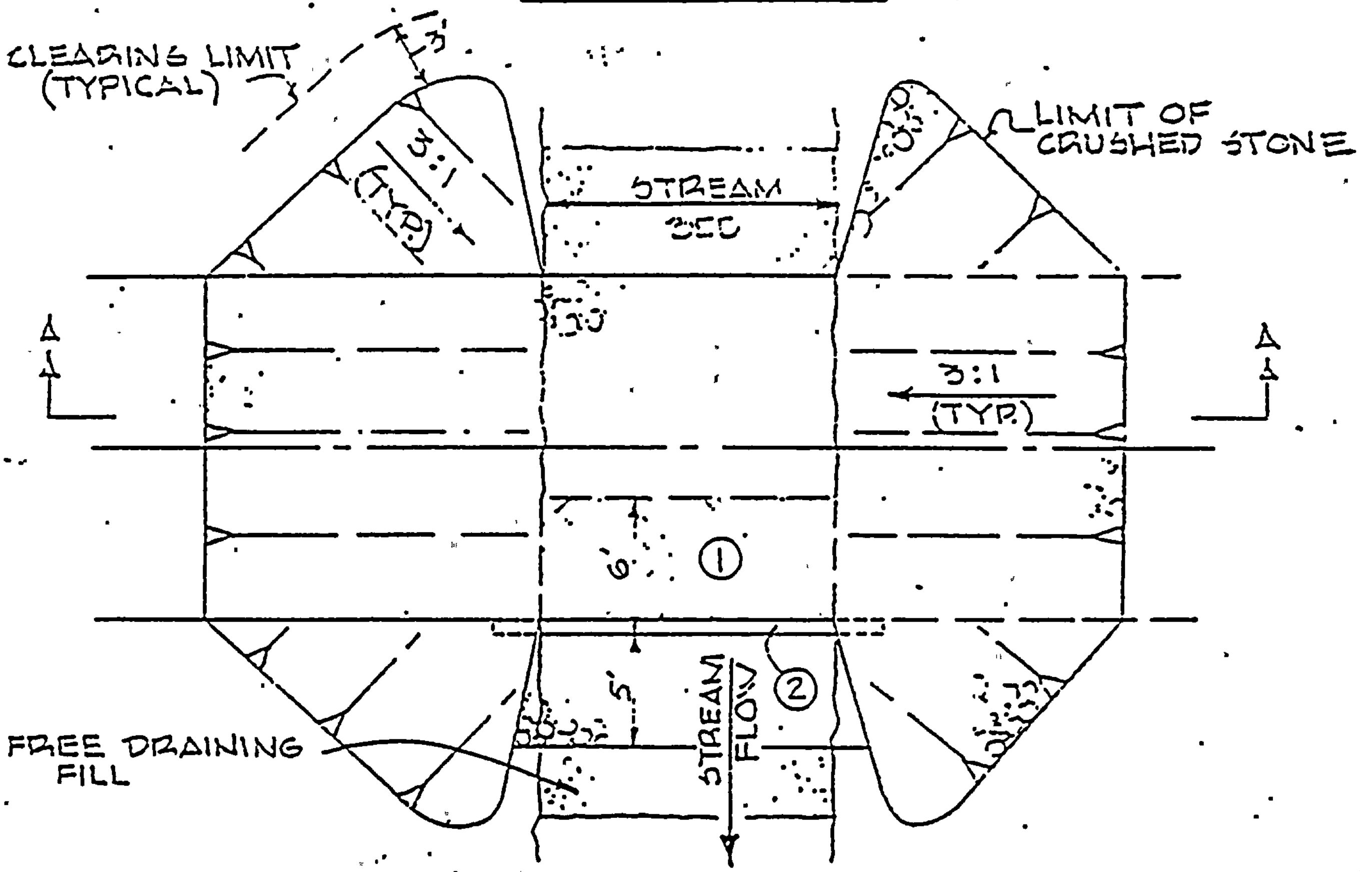
NIAGARA MOHAWK POWER CORPORATION
SYRACUSE, N.Y.

STREAM FORD-TYPE 2

SHEET 4 of 6



SECTION A-A



PLAN – TYPICAL STREAM FORD – TYPE 3

WHERE MORE THAN 3' SOFT MATERIAL ON BED

NOTE: SEE SK-7b FOR NOTES

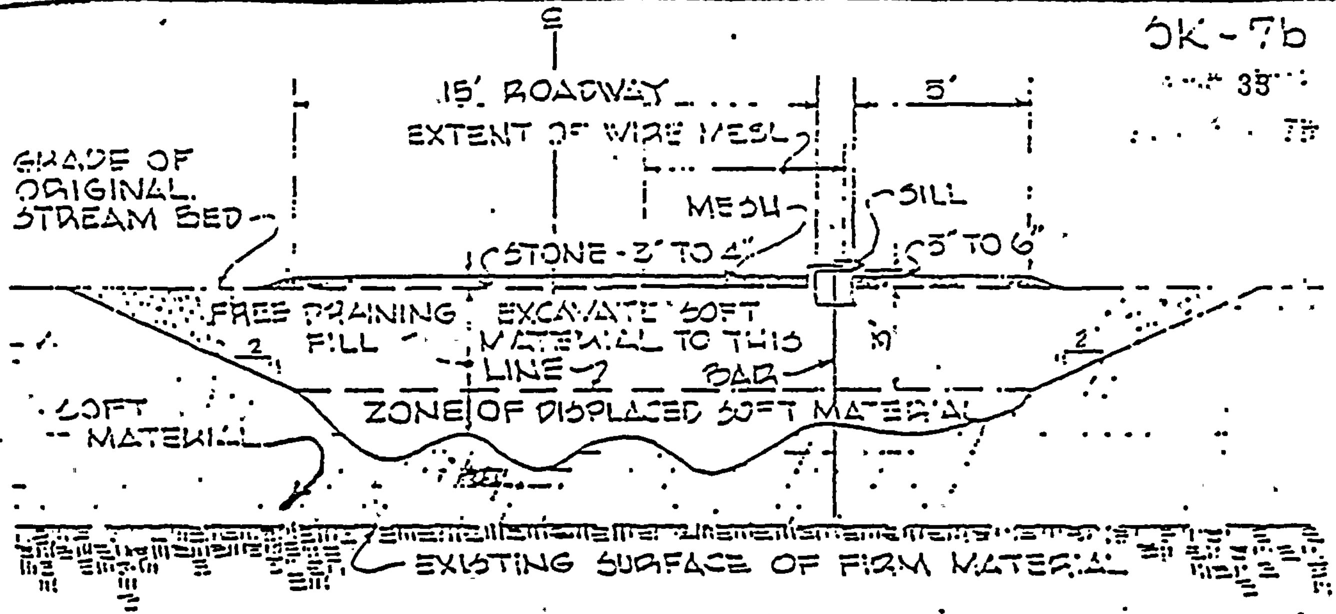
KEY

① MESH (SEE SK-5a)

② SILL (SEE SK-5a)

NIAGARA MOHAWK
NIAGARA MOHAWK POWER CORPORATION SYRACUSE, N.Y.
STREAM FORD - TYPE 3
SHEET 5 of 6

SK-7b



SECTION B-B (SK-7a)

NOTES:

1. Sill - see Note 1. SK-5b
2. Bars - see Note 2. SK-5b
3. Mesh - see Note 3. SK-5b
4. Stone - see Note 4. SK-5b
5. Free draining fill - see Note 5. SK-6b
6. Stone in cut - see Note 6. SK-6b
7. Disposal - see Note 7. SK-6b
8. Free draining fill must be placed and compacted at full width to full height progressively across stream and any soft material displaced at advancing toe of fill into excavation zone must be removed. Sufficient fill must be placed to provide firm base for sill, mesh and roadway stone at grade of original stream bed.

NIAGARA MOHAWK
NIAGARA MOHAWK POWER CORPORATION SYRACUSE, N.Y.
STREAM FORD-TYPE 3
SHEET 2 of 2

Q. Please state your name and business address.

A. My name is Thomas J. F. Ordon and my business address is 300 Erie Boulevard West, Syracuse, New York 13202.

Q. By whom are you employed and in what capacity?

A. I am employed by the Niagara Mohawk Power Corporation. My title is Senior Electrical Engineer - System Engineering in the Design Engineering Department.

Q. What is your educational background and professional experience?

A. I am a Graduate Electrical Engineer. I received a Bachelor of Electrical Engineering Degree from Union College, Schenectady, New York, in June, 1958. I am a Licensed Professional Engineer, currently registered in the State of New York, and am a member of the Power Engineering Society of the Institute of Electrical and Electronic Engineers. I am a member of the Towers, Poles and Conductors Subcommittee of the IEEE. I joined Niagara Mohawk Power Corporation following my graduation from college and I was assigned to the Civil and Structural Engineering Group in the Eastern Division Engineering Department in Albany. There, I served as an Overhead Electric Transmission Project Engineer on projects of varying but generally increasing complexity until December 1970, at which time I was appointed Supervisor, Transmission Design, in the Electric Engineering Group of the Eastern Division Engineering Department, Albany. At that time, I assumed overall

responsibility for supervising the engineering design of all overhead electric transmission line projects in the Eastern Division. On December 1, 1973, I was appointed to the position of Supervisor, Transmission Design, in the Central Engineering Department, Syracuse, where I had overall responsibility for supervising the design of major transmission line projects in the company (115 kV and above, including all Article VII projects).

In my current position as Senior Electrical Engineer - System Engineering in the Design Engineering Department, I continue to have overall responsibility for major capital transmission projects during various engineering phases, from conceptual planning to the verification of final project compliance and acceptance.

Q. In general terms, would you explain your duties as they pertain to the design and construction of electric overhead transmission lines?

A. Under my supervision, Design Engineering Department personnel prepare feasibility studies, preliminary budgets and schedules, determine design objectives and criteria, and prepare functional specifications and drawings In addition, I am responsible for the overall schedule, cost and quality compliance for projects and coordinate engineering interface with other Niagara Mohawk departments for the Design Engineering Department.

Q. Have you previously testified in other Article VII proceedings on behalf of Niagara Mohawk?

A. I have previously rendered cost, engineering and scheduling testimony in Case 70073, Coffeen Street - West Adams 115 kV transmission facility; Case 26423, New Scotland - Reynolds Road 345 kV transmission facility; Case 26729, the Wellsville - Andover 115 kV transmission facility and Case 26923, the Adirondack 115 kV transmission facility.

Q. Have you previously testified in this proceeding?

A. No.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to substantiate Niagara Mohawk's case for the proposed overhead construction of the subject 345 kV transmission line and associated facilities by outlining and describing those engineering studies, cost evaluations, construction plans and schedules and other pertinent matters which constitute part of Niagara Mohawk's application. As such, I am responsible for all of the following Amended Exhibits: 5 (Exhibit ____); 9 (Exhibit ____); E-1 (Exhibit ____); E-2 (Exhibit ____); E-3 (Exhibit ____); E-5 (Exhibit ____).

Q. Are you familiar with the planning and design of the Nine Mile 2-Volney 345 kV transmission line and associated equipment?

A. Yes.

Q. Please give a brief description of the scope of the 345 kV transmission line which is the subject of this amended Article VII application.

A. In this application, certification is requested for the installation and operation of 9.4 circuit miles of 345 kV overhead transmission line. The transmission facility will consist of two segments:

1. a 345 kV single circuit transmission line (0.5 miles) having its northern terminus at the Nine Mile 2 Nuclear Generating Station and its southern terminus at the proposed Scriba Station.

2. a 345 kV single circuit transmission line (8.9 miles) having its northern terminus at the proposed Scriba Station and its southern terminus at the existing Volney Station.

The construction, as contemplated, will utilize two wood pole H frame structures. Lattice steel towers will be utilized at angle locations. The transmission line will have typical spans of 700 feet.

Power conductors will consist of two (2) 1192.5 kcmil ACSR (aluminum cable steel reinforced) in each of the three phases of the proposed transmission line. This size satisfies the requirements outlined in Amended Exhibit E-4, Exhibit ________ of this application. Furthermore, it is the standard conductor size for use in Niagara Mohawk's 345 kV system and enables one to benefit from the advantages inherent in standard stocking of replacement hardware and fittings.

Two overhead 7/16 inch 7 strand, extra high strength galvanized steel overhead groundwires will be employed.

Projected total project costs, as is indicated in Amended Exhibit 9, Exhibit ______ are approximately $4,683,000.

Q. Is there equipment associated with the Nine Mile 2-Volney 345 kV transmission line?

A. Yes.

Q. Please give a brief description of the equipment associated with the Nine Mile 2-Volney 345 kV transmission line.

A. The equipment associated with the Nine Mile 2-Volney 345 kV transmission line consists of the following:

1. Scriba Station: Scriba Station is a new major electric switching and transformation station facility constructed at a site just south of the Nine Mile Unit #2 Station. The station will include five (5) 345 kV line termination structures and associated equipment, eight (8) 345 kV breakers and all necessary and associated control devices and protective equipment. The arrangement of these units is shown on the drawings found in Amended Exhibit E-2, Exhibit ______ of this application.

2. Volney Station - 345 kV Line Position: An existing 345 kV line position at the Volney Station will be used as the southern terminus for the proposed transmission line. The new facilities installed at the station will include one (1) 345 kV breaker and associated control devices and protective equipment. The existing and proposed facilities are shown on the drawing

found in Amended Exhibit E-2, Exhibit ______ of this application.

3. The proposed Nine Mile - Scriba 345 kV segment of the Nine Mile-Volney 345 kV transmission line will connect to the generator output at Nine Mile 2 through appropriate transformation and other facilities.

Q. Please give a brief description of other transmission lines, if any, associated with the Nine Mile 2-Volney 345 kV transmission line.

A. The other transmission facility associated with the proposed Nine Mile 2-Volney 345 kV transmission line is the relocation and reconnection of Nine Mile 2-Volney #9 345 kV line into Scriba Station. The existing Nine Mile 2-Volney #9 345 kV transmission line will be looped into the proposed Scriba Station. The construction will be approximately 0.2 miles long.

The supporting structures, power conductors and overhead groundwire used on the line relocation and reconnection will be the same as that proposed for the Nine Mile 2-Volney 345 kV transmission line which is the subject of this application.

Q. What right-of-way configuration is proposed?

A. The subject Nine Mile 2-Volney 345 kV transmission line will occupy an existing right-of-way owned by Niagara Mohawk Power Corporation. For most of its length the transmission line will be located 100 feet easterly of and parallel to the existing Nine Mile 2-Volney #9 345 kV transmission line. The edge of the existing transmission right-of-way corridor is located 80 feet

easterly and parallel to the proposed transmission centerline for the majority of its length.

Q. How were the separation distances referred to in your previous answers determined?

A. The separation distances referred to have been developed through Niagara Mohawk's engineering and operating experience for 345 kV transmission.

Q. What maximum design conductor operating temperature was utilized in your code clearance calculations?

A. Niagara Mohawk proposes to design the subject transmission lines to meet or exceed the clearances required by the National Electric Safety Code at a line operating temperature of 257°F (NYPP short-time).

Q. From engineering, cost and design perspectives, how did Scriba Station come to be located just south of the railroad spur?

A. Niagara Mohawk reviewed three (3) alternate locations for the proposed Scriba Station.

One site was located north of Lake Road, between Lake Road and the Nine Mile 2 complex. The major disadvantage of this site was that its close proximity to the plant would hamper any future plant expansion. The site is used as a storage and supply area for the present plant facility. This fact would preclude occupying the site in time to meet the schedule for substation construction. Existing distribution lines used for construction

power are routed through the area. Their relocation might result in some construction delays. In addition, the site does not have good accessibility via railroad and placement of the substation at this site would involve disturbance to the existing Nine Mile 2-Volney #9 345 kV line, necessitating some revamping or rerouting of this line. Finally, the rocks and boulders at this site make it least desirable from a grounding standpoint.

Another site that was considered was situated south of Lake Road, between Lake Road and the Fitzpatrick railroad. This site was the least desirable. The site is located adjacent to an existing marshland and construction in this area could pose potential drainage problems. In addition, this site is in an area which functions as a retention pond with the capability of storing the entire storm in event that the existing 36 inch culvert south of Lake Road becomes inoperable. Locating the substation in this area would eliminate significant storage volume, resulting in changes to the entire drainage system. Any solution would probably involve the reconstruction of Lake Road at a higher elevation.

The third location evaluated was the most desirable and was finally selected as the site for the station. This site is 300 feet south of the railroad. The presence of less tree cover than at the site just south of Lake Road and the increased distance from the marshland are factors which would facilitate clearing and construction activities. Also, the site is

slightly higher in elevation than the other two, providing somewhat better draining conditions. The ground cover at this site is less rocky, thereby resulting in lower soil resistivity for electrical grounding purposes. The site is accessible from both the existing FitzPatrick Railroad and existing roadways. Transmission line connections to the station could be planned and located more strategically. Construction would interfere less with the existing marshalling yards and storage and work areas adjacent to the Nine Mile 2 facility. Construction of the substation at this location poses the least constraints with regard to the construction schedule for the Nine Mile 2 project.

Q. Must new right-of-way be acquired for the Nine Mile 2-Volney 345 kV facility or associated equipment?

A. No new right-of-way will be required by the Applicant for construction of the Nine Mile 2-Volney 345 kV facility or associated equipment.

Q. What routing and design alternatives were investigated in the area of the Strano muck farm?

A. Niagara Mohawk investigated several routing and design alternatives in the vicinity of the Strano muck farm Alternative 1 consisted of continuing the use of two pole wood H frame structures through the farm area along a centerline parallel to and adjacent to the existing 345 kV transmission lines. Both structures will be located in the muck farm area at locations either

adjacent to the existing structures or at sites mutually agreed to by Niagara Mohawk and the adjacent property owner. Another plan (Alternate 2) called for using tall steel structures on either side of the farm and spanning the farmed area. Both of these plans would involve no new right-of-way. Other plans considered (Alternatives 3, 4 and 5) involved rerouting the proposed new line around the muck farm area. New right-of-way would be required. Depending on which side of the existing alignment the new routing would be located, the existing 345 kV facilities would be involved and relocation would be required.

Q. What routing and design alternative was selected in the area of the Strano muck farm?

A. The company proposes to construct on its property, which property is also used by the Strano muck farm, using the first alternative described in the previous answer, namely the use of twin wood pole H frame structures strategically located along the proposed centerline. The total cost for this scenario is included in Amended Exhibit 9, Exhibit ______ and amounts to $371,000.00 in 1982 dollars.

Because of greater total costs associated with all of the other alternatives, i.e. $1,333,333.00, $1,129,000.00, $2,304,000.00 and $1,761,000.00 respectively for Alternatives 2 - 5, the other plans were discarded.

Q. Do you forsee any particular or unique soil erosion areas associated

with the route and line design proposed?

A. I have examined the proposed route and the existing line in the field and I do not foresee any particular or unique soil erosion areas which would effect the plan the company is proposing.

Q. Is there a practical or feasible undergrounding alternative to the overhead construction proposed?

A. An underground scenario for the proposed line was prepared and evaluated, as described in Amended Exhibit E-3, Exhibit ______. Also included in this exhibit is the cost for undergrounding, i.e. $45,503,700.00.

Because the cost for undergrounding the proposed facility will be prohibitive and because undergrounding the facilities would not appear to be practical in light of the cost penalty associated with that method of construction, undergrounding was discarded.

Q. What vegetative clearing limits relative to the conductors will be imposed and how are they derived?

A. The vegetative clearing limits relative to the conductors will be established to protect the integrity of the wire security zone associated with the configuration proposed for this project.

I should first explain that the wire security zone is that region surrounding the line conductor which should be kept completely free at all times from any vegetation or other grounded objects. It must be dimensioned

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

as to take into account conductor position under conditions of blowout due to transverse wind and also increased sag due to high temperature conditions per line operation. For the subject line, a blowout angle of 30 degrees in either direction should be assumed. For the two pole H frame configuration, incorporating 700 foot typical spans, the sag resulting from line operation at 60°F is approximately 18.3 feet. The sag increase from line operation at 257°F (NYPP short time emergency loading criteria) is approximately 8 feet. The total sag, therefore, at 257°F is 26.3 feet. The additional distance between the conductor and its extreme position of this placement relative to static conditions as caused by wind swing and/or elevated temperature and the edge of the wire security zone should be 20 feet.

Q. Please discuss the project schedule, including the most critical path facility, and indicate the time allotted in that schedule for Public Service Commission, Article VII certification?

A. The project schedule is attached hereto as TJFO-1, Exhibit _______. In order to provide sufficient time to construct all phases of the project the approval of the EM and CP should take place no later than August, 1983 for the Scriba Station and no later than January, 1984 for the proposed transmission line and other facilities.

Q. Which former witness do you succeed in this proceeding?

A. I succeed Niagara Mohawk witness Peter A. Benson.

Q. Will Niagara Mohawk comply with the "Health and Safety" Orders of the Commission, i.e. Opinions 76-12 and 78-13 from the Case 26529 and 26559 Common Record Hearings insofar as they are applicable to the instant 345 kV transmission facility?

A. Yes.

Q. Does this conclude your direct testimony?

A. Yes.

TJFO-1
Exhibit ______

SCHEDULE

		New Construction		Relocation		
	Temporary 345 kV Tap To 345/115 kV Bank	Nine Mile-Scriba	Scriba-Volney	Nine Mile-Scriba #9 Scriba-Volney #20	Scriba Station	Volney Station
Approve EM & CP	--	1/84	1/84	1/84	8/83	1/84
Start Clearing	6/83	3/84	3/84	3/84	8/83	--
Start Grading and Site Preparation	--	--	--	--	9/83	--
Start Foundations	--	5/84	5/84	5/84	12/83	10/85
Start Structure Installation	8/83	6/84	6/84	3/85	4/84	--
Start Stringing	9/83	10/84	6/85	6/85	--	--
Start Electrical Equipment Installation	--	--	--	--	6/84	4/86
In Service	1/84	10/85	6/86	10/85	10/85	6/86
Restoration	12/85	12/85	12/86	12/85	12/85	12/86

SYSTEM RELATIONSHIP

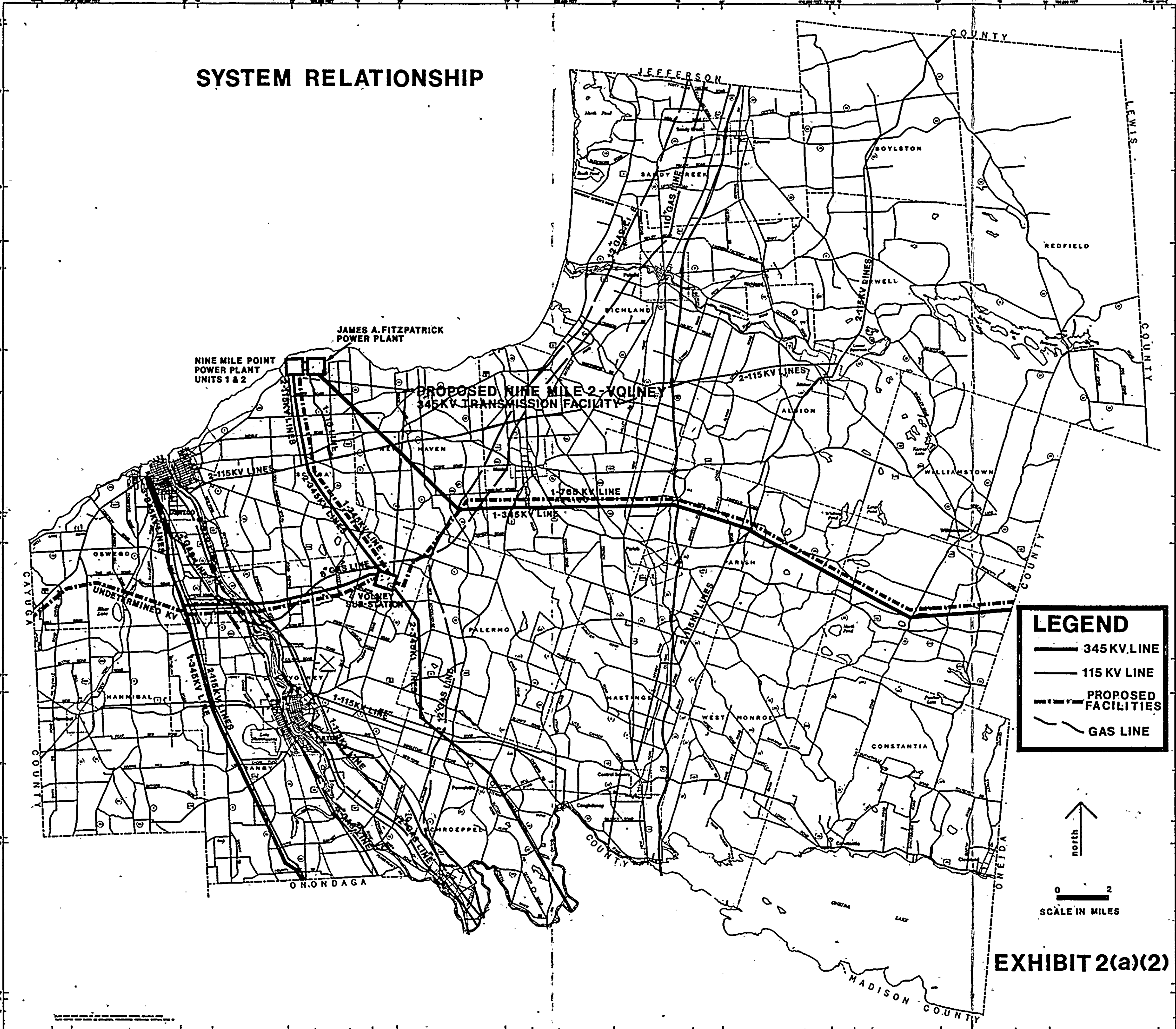


EXHIBIT 2(a)(2)

TI APERTURE CARD

Also Available On Aperture Card

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Also Available On Aperture Card

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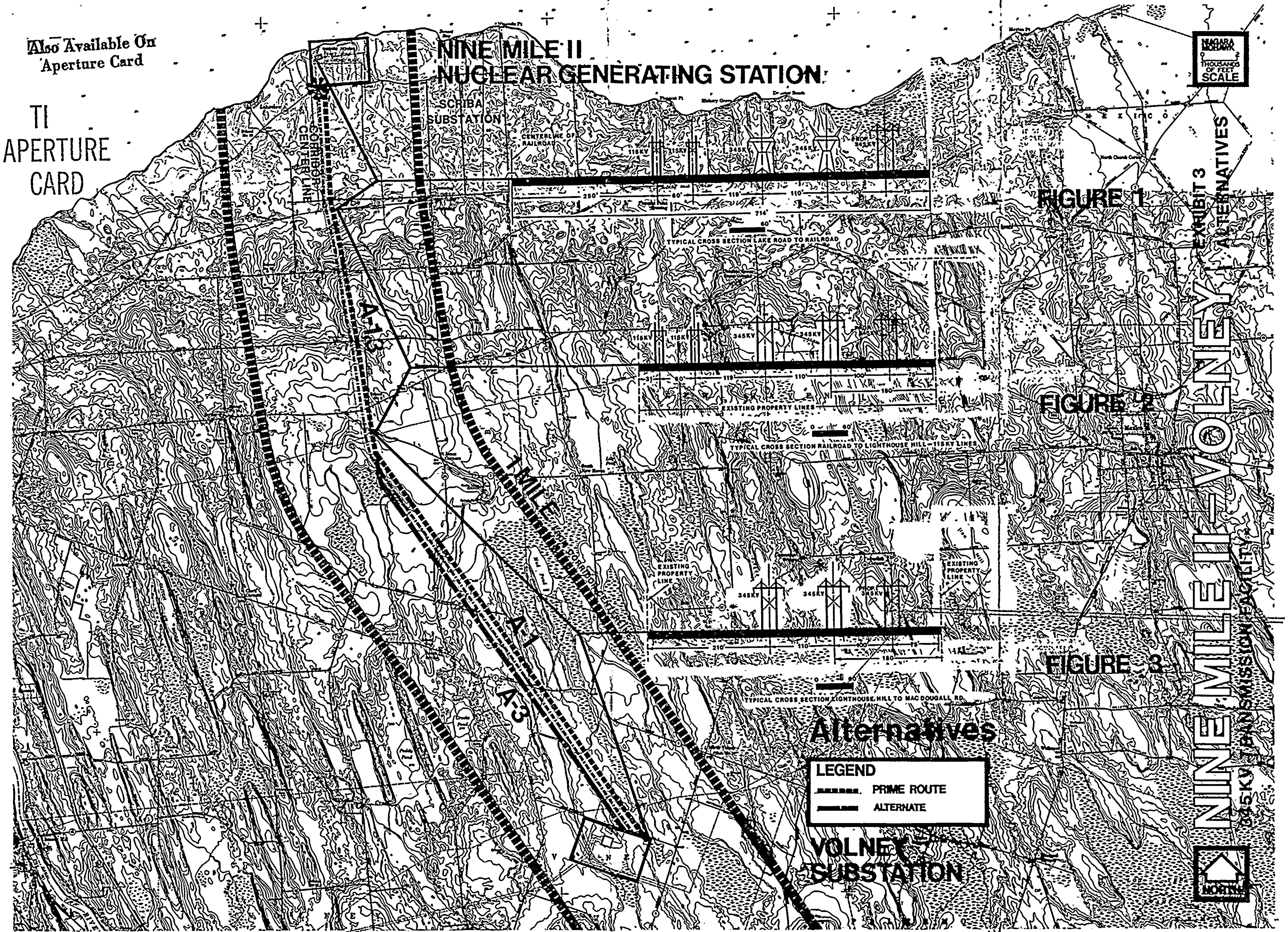

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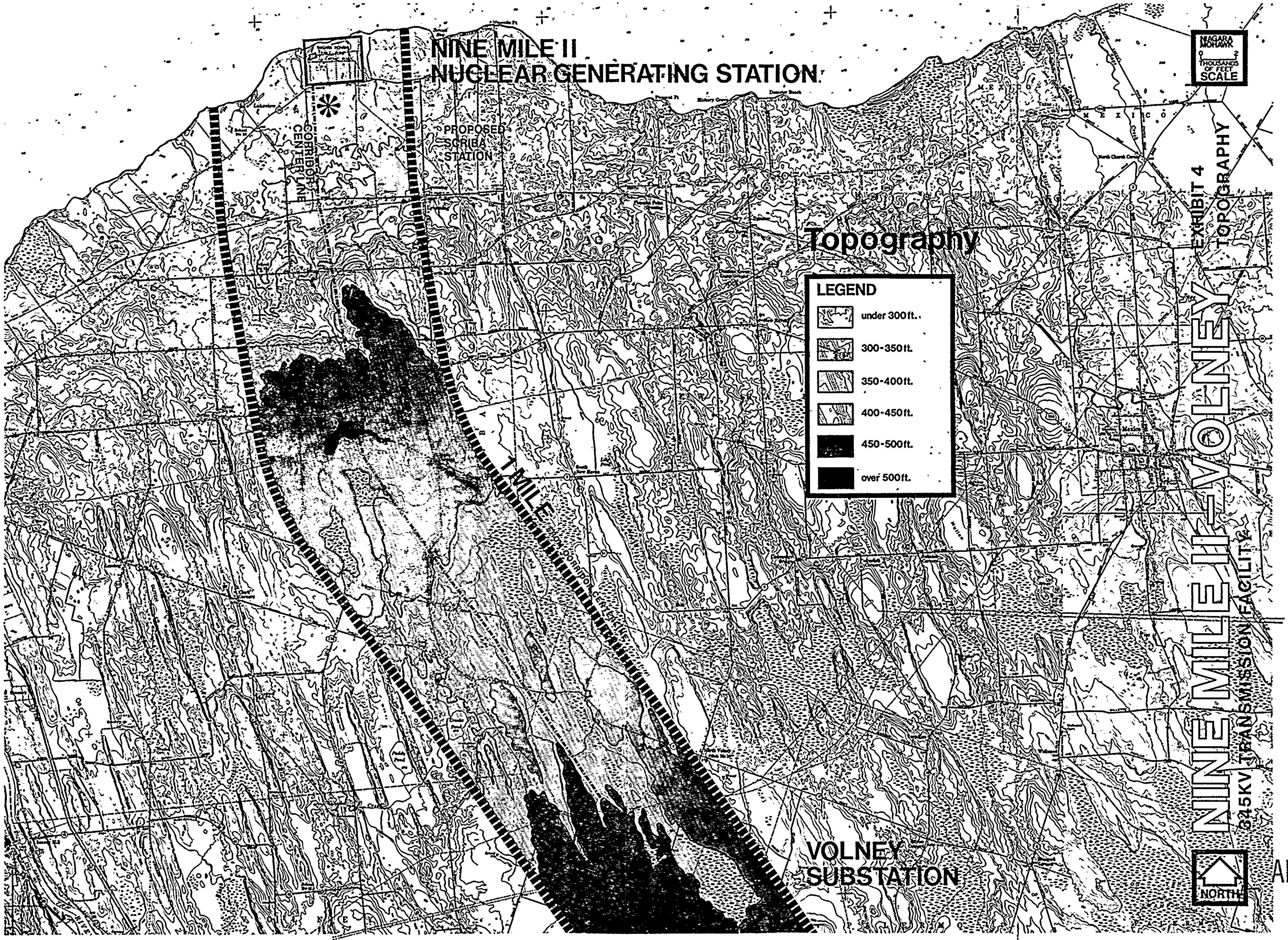

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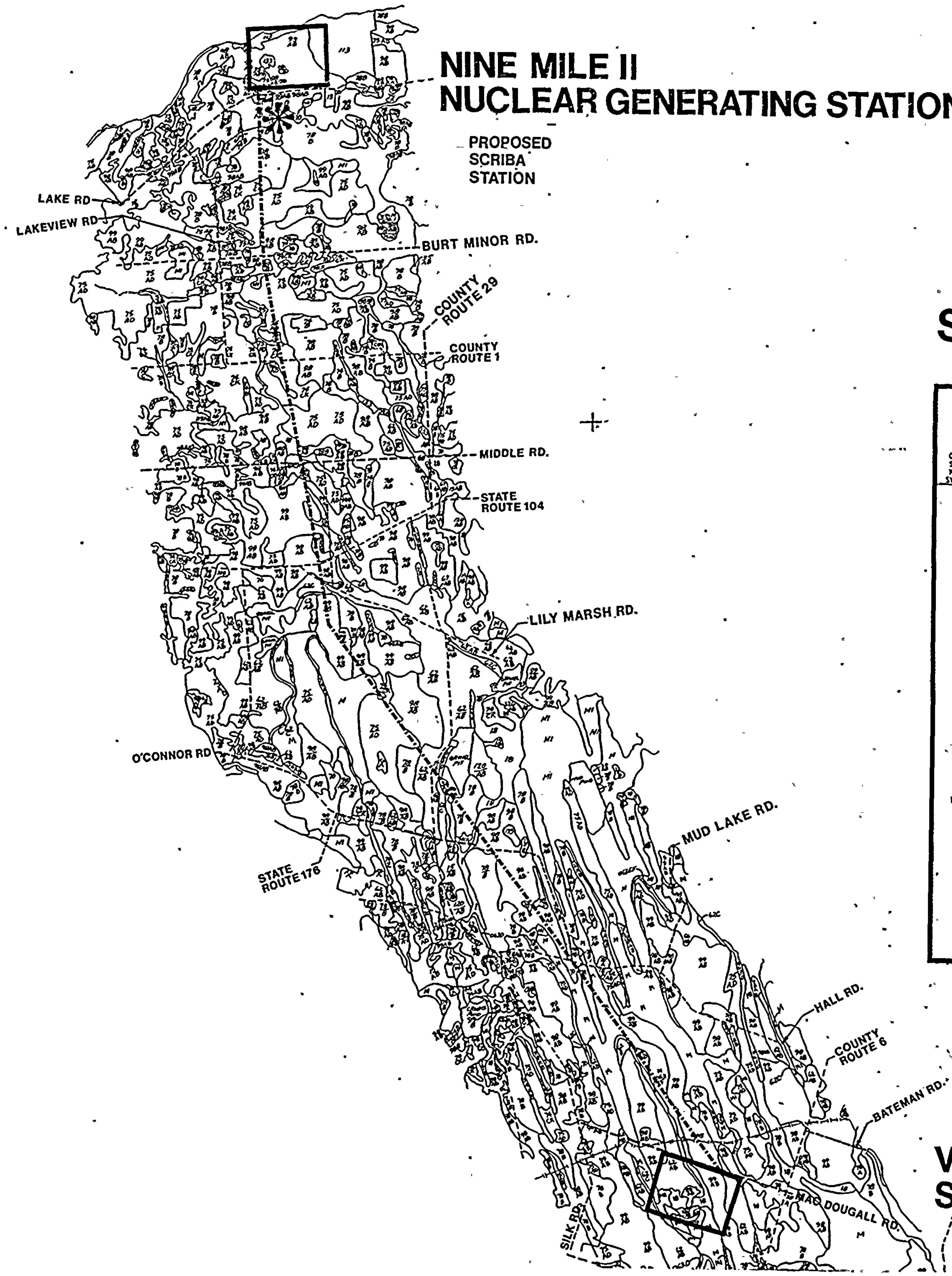


Soils

LEGEND

OLD SOIL MAP SYMBOL	NEW* SOIL MAP SYMBOL	% OF LINE LENGTH	SOIL NAME	AASHO CLASS	WATER EROSION HAZARD	DEPTH TO BEDROCK
1	Fa	.4%	FLUVAQUENTS & UDIFLUVENTS	NOT LISTED	SLIGHT	5'+
18	Lf	.8%	LAMSON	A-2; A-4	SLIGHT	5'+
34AB	Cd	1.0%	CANANDAIGUA	A-4; A-6	SLIGHT	5'+
62AB 62B	HkB	2.4% 1.2%	HINCKLEY (3-8% SLOPES)	A-2; A-1	SLIGHT/ MODERATE	5'+
62C	HkC	.8%	HINCKLEY (8-15% SLOPES)	A-2; A-1	SLIGHT/ MODERATE	5'+
70	Sw	1.0%	SUNLOAM	A-2; A-4	SLIGHT	5-10'+
74B	SgB	1.8%	SODUS	A-4; A-2	SLIGHT/ SEVERE	5-10'+
74CK	IsC	5.8%	IRA SODUS (GRAVEL)	A-2; A-4	MODERATE	5'+
75AD	IUD	16.2%	IRA SODUS (VERY STONY)	A-2; A-4	MODERATE	5'+
78 78B	IrB	1.6% 6.8%	IRA	A-2; A-4	SLIGHT/ MODERATE	5'+
81CK	AwC3	1.2%	AMBOY WILLIAMSON	A-4	SEVERE	5-10'+
35AB	RaB	.2%	RAYNHAM	A-4	SLIGHT	5'+
98AB	ScB	25.6%	SCRIBA	A-4; A-2	SLIGHT	5'+
99AB	SDB	20.3%	SCRIBA (VERY STONY)	A-4; A-2	SLIGHT/ MODERATE	5'+
120AB	OaB	1.0%	OAKVILLE	A-4; A-3; A-1.	SLIGHT	5-10'+
M	Ce	11.6%	CARLISLE MUCK	NOT USED	SLIGHT	5'+
M1	Pa	.2%	PALMS MUCK	A-4; A-6	SLIGHT	5'+
063D	CHD	.1%	COLTON-HINCKLEY COMPLEX (MODERATELY STEEP)	A-1; A-2	MODERATE	5'+
063EF	CHE	.1%	COLTON-HINCKLEY COMPLEX (STEEP)	A-1; A-2	MODERATE	5'+

*THESE ARE NEW SOIL MAP SYMBOLS AS PORTRAYED IN THE RECENTLY AMENDED SOIL SURVEY OF OSWEGO COUNTY, NEW YORK - ISSUED SEPTEMBER, 1981.

TI
APERTURE
CARD

Also Available On
Aperture Card

NIAGARA MOHAWK

THOUSANDS OF FEET
SCALE

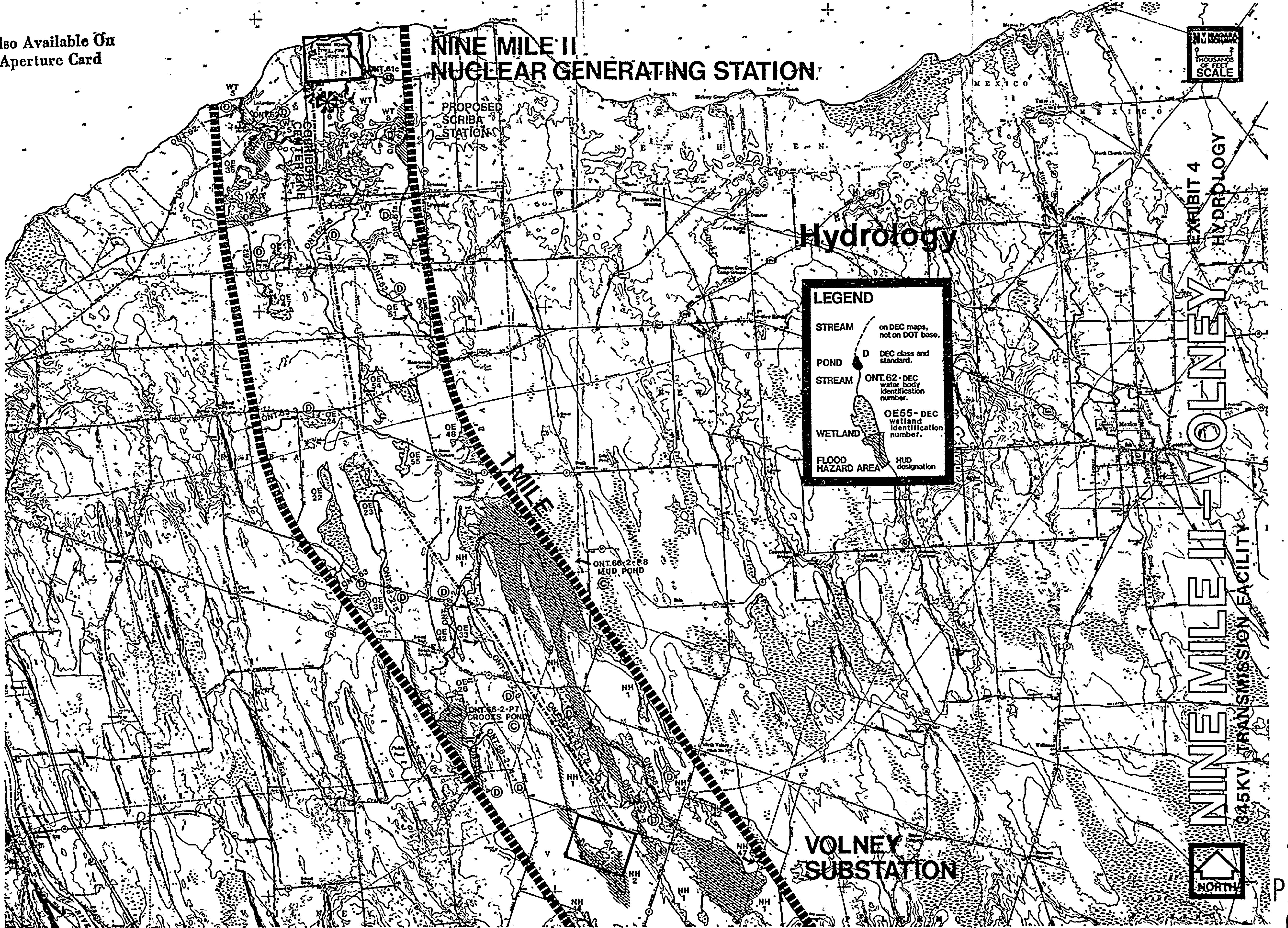
EXHIBIT 4
SOILS

NINE MILE II — VOLNEY
345 KV TRANSMISSION FACILITY

NORTH

8403200248-04

Also Available On
Aperture Card



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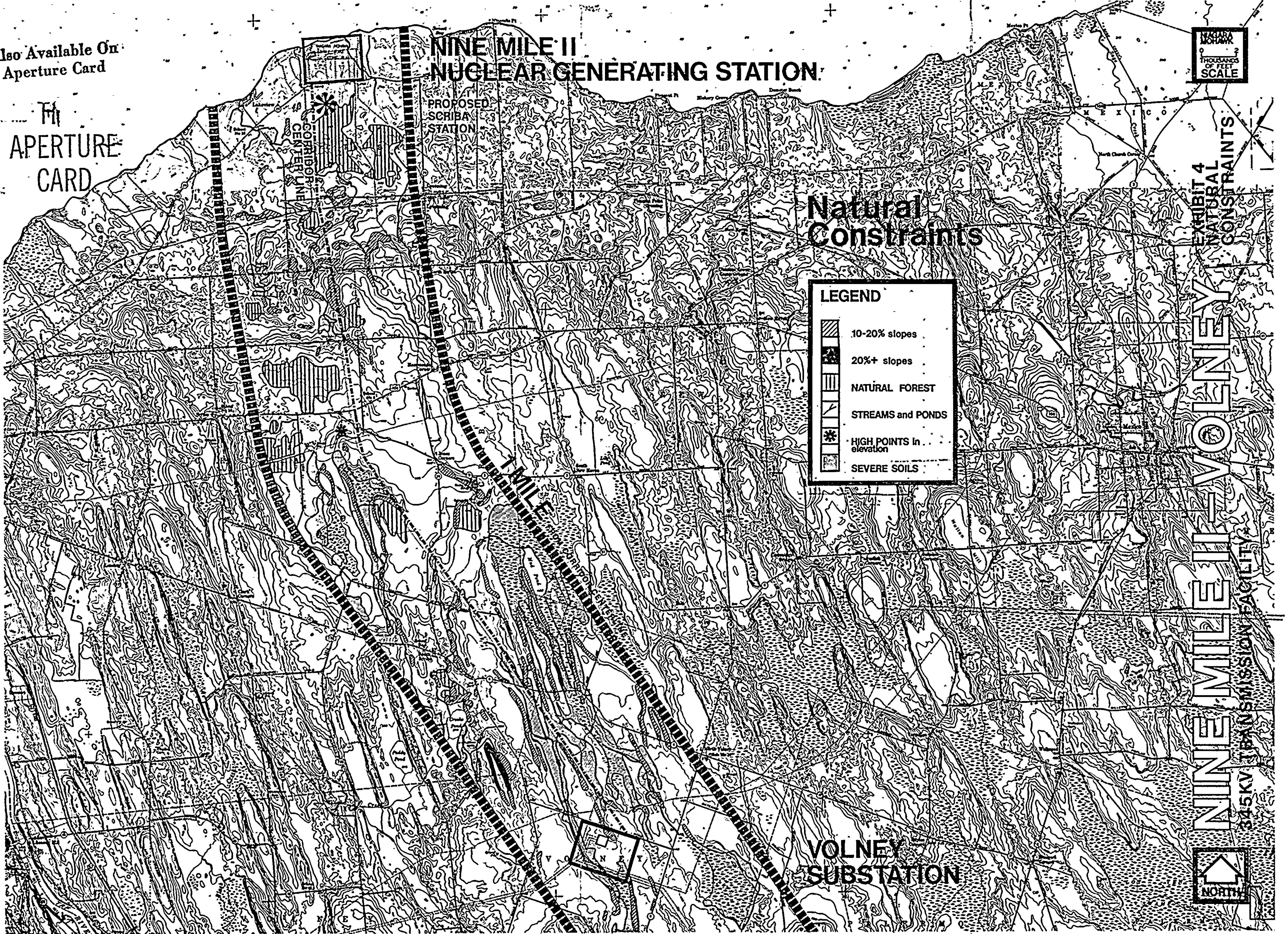

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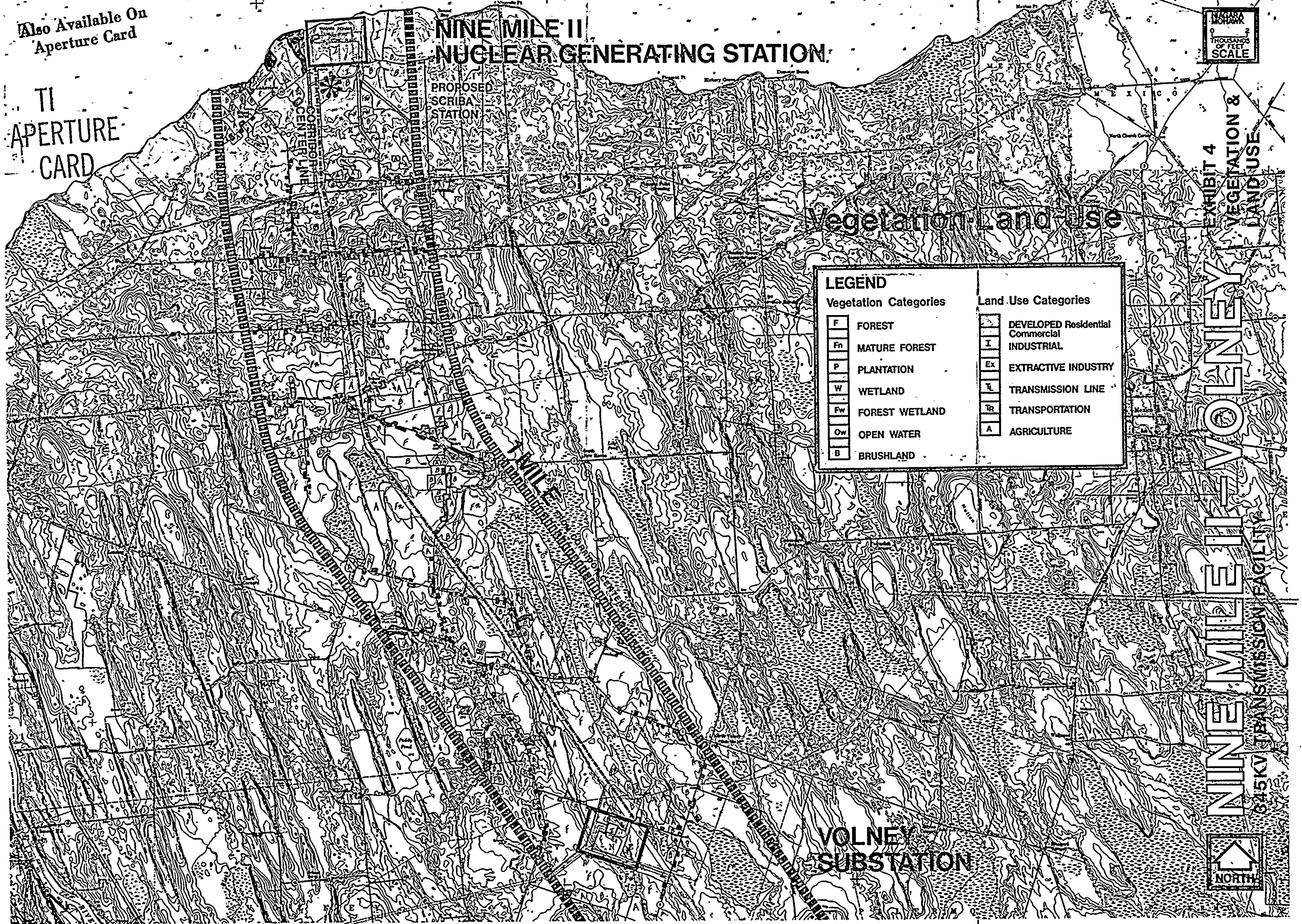

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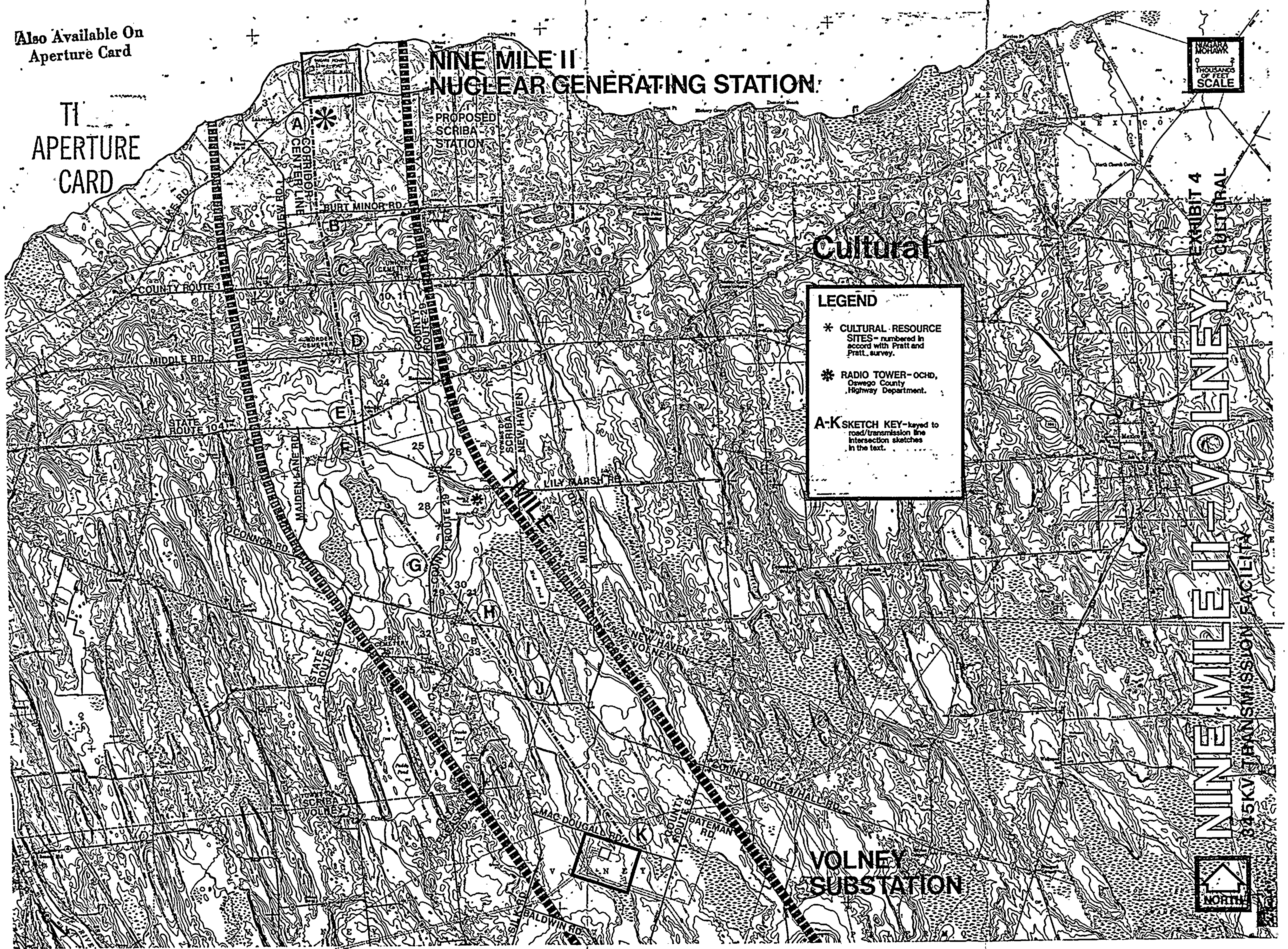

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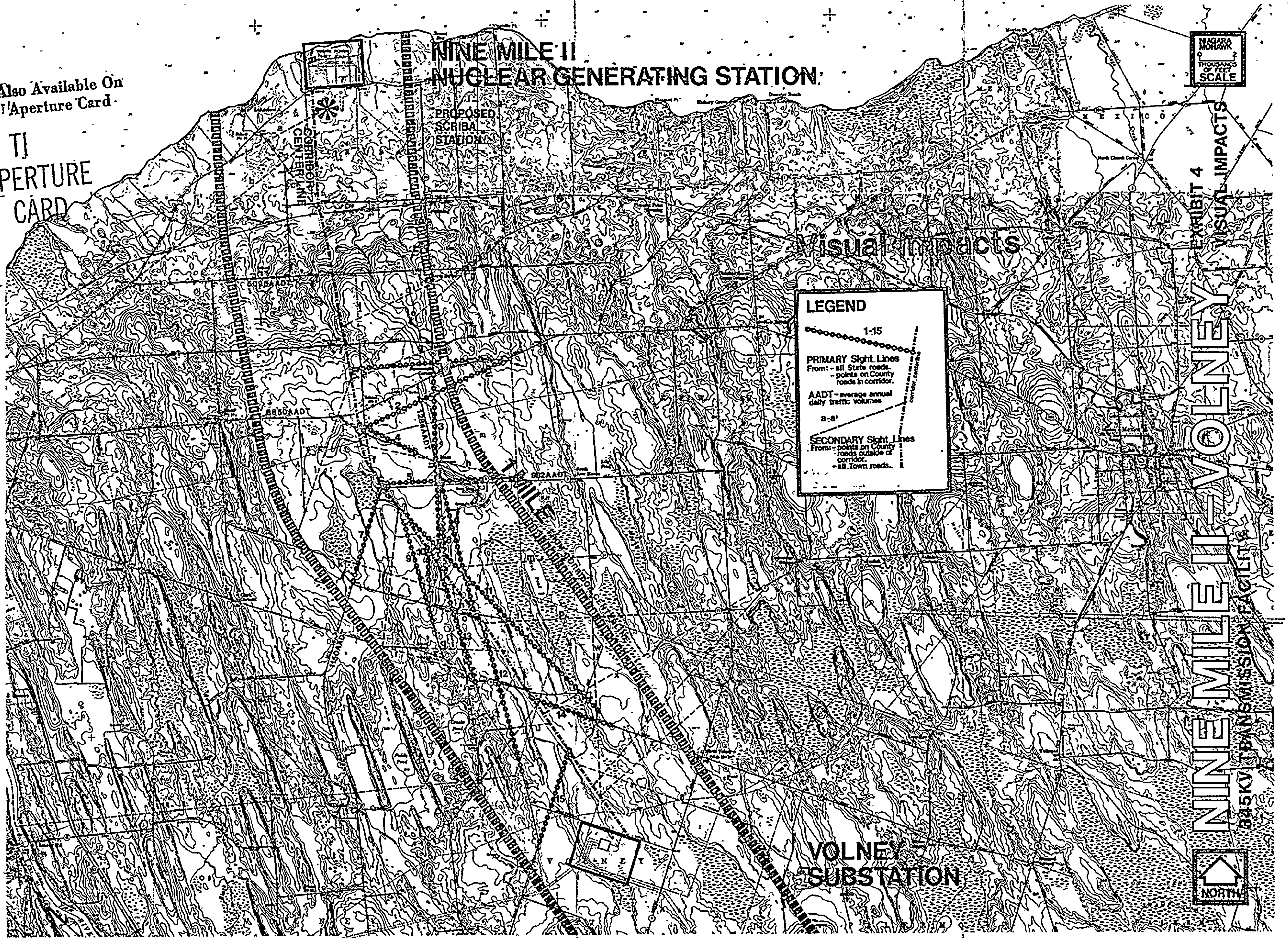

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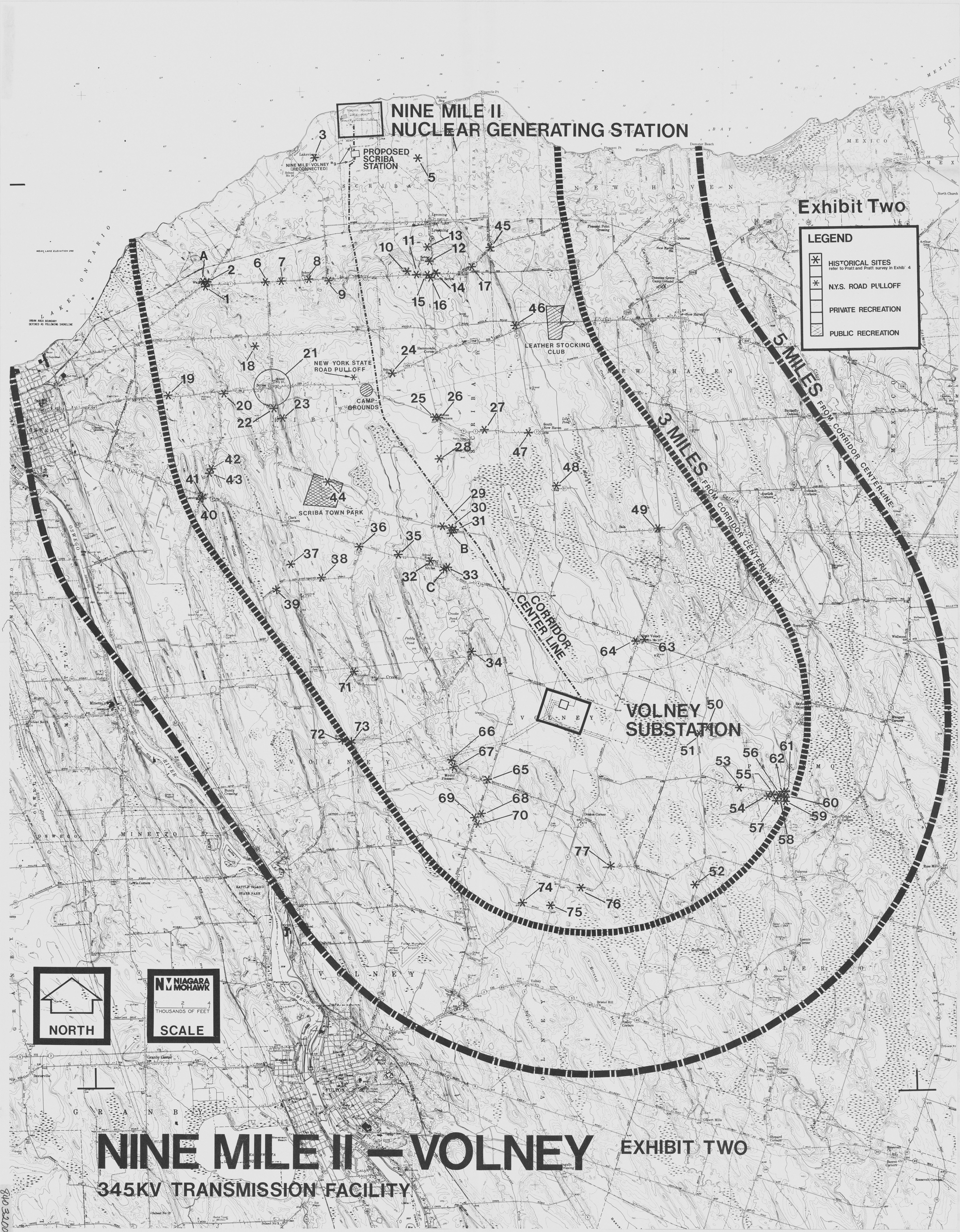

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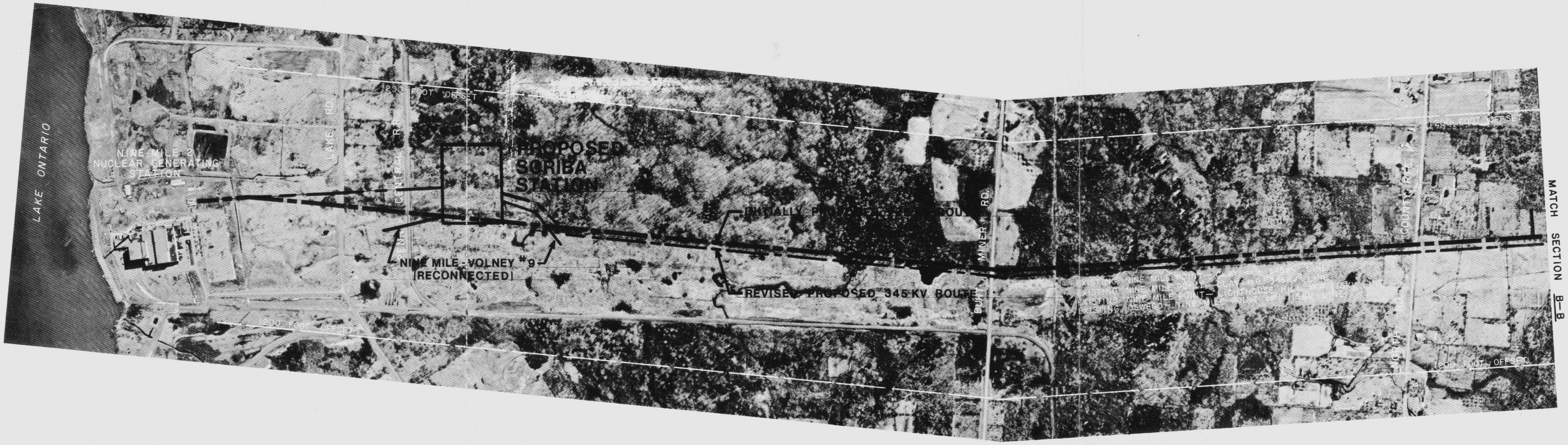
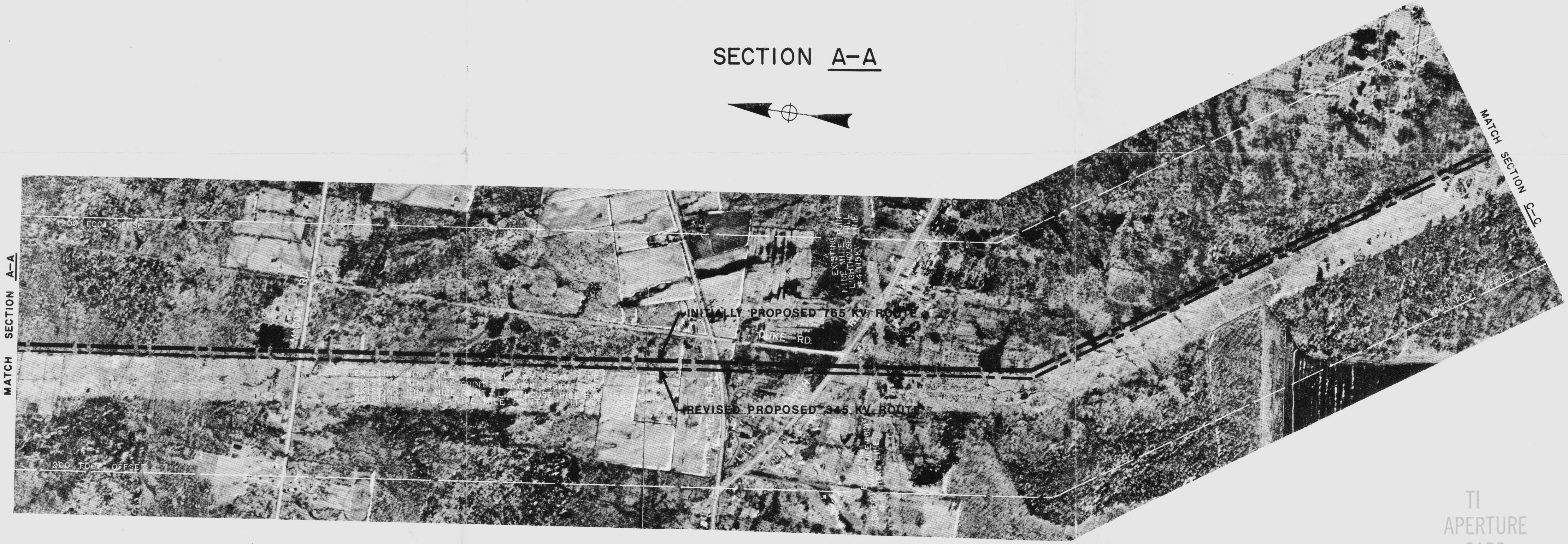


SECTION A-A



SECTION B-B

MOSAIC PREPARED USING AERIAL
PHOTOGRAPHY FLOWN 4/11/74

APPROXIMATE
CENTERLINE

SCALE
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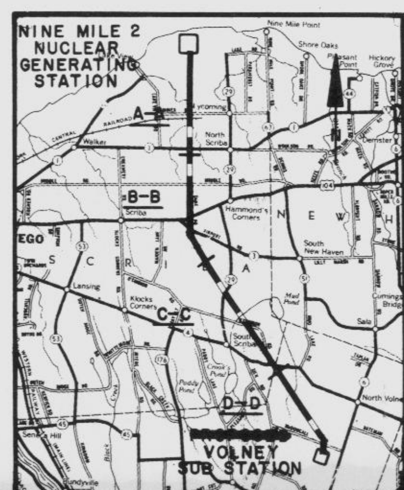
FEET



NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION
SYRACUSE, N.Y.

NINE MILE 2-VOLNEY
345kV TRANSMISSION FACILITY

RIST-FROST-WARNECK AND PARTNERS
CONSULTING ENGINEERS SURVEYORS
WATERTOWN, NEW YORK

SHEET 1 OF 2
DATE: FEB, 1978

SHEET 1 OF 2

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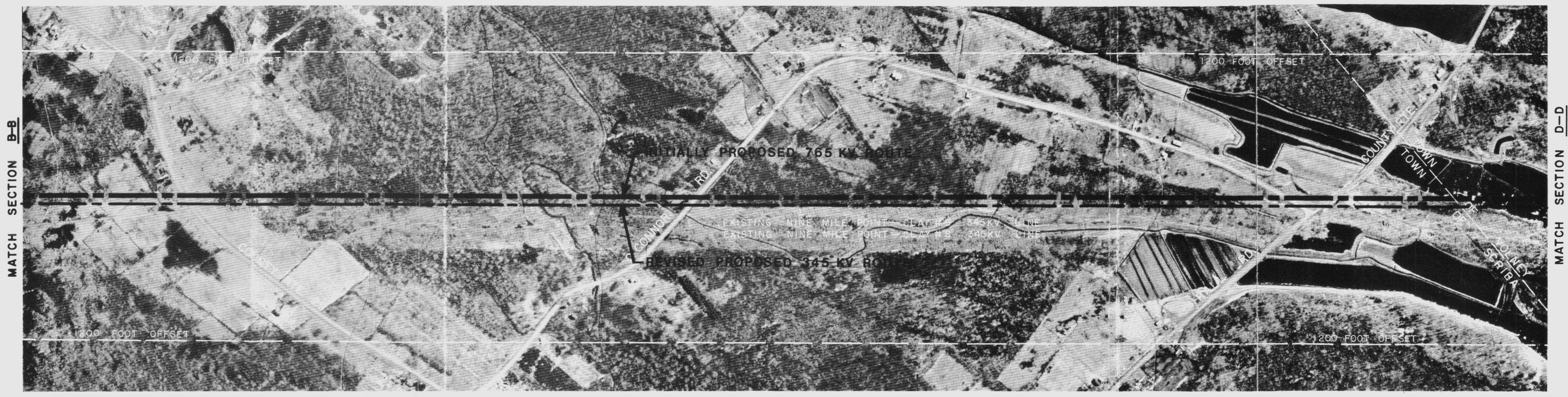
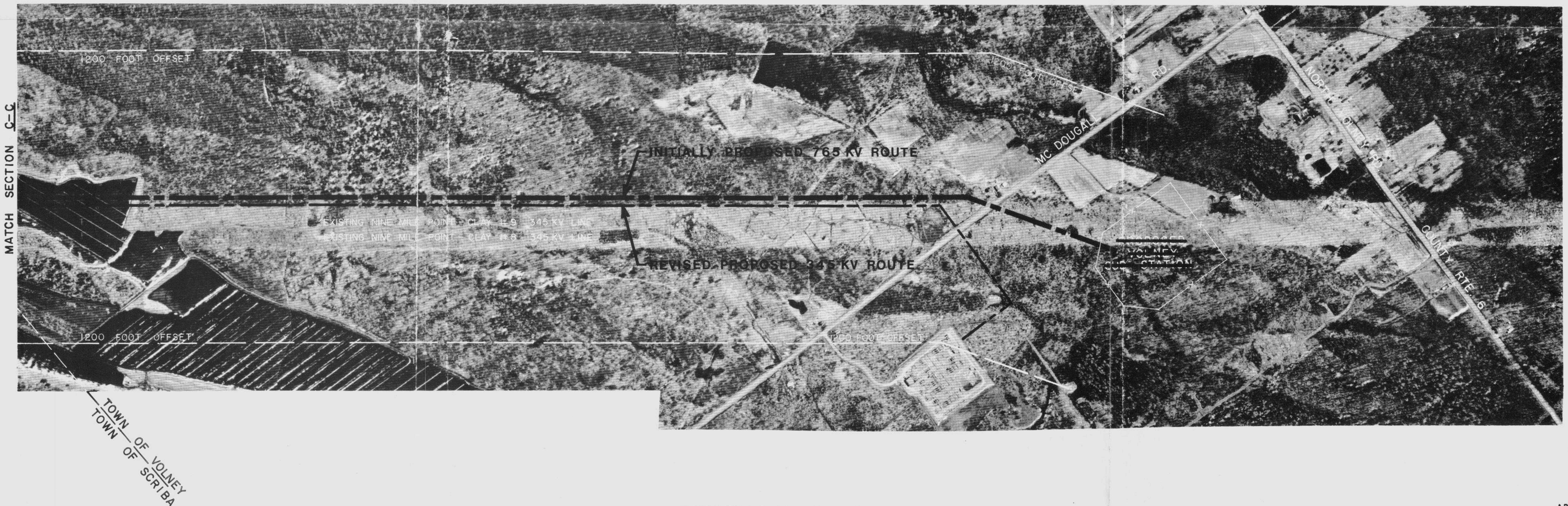


SECTION C-C



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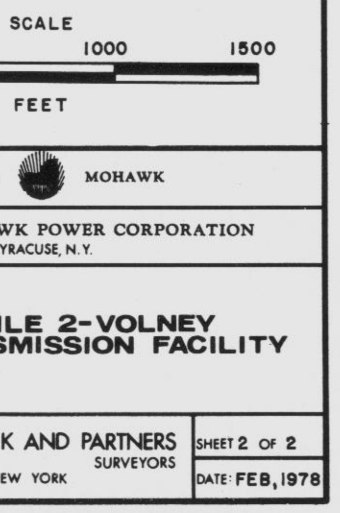
SECTION D-D

MOSAIC PREPARED USING AERIAL PHOTOGRAPHY FLOWN 4/11/74

APPROXIMATE CENTERLINE

SCALE 0 500 1000 1500 FEET



NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION
SYRACUSE, N.Y.

NINE MILE 2-VOLNEY 345kV TRANSMISSION FACILITY

RIST-FROST-WARNECK AND PARTNERS
CONSULTING ENGINEERS SURVEYORS
WATERTOWN, NEW YORK

SHEET 2 OF 2
DATE FEB, 1978

D

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SHEET 2 OF 2