Stephen G. Whitley
Senior Vice President and Chief Operating Officer

September 15, 2005

Mr. Paul Vaitkus
Vice President - Engineering
NSTAR Electric
One NSTAR Way
Westwood, MA 02090

Re: TCA Application #NSTAR-04-TCA-01-Rev. 1, Dated: August 24, 2004

Dear Mr. Vaitkus:

This letter provides the determination of ISO New England Inc. (the "ISO") in connection with the revised transmission cost allocation ("TCA") application dated August 24, 2004 (the "Revised Application")[1] submitted by Boston Edison Company d/b/a NSTAR Electric ("NSTAR") pursuant to Schedule 12C of the NEPOOL Open Access Transmission Tariff ("NEPOOL OATT").[2]

The Revised Application involves the construction of a new three-circuit, 345 kV underground transmission facility from a point of origin along an existing 345 kV

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1 Exhibit No. 1 is the narrative report and form application of the TCA application dated June 11, 2004 received by the ISO in electronic format from Boston Edison Company. Exhibit No. 1 also includes the attachments Boston Edison Company included in the paper copy version of the June 11, 2004 TCA provided to the ISO. Exhibit No. 2 is the revised form application dated August 24, 2004.

2 Effective with the start of ISO operations as a regional transmission organization on February 1, 2005 (the "RTO Operations Date"), Schedules 12 and 12C are contained in Section II of the ISO New England Inc. Transmission, Markets and Services Tariff (the "Tariff"). Because there are no substantive differences between the version of Schedules 12 and 12C contained in the NEPOOL OATT and in the Tariff, the schedules will be referred to throughout this letter simply as "Schedule 12" and "Schedule 12C," respectively. Capitalized terms not defined herein have the meanings ascribed thereto in the Tariff.

overhead transmission line running between NSTAR's substations in West Walpole and Holbrook, MA, and a point of termination at the existing Hyde Park and K Street substations in Boston (the "Project"). The Revised Application seeks a determination that the entire estimated Project cost of $234,217,000 is Pool-Supported PTF cost.

I. SUMMARY OF ISO DETERMINATION

The ISO finds that $225,562,500, the majority of the estimated costs for the Project, qualifies as Pool-Supported PTF costs. The ISO finds that $8,654,500 of the total estimated cost of $234,217,000 are Localized Costs, as defined in Schedule 12C.

II. OVERVIEW OF SCHEDULE 12C

Given the large dollar amounts at issue with this Project and the questions raised by Market Participants and other stakeholders regarding other potential transmission designs and routes, an understanding of the Schedule 12C determinations made by the ISO with respect to the Project will be facilitated by an overview of the contents and purpose of Schedule 12C.

The ISO's role in determining Localized Costs is defined by Schedule 12C and Planning Procedure No. 4 ("PP-4").[3] Schedule 12C provides that "[t]he ISO shall determine what those reasonable requirements are that are consistent with Good Utility Practice and the current engineering design and construction practices in the area in which the Transmission Upgrade is built [and that] [t]he costs of Transmission Upgrades that exceed those reasonable requirements . . . shall be deemed Localized Costs." Schedule 12 of the Tariff provides that Localized Costs "shall not be included in the Pool-Supported PTF costs recoverable under this OATT . . . ."

In discussing the factors the ISO must consider when making its determination of whether Localized Costs exist, Schedule 12C provides that, with advisory input from the Reliability Committee, the ISO will consider the reasonableness of the proposed design and construction method with respect to:

a) Good Utility Practice;

b) current engineering design and construction practices in the area in which the Project is proposed to be built/is being built;

c) allowing for appropriate expansion and load growth;

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[3] PP-4 was originally entitled NEPOOL Planning Procedure No. 4; therefore, the RTO Operations Date, is denominated ISO New England Planning Procedure No. 4. Because no substantive change was made in this transition, the document will be referred to herein simply as PP-4.

d) alternate feasible and practical transmission alternatives; and

e) the relative costs, operation, efficiency, reliability and timing of implementation of the proposed Project.

The ISO's determination of Localized Costs is based primarily on the types of expenditures proposed. Such cost estimates are relevant to the ISO, not for ratemaking purposes, but rather for determining the presence of Localized Costs by analyzing, for example, whether a Project will cost more than a transmission alternative with equally robust power system performance. However, an ISO finding that certain proposed expenses do not constitute Localized Costs should in no way be interpreted as a determination by the ISO that such estimates are accurate and should automatically be included in the Transmission Revenue Requirement collected by the PTOs through the Tariff, since that revenue requirement is based on actual costs, not forecasts and estimates.[4] The PTOs are responsible for including the proper supporting information and detail in their annual informational filing as required by Attachment F and its Implementation Rule. However, an ISO finding of Localized Costs does not prohibit a PTO from including such expenditures in its rates for Local Service under Schedule 21 of the Tariff.

III. SUMMARY OF PROJECT, ITS GENESIS AND RELATED RELIABILITY AND SITING REVIEW

In this section, the ISO describes the core elements of the Project, explains its genesis in Regional Transmission Expansion Plans and summarizes the reliability and siting review undertaken for the Project.

A. Core Elements of the Project

As described more fully in the TCA application, the Project bifurcates the existing #316, 345 kV overhead transmission line where it travels past Route 138 and York Street in Stoughton, Massachusetts. At this location, NSTAR proposes to construct a new 345 kV switching station. From this switching station, NSTAR proposes to construct three 345 kV underground cables north along Route 138 through Stoughton for approximately

[4] The Schedule 12C process does not constitute, for example, an ISO audit of such costs. Should a PTO include imprudent expenditures or make an error in its Transmission Revenue Requirement, a Customer may challenge such expenditures at FERC through filing a Section 206 complaint in response to the PTOs' informational filing. Similarly, if a Customer believes the formula rates currently in effect have become unjust and unreasonable, that Customer may file a Section 206 complaint with FERC. Such issues, however, are unrelated to the TCA application process and the ISO's determination on Localized Costs.

0.4 miles; through Canton, Massachusetts for approximately 5.0 miles; and through Milton, Massachusetts for approximately 3.7 miles.

Near Mattapan Square, one of the three 345 kV cables will travel through the city streets of Hyde Park, Massachusetts for approximately 2.1 miles and terminate at Hyde Park Substation. The other two 345 kV cables will leave the Mattapan Square area and travel approximately 3.0 miles through Hyde Park along American Legion Highway northeast along Blue Hills Avenue approximately 2.0 miles through Mattapan, Massachusetts and into Dorchester, Massachusetts. These two cables will travel approximately 1.6 miles through Dorchester, continuing northeast through various city streets for approximately 1.2 miles through Roxbury, Massachusetts and for approximately 1.5 miles through South Boston, where they will terminate at the existing K Street Substation.

B. Genesis of the Project in Regional Plans

NSTAR explains in its Revised Application that it designed the Project to provide an integrated solution to the potential overloads identified on a series of transmission facilities located in the Greater Boston area, including downtown Boston, beginning in 2006 and extending through 2013. The Revised Application notes that the reliability benefits of the Project are reiterated in the Regional Transmission Expansion Plan issued by the ISO on November 13, 2003 ("RTEP03").

In its RTEP03, the ISO identified several interrelated reliability problems in the Boston area that required significant transmission improvements.[5] As part of the long-term solution for these reliability problems, RTEP03 summarized the need for a new 345 kV transmission line:

> For the long term, ISO New England recommends the construction of a new 345 kV transmission linking the Holbrook to the West Walpole 345 kV transmission corridor in Stoughton (southeast Massachusetts) with Downtown Boston. The desired delivery point is K Street Station, with a midpoint injection into the Baker Street load pocket at either Hyde Park or Baker Street. It is expected that this project will cost approximately $170 million.[6]

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5 RTEP03 at p. 29.

6 *Id.* at p. 30.

The ISO's Regional Transmission Expansion Plan issued October 21, 2004 ("RTEP04") again identified the need for the 345 kV transmission project.[7]

C. Reliability and Siting Review of the Project

Pursuant to Section 18.4 of the Restated NEPOOL Agreement,[8] NSTAR submitted to the ISO an application to build a 345 kV transmission project (*i.e.*, the Project) similar to that identified in the RTEP03. Consistent with the NEPOOL Reliability Committee's unanimous recommendation, the ISO conditionally approved NSTAR's Section 18.4 application by letter dated August 4, 2004. However, in light of the conditions imposed by the ISO, NSTAR later submitted a revised Section 18.4 application. The revised 18.4 application included design changes to address transient over-voltages presented by the original design.[9] Finding that the Project would "not have a significantly adverse effect on the reliability or operating characteristics of NSTAR transmission facilities, the transmission facilities of another Transmission Owner, or the system of a Market Participant," the ISO approved the revised Section 18.4 application by letter dated February 10, 2005.

On January 14, 2005, the Massachusetts Energy Facilities Siting Board approved NSTAR's petition to construct the Project.

IV. SCHEDULE 12C EVALUATION PROCESS APPLIED TO THE PROJECT

To evaluate the Revised Application, the ISO carefully considered the advisory recommendation regarding Localized Costs provided by the NEPOOL Reliability Committee. This section describes the evaluation process the ISO has applied to the Project.

A. Consideration by the NEPOOL Reliability Committee

On June 11, 2004, NSTAR submitted its initial TCA application (the "Application") pursuant to Schedule 12C, with an estimated cost of $217 million. As noted above, instead of using conventional overhead transmission lines, the Application proposed to construct underground cables. The Application reflected consideration of

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7 RTEP04 at p. 69.

8 As of the RTO Operations Date, the substance of Section 18.4 of the Restated NEPOOL Agreement is contained in Section I.3.9 of the Tariff.

9 The analysis performed by GE Energy and documented in the report "Frequency Scan and Transient Analysis for the 345 kV Expansion Project" dated November 22, 2004, determined that there were no adverse system impacts resulting from the use of underground cable as described in NSTAR's revised 18.4 application.

several project alternatives, including an overhead transmission project following a route similar to that of the Project.

At its July 29-30, 2004 meeting, the Reliability Committee considered the Application and unanimously (with three abstentions) recommended ISO approval of the Project's entire $217 million estimated cost as Pool-Supported PTF. The Reliability Committee also unanimously recommended that the estimated costs associated with upgrades needed to avoid a significant adverse impact on the continued operation of New Boston Unit #1 subsequent to the operation of Phase 2 be included as Pool-Supported PTF costs. The Reliability Committee required NSTAR to provide a final estimate of the costs associated with the upgrades necessary for continued operation of the New Boston Unit #1 (preliminarily estimated to cost approximately $15 million), for review at the August 31, 2004 Reliability Committee meeting, in the form of an amended TCA Application.

In response, NSTAR submitted the Revised Application to the ISO on August 24, 2004. The Revised Application increased the estimated Pool-Supported PTF costs from $217 million to $234,217,000. NSTAR has represented that this increase of $17,217,000 stemmed from the costs necessary to relocate the proposed Phase 2 115 kV transmission connection at the K Street Station, upgrade two 115 kV circuits for cables between Kingston Street and Brighton Substations, and include two current limiting reactors at the K Street Station to mitigate short circuit fault duty concerns should the existing New Boston generating unit continue to operate subsequent to the implementation of Phase 2 of the Project.

On August 31, 2004, the Reliability Committee unanimously recommended that the ISO accept NSTAR's revisions to its Application, including the estimated increased cost of $17,217,000.

B. Evaluation Process Undertaken by the ISO

During the period following the receipt of the Reliability Committee's advisory input, the ISO has undertaken the following actions to obtain additional information to assist its determination under Schedule 12C:

- On December 14, 2004, the ISO sent a letter to NSTAR requesting *additional information* regarding real estate costs for the construction of an alternative overhead transmission project.[10] NSTAR provided its response on December 16, 2004.[11]

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[10] Exhibit No. 3.

[11] Exhibit No. 4.

- On January 28, 2005, NSTAR provided a response to questions raised by the Maine Public Utilities Commission ("MEPUC") regarding the Project.[12]

- On January 31, 2005, a TCA public stakeholder meeting was held to discuss the Revised Application. NSTAR made a presentation summarizing the Revised Application, and meeting participants were given the opportunity to ask questions.

- As a follow-up to the presentation, the ISO submitted a letter dated February 1, 2005 asking NSTAR to identify the regulatory agencies that have jurisdiction in the area identified in the suggested alternative overhead route of the MEPUC, and to determine the impact on cost, schedule, accessibility, and maintenance the MEPUC alternative would have.[13] NSTAR responded in a letter dated February 8, 2005.[14]

- In a letter dated February 7, 2005, the ISO submitted additional questions requesting (1) additional information regarding any agreements entered into by NSTAR with municipalities associated with construction of the Project ("NSTAR Agreements"); and (2) detailed information regarding costs associated with site mitigation measures as required by the Massachusetts Energy Facilities Siting Board Final Decision and/or any of the NSTAR Agreements.[15] NSTAR provided its response in a letter dated April 6, 2005 (the "Mitigation Letter").[16]

- In a letter dated August 15, 2005, NSTAR enclosed a revised Memorandum of Understanding with the Massachusetts Department of Conservation and Recreation, and provided additional information

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12 Exhibit No. 5.

13 Exhibit No. 6.

14 Exhibit No. 7.

15 Exhibit No. 8.

16 Exhibit No. 9. Because the information provided in these responses form the basis for the ISO's determination of Localized Costs, *see infra* Section V.B., the ISO would note that when the NEPOOL Reliability Committee made its recommendation to regionalize 100 percent of the Project costs at its July 2004 meeting, it specifically did not have before it the information provided in these responses.

concerning payments to the Town of Canton to be used for repaving highways disturbed by Project construction.[17]

V. DETERMINATION AND ANALYSIS BY THE ISO

The Project's estimated costs generally represent reasonable requirements to address the transmission upgrade needs in the Boston area identified in RTEP03 and RTEP04 (and discussed above) that are consistent with Good Utility Practice and the current engineering design and construction practices in the area in which the Transmission Upgrade is built. Other transmission alternatives are more expensive.

As explained below, it is the ISO's determination that $225,562,500 of the Project's estimated cost should be considered Pool-Supported PTF costs. The ISO determines that $8,654,500 of the Project's estimated cost should be considered Localized Costs.

The following discussion first describes why the majority of the estimated costs for the Project are appropriately viewed as Pool-Supported PTF costs, then identifies individual elements that constitute Localized Costs.

A. Pool-Supported PTF Costs – The Estimated Project Costs Are Cheaper than Alternative Transmission Routes or Designs.

Under Schedule 12C, estimated costs that exceed reasonable requirements shall be deemed Localized Costs. To determine whether an application exceeds the relevant reasonable requirements, it is important to determine whether an alternative route or proposal would be less expensive to construct but would provide the same benefits to the bulk power system.

NSTAR offered three transmission alternatives to its proposed project in its TCA application:

1. Overhead 345 kV transmission lines

2. Underground 115 kV transmission cables

3. "Bundled" reconductoring, circuit changes, and substation expansion

The overhead 345 kV transmission line alternative presented by NSTAR in its revised TCA application included two overhead transmission lines from an origination point south of Greater Boston to a point of interconnection with the present underground

[17] Exhibit No. 10.

transmission system serving the City of Boston. In addition to this alternative, at the request of the ISO, NSTAR also considered a combination overhead/underground option in which overhead transmission lines would be utilized in the southernmost part of the project for a length of approximately 4.6 miles (*i.e.*, through the Blue Hills Reservation). Supporting documentation reviewed by the ISO confirms that these two overhead alternatives would have been more costly than the Project. Similarly, a project alternative identified by staff of the MEPUC utilizing an existing right of way ("ROW") from West Walpole to Needham would have been significantly more costly than the Project, because of the need to use expensive underground cables (as a lesser expense than obtaining new ROW for an overhead solution) from the end of the existing ROW in Needham to connect with the intermediate Baker Street substation and on to the Hyde Park substation. Therefore, though the overhead alternatives considered would have been technically equivalent to the proposed Project, they would have been more costly to build than the proposed Project.

The use of 115 kV underground cables or "bundled" reconductoring, circuit changes, and substation expansion to provide a level of capacity equal to the proposed Project would require a greater number of lines and associated terminal equipment. Both of these alternatives could potentially provide higher availability within Greater Boston in the event of a fault. However, costs associated with constructing and maintaining these lines are anticipated to be greater than those of the Project. Furthermore, from a reliability perspective neither the 115 kV nor bundled reconductoring/expansion alternative significantly improves import capabilities.

In making its determination that $225,562,500 of the costs associated with this project should be Pool-Supported PTF costs, the ISO based its decision on the fact that the Project provides a regional reliability benefit, as described in RTEP03 and RTEP04 reports; is consistent with Good Utility Practice; and is consistent with current engineering and design practices in the area in which the project is being constructed. The Project as proposed is technically superior, from a long-term reliability perspective, to the three transmission alternatives considered by NSTAR, with the exception of the NSTAR overhead alternative. The NSTAR overhead alternative would have been technically equivalent, but longer in length and more costly. The same is true of overhead alternatives suggested by the ISO and staff of MEPUC.

With respect to the proposed transmission lines, the Project utilizes the most direct route between the #316 transmission line and the Hyde Park and K Street substations, along existing roadways. NSTAR's estimated costs for the underground cables (including the operating and maintenance costs) utilized in the Project do not exceed reasonable requirements. Although underground transmission projects can be more costly than traditional overhead lines, the ISO finds that placing the transmission lines underground is cost-effective in light of the high route costs that NSTAR would

have to incur to obtain new ROW for an overhead routing in the very expensive real estate market of the Greater Boston area.[18]

With respect to the Project's modifications to two existing electric substations (at Hyde Park and K-Street in South Boston) where the new transmission circuits will terminate, and the construction of a new switching station in Stoughton (to serve as the source of power to the new underground transmission circuits), the Project elements are consistent with Good Utility Practice, as well as current engineering and design practices in the area in which the Project is being constructed. The design of the new switching station also will improve power flows and offer flexibility in supplying the new underground transmission circuits from either or both sections of the existing overhead #316 transmission line. Given the space limitations, the estimated costs of these substation proposals do not exceed reasonable requirements.

B. Localized Costs – Excess Design and Non-Design Costs

The Project's Localized Costs arise in the context of the NSTAR Agreements between Boston Edison and state and municipal entities, as described in, and attached to, the Mitigation Letter. These agreements require Boston Edison to make certain payments or undertake certain activities, totaling $8,654,500, which exceed reasonable requirements, as described in Schedule 12C, for the Project. Those payments, which were included within NSTAR's estimated costs for the Project, constitute Localized Costs.

The Localized Costs relating to each of the agreements are summarized below:

Massachusetts Department of Conservation and Recreation	$500,000 for the allocation of funds to be used by Department of Conservation and Recreation at its own discretion.
City of Boston, MA	$3,500,000 for costs associated with creating and/or installing new facilities or structures not required by the bulk power system and where such items did not exist

[18] This finding is consistent with the analysis provided in Attachment A to PP-4 regarding underground transmission facilities, which includes the following example of a project that is not likely to contain Localized Costs:

> The Project includes underground transmission cable but the total cost of the underground transmission cable Project is lower than a feasible and practical overhead transmission line, the operating and maintenance costs are comparable, and the reliability benefits provided by the underground cable are equal to those provided by the overhead line.

	prior to Project construction, including: (i) $650,000 for new curbstones; (ii) $450,000 for new sidewalks; (iii) $700,000 for paving of side of road opposite to that occupied by power cables; (iv) $200,000 for trees; (v) $1,500,000 for conduits for dedicated city use.
Town of Stoughton, MA	$1,600,000, including: (i) costs associated with creating and/or installing new facilities or structures where such items did not exist prior to Project construction and are not required by the bulk power system ($350,000 for costs of new traffic light (already called for in the Route 138 Corridor Study) and new ADA compliant sidewalk); and (ii) $1,250,000 in payments for use by the town at its own discretion, which will include payment of legal fees related to EFSB proceedings.
Town of Canton, MA	$2,084,500 for costs associated with payments to be used for any lawful municipal purpose as deemed appropriate by the town's Board of Selectman that may or may not be related to the Project.
Town of Milton, MA	$970,000, including: (i) costs associated with creating and/or installing new facilities or structures where such items did not exist prior to Project construction and are not required by the bulk power system ($150,000 for two communication conduits for dedicated town use; $33,000 for new bike path; $50,000 for waiting enclosures for college students) and (ii) $737,000 in payment of funds for use by the town at its own discretion, 40 percent of which is estimated to be utilized for municipal activities which may not be required by the Project.

The ISO notes that the items of localized costs described in the foregoing table do not constitute repairs to existing facilities necessitated by Project construction activities. If they were, the costs might be considered Pool-Supported PTF Costs. In addition, the ISO notes that Schedule 12C calls for the ISO to review project *costs* presented by a TCA

applicant, and does not provide for consideration of any alleged *savings* in other types of project costs resulting from the applicant's payment of costs of the type described in the table above.

While the ISO has determined – based on the information provided in the Mitigation Letter – that $8,654,500 in estimated costs included with the Revised Application are Localized Costs, any actual costs associated with the Project of the nature of those listed above should similarly be excluded from any Tariff rates based on Pool-Supported PTF costs.

VI. PROCESS TO DISPUTE THE ISO'S DETERMINATION

Pursuant to Schedule 12C, NSTAR may dispute this determination of Localized Costs "by submitting within 60 days of such decision formal written notice of the dispute to the ISO . . . ." If NSTAR chooses to dispute the determination, the ISO will then enter into good faith negotiations with NSTAR not to exceed 60 days, as specified in Schedule 12C.

VII. CONCLUSION

The ISO believes, except with respect to elements constituting Localized Costs, the Project's estimated costs are consistent with the criteria in Schedule 12 of the ISO-NE Open Access Transmission Tariff for receiving regional support and inclusion in *Pool-Supported* PTF rates.

The ISO commends NSTAR for developing the Project, because it will improve reliability for the City of Boston and its surrounding communities, as well as improve the Boston import capability by 800 MW, and later by 1,000 MW with completion of the second circuit to the K Street substation. Load growth is projected to exceed available capacity in these areas beginning in 2006, which could cause potential overload conditions under single-contingency situations unless system improvements are completed.

Sincerely,

Stephen G. Whitley
Senior Vice President and Chief
Operating Officer

cc: TCA apps

Exhibit No. 1

NSTAR ELECTRIC GAS
800 Boylston Street Boston, Massachusetts 02199

June 11, 2004

Mr. Stephen J. Rourke, Chair
NEPOOL Reliability Committee
ISO New England Inc.
One Sullivan Road
Holyoke, MA 01040-2841

RE: **NSTAR-04-TCA-01** 12C Application

Dear: Mr. Rourke,

Please find attached a NEPOOL Transmission Facilities 12C Application for the transmission work associated with construction of a new 345 kV transmission project consisting of three new underground 345 kV HPFF cables originating in Stoughton, MA with two circuits running to K Street Station and one circuit running to Hyde Park Station. Construction of a new switching station in Stoughton and expansion of the existing K Street and Hyde Park substations are also required. A detailed report explaining the need, alternatives considered and cost summary of the project is also attached.

The 12C application attached identifies the POOL-Supported PTF costs based on a 100% share of the installed costs of that portion of the station which comprises pool transmission facilities.

If you have any questions I can be reached by telephone at (781) 441-8552, or by e-mail at Charles_Salamone@nstaronline.com.

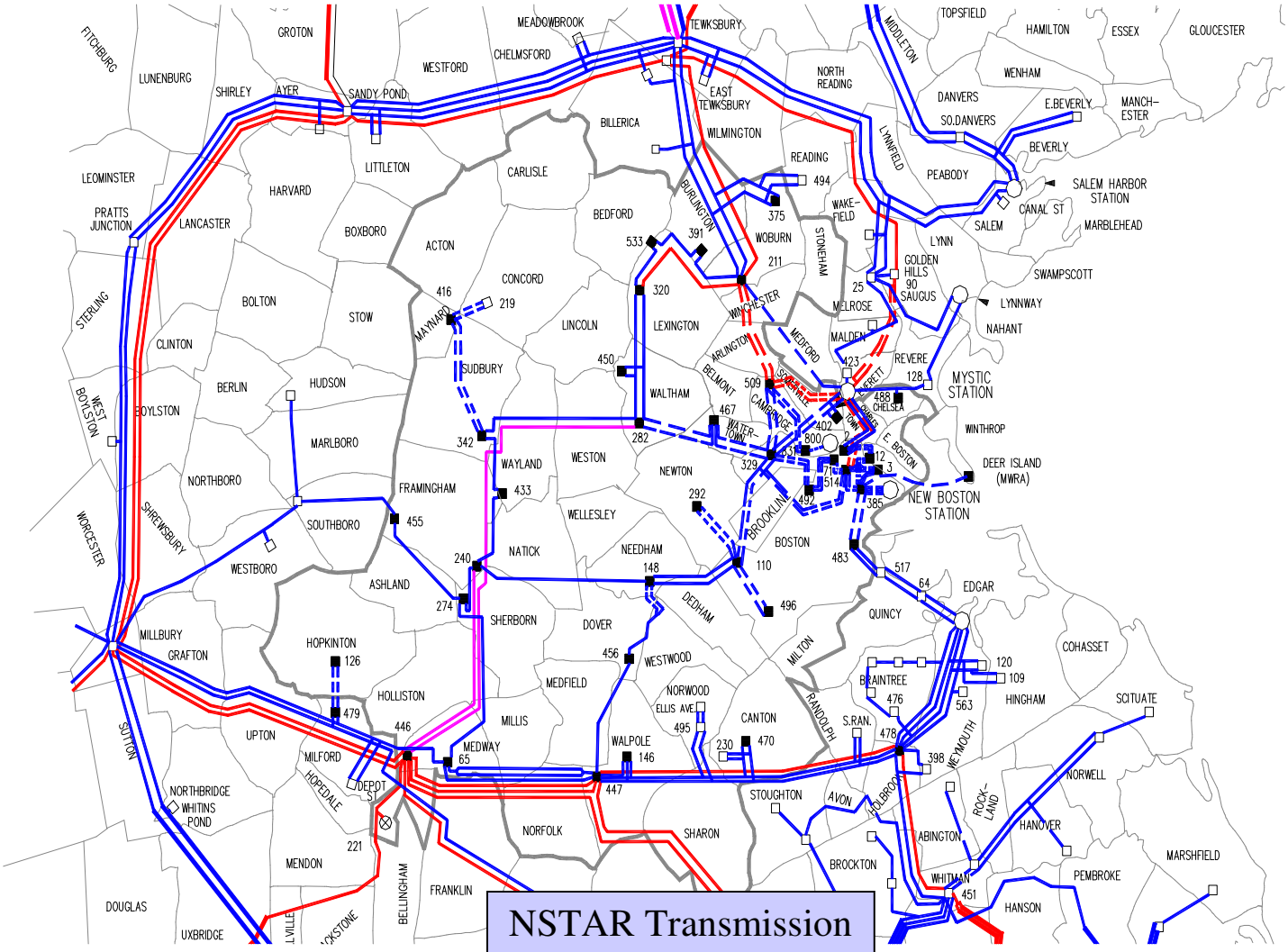
Sincerely,

Charles Salamone
Director System Planning

Cc: Greg Sullivan (NSTAR)
Swapan Dey (NSTAR)
Phil Legrow (NSTAR)
Robert Clarke (NSTAR)
Paul Krawczyk (NSTAR)

Stoughton – Hyde Park – K Street Station
345 kV Transmission Project
Schedule 12.C Application

June 11, 2004



NSTAR Transmission System

1.0 PROJECT DECRIPTION

1.1 Introduction

Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric" or the "Company") hereby applies to ISO-NE to recover costs associated with the construction of a new three-circuit underground transmission facility at a nominal operating voltage of 345,000 volts or 345 kilovolts ("kV") (the "Project"). Construction of the Project will serve the regional interest by maintaining the reliability of the regional electric transmission system serving the City of Boston and surrounding communities (collectively, "Greater Boston"). The Project is approximately 18 miles in length with a point of origin along an existing 345 kV transmission line located south of Greater Boston and a point of termination for one circuit at the Company's Hyde Park substation, and for two circuits at the Company's K Street substation in South Boston.

1.1.1 Background and Purpose

The Project involves the construction of three new underground transmission circuits to reinforce the regional transmission system in the Greater Boston area. These new circuits will connect the existing 345 kV system located south of Route 128 with two key substations in the City of Boston. The primary purpose of the Project is to maintain reliability of the regional electric transmission system serving the City of Boston and surrounding communities. Without the Project, load growth is projected to exceed available capacity beginning in 2006, causing the area to experience potential overload conditions under single-contingency situations (e.g., loss of an existing transmission circuit).

The electric transmission grid serving Greater Boston is a complex and interrelated system in which user demand, transmission resources and generating capacity are continually adjusted and balanced by a variety of public and private entities. When the grid operates smoothly and efficiently, all users receive a constant flow of electricity to meet their needs. When the grid experiences atypical events or equipment problems, the resulting imbalances in demand, transmission capacity and supply can lead to power disruptions and resulting societal costs. In 1989 and 2000, the electric transmission grid serving the City of Boston was reinforced by the installation of two 345 kV underground circuits running from the area north of Greater Boston through Charlestown to the Company's Kingston Street substation in downtown Boston (see Figure 1-1).

These two circuits, along with generation facilities located within the Greater Boston area, are the primary sources of power for customers in the City of Boston and surrounding communities. Significantly, there has been no similar reinforcement to the system from the south. Transmission lines serving key load centers in South Boston and Hyde Park are limited to 115 kV circuits that are incapable of providing the level of transmission capacity necessary to serve customer load in the Greater Boston area by 2006 (see Figure 1-2).

From a more regional perspective, there is newer, natural gas-fired electric generation capacity available to the south, while much of the generation to the north and in central Boston is decades old and nearing or past its useful life. As the constraints on the system increase, the continued reliability, flexibility to adjust to maintenance outages or unplanned outages, and power supply capability are increasingly in doubt. For all of the above reasons, the strengthening of the grid serving the Greater Boston area has assumed a high priority.

NSTAR Electric has conducted an extensive system evaluation to determine the optimal approach to mitigate transmission system reliability concerns. To that end, the Project will provide high-capacity transmission capability from the area south of Greater Boston, interconnecting with an existing 345 kV overhead transmission system running between Walpole and Holbrook, Massachusetts. When constructed, the Project will relieve anticipated overloads on the 115 kV transmission system serving the City of Boston and adjoining areas and will make available additional import capacity of approximately 800 MW in the initial phase of construction, and 1,000 MW upon completion of the second phase of construction.

1.1.2 Proposed Route

The proposed transmission line will originate at a switching station that NSTAR Electric plans to construct adjacent to the existing 345 kV overhead transmission line extending from the West Walpole substation to the Holbrook substation. From the new switching station, the three transmission circuits will proceed underground in a common trench beneath public highways and streets, approximately 9.1 miles to the Milton/Boston municipal boundary. Two circuits will continue from that point approximately 6.3 miles into Boston to the Company's K Street substation in South Boston. The third circuit will extend westerly from the Milton/Boston municipal boundary approximately 2 miles beneath public streets to the Company's substation in Hyde Park.

NSTAR Electric's Preferred Route is shown on Figure 1-3. The Preferred Route originates at the Route 138 Switching Station Site, which is adjacent to the existing 345 kV line at the intersection of Route 138 and York Street in the Town of Stoughton. From this site, the route proceeds north on Route 138, through several miles of commercial/industrial development to Route 128 (I-93). The Preferred Route crosses under Route 128 and continues on Blue Hill Avenue through Milton. The route then crosses the Neponset River also via an existing bridge and continues on Blue Hill Avenue through Mattapan to Columbia Road. The route then turns to the northeast, following Columbia Road for approximately 2 miles through parts of Roxbury and Dorchester to Everett Square.

From Everett Square, the Preferred Route would travel approximately two miles along Boston Street north to Andrew Square, then northeast on Dorchester Street to East 4th Street, then east on East 4th Street to I Street, two blocks north on I Street to East 3rd Street, then east on East 3rd Street to K Street, and north on K Street to the K Street substation.

Lastly, a 2.1-mile single-circuit branch line leaves the route in Mattapan Square, following Cummins Highway and a short stretch of American Legion Highway to the existing NSTAR Electric substation on Hyde Park Avenue.

A number of minor route variations are under consideration that addresses traffic, area impacts and construction schedule related issues. These alternative routes will be fully reviewed as part of the Massachusetts Energy Facilities Siting Board review process which the Company is currently engaged in. The final determination of the most appropriate route will be established once this review process has been completed.

1.1.3 Project Schedule

For a variety of reasons relating to the need for new facilities to serve local and regional transmission requirements, it is vital that new transmission capability be in place by the summer of 2006. Therefore, NSTAR Electric plans to complete necessary regulatory review and permitting by the third quarter of 2004, so that orders may be placed for cable and equipment and construction may commence in late 2004. Construction of three underground steel pipes to house the transmission circuits will be completed during 2005. Installation of cables in one of the two pipes that terminate at the K Street substation, and the pipe terminating at the Hyde Park substation, would begin in 2005 and be completed by June 2006. The cable for the second pipe terminating at the K Street substation would be installed in 2007.

NSTAR Electric is currently seeking regulatory approvals and permits for the Project. Approvals for construction and zoning exemptions from the Massachusetts Energy Facilities Siting Board, review of the Project pursuant to the Massachusetts Energy Policy Act, and building and street opening permits from affected cities and towns are expected by the third quarter of 2004. The Company does not anticipate any impact on the current project schedule as a result of these regulatory and permitting processes.

At all times, NSTAR Electric will work closely with municipal officials and neighborhood representatives to ensure that the construction process is carried out with sensitivity to neighborhood concerns. Although the overall construction schedule would extend over three years, the in-street pipe installation would be completed within one year. Moreover, the duration of pipe-installation activities at any given point on the approved route would be only seven to eight days.

1.1.4 Project Technology and Cost

To identify the optimal approach to resolving reliability issues in the Greater Boston area arising in the future, NSTAR Electric conducted a detailed and systematic study of project alternatives. Project alternatives considered by NSTAR Electric included conservation and energy management, distributed generation and additional central-station generation, as well as alternative transmission configurations, including increasing the number of circuits and destinations for the power. As described in Section 3.0 of this Application, the Company's analysis showed that installation of three 345 kV underground transmission circuits is the optimal means of meeting system

requirements in the future. The Project will be constructed using pipe-type cable, which is a proven technology that is used extensively in Greater Boston for 345 kV and 115 kV transmission.

The estimated cost of constructing the Project facilities along the proposed route is approximately $217 million.

1.2 Overview of 12C Application

In accordance with schedule 12C of the NEPOOL Transmission Tariff an application to ISO-NE must justify the costs and need for a proposed facility in three phases:

1) The applicant must show that additional energy resources are needed;

2) The applicant must establish that its project is superior to alternative approaches in terms of cost, reliability and the ability to address the previously identified need;

3) The applicant must demonstrate that the project costs are reasonable and consistent with the engineering, design and construction practices for the area.

The following sections of this Application describe the process that led to the identification of proposed routes for the Project. In addition, this Application provides the following information: the need for the transmission line (Section 2.0); a comparison of project alternatives as well as review of the costs of alternatives considered (Section 3.0); and a description of the detailed costs associated with construction of the proposed project (Section 4.0).

1.3 Consistency with Current Design Practices in the Area

The underground transmission proposed is entirely consistent with current practices for the area serving Greater Boston. NSTAR Electric has had experience with 345 kV high-pressure fluid-filled ("HPFF") pipe-type cable since the mid 1970's and with PPP(spell-out?) insulation since 1988. NSTAR was the first in the nation to install 345 kV PPP and has over 25 circuit miles of it in operation in the system. The 2500 kcmil copper conductors will be identical to those already installed on several of those circuits.

The manholes are a standard design on the NSTAR Electric system for HPFF transmission.

The NSTAR Electric installations at 345 kV have all been using a pair of circuits/pipes in the same trench and manholes; so much of the proposed installation is identical in configuration with existing plant. The existing underground HPFF installations are almost exclusively in public streets, where traffic and congestion issues have been addressed before. The trench dimensions are basically the same in the proposed and existing installations. NSTAR Electric has experience in suspending 345 kV HPFF in

bridges in a manner similar to that proposed. The use of steel plates to enable crossing of open trench during construction has been a common practice and the further use of plating for shallow depth protection has been employed in the past.

Backfilling has commonly been with thermal sand but increasingly flow fill has been considered to stabilize trenching and facilitate street restoration. With a stronger street it is far less likely that the project would have to revisit streets damaged by soil settlement.

Cooling of the 115 kV cables between Hyde Park and Baker Street substations through the use of fluid circulation and heat exchangers taps into a technology with which NSTAR Electric already has considerable experience. In fact, the hydraulic systems related to this project are much the same as those already employed in over 200 miles of underground transmission throughout the system.

1.4 Overview of Reliability Issues and Power Supply Situation

Based on load forecasts through 2013 and contingency analyses comparing available system resources to load requirements, NSTAR Electric has determined that the Project is needed to maintain the reliability of the existing 115 kV transmission system in the City of Boston and its surrounding areas beginning in 2006. The electric system supporting customer load in Greater Boston is composed of a complex set of transmission elements, including 115 kV, 230 kV and 345 kV facilities, and generating units ranging in size from 15 to 800 MW (see Figure 1-2). To study the reliability needs of the Greater Boston area, NSTAR Electric divided the Greater Boston area into “sub-areas” exhibiting specific transmission, generation and load characteristics. The sub-areas and results analyzed by NSTAR Electric are as follows:

1.4.1 Downtown Boston

This area includes the downtown sector, South Boston and several adjoining neighborhoods including Dorchester and Roxbury. Customer load in the Downtown Boston area is projected to be approximately 1,300 MW by 2006. Transmission elements serving this area will experience overloads under contingency conditions beginning in 2006. Specific areas of concern are two 345 kV cables running between the Mystic and Kingston Street substations, two 345/115 kV transformers located at the Kingston Street substation, one 345/115 kV transformer located at the Mystic substation, two 115 kV cables running between the Kingston Street and K Street substations and two 115 kV cables running between the Mystic and K Street substations. The Project will mitigate these projected overloads by adding a significant transmission source directly to the Downtown Boston area at the K Street substation.

1.4.2 Communities Within the Greater Boston Area

This area includes communities surrounding the Downtown Boston area, including Hyde Park, West Roxbury, Needham, Dedham, Milton, Newton, Brookline, Brighton, Watertown, Waltham and Cambridge. Because the transmission facilities serving this area also support the Downtown Boston area, load projections in this area include the

load served within the Downtown Boston area. The combined peak load is projected to be approximately 3,000 MW in 2006. Transmission elements serving this area will experience overloads under contingency conditions beginning in 2006. Specific areas of concern are the 115 kV cables running from Waltham to Watertown, the 115 kV cables running from Cambridge to Brighton, the 115 kV cables running from Mystic to Brighton, and the 115 kV cables running from West Roxbury to Brighton. The Project will mitigate these projected overloads by adding a significant transmission source to the Hyde Park substation and increasing the capacity of the 115 kV circuits between the Hyde Park and West Roxbury substations.

1.4.3 Portions of the Greater Boston Area Located to the South

The 230 kV and 115 kV transmission system south of Boston serves customer load in suburban communities and is a key corridor that supports power flow into the Greater Boston area. These facilities are projected to experience overloads under contingency conditions beginning in 2006. Specific areas of concern include the 115 kV transmission line originating in Walpole that runs through Needham to the West Roxbury substation, and potentially the 115 kV line from Framingham that runs through Needham to West Roxbury, as well as 345 kV transformers in Medway and Walpole that are the source for these 115 kV lines. The Project will mitigate these projected overloads by adding a significant transmission source to the Greater Boston area, while also relieving potential overloads on import paths from the south of Boston.

1.4.4 Boston Import Area

Although the primary objective of the Project is to mitigate reliability concerns, the Project will also serve to increase supply resources available to the area by facilitating supply imports from the southeastern part of Massachusetts into the Greater Boston area. The Greater Boston area is also referred to as the "Boston Import Area." The Boston Import Area encompasses the City of Boston and surrounding communities to the north, northwest, south and southwest, not all of which are served by NSTAR Electric. The Project would initially increase import capability in the Boston Import Area by 800 MW, and by 1,000 MW with completion of the second circuit to the K Street substation. The full import capability improvement for the Greater Boston area is dependent upon other transmission elements located to the north and northwest of the City of Boston, which are not within the NSTAR Electric service territory. Under heavy transfer conditions, these transmission elements will become overloaded and mitigation of these overloads would be necessary to allow the new 345 kV transmission circuits to reach their maximum capability. With upgrades to the constraining transmission elements implemented, the Project has the potential to increase import capability by as much as 2,000 MW.

Therefore, in addition to serving as a critical improvement in the reliability of the Greater Boston transmission system, the addition of 1,000 MW of transmission import capacity will provide supply diversity by reducing the area's reliance on the existing 345 kV system serving the City of Boston from the north and aging generating units seeking to

retire from the system within the Greater Boston area. The Project will also facilitate access to generation resources outside of the Greater Boston area, which include new, high-efficiency natural gas-fired generating units located in southeast Massachusetts.

1.4.5 Regional Reliability

The reliability benefits of the Project are reiterated in ISO-New England's ("ISO-NE") Regional Transmission Expansion Plan ("RTEP03"), which supports NSTAR Electric's conclusion that the Project is needed to improve system reliability for 2006. ISO-NE, the operator of the transmission system in New England, is responsible for the day-to-day reliable operation of the region's bulk electric generation and transmission system. The RTEP03 report, which was approved by the ISO-NE Board of Directors on November 13, 2003, includes a regional planning study that examines system needs throughout New England. With respect to the Northeast Massachusetts ("NEMA")/Boston area, the RTEP03 recommends the Project as a means of reinforcing the transmission system to support load growth and expected generator retirements.

1.4.6 Conclusion on Project Need

The central objective of NSTAR Electric's planning process is to ensure system reliability for all homes and businesses within its service territory. NSTAR Electric will meet this objective through the addition of a new 345 kV transmission line from the area south of Greater Boston. The proposed 345 kV transmission project is designed to be an integrated solution to the potential overloads identified on a series of transmission facilities located in the Greater Boston area, including Downtown Boston, beginning in 2006 and extending through 2013.

1.5 Technology Selection

The Project is designed to upgrade transmission capacity in the Greater Boston area to ensure the reliable delivery of power to NSTAR Electric customers. To meet this objective, NSTAR Electric investigated a variety of available underground transmission technologies and has elected to construct the Project using 345 kV HPFF "pipe-type" cable based on the proven performance and extensive experience NSTAR Electric has had with this technology.

A brief description of pipe-type cable technology is as follows. Each pipe-type cable circuit consists of three copper conductors, or phases. Each copper conductor is wrapped in several layers of tape consisting of insulating paper and polypropylene, which are infused with a dielectric insulating fluid. The three conductors are pulled into a single 8-inch steel pipe, which is also filled with dielectric insulating fluid. Together, these three conductors in a single pipe comprise a circuit. The fluid is pressurized to 200 pounds per square inch (psi) to increase the insulating value of the system and to permit operation at high voltages. The pipes run from manhole to manhole. Within each manhole, the segments of cable for each electrical phase are spliced together. The splice is covered by a metallic sleeve that is welded to the pipe sections, producing a continuous path that allows the dielectric fluid to circulate along the line. In some

applications, the fluid is cooled in heat exchangers and reintroduced to the pipe to circulate and cool the cables, thereby increasing their power-handling capability. As previously noted NSTAR Electric has considerable operating experience with HPFF pipe-type cable.

As compared to the alternatives, HPFF pipe-type cable technology provides the best combination of constructability, proven reliability, capacity, cost, and minimal environmental impact.

1.6 Proposed Transmission Facilities; Description of Proposed Routes

As discussed in Section 1.1, the Project involves the installation of three 345 kV underground transmission circuits to be installed in two construction phases. The three circuits will originate at a new switching station located along the existing Walpole-to-Holbrook 345 kV overhead transmission line. The three circuits will run north in a common trench to the Milton/Boston municipal boundary. At that point, a single-circuit branch line heads west to the Hyde Park substation while the other two circuits continue north/northeasterly in a common trench to the K Street substation. The first phase of construction will include civil engineering, construction of the steel-pipe conduits and manholes necessary to support all three circuits from the origination point to the two termination points. The first phase of construction will also include the installation of two circuits in the steel-pipe conduit (the single circuit to Hyde Park and one of the two circuits terminating at K Street). The first phase of construction is scheduled for completion in 2006. The second phase will involve the installation of the remaining circuit to the K Street substation and is presently scheduled for completion in 2007.

NSTAR Electric conducted a route selection study to identify the routes that offer the best balance of minimum environmental impacts and cost. NSTAR Electric is proposing the most advantageous of these routes as the Preferred Route. This route is described below.

1.6.1 Preferred Route "Route 138"

The Preferred Route involves three circuits running from a point of origin in Stoughton, Massachusetts to Mattapan Square (approximately 9.1 miles). At Mattapan Square, a 2.1 mile single-circuit segment branches off and extends to the Hyde Park substation and the remaining two circuits continue north for approximately 6.3 miles to the K Street substation. In total, the Preferred Route is approximately 15.4 miles in length from its starting point to the K Street substation. Including the 2.1 mile single-circuit segment, the Preferred Route totals 17.5 trench miles. The Preferred Route begins at the Route 138 Switching Station Site, which is a 14-acre parcel located adjacent to an existing 345 kV overhead transmission line at the intersection of Route 138 and York Street in the Town of Stoughton. NSTAR Electric would construct a new switchyard at this location.

From the Route 138 Switching Station Site, the route proceeds north on Route 138, crossing into Canton and running through about 2.5 miles of commercial/industrial

development. Continuing on Route 138, there are light density residential areas to the west and open space to the east. To the north of milepost 4, Route 138 approaches the interchange with Route 128. With the exception of a few residences just north of the Route 128 interchange, the route runs through open space from milepost 4 to 5.

The route will cross under Route 128 and continue north on Route 138 for a distance of about one mile through the western portion of the Blue Hills Reservation. After crossing the Milton line, Route 138 becomes Blue Hill Avenue, a straight two-lane road with paved shoulders through residential sections in Milton. At the City of Boston municipal boundary, the route continues on Blue Hill Avenue through Mattapan Square. North of Mattapan Square, Blue Hill Avenue is a wide, straight, urban boulevard (four travel lanes, full parking lane on both sides, median strip with integral left hand turn lanes); land use is urban residential with some street front retail and commercial uses. The route continues on Blue Hill Avenue through Mattapan, passing Franklin Park to Columbia Road. The route then follows Columbia Road (four lanes with full parking lanes on both sides) northeasterly through Uphams Corner to Everett Square.

From Everett Square, the route continues north on Boston Street to Andrew Square, then turns to the northeast for several blocks on Dorchester Street. From Dorchester Street, the route continues northeasterly on East 4th Street, then turns northwesterly on I Street. After two blocks on I Street, the route turns northeasterly on East 3rd Street. After two blocks on East 3rd Street, the route makes its final turn onto K Street, running two blocks to the 14-acre K Street substation. The distance from Everett Square to the K Street substation is approximately two miles.

The Preferred Route includes a 2.1-mile single-circuit segment terminating at Hyde Park Station. The single-circuit segment leaves Blue Hill Avenue at Mattapan Square, and runs northwesterly on Cummins Highway (four travel lanes with parking on both sides). As the route approaches American Legion Highway (four lanes, divided), NSTAR Electric would endeavor to locate the line through an existing substation property between Cummins Highway and American Legion Highway, or to acquire an easement through an adjacent shopping center parking lot, in order to avoid the sharp turn at the actual intersection of Cummins Highway and American Legion Highway. The route then runs south on American Legion Highway to the intersection with Hyde Park Avenue. At this point, the route crosses beneath Hyde Park Avenue to its termination point at the Hyde Park substation.

1.7 Ancillary Facilities, New and Expanded Substations

The Project will require the construction of a new switchyard at the point where the proposed underground transmission circuits will interconnect with the existing Walpole-to-Holbrook 345 kV overhead transmission line. The switchyard site for the Preferred Route is located in Stoughton, Massachusetts.

The Project will also require modifications to two existing electric substations at Hyde Park and K Street in South Boston, where the new transmissions circuits will terminate.

In addition, the Company will modify the Baker Street substation in West Roxbury with the addition of a heat exchanger for the existing 115 kV transmission lines running from the Baker Street substation to the Hyde Park substation.

This section describes the purpose, function, appearance and operating characteristics of the new and expanded substation facilities.

1.7.1 Construction of New Station #330 (Stoughton)

As part of the Project, NSTAR Electric will construct a new 345 kV switching station in Stoughton, Massachusetts to serve as the point of origin for two 345 kV circuits running to the K Street substation in South Boston (Station #385) and one 345 kV circuit running to the Hyde Park substation (Substation #496). The primary function of this new switching station will be to split the existing 345 kV overhead transmission line running between West Walpole and Holbrook into two 345 kV transmission circuits and to link these two circuits to the three new underground transmission circuits proposed by the Company. Please see Figure 1-10 for a diagram of the new station.

For the Preferred Route, the switching station would be located on a 14-acre parcel currently used as a commercial and industrial site. NSTAR Electric has finalized arrangements to purchase this site. The switching station would occupy approximately four acres of the 14-acre parcel and would use conventional open-air construction. As described below, the switching station would include the installation of 345 kV circuit breakers, tubular metal bus work and four voltage-controlling 345 kV reactors (three operating and one back up).

The new switching station is designed to serve as the source of power to all three of the new underground transmission circuits. As noted above, the existing 345 kV overhead transmission line will be split into two circuits and then interconnected with the three new underground circuits. This design ensures that, if one of the existing overhead circuits is inoperable, all three underground transmission circuits serving the Greater Boston area can be supplied from the remaining overhead circuit. Also, if one of the three new circuits is inoperable, the other two circuits can continue to function. Six circuit breakers are needed to allow full flexibility in supplying the new transmission circuits from either or both sections of the existing overhead transmission line.

Another function of the new switching station is to regulate the voltage effects of the new transmission circuits. Voltage regulation is achieved with the use of shunt reactors, which are similar in appearance to large transformers. By compensating for a portion of the capacitive impedance that the new high-voltage transmission circuits would induce, these devices improve the overall reliability of the electric transmission system to which they are connected. A shunt reactor would be associated with each of the three new transmission circuits and a fourth shunt reactor would be installed for use in the event that one of the dedicated shunt reactors fails or requires maintenance. Disconnect switches would also be installed for isolation of each piece of electrical equipment.

The shunt reactors and coils, like transformers, contain a cooling fluid to transfer the heat from the core of the reactors to fins on the metal exterior of the reactor. The fins dissipate heat directly to the air with no emissions. Fluid-containment systems will be provided for each reactor.

An electrical ground grid will be embedded in the earth across the entire footprint of the station to ensure that all the grounded points of all equipment and foundations are at the same electrical potential. All support structures, foundations, and equipment will be connected to the ground grid to provide safety to the equipment and personnel inside the station. Shielding masts will be provided to protect the switchyard against direct lightning strokes. At about 100 to 120 feet in height, these long, thin lightning rods will be the tallest structures on the site. By comparison, the existing lattice-type 345 kV transmission structures are approximately 120 to 130 feet in height. The yard will be completely covered with a thick layer of gravel. Additional equipment will include pumping facilities to maintain pressure in the underground pipe-type cable system and a control house.

The control house will consist of a small building containing local control and protection equipment and fiber-optic telemetry for the substation. The single-story, prefabricated modular building will be approximately 24 feet by 61 feet in size. The switching station will not be manned. The fiber-optic telemetry system will provide control and status functions to the NSTAR Electric Energy Management Center at Massachusetts Avenue, Boston. A prefabricated pump plant with dimensions of 10 by 50 feet will be installed to pressurize the dielectric fluid contained within the pipe-type cable. The pumping facilities consist of pumps, controls and a 25,000-gallon storage tank for the dielectric fluid.

Although the switching station would not typically be occupied, high-pressure sodium yard lighting will be installed as required for safe area lighting at night and to permit visual confirmation of switch positions during night switching operations. Lighting will be manually controlled from the control house. Generally, these lights would be used only for emergency conditions, or maintenance that could be completed only during the evening. Standard operation will be lights off.

The bulk of the switching station will be 30-feet high with higher structures where the existing 345 kV overhead line enter the substation site. To construct the new switching station, the Company would remove trees and shrubs within the portion of the lot used for the actual switching station. The Company would also remove any large trees outside the substation that have any potential to fall on the switching station lines or electrical equipment. The land will be graded to allow transport vehicles to move the large reactors. The property will be secured with a monitoring system and surrounded by a 10-foot high chain-link fence topped with three strands of barbed wire. High-voltage warning signs will be installed along the fence. Landscaping will be used to screen the station.

At the switching station site for the Preferred Route, the Company will construct a retaining wall in the sand hill on the south side of the site so that the station can sit lower in the property. The Company anticipates that the higher land mass adjacent to Route 138 on the west side of the property will be retained to provide further screening. At the switching station site for the Noticed Alternative Route, the site is closer to level in relation to adjacent properties and therefore landscaping will be performed at the periphery of the site.

1.7.2 Station Work at Existing Station #496, Hyde Park, Boston

Analysis performed by NSTAR Electric shows that growing electrical loads in the West Roxbury/Hyde Park area require the addition of transmission capacity in the area. The interconnection of a single 345 kV transmission circuit at the Hyde Park substation will allow the Company to meet these load requirements and ensure system reliability. To accommodate the addition of the 345 kV transmission circuit at the Hyde Park substation, new facilities must be added to convert the 345 kV voltage to 115 kV for distribution from the substation. Please see Figure 1-12 for a plan of the Hyde Park facilities. The existing substation is bound by Hyde Park Avenue to the east and an active rail line to the west.

Specifically, the Hyde Park substation will be expanded to accommodate a 550 MVA, 345 kV transformer to serve as the termination point for the single-circuit branch line. The expansion will utilize compact gas-insulated substation ("GIS") equipment to connect the underground cable to the transformer and the transformer to the existing 115 kV equipment.

A new control center building, approximately 24 feet by 46 feet in dimension, will be installed with control panels, relay cabinets, batteries and other equipment to control, protect and monitor the substation site. A remote terminal will be installed in the control center to provide control, telemetering and status functions to the NSTAR Electric Energy Management Center on Massachusetts Avenue.

To accommodate these changes, NSTAR Electric will need to expand the Hyde Park substation site by approximately 15,000 square feet. NSTAR Electric is in negotiation with the Massachusetts Water Resource Authority ("MWRA") to expand the existing substation property in a northerly direction to include adjacent land that is currently part of an MWRA pump-station site. This would enlarge the existing substation site from approximately two-thirds of an acre to approximately one acre.

The substation will also be equipped with high-pressure sodium lighting. Yard lighting will be operator controlled for illumination as required. Generally, these lights would be used only for emergency conditions, or maintenance that could be completed only during the evening. Standard operation will be lights off. Appropriate landscaping and acoustic mitigation will be provided for the expanded substation.

The upgrades to the Hyde Park substation will also improve the reliability and capacity of the Baker Street substation in West Roxbury. The two substations are currently

connected by two 115 kV underground circuits. Whereas the Baker Street substation currently supplies power to Hyde Park, the new transmission circuit will allow the Hyde Park substation to supply the Baker Street substation via a new 345 kV/115 kV transformer, which will substantially improve the reliability of service in the West Roxbury area. In addition, a heat exchanger will be installed at the Hyde Park substation to increase the electrical capacity of the 115 kV pipe-type cables between the Hyde Park substation and Baker Street substation. The heat exchanger is a 10-by-50 foot prefabricated unit with pumps and fans that will cool and circulate the dielectric fluid in the 115 kV pipe-type cable currently connecting these two facilities. The heat exchanger acts as a radiator to remove heat from the dielectric fluid.

1.7.3 Station Work at Existing Station #110, West Roxbury, Boston

NSTAR Electric will also install a heat exchanger at the Baker Street substation in West Roxbury to increase the electrical capacity of the 115 kV pipe-type cables operating between the Baker Street substation and the Hyde Park substation. Like the unit installed at the Hyde Park substation, the heat exchanger at the Baker Street substation will be a 10-by-50 foot prefabricated unit with pumps and fans that will cool and circulate the dielectric fluid in the 115 kV pipe-type cable currently connecting these two facilities (see Figure 1-12).

1.7.4 Station Work at Existing Station #385, K Street, South Boston

Analysis performed by NSTAR Electric shows that growing electrical loads in the K Street substation area will require the addition of transmission capacity. The interconnection of two 345 kV transmission circuits at the K Street substation will allow the Company to meet these load requirements and ensure system reliability. These two circuits will be connected to the existing 115 kV transmission facilities through two 550 MVA 345 kV transformers (one for each new circuit). This substation will require the installation of a shunt reactor for each of the two circuits. Please see Figure 1-13 for a plan of the K Street substation facilities.

The new substation facilities will occupy approximately four acres on unused portions of the existing K Street substation site. Specifics of the station work necessary at the K Street substation site are as follows:

- The new 345 kV switchyard facilities will be located on the NSTAR Electric property north of the existing 115 kV switchyard and between the switchyard and the reserved channel.

- In the new 345 kV switchyard, the Company will install a 345 kV air-insulated switchyard terminal that will contain disconnect switches, bus work, and support structures. This switch equipment will be connected with two new underground solid dielectric cables connecting each of the 345 kV underground circuits to the respective voltage transformer and shunt reactor. The solid dielectric cable segments will be short and will require no splices. Three 345 kV circuit breakers and

associated isolation disconnect switches will be installed for switching and protecting the equipment.

- Auto-transformers, reactors and switching equipment will be located in a new transformer yard on the NSTAR Electric property west of the existing 115 kV switchyard and north of the newly completed 115 kV/13.8 kV distribution station.

- The 345 kV transformer yard will contain two 345 kV to 115 kV transformers, complete with 345 kV terminal disconnect switches and support structures for the two solid dielectric cables that connect to the switchyard. This area will also contain two 345 kV regulating shunt reactors, complete with their own 345 kV disconnect switches, 345 kV circuit breakers and support structures for connections to the solid dielectric cables from the switchyard. Each transformer and each reactor will be provided with an fluid-containment system.

- The new sections of the switch and transformer yards will have metal halide yard lighting. Yard lighting will be operator controlled for illumination as required. Generally, these lights would be used only for emergency conditions, or maintenance that could be completed only during the evening. Standard operation will be lights off.

- The existing 115 kV switchyard equipment will be connected to new 115 kV equipment and the existing circuit breakers and bus disconnect switches will be upgraded.

- In the existing 115 kV switchyard, eleven circuit breakers will be replaced with higher interrupting capacity circuit breakers and the associated disconnect switches will also be upgraded with higher capacity disconnect switches.

- An emissions monitoring station associated with the adjacent New Boston electric generating unit, which is currently located on NSTAR Electric property north of the 115 kV switchyard, will be relocated within the substation site.

- No new buildings will be constructed at the K Street substation site. The new 345 kV transmission station will share the existing East First Street Station #385D control center, which was installed in 2003 when the Company constructed Distribution Station #385D. Control cabinets for the 345 kV circuit breakers, transformers, shunt reactors and 115 kV circuit breakers will be installed in the existing control center. Relay cabinets for the 345 kV lines, transformers and shunt reactors and associated 345 kV and 115 kV buses will also be installed in this building. A monitoring and control system for the new equipment will be installed to permit control from the NSTAR Electric Energy Management Center at Massachusetts Avenue in Boston.

1.8 Construction Overview

Upon receipt of applicable approvals, the proposed transmission circuits would be constructed along the Preferred Route between the point of origin in Stoughton,

Massachusetts and the termination points at the Hyde Park substation (single circuit) and the K Street substation (two circuits). This section provides an overview of the construction activities and schedule.

To install the pipe-type cable technology selected for the Project, NSTAR Electric would dig a trench in the public streets along the approved route to bury a steel-pipe housing for each circuit. The trench would run between manhole locations spaced approximately 3,000 feet apart. Each manhole would be approximately 10 feet wide and 20 feet long, with a depth of 8 to 10 feet.

The dimensions of the trench for the circuits will vary depending on the portion of the route under construction. Specifically, a trench for a three-circuit segment of the route will be 4 feet wide and 6.5 feet deep. For a two-circuit segment of the route, the trench dimensions will be 4 feet wide by 5 feet deep and for a single-circuit segment, the trench dimensions will be 3 feet wide by 5 feet deep.

The process to install the steel-pipe conduit along the route is accomplished in several steps, which include:

- Opening the street;
- Removing asphalt and sub-surface materials with a backhoe and loading the fill into dump trucks for recycling;
- Installing shoring in the trench, as needed;
- Installing 8-inch steel pipes with a corrosion-protecting polyethylene coating, welding sections of pipe and x-raying each weld to verify weld integrity and penetration;
- Installing 2-inch PVC fiber-optic conduits to support protective relaying systems, as needed;
- Filling trench with low-density concrete up to within a few inches of the road surface to surround and bury pipes, and allowing time for curing; and
- Paving the trench to be even with the street.

Manholes will be prefabricated in sections using reinforced concrete and delivered to the job site for installation. The underground transmission cables will be pulled through the installed pipe sections in segments from one manhole to the next, with splices connecting the cable segments at each manhole.

NSTAR Electric will determine the location of the trench and the manholes in the street based on a number of factors, including the location of existing underground utilities, public input, and the need to maintain traffic flow during construction. Only 500 to 750 feet of trench will be open at any given time and steel plating will be placed over open sections during non-construction periods to permit travel. The pace of excavation and steel-pipe installation is approximately 100 feet per day. Manhole installation takes

approximately one week. Once a suitable length of pipe and the related manholes are in place, a cable-pulling crew will pull lengths of cable from one manhole to the next. The cable-pulling crew is followed by a splicing crew. The splices join the cable ends in each manhole.

The overall pace of construction will depend upon the number of crews working at different locations along the route at the same time. The Company anticipates that as many as seven crews may be involved in the trenching and pipe-installation process; a single crew will install the manholes and at least two crews will perform the splicing. Based on this level of staffing, the pipe-installation process would take approximately 14 months to complete. The cable pulling and splicing process, which overlaps the pipe-installation work, would require an additional four months beyond the completion of the pipe installation. This results in an 18-month construction period for the first phase of construction.

2.0 PROJECT NEED

2.1 Introduction

NSTAR Electric's transmission system is an integral part of the bulk power system delivering power to customers in the northeast region of the United States. To maintain the integrity of the bulk power system, it is necessary to ensure that adequate transmission and generation resources are available to meet projected load requirements. As a transmission provider, NSTAR Electric must maintain its system consistent with the reliability standards and criteria developed by the Northeast Power Coordinating Council ("NPCC"), the New England Power Pool and the New England Independent System Operator ("NEPOOL" and "ISO-NE," respectively). These criteria are established under the purview of the North American Electric Reliability Council ("NERC"), which sets the standards for electric power transmission for all of North America. The criteria set by NPCC and NEPOOL/ISO-NE expressly require transmission operators to design, test and operate their systems to withstand representative contingencies as specified in the criteria. If the NSTAR Electric transmission system does not have sufficient capability to serve forecasted load under the conditions outlined in the NPCC and NEPOOL/ISO-NE criteria, the Company must plan and implement system additions and upgrades to address the identified inadequacies.

In this case, NSTAR Electric is proposing to install a 345 kV transmission line to alleviate transmission-capacity constraints identified in critical load centers within the NSTAR Electric service territory. As discussed below, the Company's analysis shows that transmission overloads under single-contingency conditions prescribed by the NPCC and NEPOOL/ISO-NE criteria will occur in three geographic sub-areas within the NSTAR Electric system beginning in 2006. These areas are: (1) the downtown Boston area, which is supported by the K Street substation in South Boston; (2) the area within Greater Boston supported by the Hyde Park and West Roxbury substations, including

Needham, Dedham, Milton, Newton, Brookline, Brighton, Watertown, Waltham and Cambridge; and (3) portions of the Greater Boston area to the south, which includes suburban communities such as Dover, Westwood, Medway, Sherborn and Walpole. These potential overload conditions result from a combination of factors including load growth, limitations in existing transmission infrastructure, generator availability and expected unit retirements within the Greater Boston area. Given these factors, the Company projects that transmission overloads will continue to emerge over a five- and ten-year planning horizon, unless changes to the existing system configuration are implemented in the near future.

The Project proposed by NSTAR Electric would alleviate the identified transmission overloads by increasing transmission capacity at those points on the system that require reinforcement in order to meet load requirements in the area. This would be accomplished by the installation of two 345 kV underground circuits from an interconnection point south of Route 128 to a termination point at the K Street substation in South Boston, and the installation of a single 345 kV circuit from the interconnection point directly to the Hyde Park substation. The Hyde Park substation is connected by two 115 kV transmission circuits to the Baker Street substation in West Roxbury, so that the construction of a circuit directly to the Hyde Park substation would significantly improve the capability of both stations to support load requirements in the area.

The addition of the proposed 345 kV transmission line also benefits a fourth geographic area, which is the Boston Import Area as designated by ISO-NE. The Boston Import Area encompasses all communities within the Greater Boston area, including those to the north and northwest of Boston that are not part of the NSTAR Electric service territory and are not directly served by the Company's transmission facilities. Although the import capability of the Boston Import Area falls under the purview of ISO-NE as the regional transmission authority with responsibility for assessing resource adequacy needs, the Company's analysis shows that the construction of the proposed 345 kV transmission line will increase the import capability of the Greater Boston transmission system by approximately 800 MW following installation of the first two circuits to the Hyde Park and K Street substations, and by approximately 1,000 MW (in total) with the installation of the third circuit terminating at the K Street substation.

However, the full import capability improvement for the Greater Boston area is partially dependent upon other transmission elements located to the north and northwest of the City of Boston, which are not within the NSTAR Electric service territory. Under heavy transfer conditions, these transmission elements will become overloaded and mitigation of these overloads would be necessary to allow the new 345 kV transmission circuits to reach their maximum capability. With upgrades to the constraining transmission elements implemented, the Project has the potential to increase import capability by as much as 2,000 MW.

In this section, NSTAR Electric (1) reviews the criteria and standards that are applicable to the Company's transmission-planning process, (2) discusses how the contingency analysis conducted in accordance with NPCC and NEPOOL/ISO-NE reliability criteria

demonstrates a need for incremental transmission capacity on the NSTAR Electric system, and (3) confirms that the construction of the 345 kV transmission line will eliminate transmission overloads projected to occur beginning in 2006 and additional overloads emerging through 2008.

2.3 Methodology for Analyzing System Reliability

2.3.1 NSTAR Electric Transmission Planning Process

The Company's annual planning process projects system performance over a 10-year horizon. Because there is a relatively long lead time involved in identifying, planning and implementing transmission line additions and upgrades, the 10-year horizon is designed to provide sufficient time to identify and plan for needed large-scale changes, additions or upgrades. However, the 10-year horizon also involves a significant amount of uncertainty as to the impact of future events, load-growth trends, and load-growth distribution on the system. In particular, it is a major challenge to pinpoint areas on the distribution and transmission systems where load growth will actually occur and to precisely forecast what the level of growth will be in those areas.

Therefore, the Company's planning process also targets the need for transmission and distribution system projects within a five-year horizon. Load growth and load distribution are more certain within a five-year horizon, which facilitates the Company's efforts to develop more concrete plans to implement system additions and upgrades. Lastly, the Company evaluates system performance within a one-to-two-year horizon, which is the period in which actual construction is planned and commenced. For this filing, the Company has assessed the need for the Project in 2006 (the first year that overloads emerge), 2008 (five-year projection) and 2013 (ten-year projection).

It should also be noted that the Company's planning process is synchronized with the RTEP developed each year by ISO-NE. The RTEP is developed using the PTI model and other analytical tools based on a five-year planning horizon. The PTI model used by ISO-NE incorporates data inputs provided by the Company, which have resulted from the Company's own system-specific transmission planning efforts. In addition, the Company works with ISO-NE to coordinate transmission-development projects within the region.

2.3.2 Planning Standards

As noted above, NSTAR Electric must adhere to reliability standards and criteria that are established under the purview of NERC, which has national authority to ensure the reliability of transmission systems across the United States. NERC oversees a number of regional councils, one of which is the NPCC covering New York, New England and Canada. Within the NPCC, New England is a "control area" subject to the supervision and control of ISO-NE. ISO-NE has responsibility for dispatching generation and for conducting the day-to-day operation of the integrated transmission system. ISO-NE operates the various transmission systems owned by electric utilities in New England as a single transmission system. The standards established by NPCC, NEPOOL and ISO-

NE are designed to ensure that the electric power systems serving New England and the NSTAR Electric service territory are appropriately designed to provide an adequate and reliable electric power delivery system.

Under this framework, NERC establishes a general set of rules and criteria applicable to all geographic areas. NPCC establishes a set of rules and criteria that are particular to the northeast, but that encompass the more general NERC standards. In turn, NEPOOL and ISO-NE develop standards and criteria that are specific to New England, but are also coordinated with the NPCC. Lastly, the Company has developed a set of transmission criteria that are slightly more specific than the ISO-NE standards. These criteria are designed to ensure that overloads do not occur when specific combinations of transmission elements are out of service.

For example, the NEPOOL/ISO-NE reliability standards require the Company to analyze base-case system performance assuming a typical level of generating-unit unavailability. The NSTAR Electric standards dictate that the base-case condition of the system will assume (1) a typical level of generating unit unavailability based on historical generator performance, and (2) that all transmission facilities on the Company's system are in service. The NSTAR Electric reliability standards further require that the Company will test the system's performance under three specified contingency conditions, all of which include the typical level of generator unavailability as the base-case condition. These contingency conditions are as follows:

1. Loss of one transmission line or one autotransformer, or

2. Loss of one major generating unit and one autotransformer, or

3. Loss of one major generating unit and one transmission line

For contingencies identified in items 2 and 3, the Company's analysis takes into consideration any additional resources that can be brought on to the system within 30 minutes of the loss of the first element. It should also be noted that the NSTAR Electric standards require that the load levels incorporated into the contingency analysis will be consistent with the peak loads most recently forecast by NEPOOL/ISO-NE and will consider peak-load conditions.

Whether developed by NERC, NPCC, NEPOOL or ISO-NE, the standards and criteria applicable to the Company's system are deterministic in nature in that the standards are designed to assess the performance of the Company's 115 kV and 345 kV transmission elements under a series of defined contingency situations. Specifically, these standards and criteria dictate a set of operating circumstances or contingencies under which the NSTAR Electric system must perform without experiencing overloads. For the NPCC, these performance measurements are set forth in "Basic Criteria for the Design and Operation of Interconnected Power Systems" (revised August 1995) ("NPCC Document A-2"), and for NEPOOL/ISO-NE, these measurements are set forth in "Reliability Standards for The New England Power Pool" (amended July 9, 1999). Both the NPCC and NEPOOL/ISO standards establish that the electric transmission system must meet

specific tests to be in compliance with the established criteria. For example, both the NPCC and NEPOOL/ISO-NE standards state that:

> The bulk power system should be designed and operated to a level of reliability such that the loss of a major portion of the system, or unintentional separation of a major portion of the system, *should not result from any reasonably foreseeable contingencies*. . . . Analyses of simulations of these contingencies should include assessment of the potential for widespread cascading outages due to overloads, instability or voltage collapse.

NPCC Document A-2, at 2 (emphasis added); see also, NEPOOL/ISO-NE Standards. The "reasonably foreseeable contingencies" that must be tested, and the conditions under which these contingencies must be evaluated, are specifically defined in these documents. These circumstances generally include consideration of the loss of transmission system elements and the availability (or non-availability) of generating resources.

NSTAR Electric's transmission system is designed to have sufficient capacity to serve area loads under normal operating conditions, as well as facility outage conditions. These facility outage conditions are referred to as "single-contingency" outages. Facility outage conditions are planned or unplanned conditions wherein a single transmission element, substation transformer, or autotransformer is out of service. The reliability criteria specify that system voltages, line loadings and equipment loadings should be within normal limits for normal conditions and within applicable emergency limits for single-contingency outages.

To determine if the system is in compliance with the applicable criteria, the Company builds its analytical (PTI) model to represent the existing system configuration and capabilities and then tests the model with the contingencies designated by the NPCC and ISO-NE. Specifically, the criteria require the Company to simulate the performance of the system in the event of an "N-1" contingency, which is the base system, less one element. For example, an N-1 contingency would occur where a transmission line is forced out of service due to a lightning strike or fallen tree. To perform this analysis, the Company compiles an exhaustive list of the transmission elements on the system, including transmission lines, transformers and breakers, and then runs a series of simulations to test the system with each of these individual elements taken out of service. These simulations allow the Company to monitor the loads and flows on all other elements in the event of each contingency and to perform technical evaluations of the system's capacity to meet normal and emergency operating requirements.

As discussed below, an "N-2" contingency analysis may also be used to evaluate the capabilities of the transmission system. This analysis assesses the performance of the system assuming the base-case condition with the concurrent unavailability of two transmission lines. To the extent that area resources are determined to be inadequate, the analysis identifies the level of reserve margin that is necessary to avoid a supply

shortage under contingency conditions. This is different from the N-1 contingency analysis, which is used to determine whether there is inadequate transmission capacity, which cannot be remedied by the creation of a "reserve margin." Accordingly, the N-1 contingency analysis is the primary tool used to assess whether additional transmission capacity must be added to the system, and at which location on the system that capacity is needed.

2.3.3 Technical Evaluation of System Reliability

NSTAR Electric utilizes a comprehensive analytical process to assess the performance of the transmission system. As described above, the technique used by NPCC and NEPOOL/ISO-NE to ensure the reliability of the bulk power system is to require transmission operators to design, test and operate their systems within representative contingencies as specified in the criteria. Consistent with this requirement, NSTAR Electric determines the need for new transmission facilities by testing a series of "single-contingency" outages that are designed to demonstrate whether existing transmission facilities are adequate to meet customer load requirements under normal and emergency operating conditions.

As noted above, this type of analysis represents an N-1 contingency analysis, and is referred to as a "load flow" analysis because it evaluates the load flows that result under various contingency conditions and assists in determining whether the resultant line loading exceeds the capability of any given element on the system. The line-loading capability of a given transmission element is a function of the element's heat-dissipation capability, and therefore, this analysis is also referred to as a "thermal" analysis. The primary goal of the load-flow analysis is to ensure that the occurrence of a single-contingency outage does not result in overloads to a transmission element beyond its long-term emergency rating. For the system to meet the established reliability criteria, operation of the system under an N-1 contingency cannot violate the thermal capability of any element on the system.

The NPCC and NEPOOL/ISO-NE reliability criteria dictate that the primary indicator of transmission-system need (in terms of capacity) is the N-1 contingency analysis. However, the Company also employs other types of evaluative procedures to assess the adequacy of transmission system components. These analyses are as follows:

- Voltage Performance Analysis: The voltage analysis studies the ongoing performance of the system in terms of voltage characteristics after a contingency occurs. If a transmission line is taken out of service, other lines and transmission components in proximity to the downed line have to bear the additional load flow, which causes a change in the voltage characteristics of the system. The Company routinely performs steady-state voltage assessments and will perform a voltage-collapse assessment where there is a concern with how the system would respond following a particular contingency. The primary goal of this analysis is to ensure that the voltage of the transmission line under review does not vary by more than 5 percent from its designed operational ratings.

- Stability Analysis: The stability analysis studies the transient response of rotating machines (motors and generators) and major transmission interconnections following disturbances to the system. The results are used to determine system voltage and frequency characteristics, as well as the effects on rotating apparatus performance. A stability analysis may also be referred to as a *transient stability study* because it evaluates the behavior of the power system in its transition from one steady state condition to another. In other words, the stability analysis is designed to evaluate the system's ability to withstand fault conditions as well as momentary fluctuations in load or system elements without adverse consequences to the system. The primary goal of this analysis is to ensure that a disturbance to the system will not cause the system to move to an unstable condition.

- Short-Circuit Analysis: This analysis, which is also referred to as a *fault analysis*, is performed to determine the maximum currents that system elements would be subjected to during fault conditions. Faults and short circuits result in current flows on the system that are many times higher than normal. However, the protective devices installed on the system to interrupt these currents are limited by their fault rating. Thus, the final step in the short-circuit analysis is to compare the calculated values of fault current to the ratings of the protective devices. If the rating of any device is exceeded, the device must be replaced with a unit of higher capacity or the fault current needs to be reduced to be within the capability of the device. A short-circuit analysis may also serve as the basis for selecting and setting protective devices such as relays, circuit breakers and fuses. The primary goal of this analysis is to ensure that any additions or modifications to the system do not impair the ability of the system equipment to respond to short circuits.

- Transfer Capability Analysis: This analysis is used to evaluate the collective amount of power that may be moved from one major part of the system or geographic area to another part of the system or geographic area using the available transmission elements. This analysis tests the amount of power that can be moved across the system under both N-1 and N-2 conditions to determine the transfer capability limit for a defined interface between two system areas. A further consideration evaluated in a transfer-capability analysis is stability because there is a certain limit in terms of how much power can be moved across the system without impairing the system's ability to continue to operate in a dynamically stable fashion. The primary goal of this analysis is to ensure that adequate electric supply can be moved across the system to substation interfaces.

As noted above, the Company employs these evaluative procedures to assess the adequacy of various components and interactions of the transmission system, but not necessarily to identify the need for new transmission capacity. For example, the short-circuit analysis evaluates the ability of system equipment to respond to short circuits. To the extent that the results of a short-circuit analysis indicates that the rating of any transmission device would be exceeded, the Company will replace that device with a unit of higher capacity or will implement design changes to reduce the fault current to be within the capability of those devices. Accordingly, this analysis is useful in assessing

and improving the performance and reliability of the transmission system, but is not necessarily used to identify a need for transmission capacity.

Similarly, the transfer-capability analysis is an evaluative procedure that is used by the Company to identify the collective amount of power that may be moved from one point to another on the system without impairing the system's ability to continue to operate in a dynamically stable fashion. The movement of electric supply across the system to substation interfaces is an important aspect of the transmission-system performance. However, the results of this analysis do not necessarily indicate a need for transmission capacity. For example, in this case, the Company's analysis shows that there would be an additional benefit associated with the construction of the Project because the system's transfer capability will improve with the addition of the Project.

It should be noted that the transfer capability analysis is related to the area resource adequacy evaluation, which is primarily the concern of ISO-NE. Therefore, an extensive analysis relating to these issues has been conducted by ISO-NE. Specifically, ISO-NE published and reviewed a report regarding the Boston Import Area at its most recent Transmission Expansion Advisory Committee meeting (held on January 16, 2004), This report and the meeting notes are available on the ISO-NE web page.

If the result of the Company's testing protocol is a determination that there are no overloaded elements, no voltage violations, no potential destabilization of the system, no short-circuit problems and adequate transfer capability, then the system is deemed to meet the reliability criteria established by NPCC and NEPOOL/ISO-NE. This, however, is not the case on the NSTAR Electric system beginning in 2006.

NSTAR Electric's load-flow analysis shows that the existing transmission system is inadequate to meet the reliability criteria established by NPCC and NEPOOL/ISO-NE beginning in 2006, with reliability concerns continuing to emerge through 2013. The results of these analyses are discussed below in Section 2.5.

2.4 Current Conditions

2.4.1 Introduction

There are several considerations involved in evaluating the current condition of the Company's transmission system. For example, as noted above in Section 2.3.1, NSTAR Electric evaluates and plans for transmission upgrades on a system-wide basis, with an emphasis on distinct geographic areas within the system that exhibit specific transmission, generation and load characteristics. These geographic sub-areas are given individual consideration by the Company during the planning process. As described above, the Company's analysis shows that transmission overloads under single-contingency conditions will occur in three critical sub-areas within the NSTAR Electric system beginning in 2006. These areas are: (1) the downtown Boston area, which is supported by the K Street substation in South Boston; (2) the communities within Greater Boston supported by the Hyde Park and West Roxbury substations; and

(3) portions of the Greater Boston area to the south. The results of the Company's contingency analysis for each of these sub-areas are presented below.

At the same time, the Company's transmission planning efforts are conducted within the broader context of the regional transmission system operated by ISO-NE, and therefore, changes in the NSTAR Electric transmission system will inevitably have an affect on the regional transmission system. From a regional perspective, the Greater Boston area is referred to as the "Boston Import Area." The Boston Import Area encompasses the City of Boston and surrounding communities to the north, northwest, south and southwest, not all of which are served by NSTAR Electric. The Company's analysis discusses the impact of the Project on the Boston Import Area from a high-level perspective. More detailed analysis on the regional transmission system falls within the purview of ISO-NE.

2.4.2 Existing Configuration of Transmission and Generation Facilities

The bulk power system supporting customer load in the Greater Boston area is composed of a complex set of transmission and generation elements. Transmission elements include 355 miles of 115 kV transmission lines, 59 miles of 230 kV transmission lines and 91 miles of 345 kV transmission lines. These facilities include approximately 300 miles of overhead transmission lines and 200 miles of underground transmission facilities. The capability of these transmission facilities in terms of importing power from outside the Greater Boston area is currently limited to 3,600 MW.

Existing generating units range in size from 10 MW to 800 MW. These resources include a total of 1,977 MW at Mystic Station; 350 MW at New Boston Station, 711 MW at Salem Harbor, 261 MW at Kendall Station and approximately 247 MW from a number of smaller units based on the January 2003 CELT Report. Therefore, these facilities collectively provide a total generation resource of 3,546 MW to meet load requirements within the Greater Boston area. As discussed below, the peak load for the Greater Boston area in 2006 is projected to be 5,900 MW.

2.4.3 Downtown Boston

This area includes the downtown sector, South Boston and several adjoining neighborhoods including Dorchester and Roxbury. Customer load in the Downtown Boston area is projected to be approximately 1,300 MW by 2006. There are two key substations within the downtown area. These substations are (1) the Kingston Street substation No. 514 interconnecting two 345 kV cables, two 345 to 115 kV auto-transformers and eight 115 kV underground transmission cables, and (2) K Street substation No. 385 interconnecting the New Boston generating unit with 11 115 kV underground transmission lines.

Figure 2-1 is a geographic map of these transmission facilities. This map depicts the transmission lines in the Downtown Boston area and the substation sites through which the lines interconnect. The numbers listed in the diagram are substation-site designations.

2.4.4 Communities within the Greater Boston Area

The Greater Boston communities surrounding the Downtown Boston area that lie in the NSTAR Electric service territory include Hyde Park, West Roxbury, Needham, Dedham, Milton, Newton, Brookline, Brighton, Watertown, Waltham and Cambridge. Because the transmission facilities serving this area also support the Downtown Boston area, customer load in this area includes the load served within the Downtown Boston area. The combined peak load of these two areas is projected to be approximately 3,000 MW in 2006.

The key substations in this area include the following: (1) Brighton Station No. 329 interconnecting 10 115 kV transmission lines; (2) North Cambridge Station 509 interconnecting four 345 kV transmission lines, two 345 to 115 kV transformers and four 115 kV transmission lines; (3) Baker Street Station No. 110 interconnecting eight 115 kV transmission lines and two 115 kV phase-angle regulating transformers; (4) Waltham Station No. 282 interconnecting one 230 kV transmission line, one 230 to 115 kV auto-transformer, five 115 kV transmission lines and three 115 kV phase-angle regulating transformers; and (5) Mystic Station No. 250 interconnecting three 345 kV transmission lines, one 345 kV to 115 kV transformer and seven 115 kV transmission lines.

Figure 2-2 is a geographic map of the transmission facilities located in the Greater Boston area.

2.4.5 Portions of Greater Boston Area Located to the South

The 230 kV and 115 kV transmission system south of Boston serves customer load in suburban communities and is a key corridor that supports power flow into the Greater Boston area. In conjunction with 345 kV facilities located to the north of Boston, these transmission facilities will need to support peak load for the overall Greater Boston area of approximately 5,900 MW by 2006.

There are two key substations in this area, which are (1) West Medway Station No. 446 interconnecting seven 345 transmission lines, two 345 kV to 230 kV autotransformers and two 230 kV transmission lines, and (2) West Walpole Station No. 447 interconnecting four 345 kV transmission lines, one 345 kV to 115 kV auto-transformer and five 115 kV transmission lines.

Figure 2-3 is a geographic map of the transmission facilities located in this area.

2.4.6 Boston Import Area

In addition to the three geographic sub-areas detailed above, there is an overarching “Boston Import Area” that encompasses the three areas described above, as well as the northwest suburbs and the North Shore area. Similar to the areas described above, the transmission elements that serve the Boston Import Area consist of 115 kV and 345 kV facilities. The Boston Import Area is connected to the regional New England transmission system through the Ward Hill and Tewksbury substations in the north, and

through the West Framingham, West Medway, Medway, and West Walpole substations in the south. The North Shore portion of the Boston Import Area is served from the Ward Hill, Tewksbury, and Golden Hills substations as well as the Salem Harbor generating station. More information concerning the reliability performance of the Boston Import Area is contained in a report entitled, *Boston Import Area 2004-2008 Reliability Review*, which was recently released by ISO-NE.

2.5 Projected Conditions Over the Planning Horizon

2.5.1 Load Demand Forecast

2.5.1.1 Introduction

As part of the Company's transmission reliability planning process, the Company develops a forecast of peak load for purposes of testing and evaluating the performance capabilities of the system. To analyze the need for the Project, the Company used ISO-NE's recently approved peak forecast for New England and adapted it to determine peak loads over the planning horizon at the Company's substations serving the Greater Boston area. This section provides a description of the forecasting process and methodology used by ISO-NE and the Company to assess system performance.

2.5.1.2 ISO-NE Peak Load Forecast

ISO-NE's regional Peak Load Forecast for New England is produced on an annual basis. The forecast is derived by modeling load for each of the New England states, based on NEPOOL load data from various sub-areas within the New England states, and summing the results to arrive at a New England regional forecast. The forecast is reviewed by the NEPOOL Load Forecast Committee, the NEPOOL Reliability Committee and the NEPOOL Transmission Expansion Advisory Committee. The most recent version of the ISO-NE Peak Load Forecast was published in April 2003 and was approved by the ISO-NE Board of Directors in November 2003 as part of RTEP03.

To develop the Peak Load Forecast, ISO-NE first develops long-term energy forecasts for each state. ISO-NE's long-term energy forecasts are econometric in nature and project electricity use based upon regression models relating energy per household (1980-2002) to four variable, which are: (1) real income per household; (2) real price in cents/kWh; (3) annual heating and cooling degree-days, and (4) an Auto-Regressive Moving Average ("ARMA") model for the residual process. The ARMA model is a proxy for variables that are not individually quantified as explaining changes in electricity use.

Once the long-term energy forecasts are developed, ISO-NE then develops a Peak Load Forecast by applying load factors to the energy forecasts. The load factors are short term in nature and are derived by relating the ISO-NE level daily peaks to weather conditions, which are a combination of temperature and humidity. Based upon this calculation, a load factor for one year is developed and then applied to the energy load forecasts for each state to arrive at a peak forecast for the New England region.

The Peak Load Forecasts include forecasts based on both normal and "design" weather conditions. ISO-NE's normal weather peak-load forecast is based on a 50/50 probability of occurrence, which means that there is a 50/50 probability that actual peak load will be equal to or higher than the forecast level (and a 50% chance that the actual peak load will be less than the forecast level). Under ISO-NE's design weather scenario, the peak-load forecast is modeled assuming that there is a 10% probability that peak load will be higher than forecast (and a 90% chance that the actual peak load will be less than the forecast level). ISO-NE and NEPOOL employ the "design" weather probability level for planning purposes in order to ensure the reliable operation of the grid under weather conditions that may be infrequent, but are reasonably foreseeable, in terms of their potential to occur. This is consistent with the essential nature of having a highly reliable electric system and the overarching requirement that the system be designed with sufficient capacity to meet heat-wave conditions consistent with historical experience. Moreover, the risk and consequences of having shortfalls and a constrained electric system are far more significant than having an electric system that has the flexibility to respond to both normal and reasonably foreseeable peak demands. As described below, the Company applies the ISO-NE forecast of peak loads to its projected system load, and ultimately, to its substation loads to determine a load forecast at the substation level.

ISO's Peak Load Forecast is presented in the RTEP03 Report. The Peak Load Forecast includes summer and winter load forecast values for design weather conditions as follows:

Peak Loads Summer		Peak Loads Winter	
Year	(MW)	Year	(MW)
2003	26,630	2003/2004	22,900
2004	27,260	2004/2005	23,200
2005	27,590	2005/2006	23,490
2006	27,910	2006/2007	23,800
2007	28,260	2007/2008	24,140
2008	28,650	2008/2009	24,520
2009	29,080	2009/2010	24,910
2010	29,530	2010/2011	25,330
2011	30,000	2011/2012	25,770
2012	30,470	2012/2013	26,170
2013	30,950	2013/2014	26,580

2.5.1.3 NSTAR Electric Substation Forecasts

The Company relied on ISO-NE's Peak Load Forecast under the design-weather scenario to develop specific load forecasts for substations within the NSTAR Electric system. These specific load forecasts were developed by allocating peak load to the

substations on the Company's system within the Greater Boston area over the planning horizon. The allocation factors were derived using ABB software that has the capability to develop individual substation load forecasts for Boston Edison and Cambridge Electric.[1] The ABB software is helpful in developing individual substation load forecasts because it is designed to identify growth potential on an area-by-area basis. For purposes of the Project, the relevant area was defined as the area being served by the Company's substations.

The ABB software identifies growth potential for each substation area based on historical load data, land-use data and a customer growth-potential assessment within each area, and applies a weather sensitivity calculation for each of the identified areas. Specifically, the Company provides ABB with historical peak load data (10 years) for its substations, as well as information regarding demographics in the substation areas, such as the number of residential, commercial and industrial customers and associated uses by city and town in those sectors. The ABB software takes as further inputs forecasted zoning information, land-use information and infrastructure information and performs an econometric forecast using statistical techniques to project allocation factors for the ISO-NE forecast of peak load to individual substations.

As a result of this analysis, the Company derived a growth projection for each of its substations by applying the design weather load projection from the ISO-NE Peak Load Forecast and then allocating the ISO-NE forecast of load to the Company's substation areas. The allocation is driven by the projected land-use, zoning and infrastructure characteristics that will drive growth within the Greater Boston area and the ISO-NE Peak Load Forecast, as well as related weather characteristics.

The data presented in Table 2-1 below summarizes projected load growth at the substation level. The aggregate load data for 2002 is based on actual load. The forecasts for 2006 and 2008 in each area represent the aggregate of projected peak load demand at the substation level within those areas. In total, the Company forecasts that the projected peak load for the Greater Boston area (Boston Import Area) is projected to increase at a compound annual growth rate of 1.4 percent from approximately 5,600 MW in 2002 to approximately 5,900 MW by 2006, and nearly 6,500 MW in 2013.

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[1] Because the Cambridge Electric system is entirely contained within the Boston Edison system (and is centrally located in the Greater Boston load area), the Company includes load forecasts for the Cambridge Electric system in its reliability planning process. The Company also includes load data provided by municipal electric companies within the Greater Boston supply area, as well as data from National Grid, which also serves part of the area. The ISO-NE Peak Load Forecast includes load data from each of these entities consistent with a uniform planning process.

Table 2-1 Greater Boston Sub-Area Load Forecast (Summer Peak in MW)

Year	2002	2006	2008	2013	Growth Rate
New England	25,348	27,910	28,650	30,950	1.8%
Greater Boston Load	5,593	5,861	6,017	6,495	1.4%
Surrounding Community Area Load	2,551	3,002	3,141	3,375	2.6%
Downtown Boston Load	1,042	1,294	1,359	1,457	3.1%

Table 2-2 presents the disaggregated projected load growth data at the substation level supporting Table 2-1. Table 2-2 is located at the end of this section.

2.5.2 Overview of Contingency Analysis

Consistent with the reliability criteria established by NPCC and NEPOOL/ISO-NE, NSTAR Electric assessed the ability of the local area transmission system to withstand single-contingency outages given projections of peak-load, generator availability and dispatch conditions. The studies show that there are a significant number of transmission elements that would experience overloads under these contingency conditions beginning in 2006 and continuing through 2008 (the five-year horizon) and 2013 (the 10-year horizon). The tables set forth below list by sub-area the specific transmission elements affected beginning in 2006 and the magnitude of the associated overloads at that point. The results for 2008 and 2013 are set forth in Section 2.7, discussing the impact of the Project on projected overloads.

2.5.2.1 Contingency Analysis Tables

The tables provided in this filing to highlight overloaded transmission elements are organized as follows: The first column entitled “CASE” designates the steady state dispatch condition of the system that is assumed for purposes of the analysis. The assumptions for each case used in the analysis are discussed below. The second column entitled “CONTINGENCY” states the transmission element that is taken out of service for purposes of the analysis. The third column entitled “LINE #” designates the transmission element that would be overloaded in the event that the contingency identified in the second column were to occur. The next four columns designate the originating point of the affected line (From BUS), the originating operating voltage (From kV), the terminating point of the affected line (To BUS), and the terminating operating voltage (To kV). The column entitled “PRE-LOAD” indicates the loading on the element in MVA prior to the contingency and the column entitled “POST-LOAD” indicates the loading on the element in MVA following the contingency.

The last column entitled "RATING" states the long-term emergency rating of the element in MVA and the column entitled "% LTE Existing" shows the overload that would occur on that particular transmission element under the contingency condition without transmission upgrades. It is the Company's objective to ensure that no transmission element experiences post-contingency loading greater than 95 percent of its LTE.

2.5.2.2 Transmission Line Ratings

Each transmission element on the system is rated to identify its thermal capability. Specifically, each element has a normal rating, long-term emergency rating and short-term emergency rating.

The "normal rating" for a transmission element is the continuous rating or the continuous operating limit for that element. The long-term emergency rating is the 12-hour capability of the element, which assumes that any loading affecting this line will last no more than 12 hours. Transmission elements may be operated above the normal rating (and below the LTE rating) within a 12-hour period to meet peak-loading conditions. After 12 hours, the line must operate at a normal or lower loading level, or must be taken out of service. The short-term emergency rating is the 15-minute capability of the element, meaning that the element could operate at this level for no more than 15 minutes and then would have to be operated at a normal or lower loading level, or be taken out of service.

Post-contingency loading above the LTE, but below the STE, is considered acceptable as long as prompt system action (such as local phase shifter adjustment, generation runback, or special protection system operation) could be taken to reduce loading below LTE within 15 minutes. Once the STE is exceeded, the Company has only about five minutes to alleviate the overload, which means that the Company must take immediate action to shed load.

These ratings are summarized in the chart below:

SYSTEM CONDITION	TIME INTERVAL	MAXIMUM ALLOWABLE FACILITY LOADING
Pre-contingency (all lines in)	Continuous	Normal Rating
Post-contingency	Less than 15 minutes after contingency occurs	Short Term Emergency (STE) Rating
	More than 15 minutes after contingency occurs	Long Term Emergency (LTE) Rating

The Company performs its N-1 contingency analysis based on LTE ratings (i.e., 12-hour loading) because the reliability of the system cannot be ensured unless it is capable of operating through daily (24-hour) load cycles, and unless operation of the line can continue for a sufficient amount of time to permit the Company to dispatch crews and make repairs when problems occur.

2.5.2.3 Dispatch Conditions

As dictated by the NPCC and NEPOOL/ISO-NE reliability criteria, the Company performed the contingency analysis by first establishing a base-case condition of the system that assumes (1) a typical level of generating unit unavailability, and (2) that all transmission facilities on the Company's system are in service. The base-case condition is developed in two steps. First, the Company has assumed that output from the Mystic 9 unit would be restricted by 50 percent and that no output would be available from the New Boston 1 generating unit (due to retire before 2006), and Mystic units 4, 5 and 6 (retired on December 15, 2003). This represents a "typical" amount of generating unit unavailability based on historical generator performance.

Second, the Company developed several alternative "generation scenarios." Each generation scenario reflects a base-case condition, which is the typical level of generating unit unavailability, plus the additional loss of generation. These generation scenarios are designed to allow the Company to assess transmission system loading conditions during generator forced outages that could occur coincident with transmission-element contingencies. Although the Company typically evaluates multiple generation scenarios, the Company has presented in this filing the three generation scenarios that resulted in the most severe overloads. These generator scenarios are depicted in the table below.

The Case Description and Case Identifier for each scenario are provided at the top of each column. The naming convention for the case scenarios is "Case YearOutaged Generator." For instance, the 2006 case with Kendall 4 out of service would be "06_K4," and the 2013 case with Mystic 8 out of service would be "13_M8." As noted above, the case years evaluated by NSTAR Electric were 2006, 2008 and 2013.

Table 2-3 Generator Dispatch Scenarios

Base Case: Mystic 9/50% Unavailable; New Boston 1 and Mystic 4, 5 & 6 Retired				
Units	**Size MW**	**Loss of Line and Generator Dispatch Kendall 4 Out**	**Loss of Line and Generator Dispatch Mystic 9/100% Unavailable**	**Loss of Line and Generator Dispatch Mystic 8 Out**
		Case Year_K4	Case Year_M9	Case Year_M8
Mystic 7	565	565	565	565
Mystic Block 9	707	353	0	353
Mystic Block 8	707	707	707	0
New Boston 1	350	0	0	0
Salem Harbor 1	82	82	82	82
Salem Harbor 2	80	80	80	80
Salem Harbor 3	150	150	150	150
Salem Harbor 4	431	431	431	431
Mirant Kendall	170	0	170	170

To determine whether transmission elements would become overloaded under the NEPOOL/ISO-NE reliability criteria, the Company identifies the base-case condition then simulates the subsequent failure of each transmission element on the Company's system. For example, a subsequent transmission contingency would occur where a transmission line is forced out of service due to a lightning strike or fallen tree. To perform this analysis, the Company compiles a list of the transmission elements on the system, including transmission lines, transformers and breakers, and then runs a series of simulations to test the system against each of the base-case conditions, with each of these individual elements taken out of service. These simulations allow the Company to monitor the loads and flows on all other elements in the event of each contingency and to perform technical evaluations of the system's capacity to meet normal and emergency operating requirements.

2.5.3 Contingency Analysis – Downtown Boston Area

The transmission elements serving the Downtown Boston area begin to experience overloads under contingency conditions in 2006. The elements expected to experience the most significant overloads are listed below and include two 345 kV cables running between the Mystic and Kingston Street substations, two 345/115 kV transformers located at the Kingston Street substation, one 345/115 kV transformer located at the Mystic substation, two 115 kV cables running between the Kingston Street and K Street substations and two 115 kV cables running between the Mystic and K Street substations.. Without implementation of the Project, mitigation of these problems individually would require significant transmission upgrades, as well as the addition of new transmission elements within the Downtown Boston area. With the Project, the projected overloads are fully mitigated.

Table 2-4 Downtown Boston Contingencies in 2006

Case	Contingency	LINE #	From Bus	From kV	To Bus	To kV	Pre-load	Post-load	Rating	% LTE
06_M9	372	324	MYSTIC	345	KINGSTON	345	526	1039	844	119
06_M9	MYSTIC SB102	324	MYSTIC	345	KINGSTON	345	526	1032	844	118
06_M9	MYSTIC SB108	372	MYSTIC	345	KINGSTON	345	526	1043	844	119
06_M9	324	372	MYSTIC	345	KINGSTON	345	526	1039	844	119
06_M9	KINGSTN 345B	345A Auto	KINGSTON	345	KINGA BE	115	526	701	572	123
06_M9	KINGSTN 345A	345B Auto	KINGSTON	345	KINGB BE	115	526	701	572	123
06_M9	KINGSTN 345A	345A Auto	MYSTIC	345	MYSTC MA	115	401	512	407	126
06_M9	LINE 385-510	385-511	KINGB BE	115	KINGBNTA	115	275	509	400	130
06_M9	LINE 385-510	385-511	KINGBNTA	115	HIGHST B	115	190	284	241	121
06_M9	LINE 385-511	385-510	KINGB BE	115	KINGBNTB	115	273	507	400	130
06_M9	LINE 385-511	385-510	KINGBNTB	115	HIGHST A	115	190	282	241	120
06_K4	LINE 250-517	250-516	MYSTC MA	115	HAWK-516	115	155	265	245	108
06_K4	LINE 250-516	250-517	MYSTC MA	115	HAWK-517	115	155	265	245	108

2.5.4 Contingency Analysis – Communities Within the Greater Boston Area

The transmission elements serving the Greater Boston area also begin to experience overloads under contingency conditions in 2006. The transmission facilities of concern within the Greater Boston area on the NSTAR Electric system are primarily 115 kV

transmission cables and transmission elements. Specific areas of concern are the 115 kV cables running from the Waltham substation to the Watertown substation, the 115 kV cables running from the North Cambridge substation to the Brighton substation, the 115 kV cables running from the Mystic substation to the Brighton substation, and the 115 kV cables running from the Baker Street substation to the Brighton substation. Without implementation of the Project, mitigation of these problems individually would require significant transmission upgrades, as well as the addition of new transmission elements within the Greater Boston area. With the Project, the projected overloads are fully mitigated.

Table 2-5 NSTAR Electric Greater Boston Contingencies in 2006

Case	Contingency	LINE #	From Bus	From kV	To Bus	To kV	Pre-load	Post-load	Rating	% LTE
06_M8							27			131
	110522-240510	110-510	BRGHTN A	115	WASH 510	115		184	152	
06_M8	110522-240510	110-510	WASH 510	115	BAKERPH1	115	27	208	159	143
06_M8	110522-240510	110-510	BAKERPH1	115	BAKER ST	115	27	208	159	131
06_M8	110522-240510	110-511	BRGHTN B	115	WASH 511	115	59	218	152	155
06_M8	110522-240510	110-511	WASH 511	115	BAKERPH2	115	27	209	159	144
06_M8	110522-240510	110-511	BAKERPH2	115	BAKER ST	115	27	209	159	131
06_M9	LINE 282-521	282-520	WALTHAM	115	WATER520	115	132	232	152	155
06_M9	LINE 282-520	282-521	WALTHAM	115	WATER521	115	138	234	152	156
06_M9	MYSTIC 345A	329-511	BRGHTN B	115	SMVL 511	115	64	160	164	102
06_M9	LINE 329-531	329-530	BRGHTN A	115	N.CAMB	115	196	312	292	108
06_M9	LINE 320-507	320-508	LEXINGTN	115	TRAPLO A	115	101	155	140	112
06_M9	LINE 320-508	320-507	LEXINGTN	115	TRAPLO B	115	88	161	140	118

2.5.5 Contingency Analysis – Greater Boston Area (South)

The 230 kV and 115 kV transmission system south of Boston serves customer load in suburban communities and is a key corridor that supports power flow into the Greater Boston area. Specific areas of concern on the NSTAR Electric transmission system include the 115 kV transmission line originating at the West Walpole substation that runs through Needham to the Baker Street substation in West Roxbury, and the 115 kV line from Framingham that runs through Needham to Baker Street substation, as well as 345 kV transformers in Medway and Walpole that are the source for these 115 kV lines.

Table 2-6 Greater Boston Area (South) Contingencies in 2006

Case	Contingency	LINE #	From Bus	From kV	To Bus	To kV	Pre-load	Post-load	Rating	% LTE
06_M9	240601-282602*	148-522X&Y	DOVER MA	115	W WALPOL	115	384	524	530	101
06_M9	240601-282602*	148-522X&Y	NEEDHAM	115	DOVER MA	115	350	488	494	101
06_M9	LINE 240-510	110-522	BAKER ST	115	NEEDHAM	115	200	319	289	112
06_M9	240601-282602*	345A Auto	WWALP345	345	W WALPOL	115	570	746	715	104
06_M8	WWALPLE 345A	345B Auto	W MEDWAY	345	MDFRM230	230	513	607	560	108

2.5.6 Summary of Contingency Analysis Results

The thermal-analysis results discussed above indicate that by 2006 a significant number of system elements would experience overload conditions for the contingencies tested in conformance with the reliability standards and criteria established by NERC, NPCC and NEPOOL/ISO-NE. Although these overloads conditions will generally be experienced across the system, the overloads will be of the most concern in the Downtown Boston area and in the Hyde Park/West Roxbury area because of the load requirements and system constraints in these areas. As a result, it is critical that reinforcement of the transmission system in these two distinct areas be completed as soon as possible, and in any event, no later than 2006. Therefore, NSTAR Electric will place the highest priority on the installation of one circuit directly to the Hyde Park substation and one circuit directly to the K Street substation as the first order of business in the construction process. This will ensure that projected overloads in those critical load centers will be alleviated. With the installation of the first circuit to the K Street substation, the system will receive sufficient reinforcement to maintain reliability until the second circuit can be constructed.

Construction of the third circuit will be completed by 2008 because the Company's analysis shows that, even with the first two circuits in place, overloads will continue to emerge through 2008 (the five-year horizon) and 2013 (the ten-year horizon). With three circuits in place, the overloads are fully mitigated by 2008. The tables set forth below in Section 2.6 demonstrate that the addition of the proposed 345 kV transmission line will alleviate transmission overloads that begin to occur in 2006 and continue to emerge through 2008 and 2013.

2.5.7 Voltage Analysis

In addition to the Contingency Analysis, the Company performed a voltage-level assessment for the Greater Boston area under projected peak-load conditions. This analysis evaluated the adequacy of system voltage levels both before and after transmission line contingencies occur. As discussed below, the voltage analysis showed that there is a need to install equipment to maintain adequate voltage levels both before and after the addition of the Project.

The table below establishes the minimum and maximum acceptable voltage levels on a per-unit basis for transmission elements on the Company's system. These values are consistent with industry standards and current reliability criteria.

Base kV	**Post-Contingency Bus Voltage Criteria**		
	Lower Limit (pu)	**Upper Limit (pu)**	**Voltage Deviation**
345 kV and 230 kV	0.95	1.05	5%
115 kV	0.95	1.05	5%

Base-case or contingency conditions that produced voltages either higher or lower than these values would be considered unacceptable. Where voltage levels are within a reasonable range of the criteria, the Company is able to deploy various types of equipment to mitigate voltage issues. The most common devices used for this purpose are capacitor banks, which help improve low voltages, and reactor banks to help reduce high voltages. The voltage analysis of the Company's system within the Greater Boston area indicated a need to add these types of devices to the system, both with and without the proposed addition of the 345 kV transmission line.

Prior to its completion of the contingency analysis, NSTAR Electric identified low-voltage issues throughout the 115 kV system serving the Greater Boston area, as well as in relation to facilities within the Downtown Boston sub-area. These voltage issues were present in all three of the 2008 generation scenarios, which is the time period that correlates with the completion of construction of the third circuit. Accordingly, the Company assumed the addition of a number of 115 kV shunt capacitor banks (53.6 MVAR each) in modeling simulations for each of the three generation scenarios when performing the contingency analysis. The Company included this equipment based on the assessment that significant low-voltage concerns existed on a pre-contingency basis. Specifically, the Company assumed the addition of two capacitor banks in the 2008 base-case condition and the addition of 12 capacitor banks in the 2013 base-case condition.

The bus data in Table 2-7 below highlights the areas of low voltage anticipated in 2008 using the 08_M9 base-case condition (i.e., with Mystic Block 9 out of service), and with the new 345 kV transmission line in place. The results listed below are the voltage levels that would exist assuming the base-case condition level of generator unavailability, but prior to any contingency involving the failure of a transmission element. The results show the affected substation sites, or "BUS", the voltage per unit, or V(PU), and the voltage in kV, or V(KV), wherever voltages were projected to be greater than 1.05 per unit.

Table 2-7 Bus Voltage Profile (Mystic Block 9 off) in 2008

X------ BUS -----X AREA V(PU) V(KV)	X------ BUS -----X AREA V(PU) V(KV)
70791 HYDE115 115 701 0.9378 107.84	70828 ANDRW-24 115 701 0.9470 108.91
70829 ANDRW-25 115 701 0.9471 108.92	70836 K-ST-1 115 701 0.9488 109.12
70837 K-ST-2 115 701 0.9488 109.12	70838 ANDR-T24 115 701 0.9475 108.96
70839 ANDR-T25 115 701 0.9476 108.97	70840 DEWAR A 115 701 0.9458 108.76
70841 DEWAR B 115 701 0.9459 108.77	70842 CHAT-516 115 701 0.9491 109.14
70843 CHAT-517 115 701 0.9491 109.14	70844 HAWK-516 115 701 0.9494 109.19
70845 HAWK-517 115 701 0.9494 109.19	70846 MBTA 115 701 0.9487 109.10
70847 DEER ISL 115 701 0.9483 109.06	70856 KSTREETA 115 701 0.9468 108.88
70857 KSTREETB 115 701 0.9468 108.88	70860 K-ST-3 115 701 0.9488 109.12
70888 BAKER ST 115 701 0.9409 108.20	70889 NWT110AB 115 701 0.9370 107.76
70890 NWT 110C 115 701 0.9368 107.73	70891 HYDE PKA 115 701 0.9378 107.84
70892 HYDE PKB 115 701 0.9378 107.84	70893 NEEDHAM 115 701 0.9455 108.73
70907 NEED TAP 115 701 0.9455 108.73	

On a post-contingency basis, the Company's voltage analysis showed that additional capacitor banks beyond those needed for the base-case condition would be necessary to minimize low-voltage concerns under contingency conditions, unless the proposed 345 kV transmission line was installed. These additions would be needed even under overload conditions in order to reduce the amount of load that would need to be shed to avoid damaging system equipment.

The voltage analysis further indicated that the addition of a 345 kV transmission line would mitigate all low-voltage issues for both "all lines in" and transmission outage conditions. This is because high-voltage cables exhibit a characteristic known as "charging," which produces the same effect as adding capacitors to the system. In the full deployment of the Project, therefore, there would be approximately 1130 MVAR of charging introduced by the new cables, which is comparable to the addition of 1130 MVAR of capacitors. Accordingly, the Project will provide significant support for voltages within the area under peak load conditions.

Under lower-than-projected load conditions, this effect has the potential to cause high-voltage conditions. As a result, the voltage analysis indicated the need to add reactors to the system to help mitigate these potential high voltage conditions. Accordingly, the Project design includes the installation of six 160 MVAR reactor banks.

Overall the future voltage performance of the transmission system serving the Greater Boston area will require reactive compensation to help manage system voltages under both normal and adverse conditions. The Project will mitigate the need for compensation to manage low-voltage conditions, but will require the addition of reactive compensation to help manage high-voltage conditions.

2.5.8 Regional Constraints

ISO-NE has recently completed an evaluation of the Northeast Massachusetts/Boston Import Area as part of RTEP03. ISO-NE stated in its RTEP03 Report that the "Boston Sub-area is the most sensitive RTEP Sub-area outside of Connecticut . . . from the standpoint of impact on LOLE due to changes in load or supply resources." Accordingly, ISO-NE has concluded that there is a projected need for additional resources to ensure the reliability of the electric system in this sector of the New England bulk-power system. In the RTEP03 Report, ISO-NE states that:

> The Boston Import capability has recently been increased by various upgrades, including reconductoring of overhead and underground lines, the replacement of autotransformers, and the replacement of substation equipment. These upgrades have been implemented as part of the efforts to reduce congestion and address reliability needs in the NEMA/Boston region. This approach -- reconductoring and replacing existing equipment with higher capacity equipment -- has now been exhausted. Longer-term solutions have focused on adding new

> transmission sources into the deficient area or areas. Integrated solutions to address multiple issues are appropriate to address the needs of this area.

(reference: RTEP03 Technical Report at 97)

Based on the load demand forecasts prepared by NSTAR Electric and ISO-NE, the Boston Import Area is projected to see peak loads of approximately 5,900 MW by 2006. The resources currently supplying the area include 3,600 MW of import capability and 3,546 MW of generation. However, 1,061 MW of this generation has submitted requests to ISO-NE to retire from the system. This would leave the area with approximately 6,085 MW of total capacity, which would not be sufficient to serve area loads given the need to maintain adequate reserve margins.

The bulk power capabilities of the Boston Import Area/Greater Boston area must include reserve margins that take into account the potential unavailability of generating units, the loss of critical transmission elements and the loss of a large generating unit. The values calculated by ISO-NE for the Boston Import Area are based on the high-load peak demand case, which indicates that the deficiency in area resources in terms of meeting load requirements could be as much as 700 MW by 2006, if all units seeking to retire were allowed to proceed. Moreover, the units seeking to retire are older generating plants that are generally more costly to run and difficult to maintain. Continued dependency on these units involves an inherent risk to the Boston Import Area because of the likelihood of higher unavailability rates.

In addition, the Boston Import Area/Greater Boston transmission system is highly dependent on a single station located in Tewksbury. This station interconnects four key 345 kV transmission lines that serve the Boston Import Area and loss of this station would significantly degrade the import capability of the entire system. Given these combined weaknesses, the introduction of a new major transmission resource is essential to maintaining resource adequacy for the Boston Import/Greater Boston area.

2.5.9 Summary of Current Conditions

As a result of its analysis of the current system conditions, NSTAR Electric determined that the capacity of the Greater Boston transmission system will be exceeded in the near future. Opportunities to upgrade existing facilities have been exhausted, and therefore, new transmission sources are needed at specific points on the system, including the K Street substation in South Boston, the Hyde Park substation and the Baker Street substation in West Roxbury. The capacity and voltage requirements over the forecast period also dictate the need for new high-voltage transmission facilities. Accordingly, the Company identified the following criteria to guide an evaluation of the alternatives available to ensure service reliability:

- Project alternatives must add sufficient transmission capacity to eliminate overloads in the Downtown Boston area and, in particular, should alleviate overloading on transmission elements supported by the K Street substation;

- Project alternatives must add sufficient transmission capacity to eliminate overloads in the communities served by NSTAR Electric in the Greater Boston area and, in particular, should alleviate overloading on transmission elements at the Baker Street and Hyde Park substations;

- System voltages should remain within 95% to 105% of nominal under normal and single-contingency conditions;

- Project alternatives should not diminish the transfer capability across any transmission line or relevant interface below the level of achievable transfers during reasonably stressed conditions;

- Project alternatives must be feasible in terms of permitting, construction and installation in order to ensure project completion by 2006 to meet projected load requirements in all areas on the system experiencing overloads; and

- Project alternatives proposed to address reliability concerns should be evaluated to determine whether there is a collateral benefit in terms of improving the import capability of the Greater Boston area.

2.6 System Conditions With Construction of Proposed Project

2.6.1 Transmission Contingencies

The results of the load-flow analysis discussed above indicate that by 2006 a significant number of system elements would experience overload conditions for the contingencies tested in conformance with the reliability standards and criteria established by NERC, NPCC and NEPOOL/ISO-NE. Without construction of the Project, overloads will continue to emerge through 2008 (the five-year horizon) and 2013 (the ten-year horizon). With the Project in place, these overloads are fully mitigated.

The tables below demonstrate that the addition of the proposed 345 kV transmission line will alleviate transmission overloads that will occur in 2006, 2008 and 2013. For 2006, the analysis contemplates the addition of two circuits and for 2008 and 2013, the analysis contemplates the addition of three circuits.

In addition to the tables below, the Company has provided the load-flow diagrams for each transmission contingency listed in the tables illustrating the change in system performance with the addition of the Project. Specifically, the Company has provided load-flow diagrams for each transmission contingency showing (1) load flow results in 2006 with no change to the existing system configuration; (2) load-flow results in 2006 with two circuits installed; and (3) load-flow results in 2008 with three circuits installed. These diagrams are located at end of this section, behind the figures.

2.6.2 Summary of Results of System Performance in 2006

Table 2-8 shows that, with the addition of two 345 kV circuits by 2006, overload conditions will be mitigated in 2006 in all three geographic sub-areas of the Greater Boston area.

Table 2-8 Overloaded Transmission System Elements – 2006

Case	Contingency	LINE #	From Bus	From kV	To Bus	To kV	Pre-load	Post-load	Rating	% LTE Existing	% LTE 2 cables
06_M9	372	324	MYSTIC	345	KINGSTON	345	526	1039	844	119	97
06_M9	MYSTIC SB102	324	MYSTIC	345	KINGSTON	345	526	1032	844	118	97
06_M9	MYSTIC SB108	372	MYSTIC	345	KINGSTON	345	526	1043	844	119	98
06_M9	324	372	MYSTIC	345	KINGSTON	345	526	1039	844	119	97
06_M9	KINGSTN 345B	345A Auto	KINGSTON	345	KINGA BE	115	526	701	572	123	96
06_M9	KINGSTN 345A	345B Auto	KINGSTON	345	KINGB BE	115	526	701	572	123	96
06_M9	KINGSTN 345A	345A Auto	MYSTIC	345	MYSTC MA	115	401	512	407	126	100
06_M9	LINE 385-510	385-511	KINGB BE	115	KINGBNTA	115	275	509	400	130	100
06_M9	LINE 385-510	385-511	KINGBNTA	115	HIGHST B	115	190	284	241	121	91
06_M9	LINE 385-511	385-510	KINGB BE	115	KINGBNTB	115	273	507	400	130	100
06_M9	LINE 385-511	385-510	KINGBNTB	115	HIGHST A	115	190	282	241	120	<90
06_K4	LINE 250-517	250-516	MYSTC MA	115	HAWK-516	115	155	265	245	108	<90
06_K4	LINE 250-516	250-517	MYSTC MA	115	HAWK-517	115	155	265	245	108	<90
06_M8	110522-240510	110-510	BRGHTN A	115	WASH 510	115	27	184	152	131	<90
06_M8	110522-240510	110-510	WASH 510	115	BAKERPH1	115	27	208	159	143	<90
06_M8	110522-240510	110-510	BAKERPH1	115	BAKER ST	115	27	208	159	131	<90
06_M8	110522-240510	110-511	BRGHTN B	115	WASH 511	115	59	218	152	155	<90
06_M8	110522-240510	110-511	WASH 511	115	BAKERPH2	115	27	209	159	144	<90
06_M8	110522-240510	110-511	BAKERPH2	115	BAKER ST	115	27	209	159	131	<90
06_M9	LINE 282-521	282-520	WALTHAM	115	WATER520	115	132	232	152	155	100
06_M9	LINE 282-520	282-521	WALTHAM	115	WATER521	115	138	234	152	156	100
06_M9	MYSTIC 345A	329-511	BRGHTN B	115	SMVL 511	115	64	160	164	102	<90
06_M9	LINE 329-531	329-530	BRGHTN A	115	N.CAMB	115	196	312	292	108	<90
06_M9	LINE 320-507	320-508	LEXINGTN	115	TRAPLO A	115	101	155	140	112	<90

Table 2-8 Overloaded Transmission System Elements – 2006 (continued)

Case	Contingency	LINE #	From Bus	From kV	To Bus	To kV	Pre-load	Post-load	Rating	% LTE Existing	% LTE 2 cables
06_M9	LINE 320-508	320-507	LEXINGTN	115	TRAPLO B	115	88	161	140	118	<90
06_M9	240601-282602*	148-522X&Y	DOVER MA	115	W WALPOL	115	384	524	530	101	<90
06_M9	240601-282602*	148-522X&Y	NEEDHAM	115	DOVER MA	115	350	488	494	101	<90
06_M9	LINE 240-510	110-522	BAKER ST	115	NEEDHAM	115	200	319	289	112	<90
06_M9	240601-282602*	345A Auto	WWALP345	345	W WALPOL	115	570	746	715	104	<90
06_M8	WWALPLE 345A	345B Auto	W MEDWAY	345	MDFRM230	230	513	607	560	108	<90

2.6.3 Summary of Results for System Performance in 2008

The results of the load-flow analysis shown below in Table 2-9 for the transmission system serving the Greater Boston area in 2008 demonstrate that the contingency overloads will continue to emerge with only two of the three circuits in place. The table below shows that the introduction of a third circuit to the K Street substation will successfully mitigate these additional contingency overloads. These results are the basis for the Company's conclusion that three circuits are needed and that the third circuit should be in service prior to summer 2008 peak load conditions.

Table 2-9 Overloaded Transmission System Elements -- 2008

Case	Contingency	LINE #	From Bus	From kV	To Bus	To kV	Pre-load	Post-load	Rating	% LTE 2 cables	% LTE 3 cables
08_M9	372	324	MYSTIC	345	KINGSTON	345	449	885.5	844	101	93
08_M9	MYSTIC SB102	324	MYSTIC	345	KINGSTON	345	449	881	844	100	93
08_M9	MYSTIC SB108	372	MYSTIC	345	KINGSTON	345	449	885.5	844	101	94
08_M9	324	372	MYSTIC	345	KINGSTON	345	449	889	844	101	93
08_M9	KINGSTN 345B	345A Auto	KINGSTON	345	KINGA BE	115	526	701	572	103.5	91
08_M9	KINGSTN 345A	345B Auto	KINGSTON	345	KINGB BE	115	526	701	572	103.5	91
08_M9	KINGSTN 345A	345A Auto	MYSTIC	345	MYSTC MA	115	401	512	407	100	94
08_M9	LINE 385-510	385-511	KINGB BE	115	KINGBNTA	115	230	448	400	111	91
08_M9	LINE 385-511	385-510	KINGB BE	115	KINGBNTB	115	229	447	400	111	90
08_M9	LINE 282-521	282-520	WALTHAM	115	WATER520	115	93	160	152	105	95
08_M9	LINE 282-520	282-521	WALTHAM	115	WATER521	115	97.5	161	152	106	95

2.6.4 Summary of Results for System Performance in 2013

The thermal analysis results for system performance in 2013 show that, even with the addition of three 345 kV circuits, contingency overloads begin to emerge as a result of projected load growth in the area. These results suggest that additional transmission system upgrades will be required beyond those proposed as part of this filing for the time frame beginning in 2013 and beyond. Because there is sufficient time to respond to these conditions before 2013, specific measures are not being proposed at this time;

however, these conditions will be closely monitored and mitigation plans will be implemented in the future.

Table 2-10 Overloaded Transmission System Elements in 2013

Case	Contingency	LINE #	From Bus	From kV	To Bus	To kV	Pre-load	Post-load	Rating	% LTE 3 cables
13_M9	372	324	MYSTIC	345	KINGSTON	345	439	865	844	98
13_M9	MYSTIC SB102	324	MYSTIC	345	KINGSTON	345	439	863	844	98
13_M9	MYSTIC SB108	372	MYSTIC	345	KINGSTON	345	439	869	844	98
13_M9	324	372	MYSTIC	345	KINGSTON	345	439	865	844	98
13_M9	KINGSTN 345B	345A Auto	KINGSTON	345	KINGA BE	115	439	554	572	96
13_M9	KINGSTN 345A	345B Auto	KINGSTON	345	KINGB BE	115	439	554	572	96
13_M9	KINGSTN 345A	345A Auto	MYSTIC	345	MYSTC MA	115	340	411	407	100
13_M9	533-508	345A Auto	WOBURN	345	WOBURN	115	320	403	370	109
13_M9	LINE 385-510	385-511	KINGB BE	115	KINGBNTA	115	201	431	400	105
13_M9	LINE 385-511	385-510	KINGB BE	115	KINGBNTB	115	200	431	400	104
13_M9	240601-282602	282-520	WALTHAM	115	WATER520	115	73	171	152	114
13_M9	240601-282602	282-521	WALTHAM	115	WATER521	115	66.5	159	152	107
13_M9	320-508	320-507	TRAPLO B	115	WALTHAM	115	36	119	118	107
13_M9	319	320-508	TRAPLO A	115	WALTHAM	115	39	124	118	108
13_M9	WOBURN 345A	533-508	LEXHRTWL	115	LEXINGTN	115	174	281.5	279	104

2.6.5 Overall Results of Load Flow Analysis

Using a load-flow analysis, the Company determined that all reliability standards and criteria for steady-state system performance would be satisfied with the addition of two 345 kV circuits by 2006 and three 345 kV circuits by 2008. The Company has performed additional system testing for both short circuit and stability performance assuming construction of the Project and the results indicate that there are no adverse impacts on the system with the proposed transmission circuits in service. Full assessment of the system performance with respect to short-circuit duty and system stability is under review by NEPOOL and ISO-NE for compliance with NEPOOL transmission system modification procedures. This review will further ensure that there is no adverse impact to the New England transmission system and that all potential impacts are appropriately addressed.

These assessments are performed as part of the NEPOOL “18.4 review and approval” process. This process will review all relevant thermal, short circuit and stability studies to ensure that they are appropriately conducted and that the results demonstrate that the New England transmission system will meet all performance criteria with the Project in service. This assessment is currently in progress and should be completed by mid-2004 with approval expected during the summer of 2004.

2.6.6 Import Capability

As noted above, NSTAR Electric has analyzed the collective amount of power that could be moved from one part of the system to another using the available transmission

elements, plus the addition of a 345 kV line from the south. This type of analysis is referred to as a "transfer-capability" assessment, which is used to evaluate whether the resource adequacy needs of the system are satisfied. In this case, the addition of the 345 kV line will add diversity of supply, will increase the ability to import power from the southern part of the system, and will relieve stress on lines that are currently supporting the interface from the southern part of the system.

The transfer-capability assessment shows that the overall import capability of the transmission system supplying the Greater Boston area would be increased by approximately 800 MW with the addition of the two proposed 345 kV circuits in 2006, and by 1,000 MW with the completion of the Project in 2008. The improved import capability will allow for greater import of power from outside the Greater Boston area and will provide access to new, high efficiency combined-cycle generating facilities recently added in Southeastern Massachusetts. In addition, the increased import capability will reduce "congestion" in the Greater Boston area, which is the increased generation costs that result from the need to run generating units out of merit because of transmission constraints. The reduction in congestion could be significant with estimates ranging in the tens of millions per year.

However, the full import capability improvement for the Greater Boston area available as a result of the proposed transmission addition is dependent upon other transmission elements serving the area. Under heavy transfer conditions, these other elements would become overloaded prior to the new transmission lines and mitigation of these overloads would be necessary to allow the new transmission lines to carry their full capabilities. With mitigation of these other transmission overloads through system upgrades or addition of other new transmission system elements, the proposed transmission lines could potentially support an increase in area import capability of up to 2,000 MW.

3.0 PROJECT ALTERNATIVES

3.2 Assessment Factors for Project Alternatives

NSTAR Electric's transmission system is an integral part of the bulk power system delivering power to customers in New England. To maintain the integrity of the bulk power system, there must be adequate transmission and generation resources available to meet projected load requirements. Based on an analysis of system performance under reliability criteria established by NPCC and NEPOOL/ISO-NE, NSTAR Electric has determined that the capabilities of the NSTAR Electric transmission system serving the Greater Boston area will be exceeded in the near future. For that reason, NSTAR Electric has evaluated a number of options geared at improving the capabilities of its transmission system.

In general, the installation of transmission upgrades and additions can be a costly and time-consuming undertaking. As a result, NSTAR Electric continually strives to identify

transmission solutions that are efficient in terms of cost, resources and implementation, meaning that the Company pursues upgrades and additions that solve the greatest number of problems with a single application. Over the past several years, NSTAR Electric has completed a series of projects designed to reinforce the transmission capabilities of the NSTAR Electric system. These projects have involved reconductoring overhead and underground lines and upgrading auto-transformers and substation components with higher capacity equipment. However, in certain areas, the Company has exhausted the opportunities to upgrade existing facilities. The capacity and voltage requirements over the forecast period dictate the need for new high-voltage transmission facilities. Moreover, the Company's analysis shows that new transmission facilities are needed at specific points on the system, including the K Street substation in South Boston, the Hyde Park substation and the Baker Street substation in West Roxbury.

Based on the contingency analysis performed in accordance with NPCC and NEPOOL/ISO-NE reliability standards, the Company identified a set of criteria to guide an evaluation of the potential alternatives available to improve the transmission capabilities of the system serving the Greater Boston area. In addition to cost, reliability and environmental impacts, the Company considered project alternatives based upon their ability to address the following criteria:

- Project alternatives must add sufficient transmission capacity to eliminate overloads in the Downtown Boston area and, in particular, should alleviate overloading on transmission elements supported by the K Street substation;
- Project alternatives must add sufficient transmission capacity to eliminate overloads in the communities served by NSTAR Electric in the Greater Boston area and, in particular, should alleviate overloading on transmission elements at the Baker Street and Hyde Park substations;
- System voltages should remain within 95% to 105% of nominal under normal and single-contingency conditions;
- Project alternatives should not diminish the transfer capability across any transmission line or relevant interface below the level of achievable transfers during reasonably stressed conditions;
- Project alternatives must be feasible in terms of permitting, construction and installation in order to ensure project completion by 2006 to meet projected load requirements in all areas on the system experiencing overloads; and
- Project alternatives proposed to address reliability concerns should be evaluated to determine whether there is a collateral benefit in terms of improving the import capability of the Greater Boston area.

3.3 Project Alternatives

3.3.1 Project Alternative -- Proposed 345 kV Transmission Project

The proposed Project involves the construction of a three-circuit, 345 kV underground transmission facility from a point of origin along an existing 345 kV overhead transmission line running between the Company's substations in West Walpole and Holbrook, and a point of termination at the existing Hyde Park and K Street substations in Boston. The Project would be constructed in two phases. In the first phase, the Company would complete construct and install two circuits; one extending from the point of origin to the Hyde Park substation and one extending from the point of origin to the K Street substation. Also in the first phase of construction, the Company would install the steel-pipe conduit to house the third circuit, which will extend from the point of origin to the K Street substation. The Company would install the third circuit in the steel-pipe conduit in the second phase of construction.

The Project is targeted at resolving a series of identified reliability concerns involved in serving customer load within the Greater Boston area beginning in 2006. Construction of the Project will ensure that thermal ratings of all circuit elements in critical areas of the system within Greater Boston will not be exceeded under normal and single-contingency conditions, as required by NPCC and NEPOOL/ISO-NE reliability standards. In addition, construction of the 345 kV transmission line will ensure that system voltages stay within 95% to 105% of nominal under normal and single-contingency conditions.

Specifically, the Project would eliminate projected overloads on nine key transmission elements supporting load in the Downtown Boston area, including:

- Overloads on two parallel underground 345 kV circuits running from the Mystic substation to the Kingston Street substation that supply the 115 kV system in the Downtown Boston load center;
- Overloads on two parallel auto-transformers that connect the 345 kV circuits running from the Mystic substation with 115 kV loads in the Downtown Boston load center;
- Overloads on an auto-transformer connecting the 345 kV circuit and 115 kV busses at the Mystic substation;
- Overloads on two parallel 115 kV underground circuits running between the Kingston Street substation and the K Street substation; and
- Overloads on two parallel 115 kV underground circuits running between the Mystic substation and the K Street substation.

The Project would also address reliability concerns centered around projected overloads on eight key transmission elements supporting load in the Hyde Park/West Roxbury area. This area is of particular concern because persistent load growth, coupled with the relatively limited capability of the circuits supporting this load center from the south,

results in this area drawing off load flow from the Downtown Boston area under contingency conditions. The reliability of the Hyde Park/West Roxbury area will be greatly enhanced with the addition of a major transmission source from the south.

A third area of improvement will occur in areas located in the southern portion of the Greater Boston area as a result of the Project. The Company's analysis shows that overloads will occur on import paths from the south, substantially limiting the system's import capability as load grows into the future. As a result, it will become increasingly difficult to achieve acceptable phase-shifter operating settings, which are used to keep import-path facilities under normal ratings pre-contingency, without aggravating post-contingency conditions on facilities within Greater Boston, including Downtown Boston. Construction of the Project will alleviate these import constraints.

In that regard, an added benefit of the Project is that it will provide a high-capacity path to facilitate power imports from the southeastern Massachusetts area. The installation of a high-capacity path originating south of the Greater Boston area will provide multiple benefits to eastern Massachusetts. First, the high-capacity path will reduce the area's reliance on the Tewksbury 345 kV substation, which currently is the only high-capacity (345 kV) system connecting directly to the City of Boston. Second, the high-capacity path will improve the transfer capabilities of the system by relieving stress on lines that are currently supporting the interface from the southern part of the system. Third, the high-capacity path will provide access to plentiful generation resources located in southeastern Massachusetts.

The high-capacity path will also increasing the transmission import capability into the area providing greater access to the energy market, allowing for customers to benefit through lower cost. The increased import capability can help to reduce the need for Reliability Must Run (RMR) contracts and out of merit generation. Increased import capability reduces the likelihood of constraints occurring in the area, thereby reducing the need for such services. Additionally, to the extent that the Locational Marginal Price (LMP) in area is above that of the region-wide LMP, an increase in import capability can promote the convergence of such differences. In the case of the Greater Boston Area, the Project responds to a reliability need identified by the ISO in RTEP03. Quantification of any economic benefits would also be provided by ISO-NE.

Accordingly, the Project meets one central objective, which is to maintain system reliability through the elimination of projected overloads at several critical load centers within the Greater Boston area. The Company will achieve this objective through the installation of a high-capacity transmission path that (1) strategically places transmission capacity at critical locations within growing load centers, (2) increases import capability, and (3) reduces reliance on the existing 345 kV system to the north of Boston and on local generation that is due to retire.

3.3.2 Project Alternative -- No-Build Alternative

As an alternative to the Project, NSTAR Electric first considered the "no-build" alternative, which means that NSTAR Electric would not pursue construction of the Project, but instead, would continue to rely upon the existing system configuration. However, in this case, the Company does not have the option to take no action because significant reliability issues would emerge in terms of the Company's ability to provide uninterrupted electric service to customers, which is inconsistent with the Company's service obligation. By taking no action, load demand would increase while the area line-loading capabilities would remain fixed. In addition, the fixed amount of transmission capacity would become increasingly overburdened at the same time that available regional generation sources are declining. By 2006, the Greater Boston area would likely face transmission line overloading and supply deficiencies in the summer peak months, resulting in service interruptions possibly for extended periods of time. The significant number of transmission element overloads associated with contingency conditions would violate the established reliability criteria of NSTAR Electric, NEPOOL/ISO-NE, NPCC and NERC.

Accordingly, if NSTAR Electric fails to implement a long-term solution to address these conditions, the Company would eventually be unable to ensure an adequate margin of reliability in serving its customers in Greater Boston.

3.3.3 Project Alternative - Demand Side Management

As a second potential alternative to the Project, NSTAR Electric evaluated demand-side management ("DSM") initiatives. NSTAR Electric is a program administrator for two broad-based DSM initiatives, which are the Massachusetts Energy Efficiency program offerings and the ISO-NE Demand Response Program. The primary goal of programs encompassed within the Massachusetts Energy Efficiency initiative is to reduce the energy consumption of Massachusetts electric customers through cost-effective installation of energy-efficient measures. The primary goal of the ISO-NE Demand Response Program is to reduce demand on a system-wide basis during critical periods through customer load curtailment or the use of onsite generation.

3.3.3.1 NSTAR Energy Efficiency Programs

NSTAR Electric operates a comprehensive array of energy efficiency programs and services targeting residential, low-income and commercial and industrial ("C&I") customer sectors throughout the NSTAR Electric service territory, exclusive of Cape Cod, where the Cape Light Compact administers energy efficiency offerings. The Company's energy-efficiency programs are mandated by law and are administered with the oversight of the Massachusetts Division of Energy Resources ("DOER") and the Department of Telecommunications and Energy. The DSM measures installed through the Company's programs include installation of high-efficiency lighting, motors, air conditioners and appliances, as well as the construction of high-efficiency homes and commercial buildings. The Company's programs are funded through an energy-efficiency charge collected through customer electric-utility bills. In 2002, approximately

5 percent of NSTAR Electric's customers voluntarily participated in the Company's program offerings and implemented energy efficiency projects that reduced peak-load summer demand by approximately 21 MW.

In order to alleviate transmission capacity constraints in Downtown Boston and the communities within the Greater Boston area served by NSTAR Electric, the Company would need to be assured of approximately 327 MVA (MW) of targeted load reduction in the Downtown Boston area and approximately 478 MVA (MW) of targeted load reduction in the communities adjacent to the Hyde Park and Baker Street substations, which totals approximately 800 MW, if viewed on an area-wide basis for Greater Boston. These targeted load reductions were derived from the Company's load-flow analyses for comparison purposes.

However, the Company does not serve all customer load located in the Greater Boston area. In the Greater Boston area (including the Downtown Boston area), the Company serves approximately 650,000 customers with a projected summer peak load in 2006 of 4,130 MW, which is approximately 70 percent of the total peak load for the Greater Boston area. The remaining load is served by National Grid and municipal electric companies. The Company would need to achieve summer peak load reductions of approximately 14 percent to achieve load reductions equal to 560 MW, or 70 percent of the required 800 MW load reduction in the Greater Boston area to make available the capacity necessary to reliably serve projected load growth in the area. To achieve the 800 MW of load reduction, NSTAR Electric would need to achieve summer peak load reductions of approximately 19 percent.

According to studies submitted in 2001 by the Massachusetts investor-owned electric utilities to DOER, entitled, *Remaining Electric Energy Efficiency Opportunities in Massachusetts – Final Report*, the annual maximum cost-effective reduction in energy use potential in Massachusetts is 4 percent. Therefore, at its maximum potential, DSM initiatives could theoretically produce a reduction in energy use net of projected growth of about 2.5 percent per year. Under current funding levels, energy-efficiency programs capture about one third of this potential each year. In addition, according to the analysis submitted in the DOER study, savings achieved beyond 4 percent per year cannot be implemented cost effectively.

Given that the maximum energy reduction potential associated with the Company's DSM initiatives is 2.5 percent, reliance on DSM initiatives is not a feasible alternative to the Project. For example, achieving the required load reduction of 800 MW would require all of the 650,000 customers to reduce peak load requirements by 19.3 percent. Even if it was assumed that NSTAR Electric customers would need to reduce load to meet just 70 percent of the identified need (with customers served by other utilities in the Greater Boston area responsible for the remaining 30 percent in load reductions), NSTAR Electric customers would need to reduce peak load requirements by 14 percent (i.e., 560 MW, or 70 percent of 800 MW).

However, the Company's best experience has been that DSM programs reduce average demand by approximately 10 percent *for the 5 percent of customers* (approximately 32,500 customers) who choose to participate in any given year. Accordingly, it is not feasible to rely exclusively on DSM initiatives to meet the identified need for transmission capacity in the Greater Boston area.

3.3.3.2 ISO-NE Demand Response Program

NSTAR Electric is a Demand Response Service Provider ("DRSP") for the ISO-NE Demand Response Program ("DRP"). NSTAR Electric has acted as a DSRP since 2001. By the end of 2003, NSTAR Electric enrolled approximately 110 participants with a total response capacity of 45 MW. The total DRP enrollment for New England (as of October 2003) is approximately 400 MW, with 180 MW enrolled in the overall Greater Boston area.

The DRP is designed and administered by ISO-NE. Through the DRP, C&I end-users are eligible to receive incentive payments in return for reducing electrical consumption or operating self-generating units when prevailing wholesale electricity prices are high or when the region's electricity grid is stressed. ISO-NE is responsible for notifying customers of an event requiring load reductions, computing electrical-use reductions and providing payment so the DRSP. NSTAR Electric, acting as the DRSP, markets the demand-response programs to its customers, enrolls participants, facilitates installation of necessary metering, provides settlement data in a timely fashion and pays the earned incentive to participating customers.

The DRP has two primary components: (1) an Emergency Response track that requires load reductions or self-generation from participants when the ISO-NE determines that the reliability of the electric grid is threatened; and (2) a Price Response track that calls for participants to voluntarily participate in load reductions when the forecasted market hourly energy-clearing price exceeds a set threshold ($100 per MWh in 2003).

In 2003, NSTAR Electric conducted an independent assessment of the value of demand response in the NSTAR Electric territory, which is entitled, *Assessment Of Demand Response Options – NSTAR and Market-Wide Perspectives*. This study concluded that there is a demand-response potential of approximately 200 MW in the NSTAR Electric service territory under an aggressive marketing scenario. In this scenario, NSTAR Electric would contract with customers to provide demand response capacity for a reserve payment of $20 per kW per year. NSTAR Electric would manage this resource, activating its customer-response capabilities when necessary to meet ISO-NE and/or NSTAR Electric reliability needs. The current ISO-NE DRP has captured about 25 percent of the total demand-response potential of 200 MW. However, the Company's assessment appears reasonable in light of the Boston Edison experience in 1997-1999 managing two demand-response programs (BEEC and GAP), which jointly enrolled between 30 and 56 MW in demand-response capacity at a cost of $8-17 per kW per year.

However, even at its maximum potential, demand-response capacity of approximately 200 MW would become available, which is insufficient to meet the targeted need for 800 MW of transmission capacity in the Greater Boston area, or even a lesser requirement of 560 MW, if NSTAR Electric customers are relied on only for 70 percent of the identified need. As calculated above, achieving even just 70 percent of the needed level of transmission capacity would require all of the Company's 650,000 customers to reduce

summer peak load by 14 percent. In addition, the Company's experience shows that demand response is an available option only for a relatively small number of customers with unique operating characteristics or a generating unit. Therefore, it is not feasible to rely exclusively on demand-response initiatives to meet the identified need for transmission capacity in the Greater Boston area.

3.3.4 Project Alternative - Distributed Generation

As a third alternative to the proposed Project, the Company evaluated the installation of distributed generation ("DG") within the NSTAR Electric service territory to alleviate the need for 800 MW of new transmission capacity. In this case, DG would involve the deployment of limited-capacity electric generating units in key locations on the electric system that would provide energy production to serve customer demand in lieu of additional transmission resources. Available DG technologies include the following:

- Reciprocating Internal Combustion Engines
- Combustion Turbines
- Microturbines
- Fuel Cells
- Wind Turbines
- Photovoltaic Cells

There are advantages and disadvantages associated with each of these technologies in terms of actual implementation within the NSTAR Electric service territory. For example, reciprocating engines, combustion turbines, and microturbines require siting and zoning permits. Fuel cells have a high capital cost and are not widely available. Wind and photovoltaic sources provide only an intermittent source of power. All of these factors, as well as interconnection issues, would need to be considered in actually placing DG units within the Company's service territory to meet the identified need for transmission capacity. However, these technologies are generally available with the following capabilities:

	Size Range (MW)		Fuel Efficiency	Installed Cost ($/kW)	Total Operating Cost ($/kWh)	
Type of DG	**Low**	**High**			**Low**	**High**
Reciprocating Engine Gas-Fired	0.005	20	29%	$1,270	0.064	0.094
Oil-Fired/Diesel	0.05	10	36%	$1,000	0.054	0.093
Combustion Turbines	0.5	100	23.50%	$1,522.00	0.063	0.137
Microturbines	0.005	0.3	28.50%	$1,653	0.064	0.15
Fuel Cells	0.001	10	39.50%	$3,000	0.04	0.108
Wind Turbines	0.001	240	NM	$1,770	0.008	0.015
Photovoltaic	0.0001	0.1	16%	$6,700	0.021	0.021

Theoretically, the transmission-capacity requirements of the system could be supported through the addition of DG capacity across the NSTAR Electric system at the levels provided by the Project. However, in practice, reliance on DG in lieu of the Project would require the development of potentially hundreds of sites in a geographically confined urban area, given the limited capacity of these types of technologies. The largest distributed generation units produce a maximum of 20 MW of capacity. Although the installation of larger-sized units such as reciprocating engines, combustion turbines and micro-turbines would mean that relatively fewer units would be required, a multitude of units would still be required, each requiring siting, emissions and zoning permits. Siting and permitting the required number of units within the Greater Boston area would be problematic and a range of issues such as aggregate fuel and emissions requirements would need to be considered. Fuel cells are not widely available in the sizes necessary to make a substantial contribution to the alleviation of capacity overloads. Moreover, because of the need to ensure system reliability, capacity requirements could not be satisfied with intermittent forms of capacity. These forms of capacity would have to be supplemented with major energy storage facilities.

As a result, it is not feasible for the Company to rely on DG initiatives to meet the identified need for transmission capacity in the Greater Boston area.

3.3.5 Project Alternative - New Generation Facilities

A fourth alternative to the Project would be the construction of new generation facilities within the Greater Boston area. For example, new generation within the Downtown Boston area has the potential to alleviate system reliability concerns because the existing system is configured around generation provided in the past by the New Boston 1 generating unit and because addition of a significantly sized generation source would increase available capacity on the system. Also, new generation could replace older generation serving Greater Boston that is scheduled to be retired over the next few years. However, the addition of a new generation source is not an option for the Company for several reasons.

First, consistent with the generation divestiture provisions of the Electric Restructuring Act of 1997, the Company no longer owns generation facilities. Although merchant generation facilities could be proposed for construction within the Greater Boston area, no such facilities are under development or are pending in the interconnection queue at ISO-NE. As a result, the Company cannot rely on the construction of new generation facilities as a planning tool in ensuring the reliability of the transmission system.

Second, the placement of a single generation source, even if significantly sized, would not resolve the transmission overloads in both the Downtown Boston and Baker Street/Hyde Park areas. Therefore, new generation would need to be installed in both areas. Given the inherent difficulties in permitting and constructing even one facility within the Greater Boston area, the construction of new generation facilities is not a viable alternative to the Project.

3.3.6 Overhead Transmission

A fifth alternative to the Project is the construction of an overhead transmission line from an origination point south of Greater Boston to a point of interconnection with the underground transmission system serving the City of Boston. To the extent it could be constructed, overhead transmission could provide sufficient transmission capacity to relieve projected overloads. The number of transmission lines required would depend upon the voltage selected and the degree of reliability needed. For example, at a voltage level of 345 kV, a single overhead circuit could provide the transmission capacity provided with three underground circuits, but would not be sufficient in terms of alleviating the projected overloads at distinct points on the system.

Most importantly, the construction of an overhead transmission line requires the Company to obtain sufficient right-of-ways for the wires and supporting structures, with sufficient spacing between the electric conductors and surrounding properties and structures to ensure safe and reliable operation of the line. In evaluating project alternatives, the Company recognized that a continuous overhead right of way that would enable the addition of circuits to the Baker Street, Hyde Park and K Street substations does not exist. For example, there is an existing right-of-way along a set of working rail tracks from Needham to the Baker Street substation. However, the area surrounding the railroad right-of-way is fully developed and is too narrow to support

additional transmission. There is also an existing right-of-way along a rail line running between Sharon and the Hyde Park substation, which is also not feasible because it is too narrow and construction along this route would be subject to extensive work restrictions in order to ensure safety and minimize impacts on rail service. This route also passes through wetlands areas.

Moreover, the closest right-of-way that could support a new 345 kV overhead transmission line comes no closer than four miles from the Baker Street substation. The terrain between the right-of-way and the Baker Street substation is a combination of reservations and wetlands associated with the flood plain of the Charles River. In addition, the right-of-way passes through a number of areas of highly valued property and homes. If the Company were to pursue this option, it would have to acquire a right-of-way that is at least 150 to 200 feet wide and at least four miles long, involving nearly 100 acres of real estate. Aside from issues of cost, the time and effort involved to acquire this right of way (which passes through the residential communities of Westwood, Needham and Dedham) would be considerable and not practical. Even if the Company were able to overcome this obstacle, additional right-of-ways would be needed to run the line from the Baker Street substation into the City of Boston.

Accordingly, NSTAR Electric determined that, although an overhead transmission line would provide the necessary capacity, development of a new right-of-way in a high-density suburban and urban area is not feasible. Therefore, overhead transmission is not a viable alternative to the proposed Project.

3.3.7 Lower Voltage Transmission

A sixth alternative to the Project is the installation of a lower-voltage transmission source. To the extent it could be constructed, lower voltage transmission could provide sufficient transmission capacity to relieve projected overloads. Because overhead construction is not feasible given the difficulties and cost involved in obtaining the necessary right-of-ways, the Company's evaluation of a lower voltage transmission option focused on the use of underground circuits. However, whether overhead or underground, the load-flow requirements would quickly overwhelm a 115 kV transmission circuit, unless enough circuits were built to match the capacity available from a 345 kV line.

In that regard, the Company is proposing to construct three underground 345 kV circuits. Transmission line capacity increases linearly with voltage. Were the Company to implement a 115 kV solution, the Company would anticipate that up to eight or nine underground circuits would be required. However, there is a mutual heating effect when underground cables are placed in close proximity to one. Therefore, it is generally not practical for more three underground circuits to be in the same trench. As a consequence, the Company would need to construct lines in many more streets than proposed for the Project in order to create adjacent routes. This could potentially triple the mileage of street excavation for a 115 kV solution. Also, because the Company would need to utilize similar or parallel routes to construct these lines, alternatives for

managing local traffic during construction would be greatly complicated creating significant disruption to traffic flow.

3.3.8 Bundled Reconductoring and Expansion Project

The seventh alternative to the Project is the implementation of a "bundled" reconductoring and expansion project designed to alleviate overloads at all of the specific points on the system requiring additional transmission capacity beginning in 2006. For this alternative, the Company first evaluated a series of more limited, localized alternatives to the Project. Through this evaluation, the Company determined that no single reconductoring and expansion project by itself could represent an alternative to the Project in terms of providing sufficient transmission capacity to eliminate all of the identified overloads on the NSTAR Electric system. Therefore, the Company developed a project alternative that involves a combination of line reconductoring, circuit changes and substation expansions to address all of the same transmission constraints addressed by the Project. The following table summarizes the bundle of system upgrades that would be implemented as part of this project alternative.

Sub-Area	Overloaded Facilities	Proposed Upgrade
Downtown Boston	324/372 Kingston Autotransformers Mystic Autotransformer 385-510/511 250-516/517 329-510-511	2-345 kV circuits Mystic to K Street 2-345 kV breakers Mystic Station 2-345-115 kV Autotransformers K Street Station 2-160MVAr Reactors K Street Station
345 kV Northern Transmission Loop	349XY 345/365	Add heat exchangers Reconductor Circuits
Baker Street Substation	110-510/511	Add 2 circuits Needham to Newton Expand Station 292 Expand Station 148
115 kV System in Greater Boston	282-520/521	Add 2 parallel 115 kV circuits from Waltham to Watertown Bifurcated one line with the 282-521 line Reconductor from Watertown to Brighton

	329-530	Reconnect Watertown to feed radially from Waltham Reconductor 329-530/531
Southern Import Capability	148-522 Walpole Auto West Medway Autotransformers	Add 2nd 115 kV line in parallel Expand Station 447 Add 2nd Walpole 345-115kV Autotransformer Replace both autotransformers 550/715/825

3.3.8.1 Downtown Boston Area

The Downtown Boston area includes the downtown business district and immediately proximate neighborhoods such as South Boston and Dorchester. The transmission network in this area consists of two 345 kV underground circuits extending between the Mystic substation in Everett to the Kingston Street substation in the financial district in addition to 345 kV facilities at the Mystic substation and numerous 115 kV underground circuits that tie to nine major substations located in the district. From the financial district, these stations include the Mystic substation to the north, the Brighton substation to the west and the Baker Street substation in West Roxbury. The New Boston Generating Station in South Boston lies in the center of this district. Continuing load growth and the impending retirement of generating units in this vicinity are combining to pose reliability issues beginning in 2006.

The proposed transmission-system upgrade for this area would be to install two new 345 kV underground transmission lines extending approximately six to seven miles through Charlestown, the North End, Downtown Boston and South Boston. The circuits would originate at the Mystic substation 345 kV switchyard, which is heavily congested. Installation of the terminal equipment would require expansion of this switchyard, if space is available, and would also involve installation of gas insulated substation equipment. At the termination point in South Boston, the Company would implement the same scope and type of upgrades involved in the Project.

The licensing requirements for this proposal would be similar to those involved in the Project. However, these upgrades would involve long crossings of the Mystic River and the Charles River, as well as the Fort Point Channel and the Reserved Channel, which would complicate and extend the permitting process because the existing 345 kV facilities cross the Mystic River and Charles River under the water and it is likely that the Company would have to propose a parallel path.

Although this transmission-system upgrade project would not impede the power flows across the City of Boston, it would exacerbate loading issues emerging on transmission resources extending into the Greater Boston area from the north. In addition, this

upgrade project would not provide any increase in the import capability of the Greater Boston transmission system.

3.3.8.2 345 kV Northern Transmission Loop

The 345 kV transmission source point located at the Mystic substation and serving the Downtown Boston area is supplied from two directions (1) two underground 345 kV circuits (Line 346 and 365) extending from Woburn to the Mystic substation, and (2) two 345 kV circuits from Saugus to the Mystic substation (Line 349X and 349Y). All of these circuits are fed from the 345 kV overhead transmission lines originating at the Tewksbury substation. These underground circuits will experience overloads resulting from continued load growth in the Downtown Boston area and the impending retirement of generating units in the same area.

The proposed transmission-system upgrade in this area involves increasing the capacity of each of the four existing transmission circuits. Forced cooling through the application of heat exchangers would be applied to Circuits 349X and 349Y. Circuits 346 and 365 are already forced cooled, so the Company would either install higher capacity conductors or install additional transmission lines over the same paths. The most significant issue with this upgrade is that, to install higher capacity conductors, the circuit would have to be taken out of service. Removing these lines from service, even if accomplished one circuit at a time, would eliminate a critical power import path to the area, which would place area supply at risk and significantly elevate the overload potential on the remaining circuits. Installing a parallel circuit would require six miles of circuit installation and involve extensive permitting and substantial cost, as discussed below.

Another important consideration is that, under either configuration, this solution would increase reliance on the 345 kV transmission facilities from the north and, in particular, would increase reliance on a single substation (Tewksbury) supporting that 345 kV system.

3.3.8.3 Baker Street Substation and Southern Import Capability

The Baker Street substation is located in the midst of a major load center in the West Roxbury/Newton/Hyde Park area. Currently, underground 115 kV transmission circuits link the Baker Street substation in West Roxbury to the Hyde Park, Newton and Brighton substations. The Baker Street substation is fed by a single double-circuit overhead transmission line from the Needham area. Customer load in this area has grown to the point that additional transmission capacity is needed. If the existing overhead transmission line were to fail, the flow on the two 115 kV circuits from the Brighton substation would reverse, feeding back to Baker Street from Brighton and overloading those circuits. Moreover, the magnitude of this potential overload situation would increase each year.

The proposed transmission-system upgrade for this area would be to install two five-mile underground 115 kV cables from Needham to Newton, or to the Baker Street substation,

and to expand the substations at both ends of the circuits. This option would also require reinforcements to the existing transmission system south and west of the Baker Street substation, including the installation of a new 10-mile 115 kV overhead or underground transmission line from Walpole to Westwood/Needham (which would involve the expansion of a right-of-way), as well as reinforcements at the Walpole (installation of new 345kV transformer) and Medway substations (replacement of existing 345kV transformer with a unit of greater capacity). A second approach to resolve the Baker Street substation issues would be to install two 115 kV underground transmission circuits along a seven-mile route from the Brighton substation to the Baker Street substation. However, the Brighton substation does not have the space needed for the expansion that would be necessary to accommodate these circuit positions, nor is the transmission system supporting the Brighton substation (from the Mystic substation) strong enough to support this burden.

This transmission-system upgrade would require (1) a licensing process for a total of three new 115 kV circuits; (2) substantial clearing of an additional right-of-way; and (3) excavation of approximately 5 to 7 miles of public streets, depending on the selected approach. In addition, expansion of the Brighton substation, which is located in a congested urban neighborhood, would require acquisition of additional property.

3.3.8.4 115 kV System in Greater Boston (West)

As a result of load growth and generator retirements, there will be a significant increase in the load flows into the Brighton area over two 115 kV underground transmission lines from Waltham, causing overloads during contingency situations. This concern is exacerbated by the fact that, because of space limitations, it is not feasible to expand the Brighton substation.

The transmission upgrade for this area of the system would be to replace the two underground 115 kV circuits between the Brighton and Watertown substations and to install two new 115 kV underground circuits from Waltham to the vicinity of Watertown substation. The new circuits from Waltham would be tied into the new circuits from Brighton, creating a high-capacity path and leaving the existing 115 kV circuits between Waltham and Watertown to serve Watertown exclusively. This approach also involves expanding the Waltham substation and upgrading the 345 kV transformer at the Medway substation.

This approach would require a siting process for the new circuits between Waltham and Watertown. This approach also involves risk because it would require a sustained outage of several months on each of the 2.5-mile underground transmission lines between Brighton and Watertown during the conductor replacement.

3.3.8.5 Summary of Bundled Reconductoring and Expansion Alternative

In the aggregate, these five transmission-system upgrade projects would resolve the reliability concerns projected to emerge in 2006. Specifically, construction of the components involved in this alternative would ensure that thermal ratings of all circuit

elements in critical areas of the system within Greater Boston will not be exceeded under normal and single-contingency conditions. However, this alternative violates the Company's basic engineering construct, which is to pursue transmission-system upgrades and additions that address the greatest possible number of system requirements with a single application in order to minimize risks and disruptions associated with project construction. In that regard, implementation of the bundled reconductoring and expansion project would require the Company to prepare and file a series of siting applications for permission to construct six to eight underground transmission lines and one overhead transmission line. Given the lead time involved with each on these upgrades on an individual basis, it is highly doubtful that the Company could complete the siting process and construct the five needed projects composing the bundle by 2006 (or even 2008).

In addition, this project alternative would impose additional risk of overloads for contingencies or loss of customer service during construction because two to four of the transmission line upgrades would involve removing existing lines from service for extended periods of time to replace conductors. Moreover, in the aggregate, these upgrade projects improve the import capability of the system by only 200 MW, as compared to the 800-1,000 MW of import capability improvement associated with the Project. As a result, the bundled reconductoring and expansion alternative is not a favorable alternative in comparison to the Project.

3.4 Comparison of Alternatives -- Reliability

NSTAR Electric has analyzed each of the project alternatives to determine how those alternatives compare in terms of improving the overall reliability of service on the NSTAR Electric system. Specifically, the Company analyzed reliability improvements in terms of three factors, which are: (1) the extent to which the project alternative relieves transmission overloads projected to emerge beginning in 2006; (2) the extent to which the project alternative increases the diversity of supply available to the Greater Boston area; and (3) the extent to which the project alternative increases the import capability of the Greater Boston area. The results of this analysis show that the Project offers the greatest level of reliability improvement.

3.4.1 Reliability -- Proposed 345 kV Transmission Project

The proposed 345 kV Transmission Project will provide two 345 kV delivery points into the Greater Boston transmission system, which are located at the Hyde Park substation and at the K Street substation. Although the combined effect is to add transmission capacity to the overall system, each delivery point is designed to address different emerging reliability issues. Taken in combination, the construction of three 345 kV transmission circuits to two delivery points within the Greater Boston area will resolve all of the identified transmission overload issues.

Specifically, the Hyde Park terminal will serve customer load in the immediate area and will also support the Baker Street substation through the two existing 115 kV cables

running between the Hyde Park substation and the Baker Street substation. The Baker Street substation is a supply hub for Roslindale and West Roxbury load, as well as load located in Newton and Dedham. By adding a 345 kV source into the Hyde Park/Baker Street substations, the Company will greatly improve the reliability of service in West Roxbury and areas extending into Brighton. In turn, this will relieve potential overloads on the 115 kV system between North Cambridge and Brighton and between Everett and Brighton.

In addition, when the second stage of construction is complete, the K Street substation will be positioned to support load in South Boston, Roxbury and Dorchester and to offset flows from the north that would otherwise lead to overloads on the 115 kV and 345 kV circuits from the Mystic substation to Downtown Boston, and on the two 345 kV transformers at the Kingston Street substation in the Financial District.

The Project will also improve system reliability in terms of supply diversity and import capability. Supply diversity will be improved because the Greater Boston area is highly dependent on a single station located in Tewksbury. This station interconnects four key 345 kV transmission lines that serve the Greater Boston Area and loss of this station would significantly degrade the import capability of the entire system. The introduction of a new major transmission resource from the south is essential to maintaining resource adequacy for the Greater Boston area.

In terms of improved import capability, the Company's analysis shows that the overall import capability of the transmission system supplying the Greater Boston area would be increased by approximately 800 MW with the addition of the two proposed 345 kV circuits in 2006, and by 1,000 MW with the addition of the third circuit.

Accordingly, the Project will substantially improve the reliability of the NSTAR Electric system.

3.4.2 Reliability – No Build Alternative

Because no new facilities would be added under this alternative, existing reliability issues would not be addressed. Without transmission-system upgrades, and if planned generation retirements move forward, transmission line overload issues during summer peak conditions would likely result in interrupted service to Boston customers, possibly for extended periods of time. The significant number of transmission element overloads associated with single contingency conditions would also violate the established reliability criteria of NSTAR Electric, NEPOOL/ISO-NE, NPCC and NERC.

Accordingly, the No Build alternative will jeopardize reliability of electric service in the Greater Boston area.

3.4.3 Reliability – Demand-Side Management

NSTAR Electric conducts an examination of its energy-efficiency programs every year in accordance with the guidelines established by the Department of Telecommunications

and Energy in D.T.E. 98-100 (2000). These efforts involve statistically rigorous methodologies that accurately identify the "savings at the meter." Sophisticated techniques including detailed equipment inspections, extensive monitoring and measurements, state-of-the-art building performance analysis, regression analysis and engineering analysis are employed to determine these energy savings in a reliable manner. In addition, considerable effort is expended to quantify the "non-program" effects, which is primarily the rate at which program participants would have installed the measures without the program, in order to produce a true measure of the program impacts on energy consumption.

Although NSTAR Electric scrutinizes the results and savings achieved by its energy efficiency programs, other uncertainties are introduced when considering energy efficiency as an alternative to the addition of transmission capacity. Specifically, energy-efficiency projects would need to be targeted at a much more precise capacity goal than the 345 kV transmission line, even if DSM were a feasible alternative. Because the margin of error is smaller, the load forecast becomes much more critical. A forecasting underestimate due to a summer of extreme weather, for example, or under-production of energy savings, could quickly erode the reliability of DSM initiatives in terms of meeting capacity needs.

Demand-response programs also have the potential to deliver predictable load reductions, as demonstrated by long-standing programs operating in diverse locations such as rural Georgia and urban Minnesota. Demand-response programs administered by Boston Edison in the past generally delivered between 70 and 100 percent of the enrolled load during an event and have been an important component of the Company's system planning efforts. However, demand-response programs are not a reliable resource where the capacity produced is insufficient to meet capacity requirements.

Because DSM project alternatives are insufficient to meet the identified transmission-capacity requirement, this project alternative does not compare favorably to the Project in terms of improving the reliability of the system. Specifically, DSM initiatives will not relieve transmission overloads projected to emerge beginning in 2006; (2) will not increase the diversity of supply available to the Greater Boston area; and (3) will not increase the import capability of the Greater Boston area.

3.4.4 Reliability – Distributed Generation

Distributed generation assets would need to be sited at very specific locations within the Greater Boston area to resolve each particular reliability issue. Some of the locations in which distributed generation would need to be sited would include urban neighborhoods, which poses a significant challenge in terms of emissions. Even if siting and permitting issues could be overcome, distributed generation has a scale disadvantage. Because most forms of distributed generation possess an electromechanical feature, there is the potential for the technology to break down and require maintenance. Therefore, the Company cannot expect to rely on distributed generation units placed in any particular location 100 percent of the time. As a result, to reach the capacity level required, more

nameplate capacity would have to be added than just enough to match the capacity need.

Given the potential for individual units to be out of service at any given time, and given the number of units that would be required to meet the identified need, the use of distributed generation alternatives to alleviate transmission overloads does not compare favorably to the Project. Like the DSM project alternative, the distributed generation project alternative is insufficient to meet the identified transmission-capacity requirement.

3.4.5 Reliability – New Generation Facility

Although the reliability of electric service in the region would, in general, benefit from the construction of a central station generating unit within the Greater Boston area, transmission overloads would persist in several areas outside of the Downtown Boston area. However, the addition of a new generating unit would increase the diversity of supply available to the Greater Boston area and would decrease the need for addition import capability of the Greater Boston area. Thus, the reliability of this project alternative is comparable to the Project.

3.4.6 Reliability – Overhead Transmission

Theoretically, a single overhead 345 kV circuit could provide the required transmission capacity. However, if it were to fail, all of the added capacity would be lost. Under the NEPOOL/ISO-NE reliability criteria, the Company's system must be able to withstand an N-1 contingency event. Recognizing this, a minimum of two overhead 345 kV circuits of comparable capacity would be needed. This alternative would also increase supply diversity and improve the import capability of the transmission system. Therefore, the overhead transmission alternative would be comparable to the Project in terms of improving the reliability of the system.

3.4.7 Reliability – Lower Voltage Transmission

To provide a level of transmission capacity equal to the Project, a greater number of lower voltage lines would be employed. The installation of a greater number of lines would mean that there would be a higher availability of some level of transmission capacity in the event of a contingency. Accordingly, the reliability improvement associated with this project alternative would be comparable to the Project.

3.4.8 Reliability – Bundled Reconductoring and Expansion Project

The Company developed this project alternative to specifically address the localized reliability aspects of the need for transmission capacity. In that respect, the bundled reconductoring and expansion is comparable to the Project. However, this alternative increases dependence on the Tewksbury substation and does not result in the creation of a high-capacity import path from the south of Boston. Without the high-capacity import path, there is only a marginal benefit in terms of improving the import capability for the Greater Boston area, increasing the import capability by only 200 MW. Therefore, this alternative does not provide the added benefits of supply diversity and

security, which are components of reliable electric service. Accordingly, on an overall basis, the Project provides a higher level of reliability.

3.5 Comparison of Alternatives -- Cost

3.5.1 Cost -- Proposed 345 kV Transmission Project

The cost of the Project, including installation of the transmission circuits, switching station additions and substation modifications involved in the Project, is estimated at approximately $217 million. The breakdown of these costs is as follows:

Cost Category	Total Cost	Description
Stoughton Substation Development	$25.8M	Includes 345 kV Ring Bus, Termination of two existing 345 kV overhead lines, three new 345 kV underground cables, and four 160 MVAR 345 kV reactors
K Street Substation Expansion	$23.8M	Includes termination of two 345 kV underground cables, addition of two 550 MVA 345/115 kV autotransformers, addition of two 160 MVAR 345 kV reactors and reconfiguration of the existing 115 kV ring bus
Hyde Park Substation Expansion	$10.9M	Includes termination of one 345 kV underground cable, addition of one 550 MVA 345/115 kV autotransformer
345 kV Transmission Cable Construction	$147.1M	Includes construction of three 345 kV HPFF underground cables and addition of 115 kV heat exchangers to two existing 115 kV cables
Other Construction Costs	$5.2M	Includes additional costs such as adjacent station relay system upgrades and replacement of existing 345 kV breaker at Medway and Mystic Stations to IPT type breakers
Administrative and Licensing	$4.1M	Includes project management and federal and state licensing.
TOTAL	**$217.0M**	

3.5.2 Cost – No Build Alternative

Although there are no direct costs associated with the “No Build” alternative, the indirect costs would likely be significant. A failure to build new transmission capacity will result in system deficiencies and growing reliability issues such that loss of service would be experienced.

3.5.3 Demand-Side Management

In 2002, NSTAR Electric energy efficiency expenditures totaled $49.4 million, including marketing, implementation, customer incentives, performance incentives, evaluation, planning, and general administration. The total value of the benefits derived from the

programs was $144.7 million, resulting in an overall benefit-to-cost ratio of about 2.9. The program costs represent approximately $0.032 per kWh over the lifetime of the installed measures. Although it is not feasible to scale-up the Company's DSM initiatives to meet the identified need, the theoretical cost that would be incurred to produce the needed level of load reductions would substantially exceed the cost of the Project.

In 2002, ISO-NE system-wide expenditures for the DRP program were $2.8 million. Based on the Company's internal assessment, the incremental cost of a unit of load reduction (one kW of proven capacity per year) is about $20 per kW per year, when targeting 200 MW. Also, ISO-NE issued an emergency supplemental Demand Response RFP, which resulted in bids to provide demand response at an average cost of $47 per kW-Month (or about $188 per kW per year, assuming a four month critical period). Presuming the existing programs could be scaled up to meet the 560 MW minimum target, the budget of $24 million over five years would result in costs of about $80 million. However, the first kW "harvested" is less expensive than the last kW. Therefore, assuming price points of $150 per kW per year (similar to the Connecticut bids), the last 440 MW would cost $400 million over five years.

3.5.4 Distributed Generation

The following is a summary of costs associated with each form of technology. Efficiency and installed costs were derived by averaging data from year 2000 with that projected for year 2010.

	Size in MW		Fuel Efficiency	Installed Cost ($/kW)	Total Operating Cost ($/kWh)	
Type of DG	**Low**	**High**			**Low**	**High**
Reciprocating Engine Gas-Fired	0.005	20	29%	$1,270	0.064	0.094
Oil-Fired/Diesel	0.05	10	36%	$1,000	0.054	0.093
Combustion Turbines	0.5	100	23.50%	$1,522.00	0.063	0.137
Microturbines	0.005	0.3	28.50%	$1,653	0.064	0.15
Fuel Cells	0.001	10	39.50%	$3,000	0.04	0.108
Wind Turbines	0.001	240	NM	$1,770	0.008	0.015
Photovoltaic	0.0001	0.1	16%	$6,700	0.021	0.021
Typical T&D Costs						
Transmission	600			$58		
Substations	100			$320		
Distribution	5	10		$133		
Total T&D				**$511**		

Distributed Generation, as an alternative to the proposed transmission line, would require attracting investors to invest in construction of regional generation. For example, combustion turbines at an installed cost of $1,522 per kW, the cost of constructing enough capacity to equal the import requirement of 800 MW would be substantial, assuming acceptable siting and permitting could be obtained. The most inexpensive source are diesel generators at an installed cost of $1,000 per kW. The installed cost of the various turbine technologies ranges from $1,000 to $1,650 per kW. Fuel cells are on the order of $3,000 per kW and photovoltaics exceed $6,000 per kW. In addition, each technology would incur an annual operating cost of $0.04 to $0.065 per kWh. Taking into consideration only the installed cost, the capacity needed to meet the identified requirement equal to the Project would be exponentially more expensive in comparison to the Project.

3.5.5 New Generation Facilities

The cost to establish new central station generation includes the development cost of permitting and construction, as well as a variety of emission control requirements reflective of siting a large-scale generating facility in an urban environment. NSTAR Electric is not in a position to estimate the cost of constructing a central generation station.

3.5.6 Overhead Transmission

The project alternatives investigated included the construction of new 345kV transmission facilities, selected reinforcement of the 115kV system to address reliability issues, and various forms of Distributed Generation and Demand Side Management. The 345kV transmission alternative evaluated technology alternatives, route alternatives and the potential to construct overhead or underground lines.

Overhead transmission is substantially less expensive than underground transmission when opportunities exist for these technologies to be constructed side by side. A single 345 kV overhead circuit, using steel-pole technology would cost approximately $1.35 million per mile without consideration of the cost of obtaining right-of-ways. A single underground 345 kV circuit would cost approximately $3.3 million per mile and would have about 1/3 the capacity of the overhead line. To bring the 345 kV underground circuits to a comparable capacity, installation of the three underground circuits, installed in a common trench, would cost approximately $7.1 million per mile. In this case, two overhead circuits would be required. However, no appropriate transmission right of way exists into the Downtown Boston area.

Overhead transmission construction was considered both as the possibility of building lines overhead the entire distance of new lines from the Southern portion of the existing 345 kV transmission network into Boston or by building part of the distance overhead and continuing the remainder of the way with underground lines. In either situation the major impediment to the overhead transmission alternative is the lack of overhead right of way entering or approaching the City of Boston. Transmission right of way does ring the City at a distance of 15 to 20 or miles outside of the City limits. However, that right of way has been enveloped by suburban sprawl in most directions. What might have been potential open space corridors in the past are now largely residential neighborhoods, commercial areas or green belt parks/reservations.

An overhead alternative would be to roughly mirror the proposed route with a R/W through Canton, Milton and into the City neighborhoods of Mattapan, Hyde Park, Dorchester and ultimately South Boston. There is no right of way there now. That path is similar to the Interstate 95 corridor as it approaches the City of Boston from the South. Over 40 years ago the Federal government began acquiring land for what was to become Interstate 95 through wetlands along the Neponset River up to Route 128/93. The land north of this intersection is now a wildlife reservation and protected watershed. The plan was to extend from Route 128 across the wetlands and acquire properties in Hyde Park, West Roxbury and Roxbury such that the interstate highway would connect to an inner ring near what is now Melnea Cass Blvd. The plan was abandoned by the Federal government over 20 years ago because of the intense cost and difficulty to obtain the needed right of way for the route.

Acquiring a transmission right of way along that path or a similar path would face even greater resistance, cost and time if attempted now. Moving farther east to parallel Route 138 would require extensive acquisitions and/or eminent domain property takings in

Milton, Randolph, and Stoughton. Acquiring new right of way into the City of Boston from the south in the vicinity of Stoughton, MA would likely take many years to complete and cost easily in the order of hundreds of millions of dollars. For these reasons, the overhead alternative was not pursued as a viable alternative.

Another option was to develop and extend an existing right of way from a different direction for a portion of the route and continue the lines underground from the end of the right of way to the final termination points. Two rights of way converge from the southwest. The first is from Framingham to Needham and the second is from West Walpole to Westwood.

The first is too narrow to support additional development. It coexists with a railroad right of way used heavily by commuter rail. That path traverses the communities of Sherborn, South Natick, and Dover. Expansion of the right of way would require extensive and difficult negotiations with low likelihood of success, given the aggressive resistance of those communities to previous attempts to construct overhead transmission. Even if additional right of way could be obtained, the narrow right of way continues east through the center of the Town of Needham and many properties are built right to the edge of the route. This concept was also rejected as infeasible.

The second concept was to use the 10-mile right of way from West Walpole to Westwood. This path approaches the City of Boston in an oblique manner, such that once at the northern terminus of the right of way, the K Street Substation destination is still nearly 15 miles away. The northern terminus of the right of way is densely populated. Continuing the right of way north toward Needham Substation has been attempted in the past without success and is not a feasible option.

This concept was investigated further, however, to consider acquiring additional right of way in the direction of the Baker Street Substation to the east as a terminal point for one of the transmission lines. These points are about 3 ½ miles apart and the properties separating the points consist of a combination of estates and State conservation property. It is estimated the process of acquiring or taking the necessary right of way would take many years and cost in excess of $60,000,000. Approaching the Westwood end of the existing right of way would be further complicated by the need to clear additional right-of-way width of trees in Dover, Walpole, Medfield, Westwood, and through a Boy Scout reservation. These areas successfully resisted an overhead right-of-way width expansion 30 years ago and are expected to be at least as difficult now.

3.5.7 Lower Voltage Transmission

The cost of constructing an underground transmission circuit is a function of two factors: (1) the cost of construction materials; and (2) the cost of trenches and manholes to enable its installation. A single 345 kV underground circuit would cost approximately $3.3 million per mile. It would take three 115 kV circuits to match that capacity. Assuming three circuits would be in a common trench, the 115 kV alternative would cost $5.4 million per mile as compared to each underground circuit. Given that a maximum

of three circuits would be placed in a common trench, the 115 kV underground option would require as many as three sets of trenches/routes to support up to nine circuits.

In addition, development of this project alternative would include the following to achieve objectives comparable to the Project:

- The lower voltage alternative would still require the construction of a switching station site at the origination point. However, instead of 345 kV circuits, a like number of 345 kV transformers would be installed. A new 115 kV portion of the station would have to be created, which would nearly double the overall site space requirements. That 115 kV station would need to accommodate up to 12 positions: 9 for the new 115 kV circuits and one each for the transformers connecting it to the 345 kV system. Although the cable charging from the 115 kV circuits would not be as great as that for 345 kV, 115 kV reactors would still be needed. A general estimate of the resulting station would be on the order of $25M. The K Street substation would not require transformers, but much of the same bus work and breakers would be required to terminate potentially 6 of the 115 kV circuits. Again, the cost would likely be as much as $20M. The Hyde Park substation would also be scaled down to three 115 kV circuit positions and no 345 kV transformer. The heat exchangers would still be required at the Hyde Park and Baker Street substations, adding $2.3 million to the overall cost. The remaining station upgrades would cost in the range of $5 million.

- The 115 kV underground transmission circuits would consist of six to K Street and three to the Hyde Park substation with a total cost of approximately $218 million (48,000 feet of 9 circuits, 11,000 feet of 3 circuits and 34,000 feet of 6 circuits – based upon a mirror image of the Preferred Route). This would bring the combined station and line cost to approximately $270 million. Based upon this high cost and the greater scale of street disruption associated with this approach, this project alternative was not further developed.

3.5.8 Bundled Reconductoring and Expansion Project

The aggregate cost of the bundled reconductoring and expansion project alternative is $216.5 million, which is comparable to the Project. However, this alternative produces an increase in the import capability for the Greater Boston area of only 200 MW, as compared to the Project, which will improve area import capability by at least 1,000 MW, when completed.

Sub-Area	Overloaded Facilities	Proposed Upgrade	Cost
Downtown Boston	345 kV lines 324/372	2-345 kV circuits (6 to 7 miles in city streets)	$42.2M
	Kingston St Autotransformers	2-345 kV breakers and gas bus extension Mystic Station	$8M
	Mystic Autotransformer	2-345/115 kV Autotransformers, 5 345 kV breakers, splitting 115 kV bus K St Station	$19M
	115 kV lines 385-510/511 250-516/517 329-510-511	2-160 MVAr Reactors K Street Station	$3.5M
345 kV Northern Transmission Loop	345 kV line 349XY	Add heat exchangers at Mystic and Saugus Stations	$2.3M
	345 kV lines 345/365	Replace the conductors of 345 kV circuits #346 and #365 for a distance of 6 miles	$23.1M
Baker Street Substation	115 kV lines 110-510/511	Add 2 115 kV underground circuits (4 miles each from Needham to Newton, or alternatively to West Roxbury)	$23M
		Expand 115 kV Station 292, Newton – complete 6 breaker ring, install retaining walls and relocate existing lines	$2.3M
		Expand 115 kV Station 148, Needham, expand property, convert to an 8 breaker ring	$1.1M

Sub-Area	Overloaded Facilities	Proposed Upgrade	Cost
		Install 2 parallel 115 kV underground circuits from Waltham to Watertown, 5 miles each, disconnect Watertown ends of 2 circuits to Brighton, reconductor those 115 kV lines ~ 2.5 miles each and connect to the new circuits from Waltham	$41.4M
115 kV System in Greater Boston	115 kV lines 282-520/521	Expand Waltham station to add 2 115 kV circuit positions	$1.4M
		Add 115 kV underground circuit from Brighton to North Cambridge ~ 3 miles, expansion potential of Brighton may not enable this addition and require replacement of conductors on other lines	$13.5M
	115 kV line 329-530		
Southern Import Capability	115 kV line 148-522	Add 2nd 115 kV line for 10.5 miles in parallel with existing overhead/underground line	$16.5M
		Expand 115 kV at Station 447, Walpole and Sta 148, Needham for one circuit position at each	$1M
	Walpole 345 kV Transformer	Add 2nd Walpole 345-115 kV transformer and two 345 kV breakers	$4.2M
	West Medway 345 kV transformers	Replace both transformers	$9M
Total Of All Projects Administrative And Licensing Costs		Includes project management and federal and state licensing for each of the above projects.	$5M
Total Bundled Project Costs			**$216.5**

3.6 Comparison of Alternatives – Operating Costs

3.6.1 Underground 345kV solution

The proposed project facilities are consistent with existing 345 kV HPFF cable and substation facilities owned and maintained by NSTAR Electric. The operating costs of this type cable system are associated with maintaining the dielectric fluid support systems and ensuring integrity in the cathodic protection systems. Maintenance and operation of the circuit breakers, reactors and transformers are similar to that of other existing breakers, transformers and reactors on the NSTAR Electric system. The primary difference in the proposed project equipment is the 345 kV 160 MVAR shunt reactors. These reactors have a variable output capability for compensation provided to the system. The compensation can be adjusted for approximately half the capability of

each unit in 2.7 MVAR steps over the last 70 MVAR of the reactor's compensation range.

3.6.2 Hybrid overhead/ underground 345kV solution

The hybrid solution involves construction of two overhead 345kV lines from Walpole to Westwood, expansion of Walpole substation, creation of a new Westwood substation, creation of 3 underground 345kV lines from Westwood to Baker Street and extension of two on to K Street, expansion of Baker Street substation and K Street substation. This solution calls for the construction/expansion of one more substation than the proposed solution and at least two more circuit positions. The substation related operating and maintenance costs would be incrementally greater than the proposed approach. The line related O&M would be increased because of the additional right-of-way maintenance that would be required along the widened 10-mile path from Walpole to Westwood.

3.6.3 Underground 115kV solution

In order to satisfy capacity and reliability requirements, significantly more circuits (perhaps as many as 7 or 8) would be needed to bring the same amount of additional capacity into the City at 115 kV as the Project will at 345 kV. This would require more than double the number of new breaker positions to be maintained as the 345 kV solution. Because these also would need to be run underground due to lack of rights-of-way, street routes would be used. However, the mutual heating of so many circuits in proximity to one another would actually reduce the capability of each circuit. This could be overcome by developing more street routes and manhole systems. It would likely triple the number of manholes requiring periodic inspections and would increase the cost of annual electrolysis surveys, cathodic protection systems and exposure to dig-ins.

3.6.4 Piecemeal 345 and 115 kV solution

The hybrid solution involves the construction of 2 new 345 kV underground lines (Mystic to K Street), 2 new 115 kV underground lines (Needham to Newton) and 1 overhead 115 kV line (Walpole to Needham), reconductoring of two 345 kV lines (North Cambridge to Woburn) and two 115 kV lines (Waltham to Watertown). This would yield at least ten circuit positions and just as many new autotransformers as the proposed solution. With these additional positions, the ongoing station maintenance would be at least 50% greater than that required of the proposed solution.

3.7 Conclusion

NSTAR Electric believes that the proposed project is required to ensure the safe and reliable delivery of power to homes and businesses within the City of Boston and its surrounding communities. Based on the material presented, NSTAR Electric believes that the proposed project provides the most cost effective and timely solution needed to

meet this need. The Project is consistent with engineering design and construction practices for the area and will provide significant improvements for the operation and maintenance of the transmission system. The proposed 345 kV transmission project represents an integrated solution to address potential overloads identified on a series of transmission facilities located in the City of Boston and adjacent areas beginning in 2006 and extending through 2013.

Section 4.0

Project Cost Summary Tables

345kV Transmission Line Project Substation Costs							
Location	**Element**	**Work Description**	**Quantity**	**Material**	**Contracted Services**	**NSTAR Labor**	**Total**
Station 330, Stoughton, MA	Real Estate	Purchase of substation site on SR 138 in Stoughton adjacent to existing OH ROW.	14 Acres	$0	$5,700,000	$0	$5,700,000
	Site Preparation	Grading, foundations, below grade electrical conduits, grounding, fencing	1	$0	$4,933,000	$0	$4,933,000
	Buswork, main current carrying conductors & structures	345kV Buswork and line entrances / exits are all AIS on lattice structures. Manually operated switches will be provided to allow isolation for future operations and maintenance. All electrical installation.	1	$1,096,000	$2,819,000	$0	$3,915,000
	Circuit Breakers	Single pressure freestanding SF6 insulated breakers will be used. Breakers for reactor switching (only) will be equipped with synchronous control.	11	$2,931,000	$0	$0	$2,931,000
	Reactors	Reactors are applied at the 345kV level to compensate for the charging current of the new cables. A variable shunt reactor (70- 160 MVAr) was chosen to allow for condition under the full range of load conditions without switching large blocks of reactance on and off. Four reactors will be used at this facility to provide for an n-1 design	4	$7,326,000	$0	$0	$7,326,000
	Relaying / Control	Two redundant high speed systems will be used on all elements to protect in accordance with NPCC requirements. Remote control & telemetering will be provided. Two DC systems will be provided in accordance with NPCC guidelines. This category includes all wiring and auxiliary equipment	1	$1,035,000	$0	$0	$1,035,000
		TOTAL STOUGHTON		**$12,388,000**	**$13,452,000**	**$0**	**$25,840,000**
Station 496, Hyde Park (Boston), MA	Real Estate	Purchase of 15,000 sf of property from MWRA/DCAM to expand station.	15,000 sf	$0	$500,000	$0	$500,000

	Site Preparation	Grading, foundations, below grade electrical conduits, grounding, fencing.	1	$0	$931,000	$0	$931,000
	Buswork, main current carrying conductors & structures	A hybrid GIS / AIS will be used here due to space constraints. Transitions to autotransformer and existing 115kV buswork will be AIS to reduce complexity and cost of design the interface. (i.e. eliminates direct connect GIS). One connection to the existing 115kV system will be via AIS and the second will be via a solid dielectric cable (more expensive than AIS but less expensive than GIB) due to space constraints. Manually (motor operated in GIS) operated switches will be provided to allow isolation for future operations and maintenance. All electrical installation.	1	$4,885,000	$1,370,000	$0	$6,225,000
	Circuit Breakers	Single pressure SF6 insulated breakers in the GIS will be used. No reactor switching at this location. Note: Breakers are in GIS Cost	-	$0	$0	$0	$0
	Auto Transformers	All auto transformer sizing and tap ratings were developed by Planning. With regard to operation features, the cost drivers for this application were sound level as well as short circuit strength. Other operation features such as instrumentation packages have a minor influence on the costs.	1	$2,328,000	$0	$0	$2,328,000
	Relaying / Control	Two redundant high speed systems will be used on all elements to protect in accordance with NPCC requirements. Remote control & telemetering will be provided. Two DC systems will be provided in accordance with NPCC guidelines. This category includes all wiring and auxiliary equipment	1	$710,000	$0	$196,000	$906,000
		TOTAL HYDE PARK		**$7,923,000**	**$2,801,000**	**$196,000**	**$10,920,000**
Station 385, South Boston, MA	Real Estate	Will be built on land owned by the Company.	-	$0	$0	$0	$0
	Site Preparation	Grading, foundations, below grade electrical conduits, grounding, fencing	1		$5,755,000	$0	$5,755,000

	Buswork, main current carrying conductors & structures	All 345kV and 115kV buswork is and line entrances are AIS on lattice structures. The 345kV connections to the autotransformers and reactors will be via solid dielectric cable (more expensive than AIS but less expensive than GIB) since there is not opportunity for an open-air connection. The connection to the (existing) 115kV yard will be via overhead strain busses in AIS. Manually operated switches will be provided to allow isolation for future operations and maintenance. All electrical installation and 115kV Pipe Type Cable swaps.	-	$3,404,000	$3,986,000	$0	$7,390,000
	Circuit Breakers	Single pressure freestanding SF6 insulated breakers will be used. Breakers for reactor switching (only) will be equipped wit synchronous control.	9	$1,612,000	$0	$0	$1,612,000
	Auto Transformers	All auto transformer sizing and ratings and tap ratings were developed by Planning. With regard to operation features, the cost drivers for this application were sound level as well as short circuit strength. Other operation features such as instrumentation packages have a minor influence on the costs.	2	$4,919,000	$0	$0	$4,919,000
	Reactors	Reactors are applied at the 345kV level to compensate for the charging current of the new cables. A variable shunt reactor (70- 160 MVAr) was chosen to allow for condition under the full range of load conditions without switching large blocks of reactance on and off.	2	$3,763,000	$0	$0	$3,763,000
	Relaying/Control	Two redundant high speed systems will be used on all elements to protect in accordance with NPCC requirements. Remote control & telemetering will be provided. The existing DC systems and (vacant space) in an existing control enclosure will be used. This category includes all wiring and auxiliary equipment	1	$356,000	$0	$0	$356,000
		TOTAL SOUTH BOSTON		**$14,054,000**	**$9,741,000**	**$0**	**$23,795,000**
Other	Engineering	Substation design to be performed jointly between internal resources and outside specialists		$0	$146,000	$1,284,000	$1,430,000
	Field Supervision	Aggressive contract management and field inspection to ensure quality work		$0	$0	$1,868,000	$1,868,000

	Relay modifications	Relay modifications at West Walpole & Holbrook Substations for sectionalizing Line 316 with Stoughton Substation	2	$44,000	$38,000	$75,000	$157,000
	Circuit Breaker Replacements	Medway & Mystic Station Circuit Breakers	4	$744,000	$708,000	$318,000	$1,770,000
				$788,000	**$892,000**	**$3,545,000**	**$5,225,000**
				Material	**Contracted Services**	**NSTAR Labor**	**Total**
SUBSTATION TOTALS	Stoughton			$12,388,000	$13,452,000	$0	$25,840,000
	Hyde Park			$7,923,000	$2,801,000	$196,000	$10,920,000
	K Street			$14,054,000	$9,741,000	$0	$23,795,000
	Other			$788,000	$892,000	$3,545,000	$5,225,000
		TOTAL SUBSTATION		$35,153,000	$26,886,000	$3,741,000	$65,780,000

345kV Transmission Line Project Transmission Costs							
Project Elements		**Work Description**	**Quantity**	**Material**	**Contracted Services**	**NSTAR Labor**	**Total**
Civil Work							
	Soil Testing	Test borings for soil characterization will be performed every 500 ft for the length of the route - this amounts to approximately 200 4 inch diameter, x 4 ft deep borings - to be used to determine soil contamination and appropriate disposal methods and to determine water levels for the trench dewatering plan	200 units		$260,000		$260,000
	Trench excavation	Three basic trench configurations will be excavated (1) 4ft wide by 6.5 Ft deep for 57,000 ft for three pipes, (2) 4 ft by 5 ft for 34,000 ft for portions with two pipes and 3 ft by 5 ft for 4500 ft for single pipe installation. In limited locations a 5 ft wide by 3 ft deep trench will be used.These depths minimize the amount of excavated material and will skirt above some underground congestion	81,000 cubic yds		$29,290,000		$29,290,000
	Rock excavation	Rock outgroppings are unavoidable along a limited portion of the route. Mechanical excavation of rock in the trench along portions of Cummins Highway and Rt 138 will be performed rather than blasting to minimize impact on adjacent utilities.	7,400 cubic yds		$4,050,000		$4,050,000
	Manhole installation	Manholes will be sited approximately 3,000 ft apart. They will be prefabricated concrete unless space is particularly tight and cast in place becomes needed. Each will be approximately 10 ft x 20 ft x 10 ft. Each manhole will accommodate all circuits in that street and contain splices for each circuit.	31 manholes	$550,000	$1,810,000		$2,360,000
	Soil Disposal	Materials removed from the trench will be tested and trucked to disposal sites- charge includes trucking and landfill fees. No exceptional contamination has been identified to suggest more expensive disposal is needed. The route was developed to avoid known areas of contamination.	81,000 cubic yds		$3,310,000		$3,310,000
	Pipe Installation	Steel pipe 8 5/8th inch OD , prytec coated, to be delivered to the work sites in 50 ft lengths, welded in the trench and X-ray'd to prove welds and then pressure and vacuum tested to assure continuity before cable installation. The piping system will include a cathodic protection system to minimize the effects of corrosion on the pipe surface.	240,000 ft	$4,760,000	$14,000,000		$18,760,000
	Backfilling	Stable backfill required to minimize street settling following excavation, flow - fill concrete specified to within 3 inches of trench top	78,000 cubic yds		$7,120,000		$7,120,000

	Bridge crossings	Crossing of Neponset river, 2 railroad bridges , the Southeast Expressway and directional drilling under Rt 128/95			$790,000		$790,000
Electrical work							
	Cable	2500 kcmil copper PPP 345kV cable specified , Pipe type cable at 345kV has over 25 years of operating experience on NSTAR system and has proven reliable. Solid dielectric alternative has too little world wide experience to be assured of the same performance at this time	755,000 ft	$47,920,000			$47,920,000
	Cable terminations	Porcelain potheads required to terminate each electrical phase- 3 circuits	18 terminations	$1,170,000	$290,000		$1,460,000
	Cable pulling		81 pulls		$3,740,000		$3,740,000
	Cable splicing	Each cable splice is a 24 hour a day operation lasting up to 8 days for a single circuit	78 3 phase splices	$1,090,000	$7,360,000		$8,450,000
Hydraulic System							
	Pumping plant	A pumping plant will be required at Sta 330, Stoughton to maintain dielectric fluid pressure and full insulation of the cables. It will have a compressed Nitrogen backup pressurizing system for use in the event of a power failure to ensure integrity of the cable system.	1 unit	$410,000	$170,000		$580,000
	Heat Exchanger	A heat exchanger will be required at Baker St substation and at Hyde Park substation to maintain cooling on 115kV underground lines 496- 528 and 496-529, which will carry a large portion of the output of the 345kV autotransformer being installed at Hyde Park Substation.	2 units	$1,440,000	$760,000	$90,000	$2,290,000
	Dielectric Fluid	each pipe will be filled with dielectric fluid maintained at 200 psi to insulate the cables. Pressurization monitoring, temperature monitoring and leak detection systems will be employed to support operations	410,000 gallons	$1,720,000			$1,720,000
	Miscellaneous			$370,000	$230,000		$600,000

Other							
	Police details	Under Mass Law Police details will be maintained at all street construction sites to maintain public safety and traffic flow			$1,280,000		$1,280,000
	Street repaving	Heavy traffic routes will require repaving to ensure integrity of the streets			$8,060,000		$8,060,000
	Engineering	Line design to be performed jointly between internal resources and outside specialists			$1,140,000	$1,200,000	$2,340,000
	Easement	Easements at Morton St. Police VFW and at Cummins Hwy shopping center			$250,000		$250,000
	Field Supervision	Aggressive contract management and field inspection to ensure quality work			$2,490,000		$2,490,000
		Total Transmission n Lines Cost					**$147,120,000**
		Total Project Substation Costs					**$65,780,000**
		Total Administrative and Licensing					**$4,100,000**
		Total Project Costs					**$217,000,000**

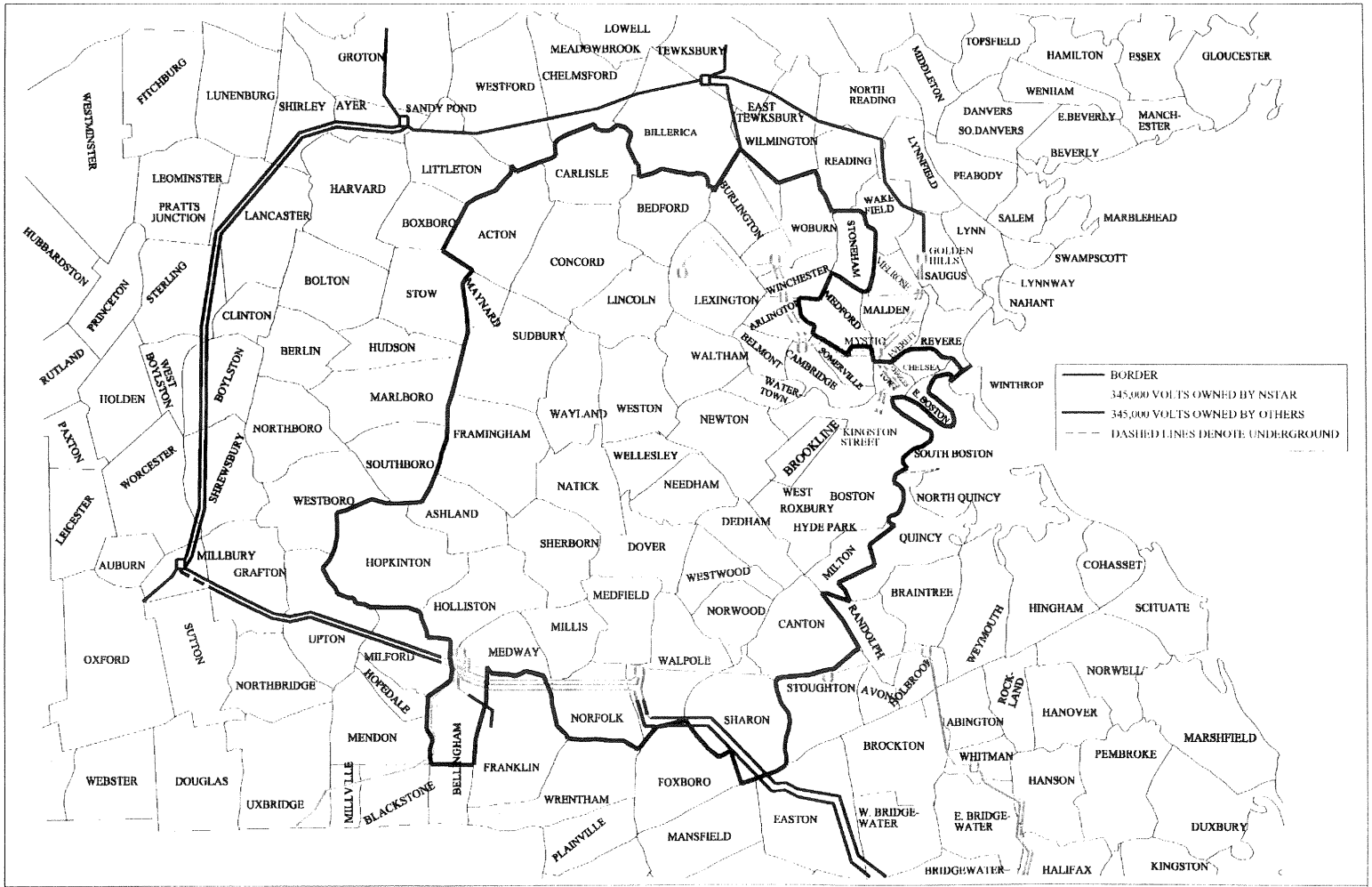

FIGURE 1-1
NSTAR Electric 345 kV Transmission Reliability Project
Eastern Massachusetts 345 kV System Layout
11-24-03

NSTAR ELECTRIC GAS

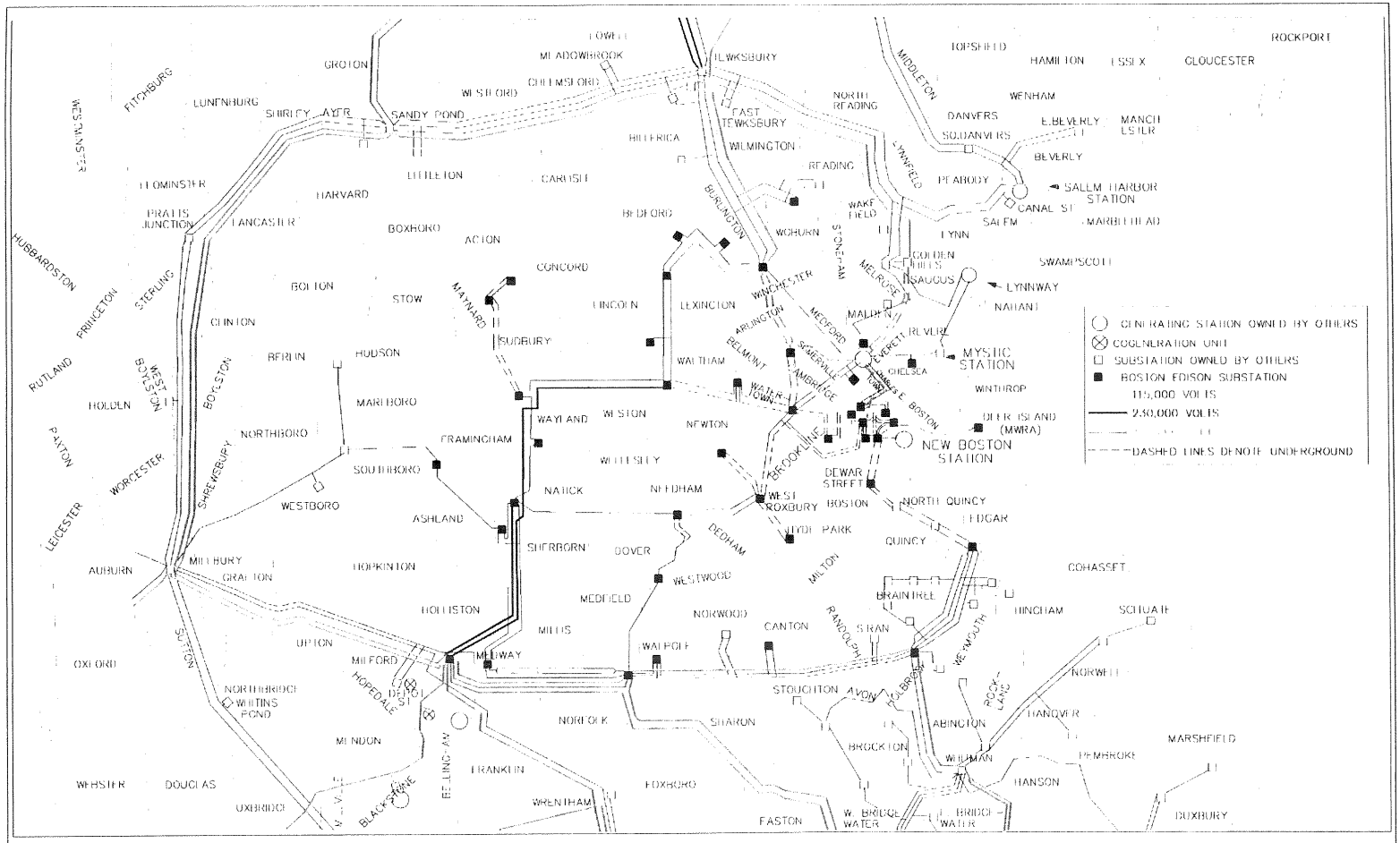

FIGURE 1-2
NSTAR Electric 345 kV Transmission Reliability Project
Eastern Massachusetts 345/230/115 kV Systems Layout
11-24-03

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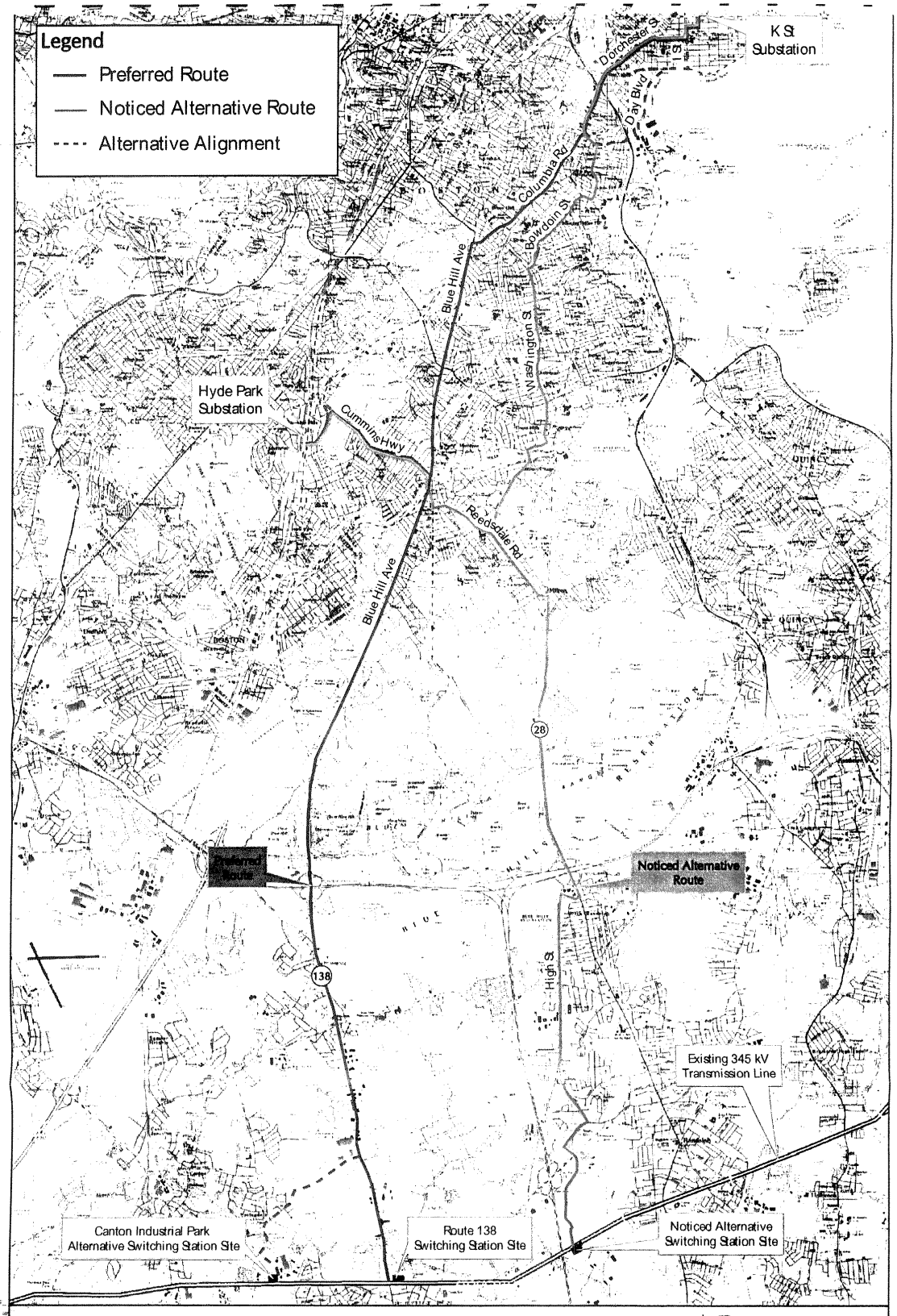
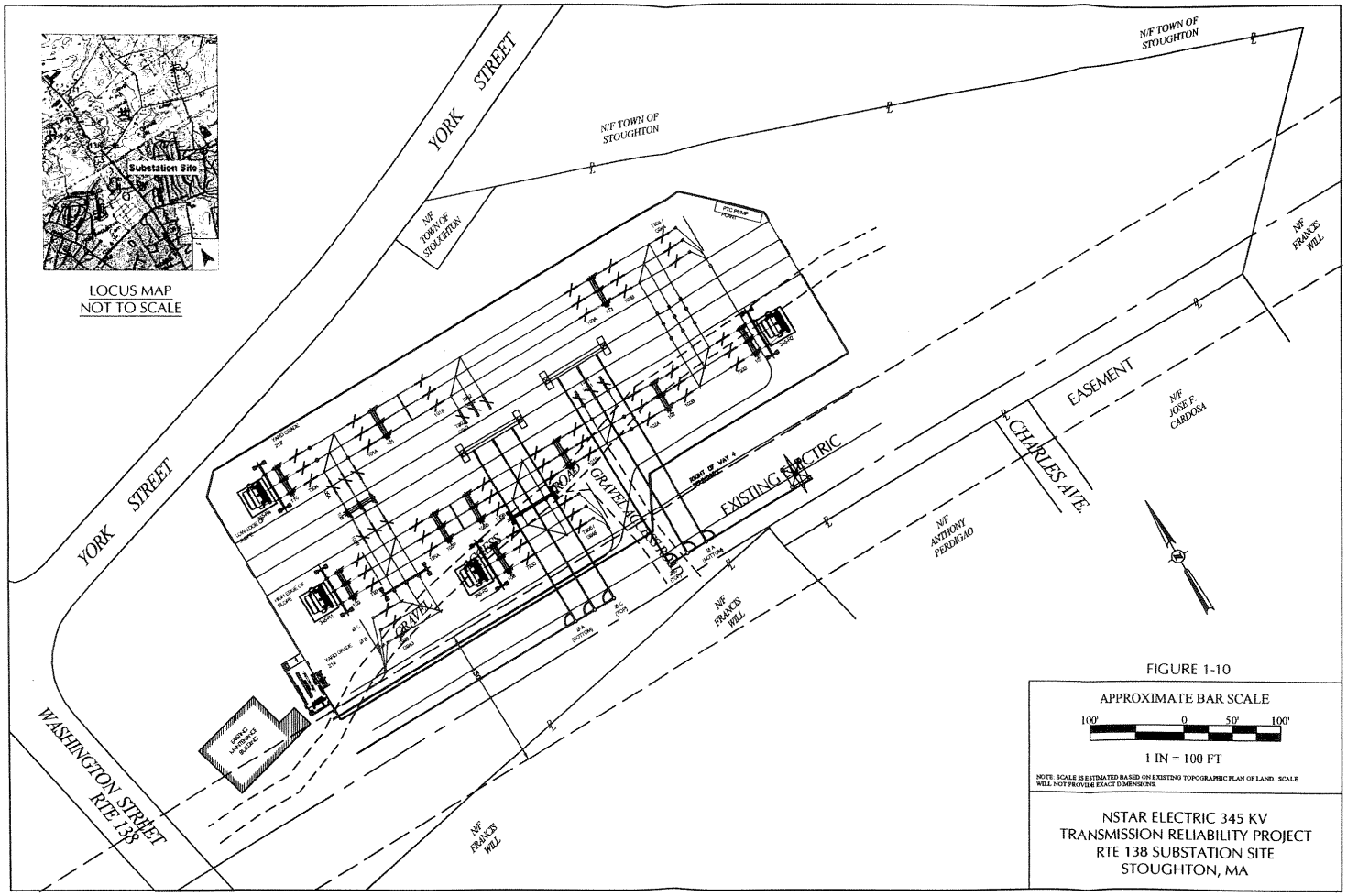


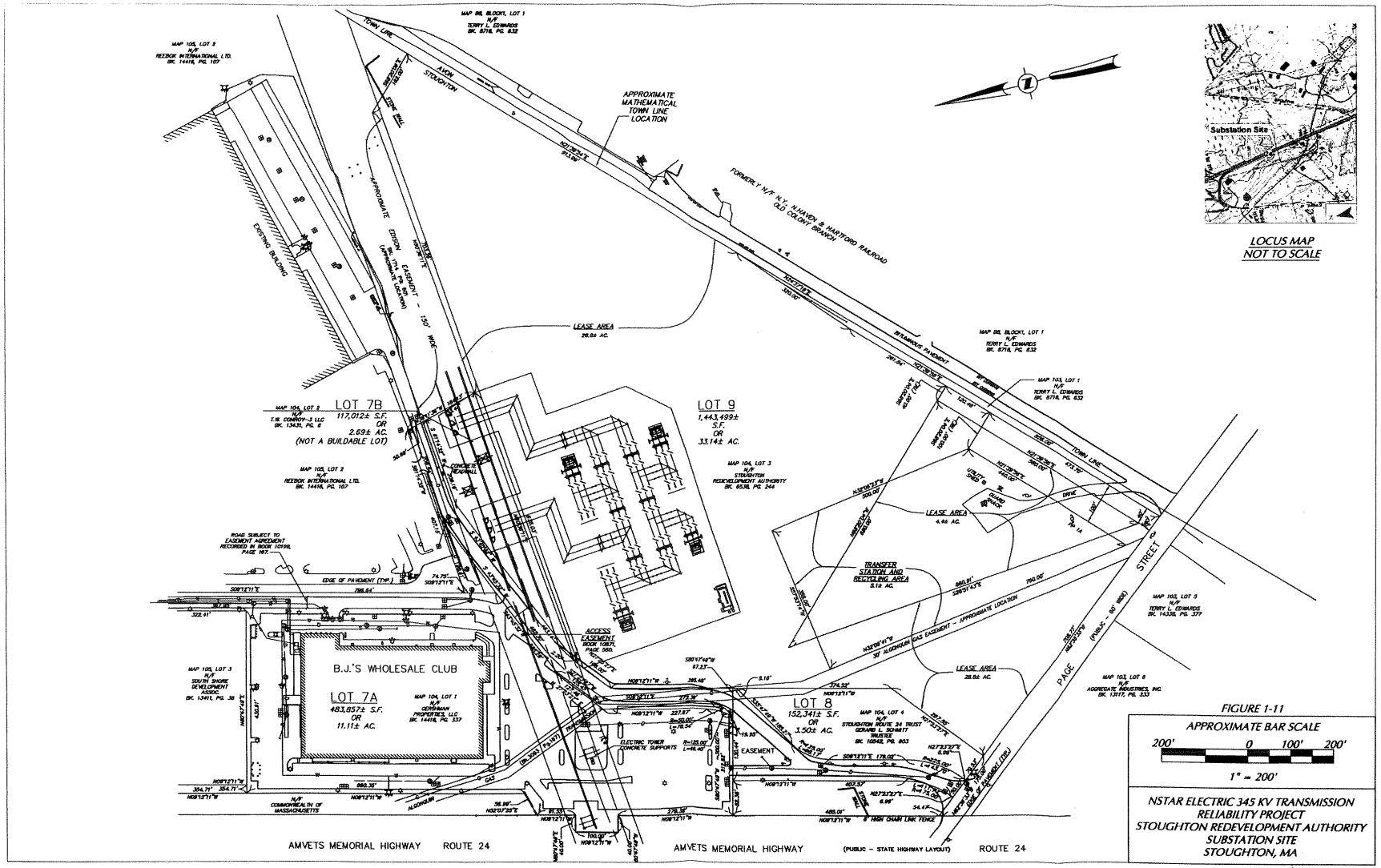
Figure 1-3
Preferred Route and Noticed Alternative Route

NSTAR Electric 345 kV Transmission Reliability Project

NSTAR ELECTRIC

Shaw The Shaw Group Inc. EPSILON


Substation Site
LOCUS MAP
NOT TO SCALE
YORK STREET
YORK STREET
WASHINGTON STREET
RTE 138
N/F TOWN OF STOUGHTON
N/F TOWN OF STOUGHTON
N/F TOWN OF STOUGHTON
N/F FRANCIS WILL
N/F FRANCIS WILL
N/F FRANCIS WILL
EASEMENT
CHARLES AVE.
N/F JOSE F. CARDOSA
N/F ANTHONY PERDIGAO
EXISTING ELECTRIC
GRAVEL ACCESS ROAD
GRAVEL
HISTORIC MASSACHUSETTS RAILROAD
FIGURE 1-10
APPROXIMATE BAR SCALE
100' 0 50' 100'
1 IN = 100 FT
NOTE: SCALE IS ESTIMATED BASED ON EXISTING TOPOGRAPHIC PLAN OF LAND. SCALE WILL NOT PROVIDE EXACT DIMENSIONS.
NSTAR ELECTRIC 345 KV
TRANSMISSION RELIABILITY PROJECT
RTE 138 SUBSTATION SITE
STOUGHTON, MA



LOCUS MAP
NOT TO SCALE

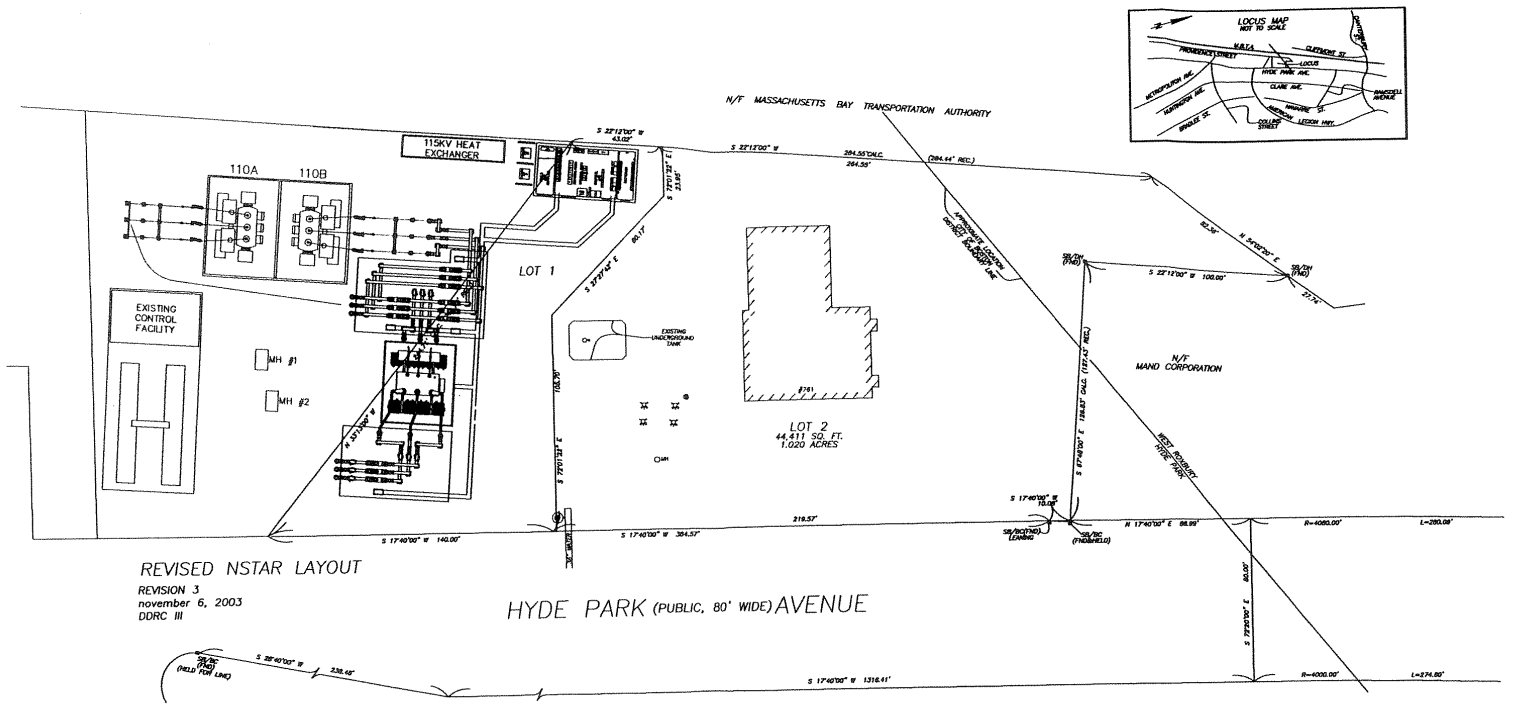
FIGURE 1-11

APPROXIMATE BAR SCALE

200' 0 100' 200'

1" = 200'

NSTAR ELECTRIC 345 KV TRANSMISSION RELIABILITY PROJECT
STOUGHTON REDEVELOPMENT AUTHORITY SUBSTATION SITE
STOUGHTON, MA



REVISED NSTAR LAYOUT

REVISION 3
november 6, 2003
DDRC III

PROPERTY REFERENCES
SUFFOLK COUNTY REGISTRY OF DEEDS
BOOK 3560 PAGE 41
7069 357
16699 186
18594 287
19234 255

NORFOLK COUNTY REGISTRY OF DEEDS
BOOK 3569 PAGE 473 (TAKING ID #140)

PLAN BOOK 5 PAGE 200

CITY OF BOSTON ENGINEERING DEPARTMENT
FIELD BOOK 629 PAGES 27 AND 29

L-PLAN NO. 4139
7090
7655

FIGURE 1-12

NOTE: EXISTING STRUCTURES AT 761 HYDE PARK AVENUE ARE SHOWN IN GRAYSCALE	APPROXIMATE BAR SCALE 50' 0 25' 50' 1" = 50'
SOURCE: HARRY R. FELDMAN, INC. 112 SHAWMUT AVENUE SUBDIVISION PLAN OF LAND 761 HYDE PARK AVENUE	NSTAR ELECTRIC 345 KV TRANSMISSION RELIABILITY PROJECT HYDE PARK SUBSTATION MODIFICATIONS 761 HYDE PARK AVENUE BOSTON, MA

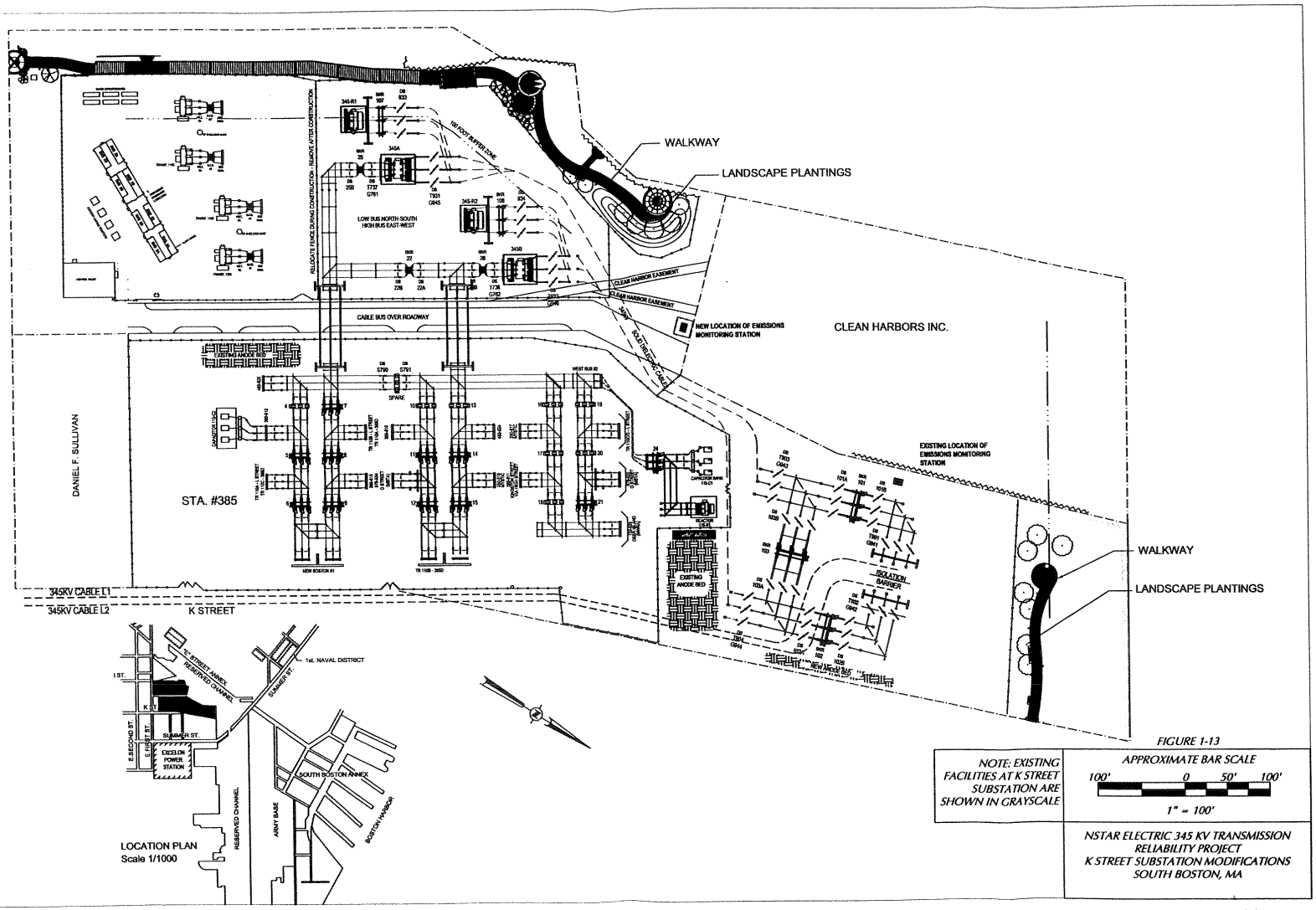


FIGURE 1-13

NOTE: EXISTING FACILITIES AT K STREET SUBSTATION ARE SHOWN IN GRAYSCALE

APPROXIMATE BAR SCALE

100' 0 50' 100'

1" = 100'

NSTAR ELECTRIC 345 KV TRANSMISSION RELIABILITY PROJECT
K STREET SUBSTATION MODIFICATIONS
SOUTH BOSTON, MA

Section 2.0 Figure List

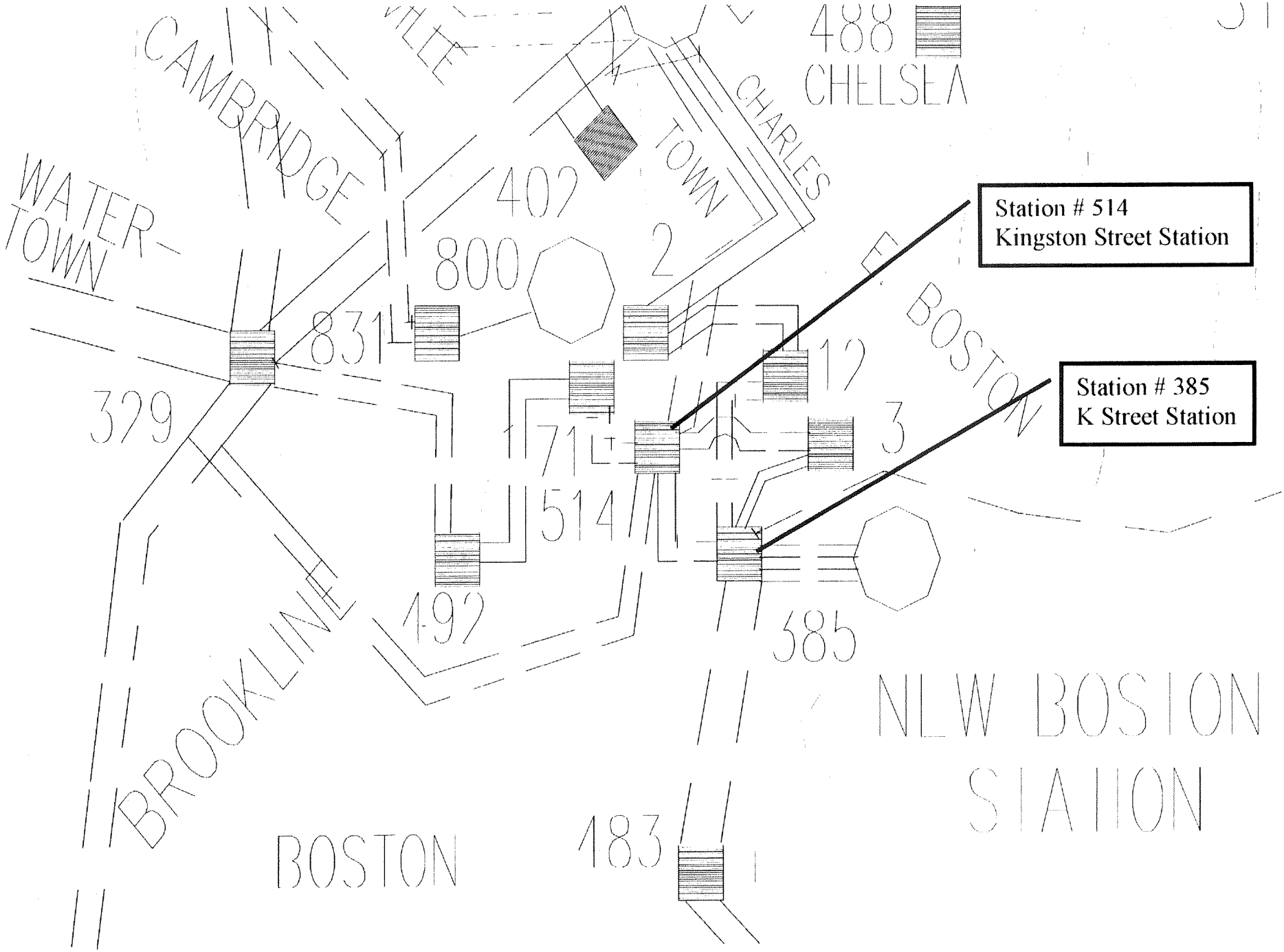

CAMBRIDGE
WATER-
TOWN
BROOKLINE
BOSTON
CHELSEA
TOWN
CHARLES
E. BOSTON
NLW BOSTON
STATION
488
402
800
2
831
329
12
71
3
514
192
385
183
Station # 514
Kingston Street Station
Station # 385
K Street Station

Figure 2-1

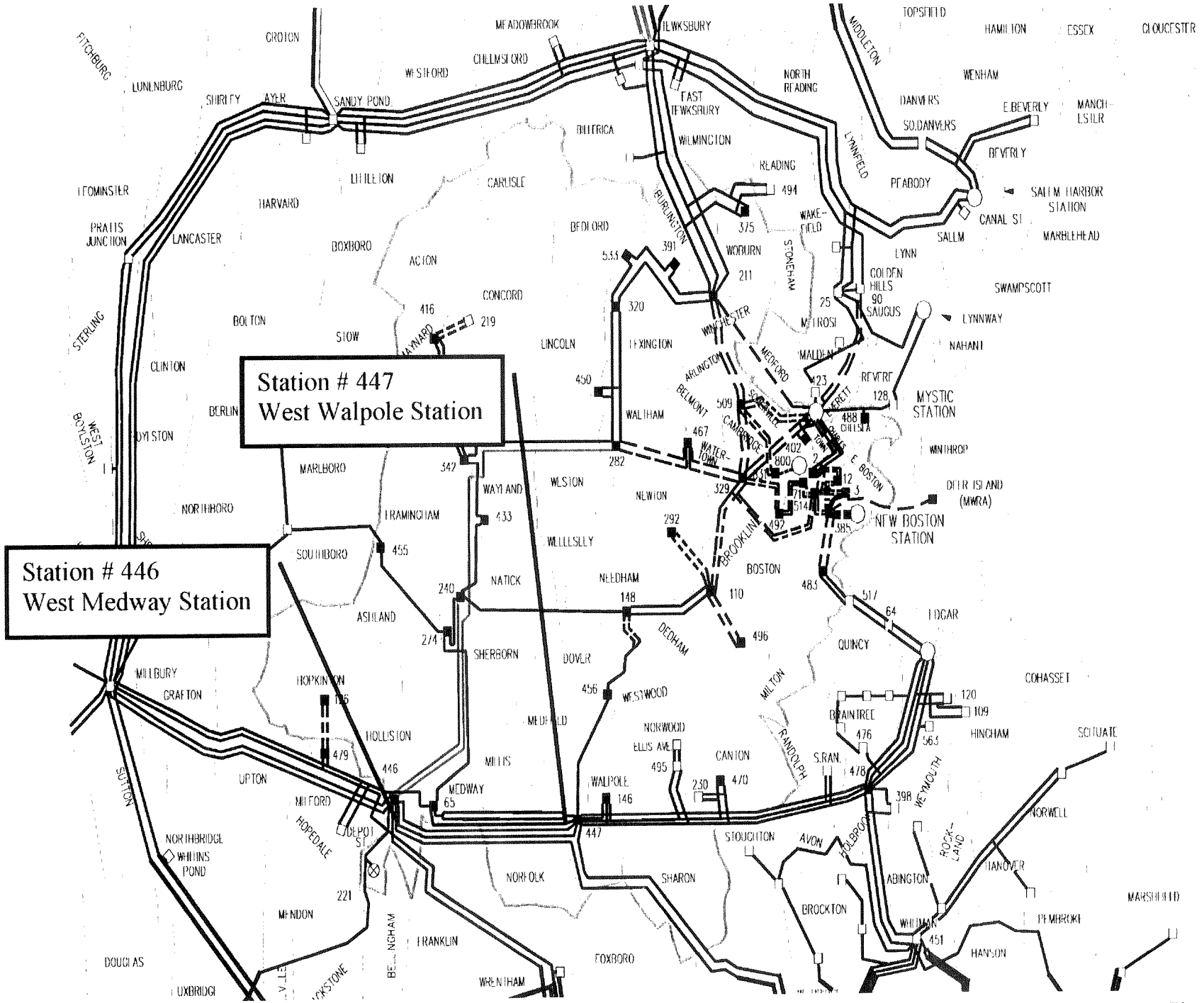

Station # 447
West Walpole Station
Station # 446
West Medway Station
FITCHBURG
GROTON
MEADOWBROOK
TEWKSBURY
TOPSFIELD
HAMILTON
ESSEX
GLOUCESTER
LUNENBURG
SHIRLEY
AYER
SANDY POND
WESTFORD
CHELMSFORD
NORTH READING
MIDDLETON
WENHAM
DANVERS
E.BEVERLY
MANCHESTER
SO.DANVERS
BEVERLY
BILLERICA
EAST TEWKSBURY
WILMINGTON
READING
LYNNFIELD
PEABODY
SALEM HARBOR STATION
CANAL ST
SALEM
MARBLEHEAD
LEOMINSTER
HARVARD
LITTLETON
CARLISLE
BURLINGTON
PRATTS JUNCTION
LANCASTER
BOXBORO
ACTON
BEDFORD
WAKEFIELD
WOBURN
STONEHAM
LYNN
GOLDEN HILLS
SAUGUS
SWAMPSCOTT
LYNNWAY
NAHANT
STERLING
BOLTON
STOW
CONCORD
HAYNARD
LINCOLN
LEXINGTON
WINCHESTER
MELROSE
MALDEN
ARLINGTON
MEDFORD
BELMONT
CAMBRIDGE
SOMERVILLE
EVERETT
CHELSEA
REVERE
MYSTIC STATION
CLINTON
BERLIN
WALTHAM
WATERTOWN
WINTHROP
WEST BOYLSTON
BOYLSTON
MARLBORO
WAYLAND
WESTON
NEWTON
E. BOSTON
DEER ISLAND (MWRA)
NORTHBORO
FRAMINGHAM
WELLESLEY
BROOKLINE
NEW BOSTON STATION
SOUTHBORO
NATICK
NEEDHAM
BOSTON
EDGAR
ASHLAND
SHERBORN
DOVER
DEDHAM
QUINCY
COHASSET
MILLBURY
GRAFTON
HOPKINTON
WESTWOOD
MILTON
BRAINTREE
HINGHAM
SCITUATE
HOLLISTON
MEDFIELD
NORWOOD
ELLIS AVE
CANTON
S.RAN.
RANDOLPH
WEYMOUTH
UPTON
MILLIS
MILFORD
MEDWAY
WALPOLE
HOPEDALE
DEPOT ST
STOUGHTON
AVON
HOLBROOK
ROCKLAND
NORWELL
HANOVER
NORTHBRIDGE
WHITINS POND
SUTTON
NORFOLK
SHARON
ABINGTON
MARSHFIELD
MENDON
FRANKLIN
BROCKTON
WHITMAN
PEMBROKE
DOUGLAS
UXBRIDGE
FOXBORO
WRENTHAM
HANSON

Figure 2-2

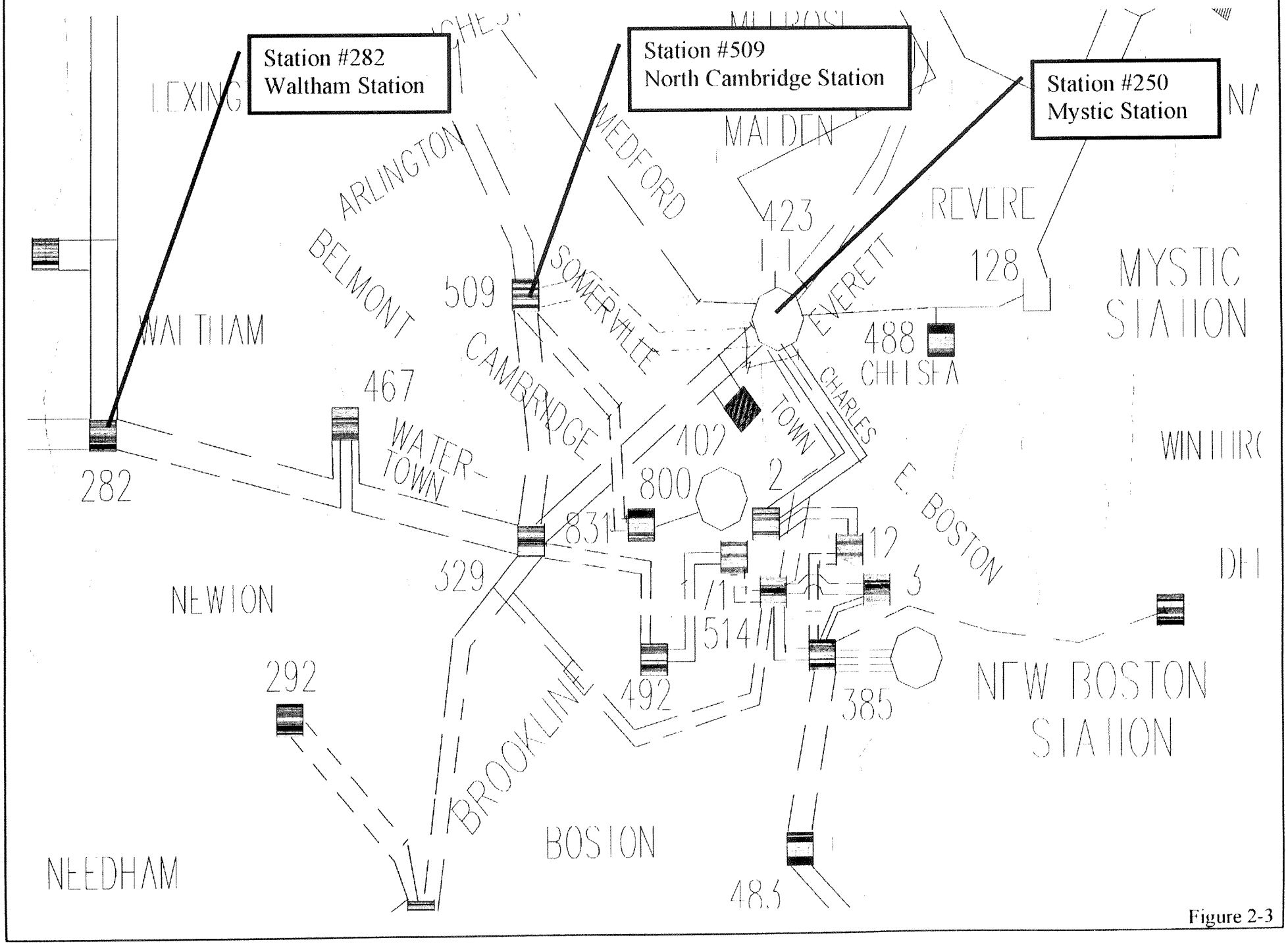

Station #282
Waltham Station
Station #509
North Cambridge Station
Station #250
Mystic Station
LEXING
ARLINGTON
BELMONT
WALTHAM
MEDFORD
MALDEN
SOMERVILLE
CAMBRIDGE
WATER-
TOWN
NEWTON
BROOKLINE
BOSTON
NEEDHAM
REVERE
EVERETT
CHELSEA
CHARLES
TOWN
E. BOSTON
MYSTIC
STATION
NEW BOSTON
STATION
282
467
509
423
128
488
102
800
2
831
12
329
514
492
385
292
485

Figure 2-3

Load Flow Plots
2006 Load Flow Cases

Index

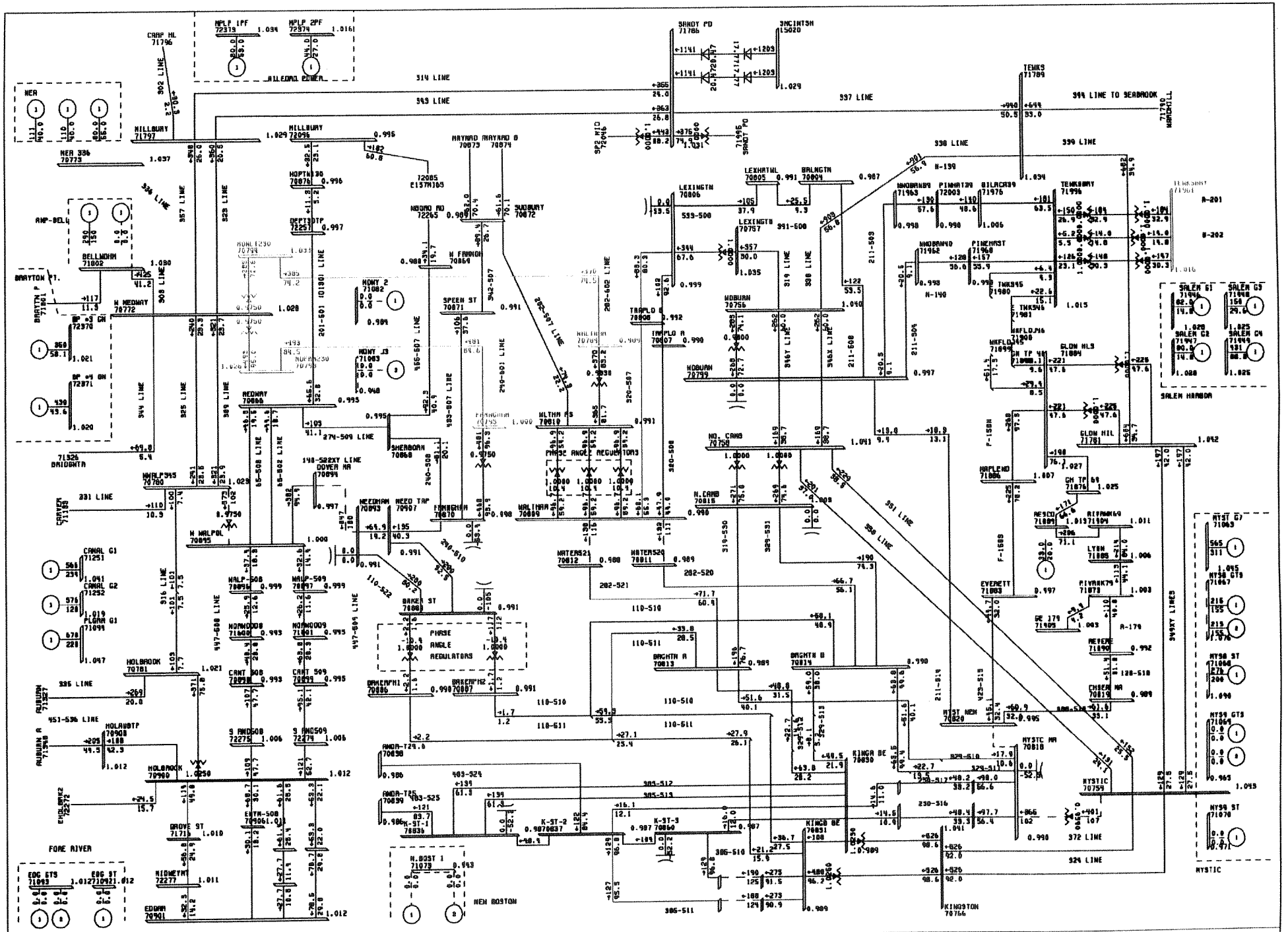
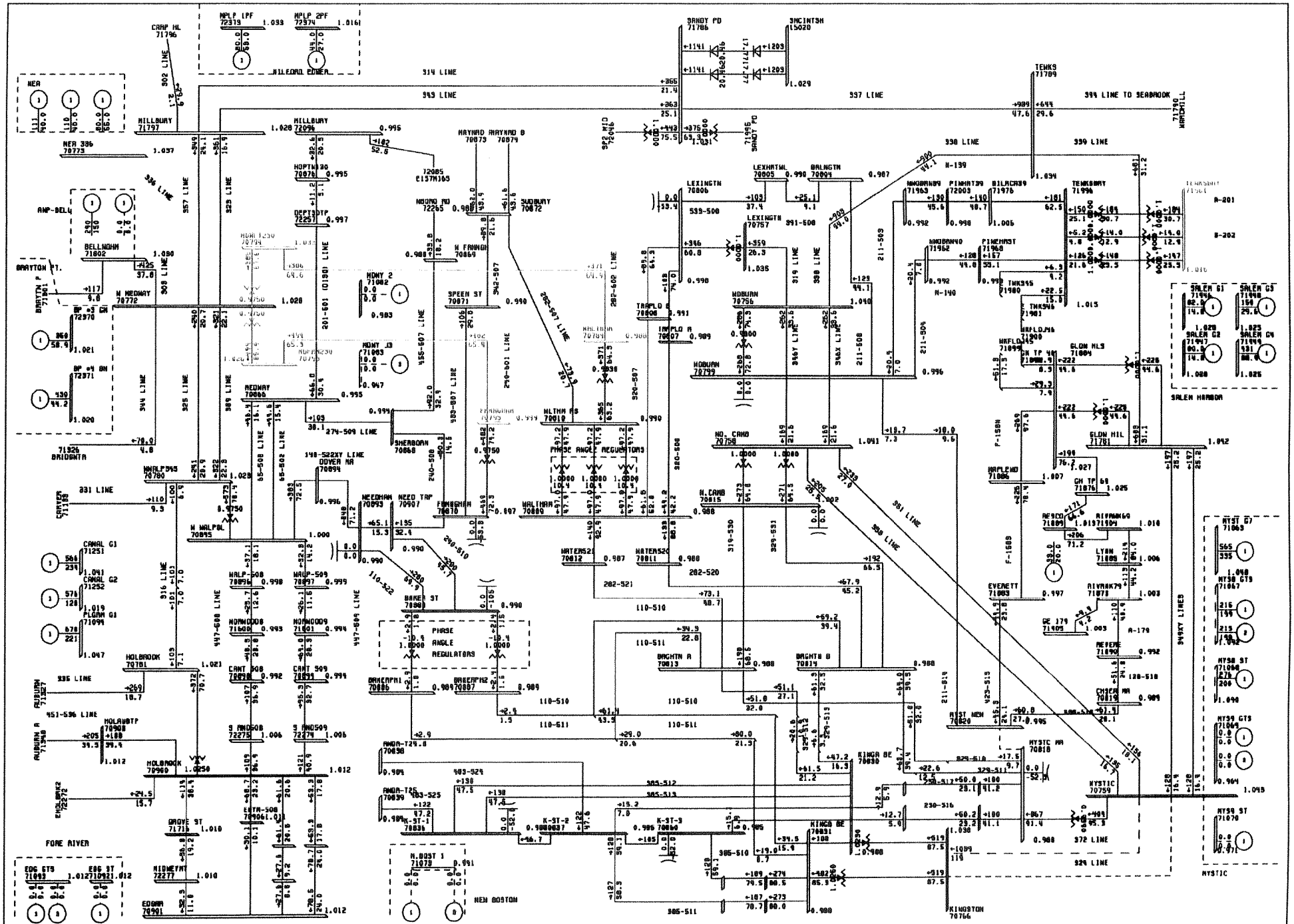

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
ALL LINES IN SERVICE WED, JAN 07 2004 8:46
100% RATED
0.950UV 1.050OV
KV: ≤115 , ≤230 , ≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATED
EQUIPMENT - MW/MVAR

Figure 1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324 LINE OUT WED, JAN 07 2004 8:52
100% RATED
0.950 UV 1.050 OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATED
EQUIPMENT - MW/MVAR

Figure 2

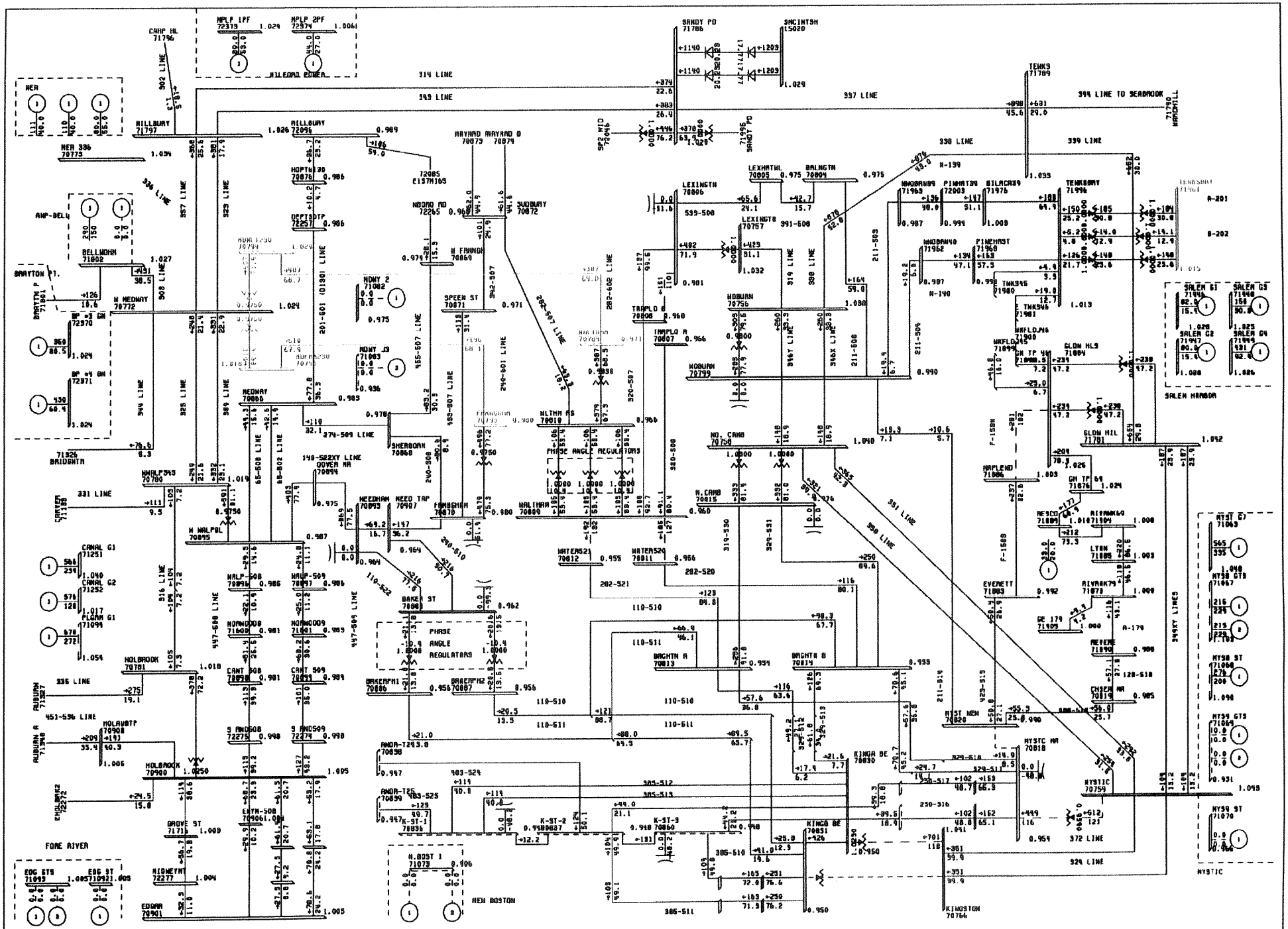

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
KINGSTON AUTO OUT WED, JAN 07 2004 8:55
100% RATED
0.950 UV 1.050 OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATED
EQUIPMENT - MW/MVAR

Figure 3

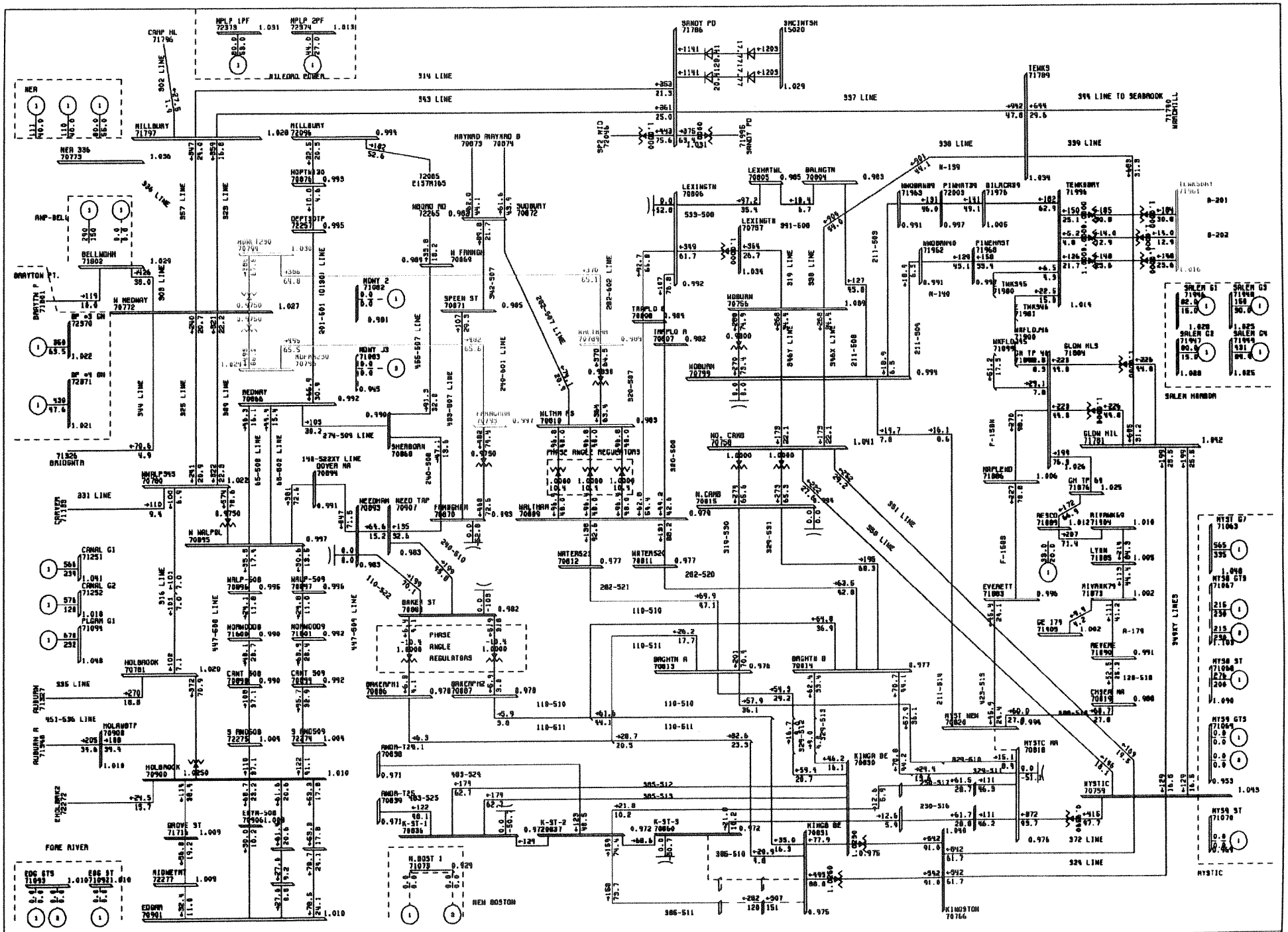

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
385-510 LINE OUT WED, JAN 07 2004 9:06
100% RATEB
0.950UV 1.050 OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATEB
EQUIPMENT - MW/MVAR

Figure 4

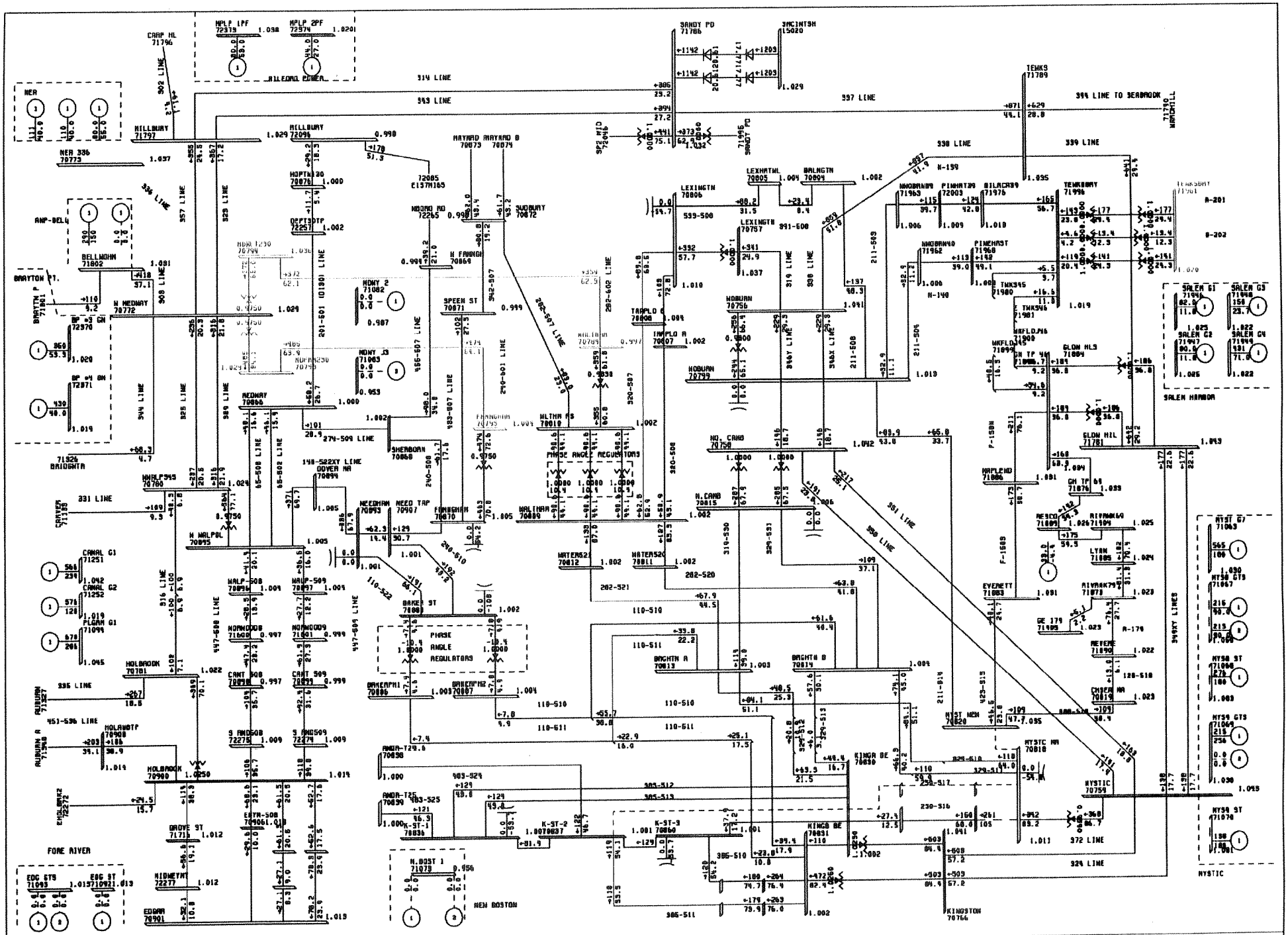

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,K4, 1/2 M9 OFF SALEM 1-4,MYSTIC7,8 + 1/2 M9 ON
250-517 LINE OUT WED, JAN 07 2004 10:27
100% RATE B
0.950 UV 1.050 OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATE B
EQUIPMENT - MW/MVAR

Figure 5

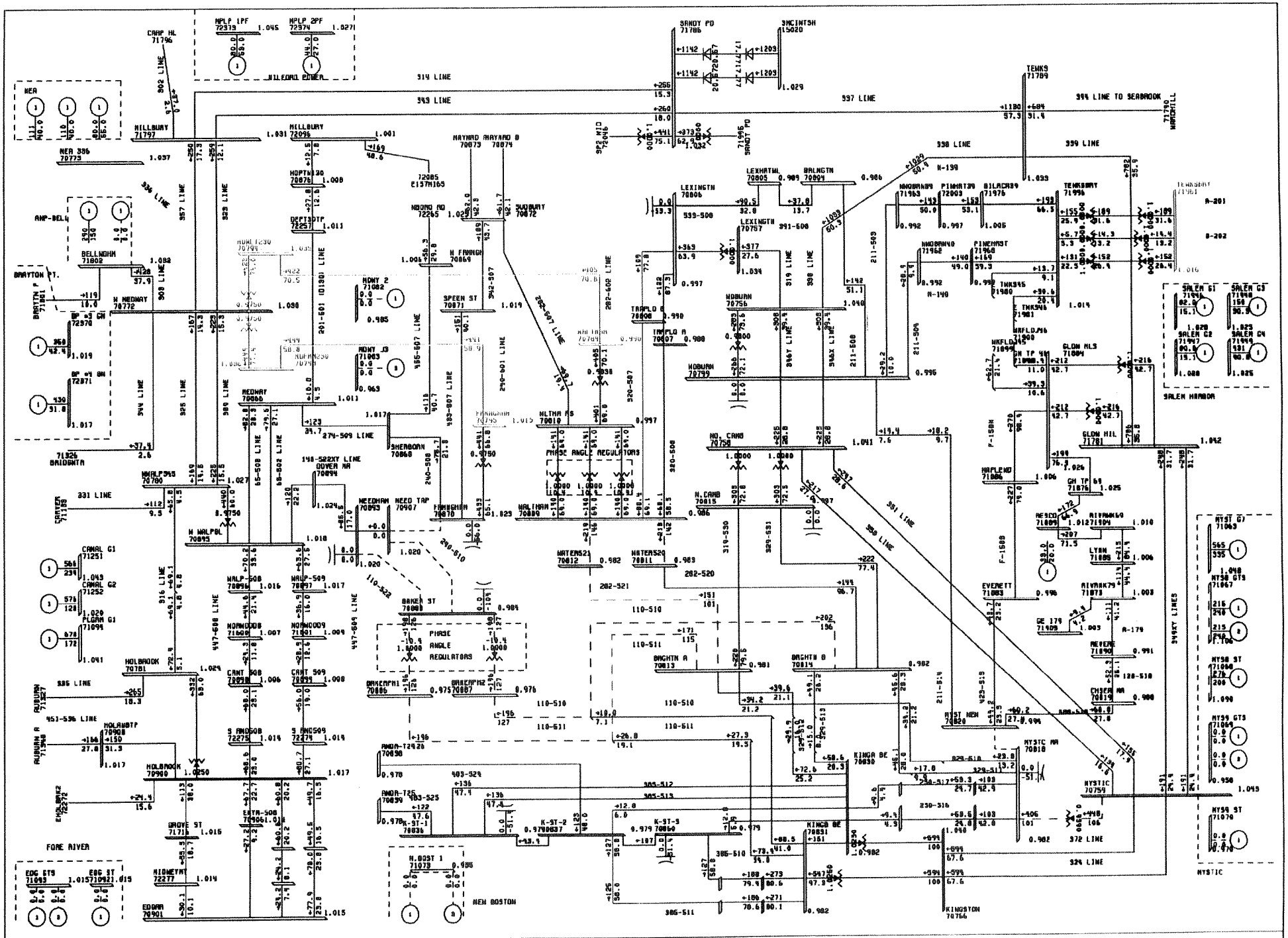

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
110522-240510 OUT+SUDBURY CAPS WED, JAN 07 2004 10:03
100% RATED
0.950UV 1.050OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE(PU)
BRANCH - MVA/% OF RATED
EQUIPMENT - MW/MVAR

Figure 6

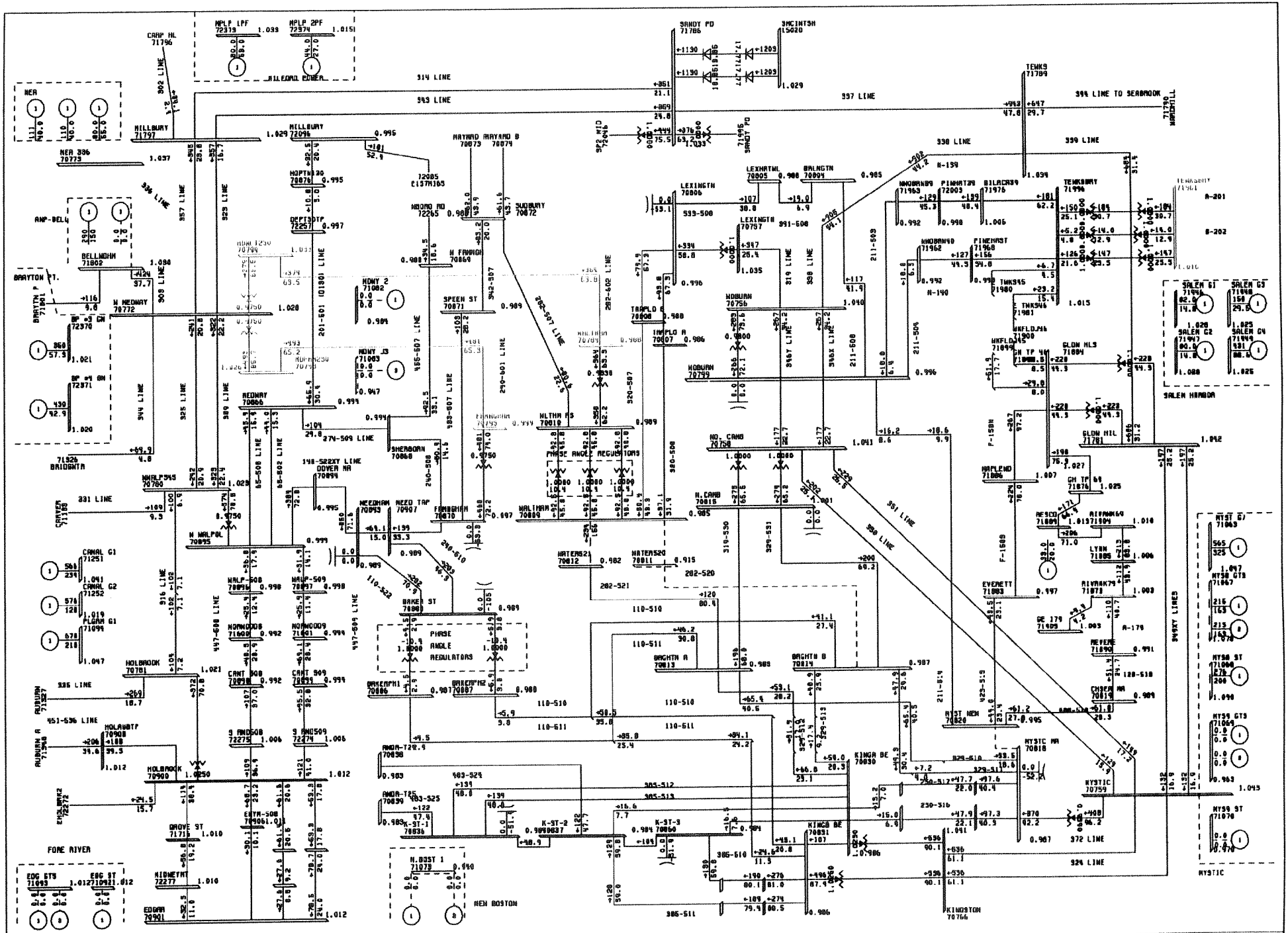

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
282-520 LINE OUT WED, JAN 07 2004 9:14
100% RATE B
0.950 UV 1.050 OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATE B
EQUIPMENT - MW/MVAR

Figure 7

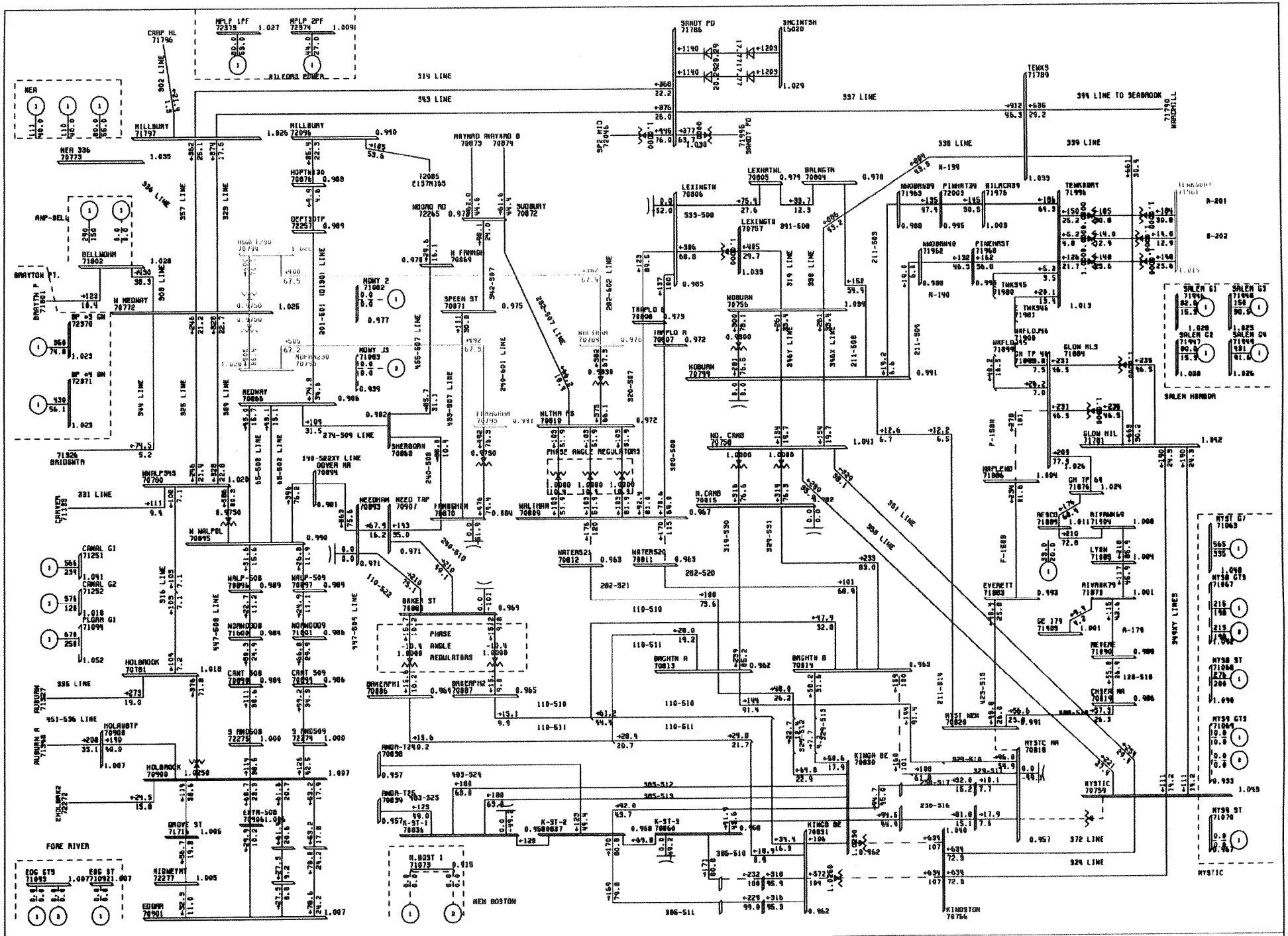

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
MYSTIC AUTO OUT WED, JAN 07 2004 9:09
100% RATES
0.950UV 1.050OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATE8
EQUIPMENT - MW/MVAR

Figure 8

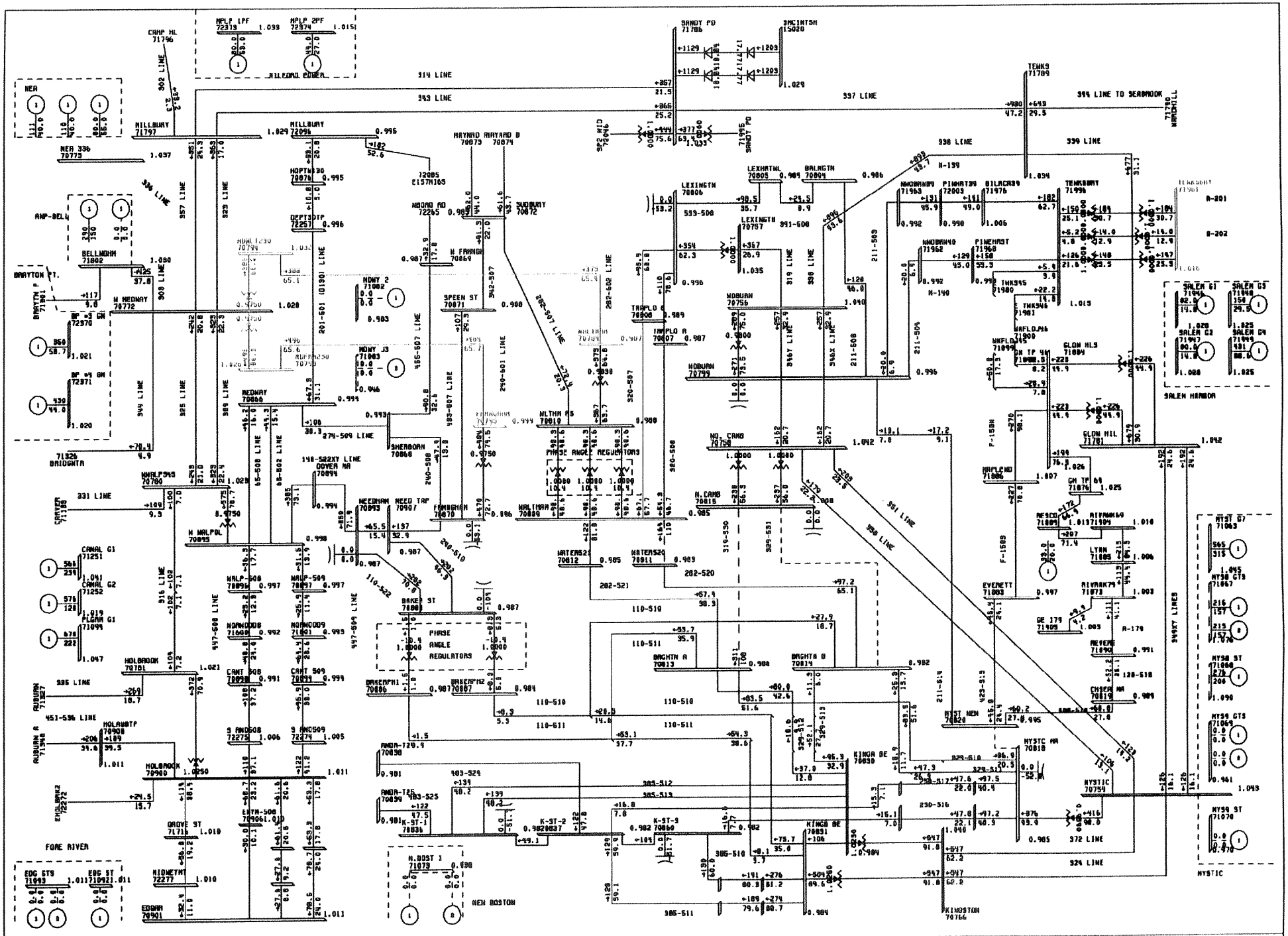

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
329-531 LINE OUT WED, JAN 07 2004 9:24
100% RATEB
0.950UV 1.050OV
KV: s115 ,s230 ,s345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATEB
EQUIPMENT - MW/MVAR

Figure 9

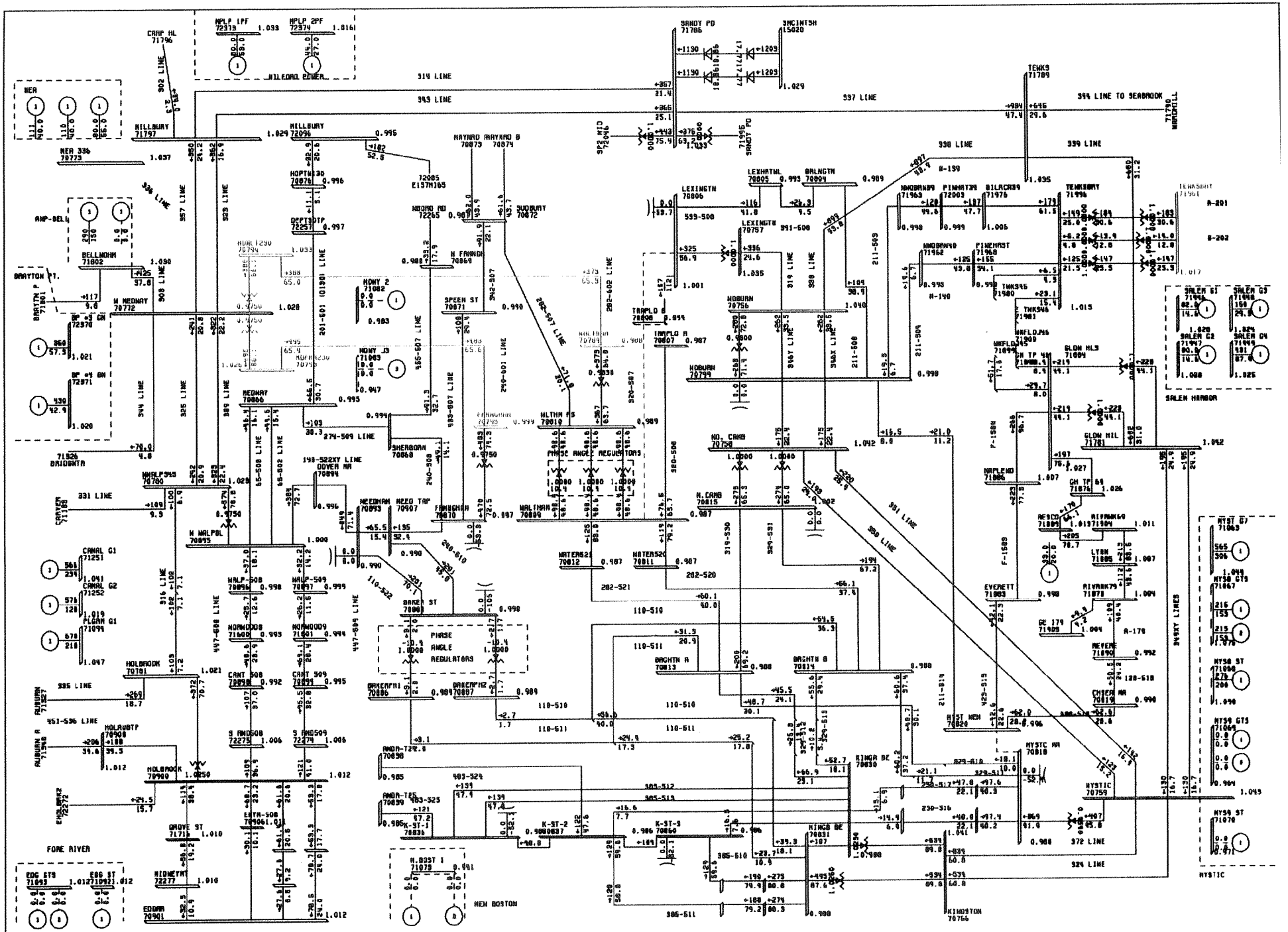

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
320-507 LINE OUT WED, JAN 07 2004 9:32
100% RATED
0.950UV 1.050OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE(PU)
BRANCH - MVA/% OF RATED
EQUIPMENT - MW/MVAR

Figure 10

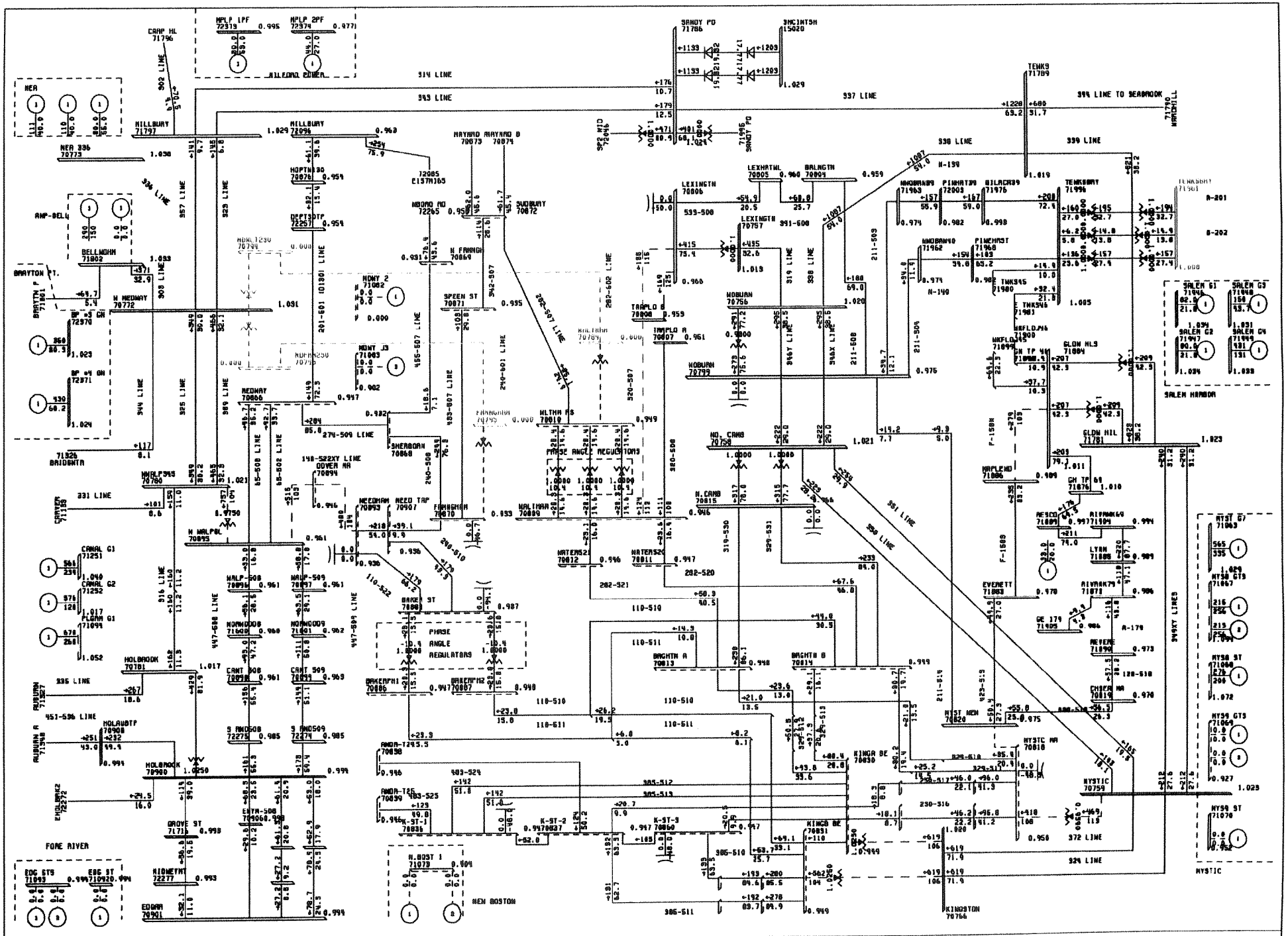

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
230KV DCT OUT+ 2 SUDBURY CAPS WED, JAN 07 2004 9:48
100% RATED
0.950V 1.050V
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATED
EQUIPMENT - MW/MVAR

Figure 11

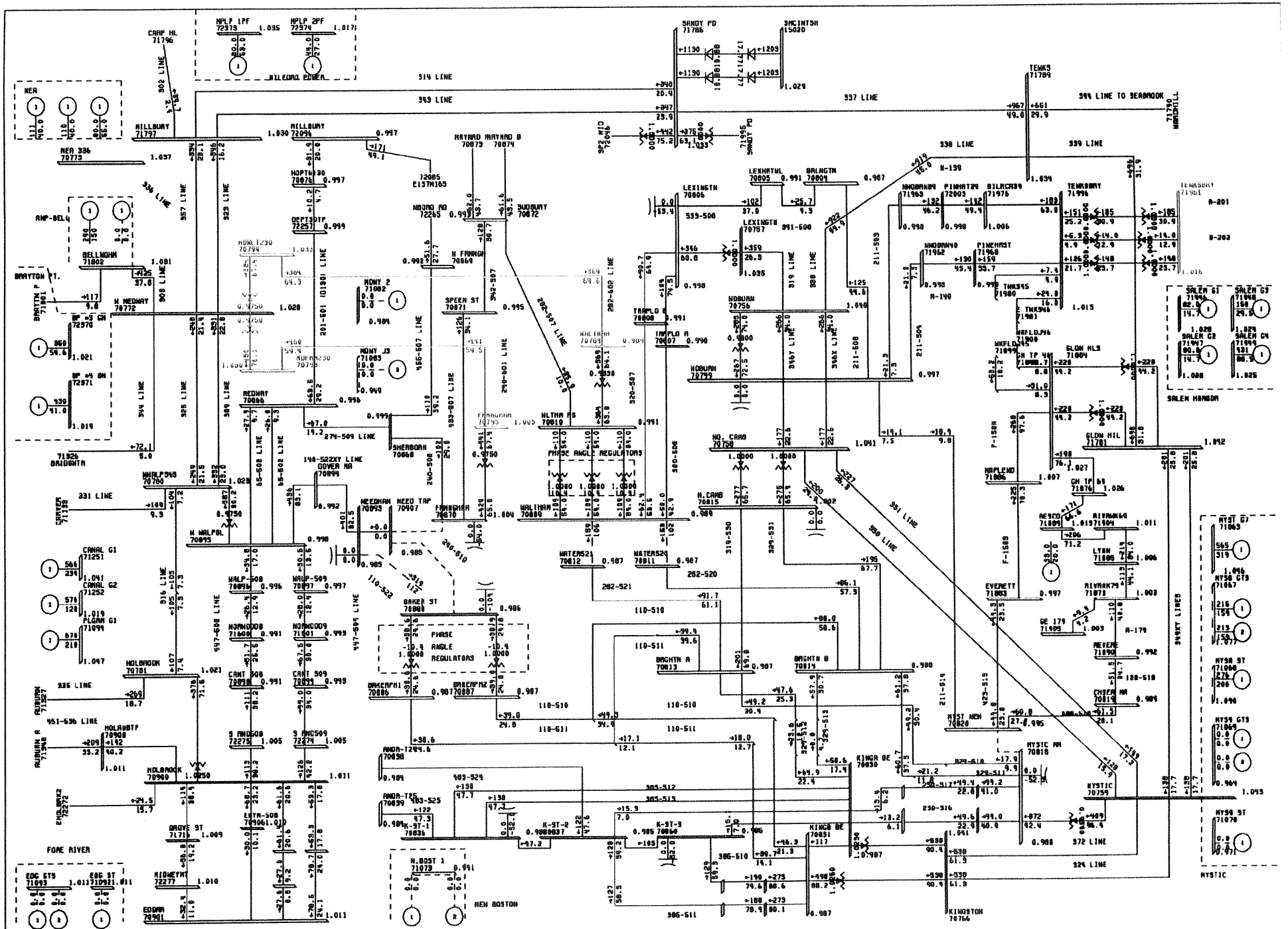

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7-8 ON
240-510 LINE OUT WED, JAN 07 2004 9:42
100% RATEB
0.950UV 1.050 OV
KV: ≤115 , ≤230 , ≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATEB
EQUIPMENT - MW/MVAR

Figure 12

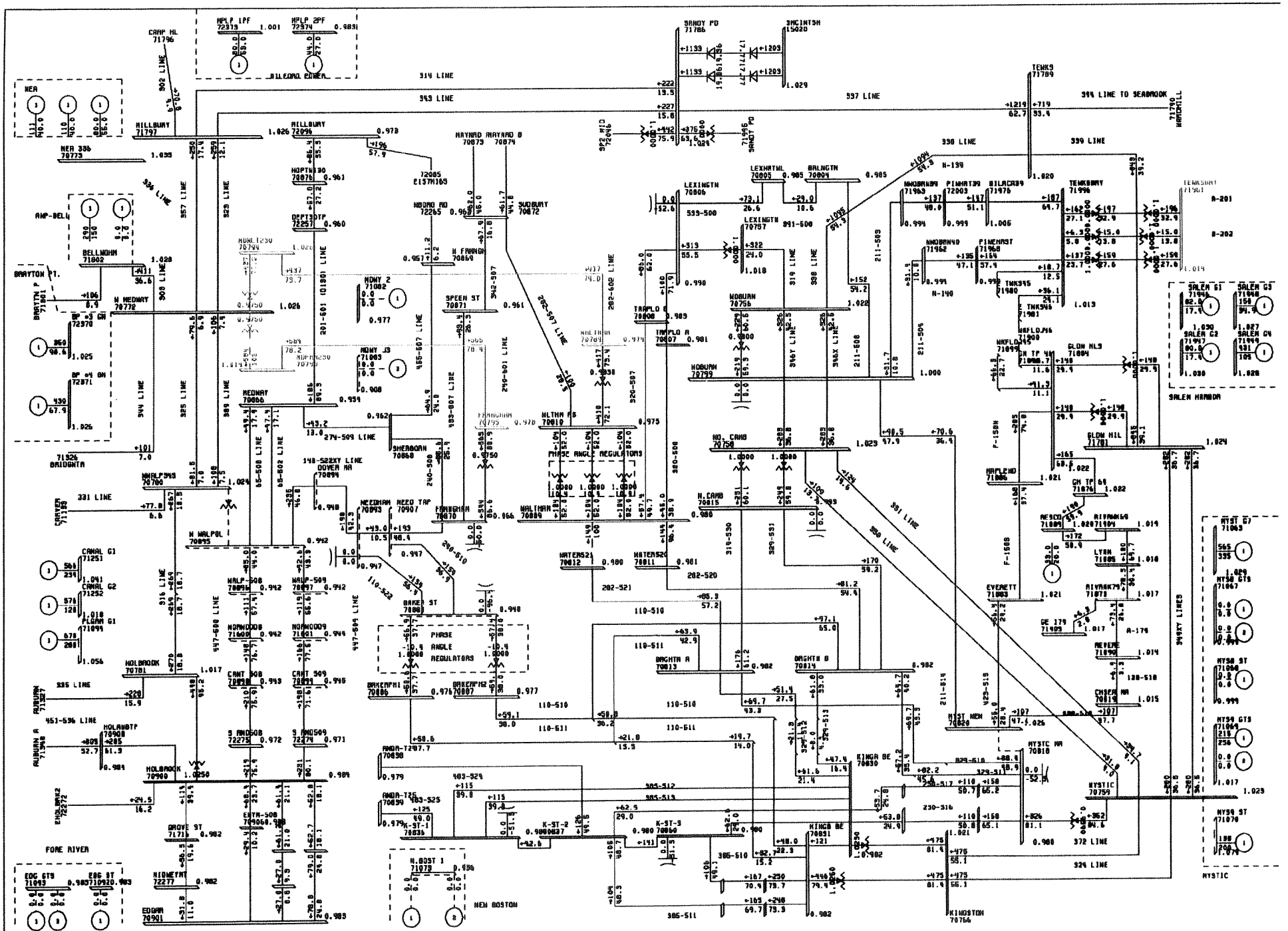

2006:2008 REDUCED BY 4% IN NEMA/BOSTON,PAR(4,4),COLBURN
NB,MYS4-6,M8, 1/2 M9 OFF K4,SALEM 1-4,MYSTIC7 + 1/2 M9 ON
W.WALPOLE AUTO OUT WED, JAN 07 2004 10:08
100% RATEB
0.950 UV 1.050 OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATEB
EQUIPMENT - MW/MVAR

Figure 13

Load Flow Plots
2006 Load Flow Cases
With 345 kV Project (Including 2 Circuits) In Service

Index

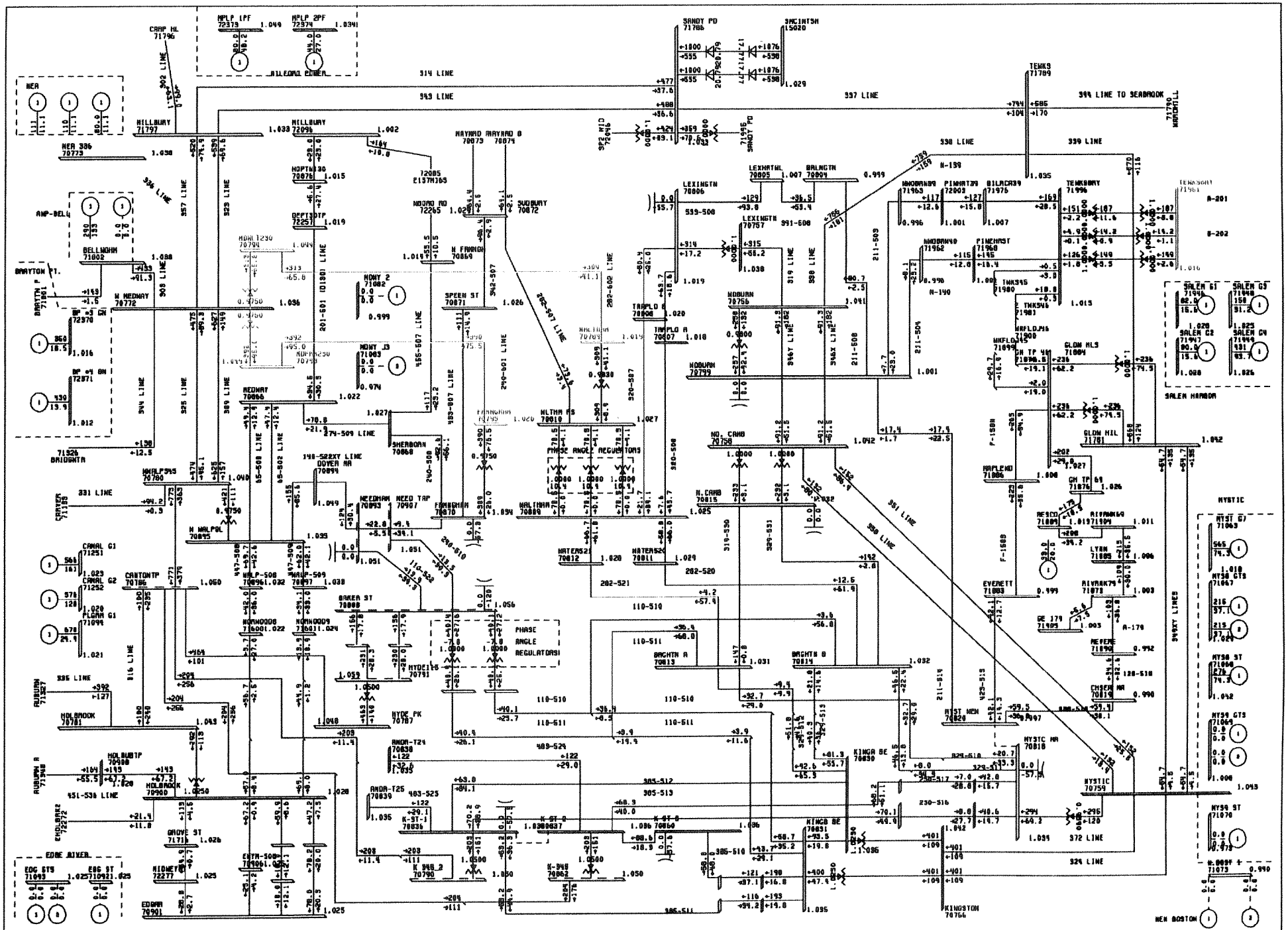

2008 IN NEMA/BOSTON,3 CABLES:1 HYDE,2 K,PAR(3,4),K SPLIT
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7+8 ON
ALL LINE IN - 3 CABLES TUE, JAN 13 2004 17:35
100% RATED
0.950 V 1.050 V
KV: 115 ,230 ,345
BUS - VOLTAGE (PU)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR

Figure 1

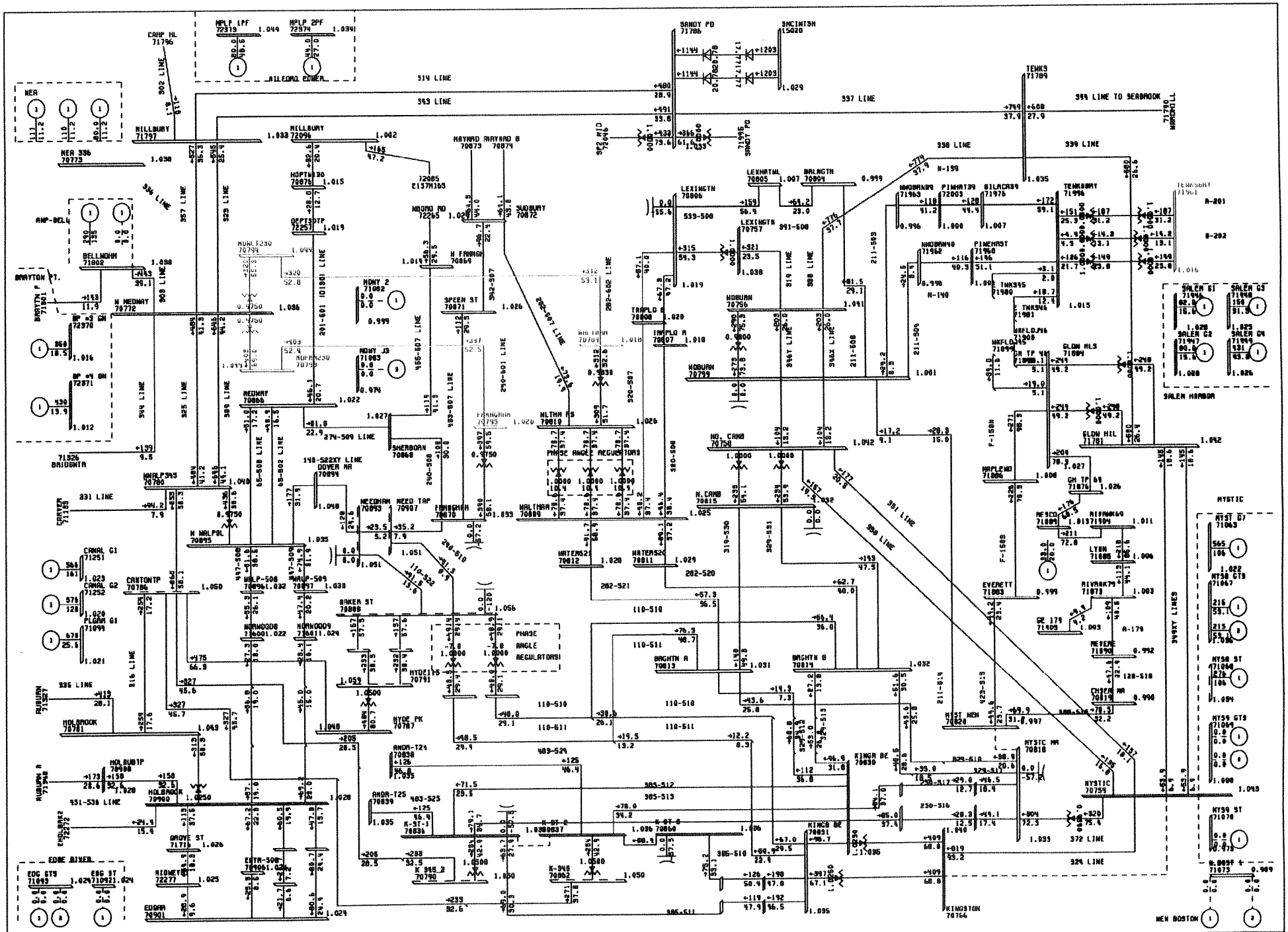

2008 IN NEMA/BOSTON,3 CABLES:1 HYDE,2 K,PAR(3,4),K SPLIT
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7+8 ON
324 OUT + 3 CABLES TUE, JAN 13 2004 17:41
100% RATEB
0.950UV 1.050OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATEB
EQUIPMENT - MW/MVAR

Figure 2

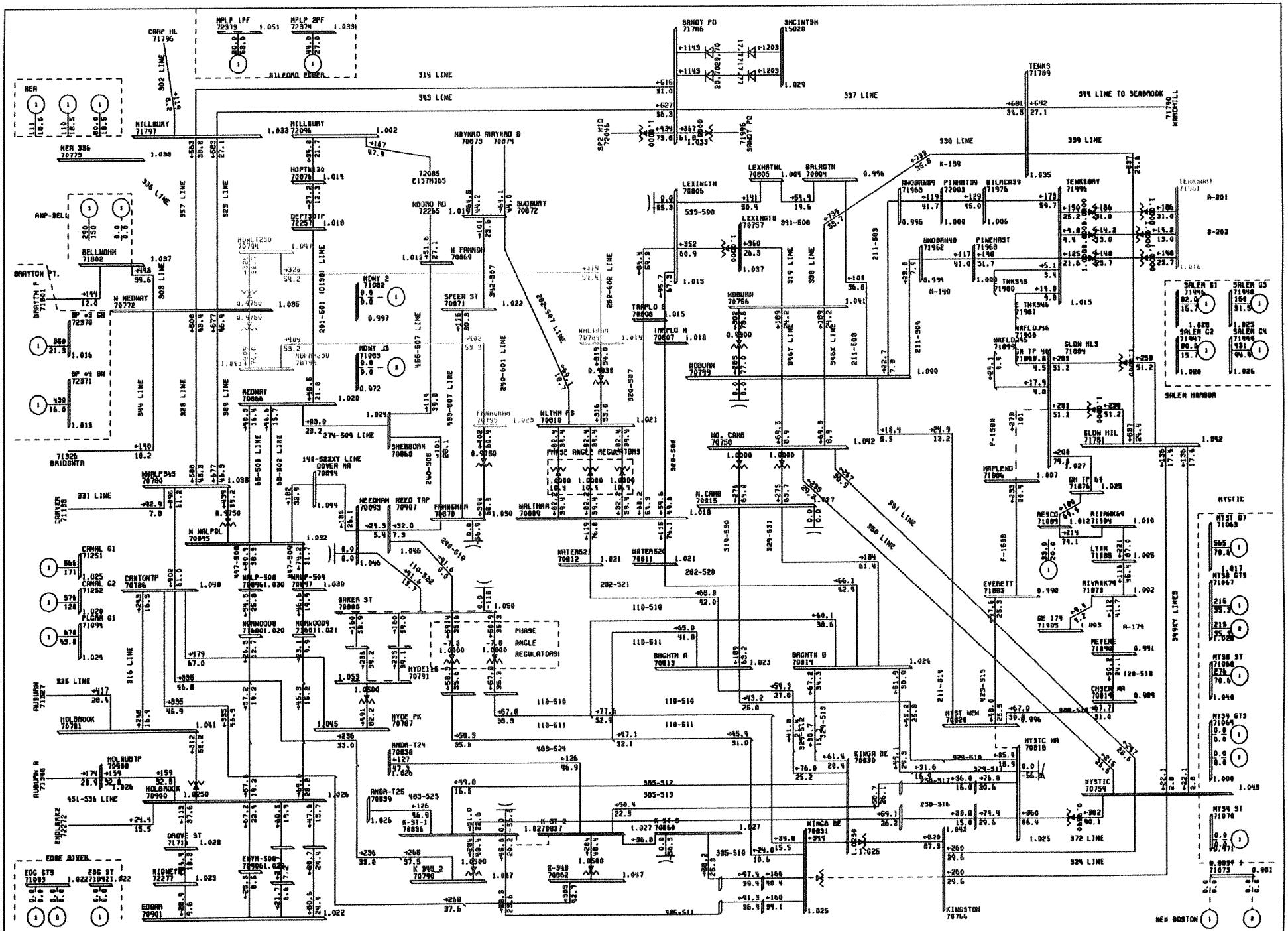

2008 IN NEMA/BOSTON,3 CABLES:1 HYDE,2 K,PAR(3,4),K SPLIT
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7+8 ON
KINGSTON AUTO OUT + 3 CABLES TUE, JAN 13 2004 17:44
100% RATEB
0.950UV 1.050OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATEB
EQUIPMENT - MW/MVAR

Figure 3

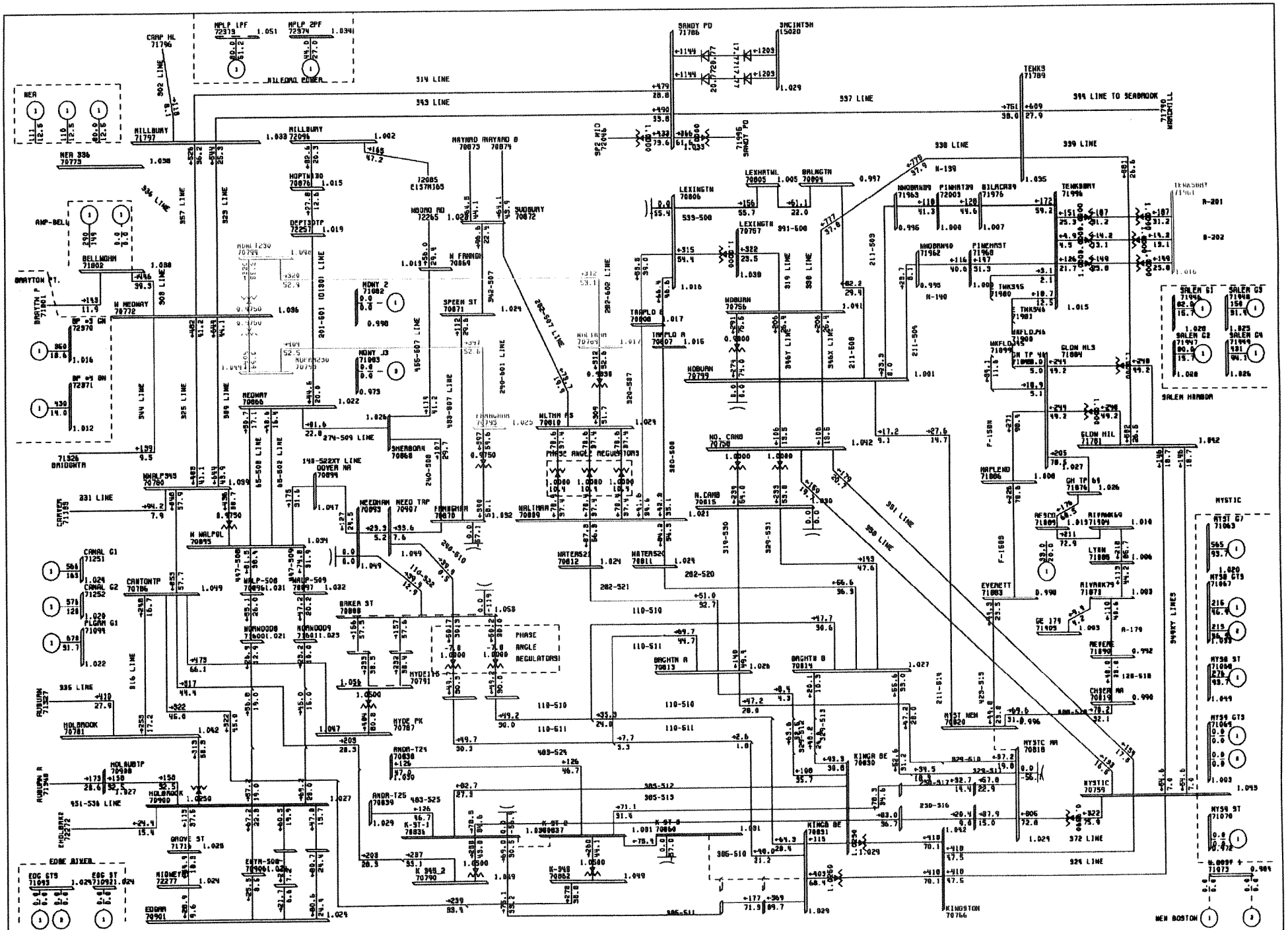

2008 IN NEMA/BOSTON,3 CABLES:1 HYDE,2 K,PAR(3,4),K SPLIT
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7+8 ON
385-510 OUT + 3 CABLES TUE, JAN 13 2004 18:05
100% RATE B
0.950 UV 1.050 OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATE B
EQUIPMENT - MW/MVAR

Figure 4

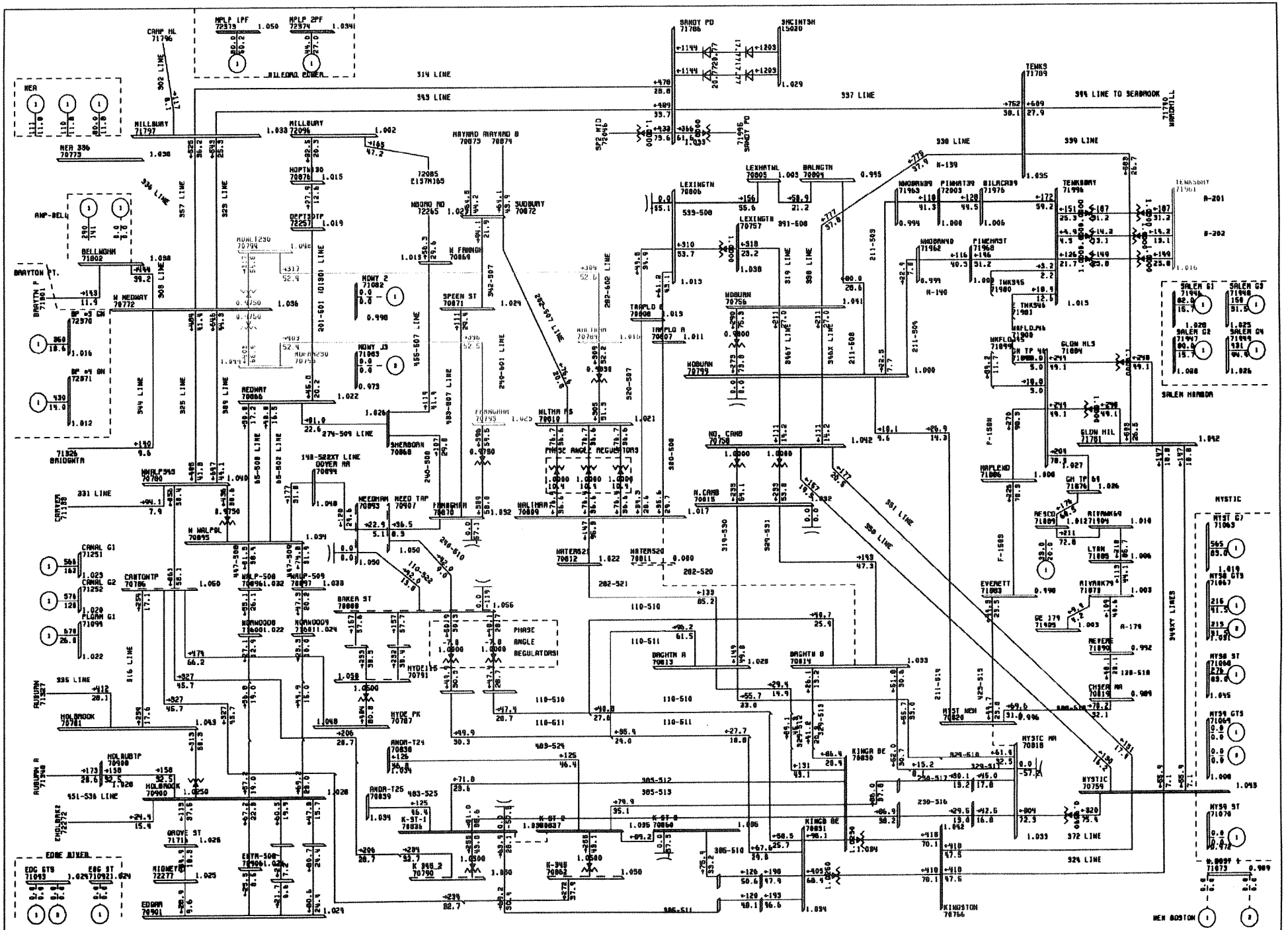

2008 IN NEMA/BOSTON,3 CABLES:1 HYDE,2 K,PAR(3,4),K SPLIT
NB,MYS4-6,M9 OFF K4,SALEM 1-4,MYSTIC7+8 ON
282-520 OUT + 3 CABLES TUE, JAN 13 2004 18:07
100% RATED
0.950UV 1.050 OV
KV: ≤115 ,≤230 ,≤345
BUS - VOLTAGE (PU)
BRANCH - MVA/% OF RATED
EQUIPMENT - MW/MVAR

Figure 5

Attachment B
TCA Application Form

Project Name:

1. Applicant:	NSTAR-04-TCA-01	Date: 6/11/04

2.	Project Description:	The proposed Project involves the construction of a three-circuit, 345 kV underground transmission	In Service Date:
a.	Summary of Work for desired Pool-Supported PTF:	facility from a point of origin along an existing 345 kV overhead transmission line running between the Company's substations in West Walpole and Holbrook, and a point of termination at the existing Hyde Park and K Street substations in Boston. The Project would be constructed in two phases. In the first phase, the Company would complete construct and install two circuits; one extending from the point of origin to the Hyde Park substation and one extending from the point of origin to the K Street substation. Also in the first phase of construction, the Company would install the steel-pipe conduit to house the third circuit, which will extend from the point of origin to the K Street substation. The Company would install the third circuit in the steel-pipe conduit in the second phase of construction.	Phase 1: June 2006 Phase 2: 2007
b.	Summary of Work associated with Localized Cost:	None	
c.	Non-PTF Costs		

3.	Was a transmission 18.4 Application required for this work?	Yes ☒	No ☐		
4.	Has a transmission 18.4 Application been approved? If yes, attach a copy.	Yes ☒	No ☐	N/A ☐	Approval Date: 7/22/04

Need For Project:

5.	Need Based On:	**Yes**	**No**
	a. Reliability	☒	☐
	b. Economic		

c.	Service to new load	☒	☐
d.	New generator interconnection	☐	☒
	If yes, Category of Generator (See NEPOOL Tariff Schedule 11):	'A' ☐	'B' ☐ 'C' ☐
	18.4 Generator Application Number		
	18.4 Generator Application Date		
	(Attach copy of cover letter & 18.4 Generator Application)		
e.	Other (specify in line 6)	☐	☐

6. Provide a narrative description of the need for this Project.

Please see attached report.

Cost of Project:

7.	Total Proposed Pool-Supported PTF Cost of Project:	$217,000,000
	a. Pool-Supported PTF Costs:	$217,000,000
	b. Generator Supported PTF Costs**:	
	If the costs in 7.a. plus 7.b do not equal the total PTF cost, please explain and indicate who is responsible for the remaining costs.	
	Costs introduced as a result of local, state or other regulatory requirements	

8. Total Non-PTF Cost associated with this Project (if any) $ 0

9. Total PTF Cost based on: (check one)

Actual Costs	☐	**OR**
Estimated Costs*	☒	

10. Provide a breakdown of the total costs consistent with Table 1. If applicable, explain how the cost of common facilities was allocated between PTF and non-PTF.

All costs are PTF costs.

11. Does this Project result in a change of existing non-PTF facilities to PTF? Yes ☐ No ☒

12. Describe the major transmission alternatives that were considered and why the preferred alternative was selected.

Please see attached report.

* If the actual PTF cost exceeds the estimated PTF cost by more than 10%, a revised filing is required.

** Pool-Supported PTF costs were determined pursuant to NEPOOL OATT Schedule 11.

Exhibit No. 2

Attachment B
TCA Application Form

Project Name:

1. Applicant:	NSTAR-04-TCA-01-Rev1	Date: 8/24/04

2.	Project Description:		In Service Date:
a.	Summary of Work for desired Pool-Supported PTF:	The proposed Project involves the construction of a three-circuit, 345 kV underground transmission facility from a point of origin along an existing 345 kV overhead transmission line running between NSTAR's substations in West Walpole and Holbrook, and a point of termination at the existing Hyde Park and K Street substations in Boston. The Project would be constructed in two phases. In the first phase, NSTAR will construct and install two circuits; one extending from the point of origin to the Hyde Park substation and one extending from the point of origin to the K Street substation. Also in the first phase of construction, NSTAR will install the steel-pipe conduit to house the third circuit, which will extend from the point of origin to the K Street substation. NSTAR will install the third circuit in the steel-pipe conduit in the second phase of construction. A single 345 kV to 115 kV autotransformer will be installed at the Hyde Park substation and a single 345 kV to 115 kV autotransformer will be installed at the K Street substation in phase 1. A second 345 kV to 115 kV autotransformer will be installed at K Street substation in phase 2 of the project. Three 345 kV 160 MVAR reactors will be installed at the point of origin and a single 345 kV 160 MVAR reactor will installed at K Street substation in phase 1. One additional 345 kV 169 MVAR reactor will installed at the point of origin and one additional 345 kV 160 MVAR reactor will be installed at K Street substation in phase 2 of the project. Heat exchangers will be added to the existing Hyde Park to Baker Street substation 115 kV cables in phase 1 of the project. Additionally, two 115 kV circuit upgrades for cables between Kingston Street and Brighton substations and addition of two current limiting reactors at K Street substation will be constructed if the existing New Boston generating unit continues to operate subsequent to implementation of phase 2 of the project.	Phase 1: June 2006 Phase 2: 2007

b.	Summary of Work associated with Localized Cost:	None	
c.	Non-PTF Costs		

3.	Was a transmission 18.4 Application required for this work?			Yes ☒	No ☐
4.	Has a transmission 18.4 Application been approved? If yes, attach a copy.	Yes ☒	No ☐	N/A ☐	Approval Date: 7/30/04

Need For Project:

5.	Need Based On:	Yes	No	
	a. Reliability	☒	☐	
	b. Economic			
	c. Service to new load	☒	☐	
	d. New generator interconnection	☐	☒	
	If yes, Category of Generator (See NEPOOL Tariff Schedule 11):	'A' ☐	'B' ☐	'C' ☐
	18.4 Generator Application Number			
	18.4 Generator Application Date			
	(Attach copy of cover letter & 18.4 Generator Application)			
	e. Other (specify in line 6)	☐	☐	

6.	Provide a narrative description of the need for this Project. Please see attached report.

Cost of Project:

7.	Total Proposed Pool-Supported PTF Cost of Project:	$234,217,000
	a. Pool-Supported PTF Costs:	$234,217,000
	b. Generator Supported PTF Costs**:	

If the costs in 7.a. plus 7.b do not equal the total PTF cost, please explain and indicate who is responsible for the remaining costs.
Costs introduced as a result of local, state or other regulatory requirements

8. Total Non-PTF Cost associated with this Project (if any) $ 0

9. Total PTF Cost based on: (check one)

Actual Costs	☐	**OR**
Estimated Costs*	☒	

10. Provide a breakdown of the total costs consistent with Table 1. If applicable, explain how the cost of common facilities was allocated between PTF and non-PTF.

All costs are PTF costs.

11. Does this Project result in a change of existing non-PTF facilities to PTF? Yes ☒ No ☐

Cost of facilities that will have classification changed: $3,160,000

12. Describe the major transmission alternatives that were considered and why the preferred alternative was selected.

Please see attached report.

* If the actual PTF cost exceeds the estimated PTF cost by more than 10%, a revised filing is required.

** Pool-Supported PTF costs were determined pursuant to NEPOOL OATT Schedule 11.

Exhibit No. 3

Stephen G. Whitley
Senior Vice President & Chief Operating Officer

December 14, 2004

Mr. Charles Salamone
Director, System Planning
800 Boylston Street
Boston, MA 02199

Dear Mr. Salamone:

Re: TCA Application #NSTAR-04-TCA-01-Rev. 1, Dated: August 24, 2004

In accordance with the provisions of Planning Procedure No. 4 (PP4) and NEPOOL Open Access Transmission Tariff (NOATT) Schedule 12C, ISO New England Inc. (ISO-NE) is in the final stages of completing their review of the subject Transmission Cost Allocation application. For ISO - NE to complete this work, additional information (separate from the outstanding information still required for NSTAR's application under Section 18.4 of the Restated NEPOOL Agreement) is requested.

With regards to the overhead line construction alternative as described in the TCA application submitted, NSTAR provided an overhead cost estimate of $1.35M per mile, excluding right of way (ROW) costs. To perform a comparison of overhead and underground costs, real estate costs must be considered. Therefore, in trying to estimate the costs of overhead construction including ROW, we request that NSTAR provide 2004 real estate costs based on average residential/commercial price per acre, per town.

For design purposes, NSTAR indicated to complete the project fewer 345 kV overhead lines would be required than underground cables. Therefore, to provide a full alternative analysis, please provide ISO-NE with real estate cost estimates, based on the following assumptions:

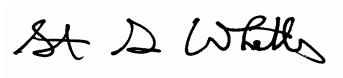
- One (1) 345 kV overhead line could be used for the Stoughton to K-Street leg (approximately 15.4 miles) and one (1) 345 kV overhead line could be used for the Stoughton to Hyde Park leg (approximately 11.2 miles); and,
- A 200-foot ROW would be required to accommodate the two (2) 345 kV lines from Stoughton to Mattapan Square and a 100-foot ROW would be required for the remaining ROW segments This information should be provided as outlined in the table below by December 30, 2004.

Town	Route Distance (miles)	Number of Lines	Implied ROW Width	Implied ROW Acres	Residential / Commercial Value per Acre	Estimated Cost (Implied ROW Acres x Value per Acre)
Stoughton	0.4	2	200	9.7		
Canton	5.0	2	200	121.2		
Milton	3.7	2	200	89.7		
Hyde Park	2.1	1	100	25.5		
Mattapan	2.0	1	100	24.2		
Dorchester	1.6	1	100	19.4		
Roxbury	1.2	1	100	14.5		
South Boston	1.5	1	100	18.2		

In reviewing TCA applications, we believe there are benefits of informing our stakeholders of large projects impacting New England. The NSTAR Reliability Project is such a project and to date there has been a great deal of interest from many of our stakeholders regarding its benefits and design. Therefore, we propose that NSTAR make a presentation to the region's state agencies, similar to the presentation made at the July 2004 NEPOOL Reliability Committee meeting. It is anticipated that this meeting will take place the week of December 20th, 2004. Carolyn O'Connor, of ISO-NE, will be in contact with you to discuss the details.

If you have any further questions about this matter, please do not hesitate to call me at 413.535.4361.

Sincerely,



Stephen G. Whitley

cc: C. O'Connor
S. Rourke, ISO-New England Inc.
C. Sedlacek, ISO-New England Inc.

Exhibit No. 4

NSTAR ELECTRIC GAS
One NSTAR Way
Westwood, Massachusetts 02090

December 16, 2004

Mr. Stephen G. Whitley
ISO New England
Senior Vice President and Chief Operating Officer
One Sullivan Road
Holyoke, MA 01040-2841

Dear Mr. Whitley,

RE: TCA Application NSTAR-04-TCA-01-Rev.1, Dated: August 24, 2004

NSTAR Electric & Gas Company appreciates all of your efforts in supporting the NSTAR 345 kV Reliability Project and understands the procedural issues with completing a cost allocation review as described in Planning Procedure #4. We are happy to provide the information you requested in your letter to me dated December 14, 2004, which can be found in the attached table. As requested the table provides NSTAR's estimate of the cost of acquiring rights-of-way sufficient to construct overhead facilities in lieu of constructing the proposed underground 345 kV transmission facilities. We would also like to note, as indicated in the footnote of the attachment, that we believe there could also be significant legal costs associated with acquiring the required parcels of land through eminent domain proceedings that would introduce additional costs that could potentially exceed the estimated cost of purchasing the right-of-way properties themselves. The evaluation also does not consider the impacts associated with the protracted amount of time needed to obtain all of the necessary permits and the cost of remedial actions that would be required during this time frame. In consideration of the objective to inform interested parties about the nature of the project, NSTAR would be glad to provide a presentation to stakeholders similar to the one given to the Reliability Committee at its July 30, 2004 meeting and will coordinate with Carolyn O'Connor to arrange for this presentation.

Please let me know if we can provide any additional data. I can be reached by telephone at (781) 441-8552, or by e-mail at Charles_Salamone@nstaronline.com.

Sincerely,

Charles Salamone
NSTAR – Director, System Planning

cc: S. Rourke – ISO-NE
C. O'Connor – ISO-NE
C. Sedlacek – ISO-NE
H. Oheim – NSTAR
P. Vaitkus – NSTAR
W. Schweiger - NSTAR

attachments

NSTAR ELECTRIC GAS
One NSTAR Way
Westwood, Massachusetts 02090

Town	Route Distance (miles)	Number of Lines	Implied ROW Width	Implied ROW Acres	Residential/Commercial percentage split (land use)	Residential/Commercial Value per acre	Estimated Cost (Implied ROW Acres x Value per Acre)	Total Estimated Land Cost per Town
Stoughton	0.4	2	200	9.7	100% commercial	$801,000	9.7 acres * $801,000 = $7,769,700	$7,769,700
Canton	5	2	200	121.2	60% commercial/40% residential	$802,500 (com)/ $610,000 (res)	72.7 acres * $802,500 = $58,341,750: 48.5 acres * $610,000 = $29,585,000	$87,926,750
Milton	3.7	2	200	89.7	100% residential	$1,029,000	89.7 acres * $1,029,000 = $92,301,300	$92,301,300
Mattapan	2	1	100	24.2	25% commercial/75%residential	$1,079,000 (com)/ $1,005,000 (res)	6.1 acres * $1,079,000 = $6,581,900: 18.1 acres * $1,005,000 = $18,190,500	$24,772,400
Hyde Park	2.1	1	100	25.5	25% commercial/75%residential	$1,069,000 (com)/ $1,009,000 (res)	6.4 acres * $1,069,000 = $6,841,600: 19.1 acres * 1,009,000 = $19,271,900	$26,113,500
Roxbury	1.2	1	100	14.5	50% commercial/50% residential	$1,424,000 (com)/ $965,000 (res)	7.25 acres * $1,424,000 = $10,324,000: 7.25 acres * $965,000 = $6,996,250	$17,320,250
Dorchester	1.6	1	100	19.4	50% commercial/50% residential	$1,315,944 (com)/ $999,000 (res)	9.7 acres * $1,315,944 = $12,764,657: 9.7 acres * $999,000 = $9,690,300	$22,454,861
South Boston	1.5	1	100	18.2	15% commercial/85% residential	$1,425,000 (com)/ $1,152,862 (res)	2.7 acres * $1,425,000 = $3,847,500: 15.5 acres * $1,152,862 = $17,869,361	$21,716,861
Totals	**17.5**			**322.4**			**ESTIMATED REAL ESTATE COSTS =**	**$300,375,622**

Notes:

Residential and Commercial values were from derived from actual sales data for over last 6 months (6/1/04 thru 12/1/04), averaged for similar properties abutting the ROW route within the respective cities/towns (Source: MLS)

Based on EFSB required abutter notices sent to all abutters within 75 feet of underground transmission line, 7,000 +/- abutter notices were sent by NSTAR.
If overhead ROW option pursued, NSTAR could conceivably have to acquire at least 7,000 individual properties.
Title, survey, appraisal, environmental & legal costs for eminent domain would be staggering (estimate = $50,000 per property, **or an additional $350 million dollars** added project (which does not include estimated real estate costs detailed above)
Another major cost to would be ***business relocation costs****, which are impossible to calculate, but could be* ***another $100,000,000***

Exhibit No. 5

Questions regarding NSTAR's application for 345 kV facilities in the Boston area
From the Maine Public Utilities Commission

NSTAR REPSPONSE

January 28, 2005

1) In Section 3.3.6 of its 12c application, NSTAR discounts a total overhead alternative as not feasible. Was consideration given to an alternative that combines both overhead and underground lines by locating the proposed Stoughton substation about 6 miles to the north, replacing those six miles of 3 circuit 345 kV cables with two overhead lines connecting to Westpole and Holbrook? If yes, please describe the results of the analysis. If no, please evaluate that alternative.

   RESPONSE: A very similar alternative was evaluated which utilized existing overhead right-of-way. This alternative is described in the Schedule 12C report. As noted in the report it would require obtaining an additional 4 miles of right-of-way and the cost of this right-of-way in combination with the cost of overhead and underground facilities was higher than the cost of the proposed project. In general the combined cost of acquiring right-of-way (estimated at approximately $17M per mile) and the cost of constructing two 345 kV overhead circuits (at approximately $3M per mile) exceeds the cost of constructing underground facilities (at approximately $8M per mile) for the Boston area.

   1.A) An additional question was raised concerning use of wetlands for overhead line construction for those segments of the route that wet lands were available.

   RESPONSE: Use of wet lands for transmission right of ways posses substantial issues both in terms of cost and the ability to license such use. In Massachusetts, wetlands are protected by State law and such use and permitting would require local, state, and federal approvals to allow use of these protected areas. From a construction perspective there would be significant costs incurred associated with obtaining access easements to each structure from abutting properties and increased costs due to the need for an additional station at the transition point. This would involve building a station with a ring bus to transition from two overhead circuits to three underground circuits. The combined costs is considered to be higher than the cost of build the proposed underground facilities through the approved route.

2) In the last paragraph of Section 3.5.6 of its 12c application, NSTAR discussed the possibility of a hybrid overhead/underground alternative, but discounted it primarily due to right of way acquisition timing and cost concerns. Please provide a cost analysis of this alternative ignoring the timing concerns.

RESPONSE: The preliminary estimate of this alternative was in the order of $250M, which was due to both the cost of acquiring right-of-ways and the longer circuit miles required.

3) Is the loss of all 345 kV pipe type cables sharing a single duct bank considered a single contingency event? If yes, what is the likelihood of receiving an exemption?

   RESPONSE: No, this not considered a single contingency event as each circuit is encased in separate steel pipes for the entirety of the length of the circuit. NSTAR has considerable experience with double circuit underground transmission facilities and we have never in our 30 years of experience encountered a simultaneous outage of two pipe type cables in the same duct.

4) Is the loss of both lines in a double circuit overhead 345 kV transmission line considered a single contingency event? If yes, what is the likelihood of receiving an exemption?

   RESPONSE: The simultaneous outage of a double circuit overhead transmission facility is considered a single contingency if both lines share the same structure (i.e. one circuit on each side of a single set of structures). To avoid such single contingency concerns two separate overhead circuits must be constructed on physically separate structures.

5) Please provide the following construction cost estimates:
   a) Double circuit 345 kV underground, per mile - ~$8M / mile
   b) Double circuit 345 kV overhead, per mile - ~ $3M/mile, based on two single-circuit monopoles
   c) Single circuit transition from underground to overhead 345 kV - Station costs range from $10M to $20M
   d) Double circuit transition from underground to overhead 345 kV - Same as above

6) Please provide the following annual operation and maintenance cost estimates:
   a) Single circuit 345 kV underground, per mile
   b) Double circuit 345 kV underground, per mile
   c) Three circuit 345 kV underground, per mile
   d) Single circuit 345 kV overhead, per mile
   e) Double circuit 345 kV overhead, per mile

   RESPONSE: While there is a difference in the maintenance costs of overhead versus underground, the cost magnitude is of limited impact. For the proposed project an overhead facility has an average cost of $125K per year per mile while the underground facility would have an average cost of $330K per year per mile. The differential of $200K per year would not be sufficient to change the economic conclusions.

7) Is the installation of above ground pipe type cable less expensive than underground? If yes, please provide those costs for single, double, and triple circuit configurations, per mile.

RESPONSE: Aboveground pipe-type cable design would actually increase the cost of the project. This would require obtaining right of ways for the above ground pipes and only save on the trench and concrete costs. The net effect is to increase costs by as much as $14M a mile. In addition, there are security issues for an aboveground installation that would require fencing the corridor and, perhaps, additional measures.

Exhibit No. 6

James L. Cross
Vice President, System Planning

February 1, 2005

Mr. Charles Salamone
Director System Planning
NSTAR
800 Boylston Street
Boston, MA 02199

Dear Mr. Salamone:

Re: TCA Application #NSTAR-04-TCA-01-Rev 1 dated August 24, 2004

In connection with the discussions at the January 31, 2005 stakeholder meeting concerning NSTAR's application for regional cost recovery of the NSTAR 345kV Reliability Upgrade, please address the following matters:

(1) Please identify the regulatory agencies (local, state and/or Federal), which have jurisdiction over the wetlands located in the area identified as the Maine PUC alternate overhead route.

(2) What would be the impact to cost, schedule, accessibility and maintenance if NSTAR utilized the alternate overhead route identified by the Maine PUC?

ISO-NE would appreciate a prompt response on these matters, as they will enable us to complete the Transmission Cost Allocation application process for this highly-needed project.

If you have any further questions about this matter, please do not hesitate to call me.

Sincerely,

James L. Cross
Vice President System Planning

cc: C. O'Connor, ISO-NE
M. Goldberg, ISO-NE
S. Rourke, ISO-NE
C. Sedlacek, ISO-NE

Exhibit No. 7

NSTAR ELECTRIC GAS
One NSTAR Way
Westwood, Massachusetts 02090

February 8, 2005

Mr. James L. Cross
Vice President, System Planning
ISO New England Inc.
One Sullivan Road
Holyoke, MA 01040-2841

RE: TCA Application # NSTAR-04-TCA-01-Rev 1, dated August 24, 2004

Dear Mr. Cross:

Your letter to Mr. Charles Salamone of NSTAR, dated February 1, 2005, concerning the captioned subject, provided two questions that originated from the January 31, 2005, stakeholder meeting concerning NSTAR's application for regional cost recovery of the 345 kV Transmission Reliability Project. This letter provides the responses to these questions.

Question #1: Please identify the regulatory agencies (local, state, and/or federal), which have jurisdiction over the wetlands located in the area identified as the Maine PUC alternate overhead route.

Response: The following regulatory agencies have jurisdiction over wetlands in Massachusetts:

- Army Corps of Engineers (Federal)
- Massachusetts Executive Office of Environmental Affairs (Areas of Critical Environmental Concern)
- Massachusetts Wetlands Protection Act (Department of Environmental Protection [DEP])
- Massachusetts Legislature (Article 97 of State Constitution for release of open space lands)
- Local City/Town Conservation Commissions (local ordinances and bylaws)

During the stakeholder meeting of January 31, 2005, a tangential question was asked concerning what agency(s) would have jurisdiction in the absence of any state or local laws or regulations governing wetlands? For the proposed alternative overhead route presented by the Maine PUC, the following information is provided.

The alternative overhead transmission line route variation proposed by the Maine PUC originated at an undefined location in Stoughton at the existing overhead 345 kV Transmission Line east of Route 138 and followed northward to an area near the intersection of Routes 138 and 128 in Canton. At this intersection, a switchyard would be constructed to transition the two overhead lines into three underground lines. The Maine PUC suggested the overhead line route would make use of noticed wetlands in Canton and Stoughton to minimize procuring rights-of-way from private entities to minimize cost.

The Commonwealth of Massachusetts maintains tight control and protection of wetlands and other protected resources and open space through the laws and regulatory agencies noted above. In addition to and in the

absence of any state or local laws or regulations, however, federal law governs the use of wetlands for the proposed use. The Army Corps of Engineers would be the jurisdictional authority.

The wetland areas through which the Maine PUC proposed alternative would be routed include an extensive wetland to the east of Route 138 in south Canton called the Pequit Brook/York Brook/Reservoir Pond Complex and the even more extensive Ponkapong Bog and Fowl Meadow Area of Critical Environmental Concern in the northern part of Canton, east of Route 138. These wetlands are high-value wetlands that provide some unique functions not typically found in suburban Boston or elsewhere in the Neponset River watershed. The extensive wetland in South Canton at York Brook contains a Great Blue Heron rookery. The Ponkapong Bog wetland and the associated upland areas surrounding the bog (including any possible area that might be used to construct the switchyard) is an area designated as an Area of Critical Environmental Concern by the Commonwealth of Massachusetts. Even though this is a state-level designation, the reason for this designation is, in great part, due to the unusually high-valued functions and extent of the wetlands.

While Massachusetts laws do act to prohibit development of extensive wetland areas like these found in Canton, the U.S Federal Clean Water Act and related federal statutes also provide the same limitations to development and construction. Pursuant to Section 404 of the Clean Water Act, a permit would be required from the U.S. Army Corps of Engineers for dredging, filling, and/or the disposal of dredged material in wetlands or waters of the US, even if this activity amounts to a temporary disturbance of the wetlands. Since siting any electric transmission structure of the size proposed for this project (2 circuits, 345 kV) would require disturbance of more than 5,000 square feet of "waters of the United States", an Individual U.S. Army Corps of Engineers Section 404 Permit Application would be required. For the proposed overhead transmission lines to be sited through these wetlands in Canton, NSTAR would be required to submit an application to the New England Division of the Corps of Engineers. That application would be required to demonstrate the proposed routing, design, and construction methods are the "Least Environmentally Damaging Practicable Alternative" for the project.

The criteria for Section 404 approval requires more than just that the "Least Environmentally Damaging Practicable Alternative" be developed for the project. The Corps is specifically concerned about the impact of the project on "waters of the United States". As a federal agency, the Corps cannot issue the individual permit without first acting as the lead federal agency and completing documentation under the National Environmental Policy Act (NEPA). Specifically, for the issuance of an individual Section 404 permit for the subject wetland use, the Corps would be required to consult with all other federal resource (land, cultural, natural resources, endangered species, etc.) agencies and cooperatively publish an Environmental Assessment (EA) or Environmental Impact Assessment (EIS). That EA or EIS would need to conclude not only that the selected route and design and construction method for the overhead transmission line was "Least Environmentally Damaging Practicable Alternative", but that with appropriate mitigation, there were no significant environmental impacts of the proposed project for all resources protected under federal law. The individual Corps Section 404 permit process is generally a lengthy process as has been witnessed in recent permit applications and it is doubtful it could or would support the project need schedule.

NSTAR has completed all the major permitting for the 345 kV Transmission Reliability Project without the need for a Corps Section 404 permit. This was accomplished by siting and routing analysis identifying the high and unique values of the nearby wetlands and avoiding all direct impacts to wetlands along the project route. It is clear that underground construction within Route 138 where there are no wetlands is a "Less Environmentally Damaging Practicable Alternative" than overhead construction through the high-value wetlands of Canton.

NSTAR ELECTRIC GAS
One NSTAR Way
Westwood, Massachusetts 02090

Question #2: What would be the impact to cost, schedule, accessibility, and maintenance if NSTAR utilized the alternate overhead route identified by the Maine PUC?

Response: In responding to this question, a comparison will be provided for each of the four categories noted in the question.

COST

The cost for constructing three underground 345 kV transmission lines from NSTAR's existing 345 kV overhead line and the intersection of Route 138 in Stoughton to the intersection of Routes 138 and 128 in Canton, MA is approximately $34.8 Million.

The estimated cost for constructing the alternate proposal of the Maine PUC route through private properties and wetlands, assuming the governing regulatory agencies were to permit construction of this route, consists of the following components:

Cost of transmission lines and structures:	$19.0 Million
Cost of 250 foot wide Right-of-Way through private properties (See Note 1 below):	$54.8 Million
Estimated additional cost of property for Switchyard location (See Note 2 below):	$ 4.3 Million
Total:	$78.1 Million+ (See Note 3 below)

Notes:

(1) The cost of right-of-way is based on 50% of the property value if the property were to be procured.
(2) This amount reflects the difference in property value from MLS data for an equivalent size parcel of property from Stoughton to the intersection of Routes 128 & 138 in Canton.
(3) The cost total does not include wetland replication cost. If wetland construction were to be permitted, NSTAR would be required to replicate equivalent amounts of wetland space. The cost for this is not included since replication is indeterminate at this time. In addition, the cost for access roadways and/or bridges for maintenance and inspection access is not included since these are highly dependent on an exact route definition.

SCHEDULE

The schedule impact of using the Maine PUC proposed alternate is enormously adverse. It is not instructive to compare actual construction schedules of the NSTAR sited route versus the Maine PUC proposal because the schedule difference is overwhelmingly determined by time to acquire right-of-way for the Maine PUC proposed route and the regulatory proceedings and processes necessary for exploring the use of noticed wetlands. For the approximate route defined by the Maine PUC, we are estimating approximately 300 private properties would be involved in negotiations or takings by eminent domain to acquire the needed 250-foot wide right-of-way. In Stoughton, these properties are roughly 50% commercial and 50% residential. In Canton, the split is roughly 30% commercial and 50% residential. We anticipate difficult negotiations and eminent domain cases that would take several years to resolve. In parallel with this activity would be the regulatory process for access to noticed wetlands. This process begins with each affected Town voting in an

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One NSTAR Way
Westwood, Massachusetts 02090

open town meeting to annex the wetlands. If favorable, Massachusetts Constitution Article 97 requires a 2/3 favorable legislative vote from both the state house and senate approving the use, and this is followed by the Governor's approval. Most town's meet annually and the legislature would vote when the issue was placed on the legislative agenda. This process would take, at minimum 18 to 36 months with almost no chance of success.

The minimum estimated schedule delay just to begin construction of the Maine PUC proposed alternative is 24 to 36 months and this assumes a successful outcome to all of the proceedings, which experience indicates is unlikely.

ACCESSIBILITY

For the 345 kV transmission line route sited by NSTAR in Route 138, access to line components would be in the highway and would generally be through manholes in the streets. Access is simple and only requires traffic management.

For the route proposed by the Maine PUC, access roads would have to be constructed within the 250-foot right-of-way that would include roads across private properties and wetlands. The roads must be maintained for year-around access for programmed maintenance as well as emergent work requiring immediate attention. This will add an initial capital cost and on-going operational cost to this option.

MAINTENANCE

Maintenance of the NSTAR sited transmission lines is minimal. NSTAR has over 200 miles of pipe-type cable transmission lines in its system and maintenance of the lines themselves is quick and simple. Periodic inspection and maintenance of the dielectric fluid pump station and manholes accounts for most of the routine maintenance.

For the Maine PUC proposed alternative, there would be annual right-of-way clearing to maintain vegetation at acceptable heights. Vegetation in wetland areas is generally more aggressive than in dryer locations so annual clearing is anticipated. This would increase maintenance/operational cost above the NSTAR sited lines.

We have estimated the costs presented in the above material in a short period of time so that we could respond to your letter rapidly, as you requested. If additional detail is needed, we will be please to provide it.

Sincerely,

Paul D. Vaitkus
Vice President-Engineering

Exhibit No. 8

Stephen G. Whitley
Senior Vice President and Chief Operating Officer

February 7, 2005

Mr. Charles Salamone
Director System Planning
800 Boylston Street
Boston, MA 02199

Dear Mr. Salamone:

Re: TCA Application #NSTAR-04-TCA-01-Rev 1 dated August 24, 2004

In accordance with Section 2 of Schedule 12C of Section II of the ISO New England, Inc. ("ISO") Tariff and ISO Planning Procedure 4 ("PP4"), the ISO has nearly completed its review of the subject Transmission Cost Allocation application. To assist the ISO in completing its work, please provide the ISO with: (a) any agreements entered into by NSTAR with municipalities associated with construction of the 345kV Reliability Project ("NSTAR Agreements")[1]; and (b) detailed information regarding costs associated with site mitigation measures as required by the Massachusetts Energy Facilities Siting Board Final Decision and/or any of the "NSTAR Agreements."

With regard to our request for detailed information associated with site mitigation measures as required by the Massachusetts Energy Facilities Siting Board Final Decision and/or measures to be undertaken by NSTAR under any of the NSTAR Agreements, please provide such information by updating Section 4 of the NSTAR TCA application to provide or break out the line item cost amounts for each mitigation or other measure, or verify that such costs are not included in the request. Specifically, indicate the amount of incremental dollars associated with

[1] To the extent such agreements are informal or unwritten, please describe the nature of the measures encompassed within such agreements, and provide or break out the incremental costs of implementing such measures. For example, press accounts indicate that NSTAR: (i) re-routed the Project from Blue Hill Avenue to Columbia Road; (ii) will "renovate" the American Legion Highway; (iii) will build a barrier wall at the Hyde Park substation; (iv) will build a bicycle path from Neponset Valley Parkway to the Trailside Museum; and (v) will "unsnarl" the Canton Avenue intersection.

each requirement of the Board's Order and any NSTAR Agreements, anticipated services/materials to be purchased with these dollars, and identify whether the Board's Order and/or an NSTAR Agreement was the cause for the cost to be incurred.

If you have any further questions about this matter, please do not hesitate to call me.

Sincerely,

Stephen G. Whitley
Senior Vice President and Chief
Operating Officer

cc: C. O'Connor
NEPOOL Reliability Committee

Exhibit No. 9

NSTAR ELECTRIC GAS
800 Boylston Street Boston, Massachusetts 02199

April 6, 2005

Mr. Stephen G. Whitley
Senior Vice President and Chief Operating Officer
ISO New England, Inc.
One Sullivan Road
Holyoke, MA 01040

Re: TCA Application #NSTAR-04-TCA-01-Rev 1, dated August 24, 2004

Dear Mr. Whitley:

By letter dated February 7, 2005, ISO New England, Inc. ("ISO-NE") requested that Boston Edison Company, d/b/a NSTAR Electric ("NSTAR Electric" or the "Company") provide additional information to ISO-NE as part of its Transmission Cost Allocation ("TCA") application.[1] Specifically, ISO-NE requested that NSTAR Electric provide (a) any agreements entered into by NSTAR Electric with municipalities associated with the construction of the 345 kV Reliability Project; and (b) detailed information regarding costs associated with site mitigation measures as required by the Final Decision of the Massachusetts Energy Facilities Siting Board ("EFSB") or through agreement with municipalities traversed by the Project. The information requested by ISO-NE is provided herewith.

1. Regional Benefits

The 345 kV Reliability Project is a critical step in achieving ISO-NE's stated objectives to ensure bulk power system reliability, to allow for voluntary participation in the regional power markets and to provide access to competitive markets. During the EFSB hearings, ISO-NE testified that several of the existing portfolio of generators serving Greater Boston are "living on borrowed time" in that they are costly to operate but have not been allowed to retire due to reliability concerns (Tr. 15 at 1,999, 2,040). ISO-NE also testified that the Project is needed by summer 2006 and that, should the Project be delayed by even six months, there is a risk that ISO-NE would have to resort to costly and environmentally onerous generation options in order to maintain system reliability in the event that existing generation serving Greater Boston is not in service during that period (id. at 2,050-51). These statements reflect ISO-NE's findings in RTEP03 that the reliability of the regional transmission system will be in jeopardy absent the development of a new transmission corridor from southeast Massachusetts to downtown Boston (see,

[1] The letter is dated February 7, 2005 and was received by NSTAR Electric on March 17, 2005.

RTEP03, Executive Summary at 30).

Consequently, a significant delay in the in-service date of the Project would have serious ramifications for the region in terms of meeting ISO-NE's regional-planning objectives. To avoid these ramifications, NSTAR Electric implemented a strategy to complete the Project on an expedited basis to meet the 2006 in-service date, while also minimizing costs and reducing risks associated with the construction process. In that regard, the municipal agreements are designed to substantially reduce the risk of delays and cost increases that, in the Company's experience, have the strongest potential to occur during the construction phase of the Project as the line is installed along the public streets and roadways of local communities involved (necessarily) in the Project.

2. Municipal Agreements

The Company entered into a Memorandum of Understanding ("MOU") with each municipality outlining the location-specific activities that would be undertaken to complete the Project on a cost-effective and timely basis.[2] These agreements are included as Appendices A through E and address construction in the Town of Stoughton, Town of Canton, Town of Milton, City of Boston and areas under the care and control of the Massachusetts Department of Conservation and Recreation ("DCR").[3]

NSTAR Electric entered into each MOU following an extensive assessment of all considerations relating to engineering and construction requirements, project schedule, budgetary constraints and safety and reliability standards. In addition, the agreements were reviewed, discussed and vetted by NSTAR Electric senior management in conjunction with the Project management team to ensure that the agreements would help to control and/or minimize construction costs and to eliminate the potential for costly and time-consuming delays. Special attention was paid to ensure consistency among the agreements with each town, the City of Boston and DCR.

Specifically, the Company strictly limited commitments under the MOUs to those activities necessary to:

(1) Complete physical construction of the Project in accordance with applicable engineering design and construction practices;

(2) Mitigate visual, noise and safety impacts created by the Project; or

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[2] In the Town of Stoughton, the agreement was referred to as the "Host Community Agreement."

[3] DCR is the state agency that owns and controls public lands in the Commonwealth of Massachusetts.

(3) Control and/or reduce costs susceptible to escalation during construction.

All of the commitments made by the Company meet one or more of these criteria and, in addition, are indispensable elements of the Company's overall strategy to complete physical construction of the 345 kV Reliability Project on an expedited basis and at the least possible cost. Moreover, none of the municipal agreements dictate: (1) the structure, design or mode of transmission alternative to be used by the Company to meet its obligation to the regional transmission system (e.g., underground or overhead), or (2) the construction method, equipment or schedule to be used by the Project. As a result, these commitments will help to ensure the 345 kV Reliability Project represents the most feasible, practical and cost-effective transmission alternative to meet ISO-NE's identified resource need by the summer of 2006.

3. Breakdown of MOU and EFSB Components

As requested, Schedule A (attached hereto) provides a breakdown of the MOU components for each municipality and for the construction and mitigation requirements set forth in the EFSB's Decision. Each component is listed by line item with a short description, the basis for inclusion in the Project, the estimated cost of the line item and a quantification of offsetting cost savings available to the Project through the MOUs.

There are a couple of factors to consider in evaluating Schedule A. First, Schedule A provides a breakdown of the mitigation measures outlined in the EFSB Decision and indicates the cost associated with each measure. However, all of the mitigation measures outlined by the EFSB were either contemplated in the Company's original project design or are also the subject of a municipal agreement. Therefore, none of the EFSB mitigation measures impose incremental costs on the Project. We have cross-referenced EFSB mitigation with the relevant municipal agreement where appropriate.

In addition, similar to the EFSB mitigation measures, many of the MOU commitments involve activities that would be undertaken by the Company in the normal course of construction, and therefore, were anticipated and included in the Company's original project design. Specifically, the cost estimates set forth in Section 4 of the TCA included amounts for a range of construction and restoration activities relating to trench excavation, conduit and cable installation, site reconstruction, safety, visual and noise mitigation and other activities at the switchyard sites and along the 18-mile expanse of the transmission line. The MOUs specify these activities and the related costs, and therefore, do not impose an incremental cost on the Project.[4]

[4] NSTAR Electric has not included or referenced requirements in Schedule A that have no cost to the Project such as compliance with the EFSB's directive to develop construction "outreach" plans.

Lastly, the cost estimates identify cost savings available to the Project associated with the MOUs. These cost savings result from municipal guarantees of extended work hours, waived trench restoration fees normally required of street-opening projects and reduced re-paving requirements. In particular, the extended work hours produce substantial cost savings because of the ability to avoid the cost of more frequent set-up and disassembling of the work site each work day.

In total, the cost impact to the Project of the municipal agreements is the net of the amounts set forth in the agreements, less (1) amounts already anticipated in the Section 4 estimates; and (2) cost savings available through the MOUs. The total is listed at the bottom of Schedule A. This total does not include a quantification of the enormous regional benefits associated with enhanced reliability and more efficient competitive markets.

4. Route Variations

The letter to NSTAR Electric references a "re-routing" of the Project from Blue Hill Avenue to Columbia Road (Letter from ISO-NE at Page 1, fn.1). However, no "re-routing" of the Project resulted from an MOU or by request of a municipality. As discussed on the record in the EFSB proceeding, the Company included several "route variations" in the EFSB petition, because, at the time the petition was filed in mid January 2004, the Company's engineering studies were ongoing and the Company anticipated gathering additional information on the characteristics and relative values of the proposed routes through ongoing activities taking place after the filing. In some instances, the route variations served as "backup" in the event that the Company obtained input from the civil engineers or other sources after the notice process was finished, preventing the Company from running the line along the Preferred Route or Noticed Alternative Route in those key areas. To avoid significant delay and additional cost in siting the facility, the Company included these workarounds to allow flexibility in the process in the event that contingencies arose regarding key segments of the proposed Preferred and Noticed Alternative Routes.

In particular, the Company petitioned the EFSB to include a route variation running along American Legion Highway ("ALH") to the intersection of Blue Hill Avenue at Columbia Road. As discussed in the record before the EFSB, the Company included this variation on its own motion, based on data that only became available after the initial filing with the EFSB. The Company factored these data into the site-selection criteria used in the original routing study with the outcome being that the ALH route variation offered specific advantages to the Blue Hill Avenue route (Exh. EFSB-SS-19). The advantages of the ALH route variation result from less onerous residential and commercial land-use

impacts, including substantially lessened traffic impacts, lower levels of noise impacts for sensitive receptors and less disruption of commercial and residential premises. In addition, ALH encompasses fewer obstacles and a wide berth for construction. Accordingly, the Company's determination to use ALH resulted from a Project design and routing decision not as a result of any local or EFSB requirement.

5. Conclusion

NSTAR Electric appreciates the opportunity to supplement its TCA application. The Company recognizes that the Project is a critical link in meeting ISO-NE's mission to maintain the reliability of the New England transmission system and promote voluntary market participation. To that end, the Company has taken every possible step to contain costs and to plan for construction contingencies that would delay construction or impose additional costs on the Project. The MOUs are a vital element of the Company's overall strategy to avoid delay and minimize costs and are designed to provide a high level of protection in that regard.

Please feel free to contact me should you have any further questions relating to Schedule A or any other aspect of the NSTAR Electric TCA application.

Sincerely,

Paul D. Vaitkus
Vice President, Engineering

cc: C. O'Connor
NEPOOL Reliability Committee

	Description of Item	Reason for Inclusion	Estimated Cost	Estimated Cost Savings	Amount Incremental to 12C Application (N.1)
EFSB Order at 166	Installation of portable noise barriers for nighttime construction.	Necessary to mitigate noise impacts that will result from cable-splicing operations along the route during construction.	$25,000		$0
EFSB Order at166	Development of noise mitigation plan for residential receptors located near nighttime construction areas.	Necessary to mitigate noise impacts along the route during construction.	$25,000		$0
EFSB Order at 168	Develop noise mitigation plan to reduce the nighttime noise at residences east of the station (across Hyde Park Avenue).	Necessary to mitigate long-term noise and visual impacts at the Hyde Park Substation due to addition of transformer equipment..	$100,000		$0
EFSB Order at 168	Provide visual screening at the Stoughton switchyard site.	Necessary to mitigate long-term visual impacts resulting from construction of switchyard in residential area.	$300,000		$0
EFSB Order at 168	Install 5-6 ft. visual screening (arborvitae) and brick pillar fencing for distance of 100-125 feet along Hyde Park Avenue border	Necessary to mitigate long-term visual impacts to residential area from new transformer equipment to be added at Hyde Park Substation	$200,000		$0
EFSB Order at 169	Install plantings along Baker Street Station fence for visual screening	Necessary to mitigate long-term visual impacts relating to addition of new heat exchanger at Baker Street Station	$50,000		$0

	Description of Item	Reason for Inclusion	Estimated Cost	Estimated Cost Savings	Amount Incremental to 12C Application (N.1)
Appendix A – City of Boston (N.2)					
City of Boston (B.1.a)	Install and raise curbing to meet existing code	Curbing along approximately 10,125 foot stretch of route in the City of Boston will be removed during excavation of trench and will be installed and/or brought up to code during re-paving.	$1,300,000		$0
City of Boston (B.1.b)	Replace streetlight standards removed during excavation for Project	Replace streetlight standards along approximately 10,125 foot stretch of route in the City of Boston that will be affected by construction.	$1,250,000		$0
City of (B.1.c)	Replace five traffic signals affected by construction.	Replace traffic signals that will be damaged to accommodate construction of line along ALH.	$1,250,000		$0
City of Boston (B.1.e)	Install and replace damaged sidewalks to meet existing code.	Sidewalks along approximately 8,000 foot stretch of route in the City of Boston will be affected by excavation construction and installed and/or brought up to code during re-paving.	$950,000		$0
City of Boston (B.1.f)	Install curb-to-curb paving along American Legion Hwy. only.	Curb-to-curb paving along 10,125 stretch of route necessary to complete physical construction. City of Boston has relinquished this standard trench repair requirement for all other roadways in the City. (The $700K cost is for curb to curb paving only along ALH. The city waived the requirement for curb to curb paving along the remainder of the route resulting in the $1.8M savings shown in paragraph C.4 section)	$700,000		$700,000

	Description of Item	Reason for Inclusion	Estimated Cost	Estimated Cost Savings	Amount Incremental to 12C Application (N.1)
City of Boston (B.1.g)	Cut, remove and trim trees to allow for construction	Trees may have roots damaged by trench construction. Trimming and removal is necessary to complete physical construction and re-paving of Project in accordance with existing code.	$600,000		$0
City of Boston (B.2)	Install interconnection conduits in trench	Two 4" PVC conduits will be installed in trench to accommodate interconnecting cables for traffic signal controls and synchronization.	$4,300,000		$4,300,000
City of Boston (B.3)	Replace and install traffic signal controllers affected by construction	Traffic signal controllers are located along route and will be replaced during construction.	$719,000		$719,000
City of Boston (B.4)	Maintain Transportation Department staffing	Necessary to oversee construction activities.	$410,000		$410,000
City of Boston (C.2)	Work hours allowed by the City with special dispensation for NSTAR	Allows work hours on extended daily basis. Avoids cost of repeated set-up and dissembling of job site with average work day.		($5,241,000)	($5,241,000)
City of Boston (C.4)	Complete trench-only road repair for entire length of transmission line	Allows waiver of obligation to re-pave roadways within City of Boston on permanent, curb-to-curb basis, except for ALH and DCR.		($1,800,000)	($1,800,000)
APPENDIX B – Town of Stoughton					
Town of Stoughton (Para.1)	Perform site clean-up for preparation for construction	Physical construction of switchyard site cannot be conducted with site preparation.	$12,000		$0
Town of Stoughton (Para.2)	Conduct site grading and drainage.	Physical construction of switchyard site cannot be conducted without site grading and drainage.	$1,012,000		$0

	Description of Item	Reason for Inclusion	Estimated Cost	Estimated Cost Savings	Amount Incremental to 12C Application (N.1)
Town of Stoughton (Para.3)	Install vegetative visual screening and berms along perimeter of switchyard site	Necessary to mitigate long-term visual impacts resulting from Project construction	*N/A – This is same item ordered for mitigation by EFSB above*		*N/A – This is same item ordered for mitigation by EFSB above*
Town of Stoughton (Para.4)	Install three-sided sound attenuation wall	Necessary to mitigate long-term noise impacts resulting from installation of switchyard equipment	$80,000		$80,000
Town of Stoughton (Para.5)	Install traffic signal and ADA compliant sidewalk along new perimeter of station yard	Needed to mitigate impacts of new switchyard equipment near perimeter of site. Sidewalk is 2,000 feet and is located from Rte 138 to intersection of York and Pine Streets.	$360,000		$0
Town of Stoughton (Para.9)	Payment to Town of Stoughton for mitigation of impacts relating to construction of Project	Needed to mitigate impact of new construction for residents and avoid siting of Project at alternative site with additional costs for land acquisition and cleanup.	$1,250,000		$1,250,000
Town of Stoughton (Para.11)	Work hours allowed by the City with special dispensation for NSTAR	Allows work hours on extended daily basis. Avoids cost of repeated set-up and dissembling of job site with average work day.		($116,000)	($116,000)
Appendix C – Town of Canton					
Town of Canton (1.a, 1.c)	Provide temporary trench repair for Route 138	NSTAR Electric is not obligated to provide permanent paving. Funds for permanent paving from Rte 128 to Milton provided to Canton for paving when Town-constructed improvements are ready.		($1,315,000)	($1,315,000)

	Description of Item	Reason for Inclusion	Estimated Cost	Estimated Cost Savings	Amount Incremental to 12C Application (N.1)
Town of Canton (1.b)	Re-pave Route 138 following construction	These are re-paving costs that will be incurred by the Company to complete construction and repaving of Project from Stoughton to Rte 128.	$338,000		$0
Town of Canton (1.c)	Payment to Town of Canton for mitigation of impacts relating to construction along Rte 138 in Canton	Needed to fund repaving and mitigation activities that cannot be completed by NSTAR Electric at construction because of Project timing. This includes the paving costs listed as savings above (1.a & 1.c)	$3,400,000		$3,400,000
Town of Canton (2.b)	Work hours allowed by Town of Canton with special dispensation to NSTAR	Allows work hours on extended daily basis. Avoids cost of repeated set-up and dissembling of job site with average work day.		($1,566,000)	($1,566,000)
Appendix D – Town of Milton					
Town of Milton (1.a)	Install interconnection conduits in trench	Two 3" PVC conduits will be installed in trench to accommodate underground facilities sharing trench.	$150,000		$0
Town of Milton (1.b)	Install paved and marked bike path along Neponset Valley Parkway	Necessary to mitigate traffic impacts of construction along highly traveled route	$33,000		$33,000
Town of Milton (1.c)	Install two waiting enclosures for college students	Necessary to protect safety of students during construction	$50,000		$50,000

	Description of Item	Reason for Inclusion	Estimated Cost	Estimated Cost Savings	Amount Incremental to 12C Application (N.1)
Town of Milton (1.d)	Payment to Town of Milton for mitigation of impacts relating to construction of Project. Mitigation to include: • Installation of traffic signal and repavement • Installation of signage and reconstruction of • Installation of	Necessary to complete construction and repaving of Project consistent with ADA requirements. These items are necessary to control traffic or to detour traffic around the construction zones within the 3.7 mile stretch of Route 138 in Milton, which is heavily traveled.	$1,735,000		$0
Town of Milton (2.a)	Work hours allowed by Town of Milton with special dispensation to NSTAR	Allows work hours on extended daily basis. Avoids cost of repeated set-up and dissembling of job site with average work day.		($1,189,000)	($1,189,000)
Appendix E -- DCR					
DCR	Repaving of DCR-controlled roadways within route.	These are re-paving costs that will be incurred by the Company to complete construction and repaving of Project from Stoughton to Rte 128.	$668,000		$0
DCR	Payment to DCR for mitigation of construction-related impacts	Necessary to complete construction and mitigation of construction-related impact on Trust-owned lands	$300,000		$300,000
DCR	Work hours allowed by DCR with special dispensation to NSTAR	Allows work hours on extended daily basis. Avoids cost of repeated set-up and dissembling of job site with average work day.		($3,180,000)	($3,180,000)
TOTAL NET IMPACT OF EFSB AND MUNICIPAL COMMITMENTS			**$21,567,000**	**($14,407,000)**	**($3,165,000)**

N.1 The cost estimates encompassed in the 12C Application included amounts for a range of construction and restoration activities relating to trencl excavation, conduit and cable installation, site reconstruction, saftey, visual and noise mitigation and other activities at the switchyard sites and along the 18-mile expanse of the transmission line that were as yet unspecified at the time the 12C Application was filed.

N.2 For the City of Boston, actual costs will not exceed estimated costs by more than 5%..

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into on this 18th day of January, 2005, between Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric" or the "Company") and the City of Boston (the "City"), by and through the Mayor of Boston, Thomas M. Menino. This MOU governs the principal aspects of NSTAR Electric's proposal to locate a 345 kilovolt ("kV") transmission line through designated areas within the City, consistent with the proposal subject to the approval of the Energy Facilities Siting Board (the "EFSB") and the Department of Telecommunications and Energy (the "DTE"), in the proceedings docketed as EFSB 04-1/D.T.E. 04-5/ D.T.E. 04-07.

WHEREAS, NSTAR Electric is proposing to construct a three-circuit 345 kV underground transmission facility approximately 18 miles in length with a point of origin at a new switching station to be constructed in the Town of Stoughton and a point of termination for one circuit at the Company's Hyde Park substation, and for two circuits at the Company's K Street substation in South Boston (the "Project");

WHEREAS, the Company's analysis of the electric transmission system shows that additional transmission facilities will be needed by June 2006 to ensure the reliability of electric service to the City and the Greater Boston area; and

WHEREAS, both NSTAR Electric and the City desire that, should the proposed Project be authorized by the applicable regulatory agencies and government authorities and thereafter be constructed by NSTAR Electric, it be done in a manner that minimizes impacts to the environment and disruption to the public and provides reasonable assurance to the City and its citizens that construction impacts will be mitigated.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which hereby are acknowledged, NSTAR Electric and the City agree as follows:

A. NSTAR Electric and the City agree that the commitments set forth below are applicable to the Project's "Preferred Route," which includes the American Legion Highway route, as described in the proceeding before the EFSB, and are contingent upon the EFSB approving such "Preferred Route" in its entirety.

B. NSTAR Electric Commitments: NSTAR Electric agrees to the following in connection with the construction and operation of the Project within the City by, and in cooperation with, contractors of its choice:

1. American Legion Highway Improvements: NSTAR Electric agrees to provide certain improvements along American Legion Highway from the intersection at Cummins Highway northward to the intersection with Blue Hill Avenue. These improvements (collectively, the "Improvements") include:

(a) Curbing: Where granite curbstones exist along this portion of American Legion Highway, NSTAR Electric agrees to raise curbstones to meet existing City standards (6-inch exposure along sidewalks and 9-inch

exposure along medians) (standard attached as Reference 1). In portions of the roadway where no curbing exists, NSTAR Electric will supply and install granite curbstones to existing City standards (standard attached as Reference 1). The estimated cost of improving and installing granite curbstones along American Legion Highway is $1.3 million.

(b) Street Lights: NSTAR Electric agrees to replace existing street light standards along the section of American Legion Highway from Cummins Highway northward to the intersection with Blue Hill Avenue with street light standards equivalent to those now in place along Hyde Park Avenue. NSTAR Electric will install additional light standards and associated cabling and controls as are currently contemplated in the City's redesign along this section of American Legion Highway. The estimated cost of replacing and installing streetlights on this section of American Legion Highway is $2.75 million.

(c) Traffic Signals: NSTAR Electric agrees to replace, in compliance with existing City standards, five existing traffic signals along American Legion Highway between Cummins Highway and Blue Hill Avenue (standards attached as Reference 2). In addition, at the intersection of Franklin Hill Avenue and American Legion Highway, NSTAR Electric will reconstruct the intersection to provide a break in the median to allow motorists to make left turns from Franklin Hill Avenue onto American Legion Highway without driving over the median. A new traffic signal will be added to this intersection. The estimated cost of replacing the five traffic signals, reconstructing the intersection at Franklin Hill Avenue and installing a new traffic signal is $1.25 million.

(d) Intersection of Cummins Highway and American Legion Highway: The City is in the process of redesigning this multi-road intersection with new curbing to facilitate safe traffic flow. The traffic signal at this intersection is one of the five mentioned above that will be upgraded to existing City standards. NSTAR Electric agrees to share with the City an AUTOCAD-compatible digitized disk showing the underground facilities of which NSTAR Electric is aware in this intersection and along the highway to Walk Hill Street.

(e) Sidewalks: NSTAR Electric agrees to replace with concrete sidewalks the existing sidewalks that are buckled from tree roots, are damaged during traffic signal installation or are currently composed of bituminous cement. Also, any area of American Legion Highway, along either side of the roadway, where a sidewalk does not exist, NSTAR Electric agrees to add concrete sidewalks to City specifications. The estimated cost of the replacement and installation of cement sidewalks is $950,000.

(f) Road Surfacing: NSTAR Electric agrees to provide curb-to-curb paving along both sides of the length of American Legion Highway from

Cummins Highway to Blue Hill Avenue. The estimated cost of curb-to-curb paving not included in the original Project scope (i.e., for the side of the road that is opposite to the location of the Project) is $700,000.

(g) Trees: NSTAR Electric agrees to cut, remove and stump grind to approximately 18 inches below the surface, any mature trees along American Legion Highway that are reasonably identified by the City as dead or dying. NSTAR Electric also agrees to procure and plant trees in identified areas of American Legion Highway where trees are removed or currently do not exist. The City will specify the location and type of trees to be planted within 6 months of the date of execution of this MOU. However, the trees designated by the City shall be native trees not greater than three inches in trunk diameter.

NSTAR Electric agrees to prune any trees blocking or obstructing street lighting on American Legion Highway. NSTAR Electric also agrees, pursuant to the existing requirements of the City Parks Department, to provide root fertilization of trees along the transmission line route that may have roots disturbed by Project trenching.

Further, no equipment will be stored under trees by NSTAR Electric during non-working hours. During working hours, NSTAR Electric and its contractors will take all reasonable efforts to avoid damage to trees as construction progresses along the City portion of the route. A licensed arborist will be available to the jobsite when construction is in the vicinity of trees anywhere along the City portion of the route.

The estimated cost of the above-described tree maintenance and replacement is $600,000.

2. Traffic Signal Interconnection/Conduits: NSTAR Electric agrees to provide two four-inch PVC conduits routed to handholes along the side of the roadways, installed near the top and side of the NSTAR Electric trench for the entire length of the City portion of the Project (approximately 45,000 feet). One of these conduits will be a "Quad" conduit containing four separate conduits within a four-inch conduit. Three of the four internal conduits will contain fiber optic cabling. The fourth internal conduit will contain a multi-conductor copper cable for traffic signal interconnection. The other four-inch PVC conduit will be left vacant for future City use. These conduits will be positioned near the top of the trench, approximately 20 inches below the road surface on the side of the roadway so as not to interfere with access to the transmission lines in the future. For trench depths less than 30 inches, NSTAR Electric will encase conduits in flow fill concrete, except on roadways under the care and control of the Department of Conservation and Recreation ("DCR"), where DCR's standards for conduit installation and trench filling shall apply. In no case will conduits be placed less than 12" from the surface. These conduits will not be routed into NSTAR

Electric's 345 kV Transmission System manholes. The estimated cost of these conduits is $4,312,500.

3. Traffic Signal Controllers: NSTAR Electric will procure and install new traffic signal controllers for 25 intersections along the Preferred Route in the City. The City will identify the 25 intersections where traffic signal controllers will be installed within 30 days of the execution of this MOU. The estimated cost for procurement and installation of the controllers is $28,750 per intersection. In total, the estimated cost of installing these traffic signal controllers is $718,750.

4. Boston Transportation Department Positions: NSTAR Electric agrees to fund two Transportation Department positions dedicated to the 345 kV Transmission Project during active construction of the Project within the City. The maximum cost for these positions shall not exceed $410,000 in the aggregate, nor shall funding exceed a two-year period.

5. Work Practices and Procedures: NSTAR Electric agrees to adhere to work practices and procedures set forth in Appendix A in connection with the Project.

6. Work Performed By NSTAR Electric Contractors: To the extent that NSTAR plans to use one or more contractors to construct and install the Improvements outlined herein, NSTAR Electric shall ensure that there are adequate assurances of performance by the contractor with respect to the Improvements.

C. City Commitments: The City agrees to the following in connection with the construction and operation of the Project within the City's jurisdiction:

1. The City agrees to waive the trench restoration deposit and any other trench-related fees that may be imposed on either NSTAR Electric or its contractors concerning the Project.

2. The City agrees to allow work hours for NSTAR Electric and its contractors as follows:

   i. Work hours shall be in accordance with the weekday and weekend parameters set forth in Appendix B to this MOU.

   ii. Work shall be suspended in residential and non-residential areas during parades or neighborhood celebrations, as designated by the City in a listing to be provided to the Company within 30 days of the execution of this MOU, or with no less than 21 days notice to the Company if the event is not included in the listing.

   iii. Construction work during the winter moratorium shall be allowed to continue provided that, during snow emergencies declared by the City, NSTAR Electric will require its contractor(s) to cease construction and, to the extent possible, to backfill excavated areas rather than using steel road plates to cover excavations. Construction work during the winter

moratorium will occur only at times when hot paving can be provided for surface restoration.

3. The City agrees to assist NSTAR Electric and its contractor(s) in expediting the receipt of all City permits required for the Project. In addition, the City agrees to cooperate with NSTAR Electric and its contractor(s) in undertaking the above-described mitigation measures so that each measure may be completed within the applicable cost estimate set forth herein.

4. The City agrees to allow NSTAR Electric to provide a trench-only road repair for the entire length of the transmission line route through the City with the exception of American Legion Highway, which will have curb-to-curb paving. Trench repair will be completed in accordance with the City's existing standards applicable to trench repair. These standards are attached hereto as Reference 3.

5. The City agrees to provide the design for all American Legion Highway Improvements required by the terms of this MOU within 90 days from the date of execution of this MOU.

6. The City agrees to provide the specification for purchase and installation of the traffic controllers described in this MOU within 30 days of the execution of this MOU.

7. The City agrees to secure all easements, property or permits necessary for the purpose of locating sidewalks, streetlights or completing road resurfacing needed to meet the City's requirements under the terms of this MOU. This includes any permits necessary to install the conduits described in Article B.2 ("Traffic Signal Interconnection/Conduits") hereof to the extent that these conduits are located in easements along private property or other property not owned by the City. Such easements, property or permits shall be delivered to the Company within 90 days of the execution of this MOU.

D. NSTAR Electric's commitments hereunder are contingent upon the Project receiving all permits, licenses, approvals, and other authorizations to construct along the Preferred Route from all federal, state and local agencies, in final form, and not subject to any further appeal in form and substance acceptable to the Company, as determined in the sole discretion of NSTAR Electric.

E. NSTAR Electric shall complete construction of the Improvements based on the designated cost estimates set forth above and the design scope discussed to date by NSTAR Electric and the City. In addition, NSTAR Electric shall bear responsibility for cost increases of up to five (5) percent (i.e., up to $650,000) on the total cost estimates for the Improvements, as defined herein. Cost increases beyond five (5) percent of the total estimated cost of the Improvements, whether caused by project design or other factors, shall not be borne by NSTAR Electric.

F. Immediately following the completion of the Improvements referenced herein, with reasonable acceptance by the City, the City and NSTAR Electric shall sign such

documents and take such actions as may be necessary or desirable to transfer or confirm all right, title and interest in and to the Improvements to the City (the "Assignment"). NSTAR Electric shall have no continuing obligation to repair or otherwise maintain the Improvements completed on the City's behalf pursuant to this MOU.

G. The City shall indemnify, defend and hold NSTAR Electric and its officers, employees, agents, representatives, successors and assigns harmless from and against any and all losses, liabilities, expenses and damages, including reasonable attorneys' fees, with respect to any third-party claims arising from or relating to the requirements, specifications and/or designs submitted to the Company by the City pursuant to this MOU.

H. As partial consideration for, and an inducement to, NSTAR Electric undertaking the construction of the Improvements, the City hereby agrees that, as of the date of the Assignment, it fully and unconditionally releases and discharges NSTAR Electric, and each of its officers, employees, agents, representatives, successors and assigns of and from any and all claims, demands and liabilities of any kind whatsoever both in law and equity, whether known or unknown, direct or indirect, express or implied, absolute or contingent, which the City or any of the City's officers, employees, agents, representatives, successors and assigns now has or ever had against NSTAR Electric in any way arising from the Project, this MOU, or any part hereof. Without modification to the provisions set forth in Paragraph G, NSTAR Electric agrees that, as of the date of the Assignment, it will likewise release and discharge the City from any and all claims, demands and liabilities, which NSTAR Electric has against the City arising from the construction of the Improvements.

I. This MOU shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts without regard to its conflicts of laws provision. This MOU contains the entire agreement of the parties hereto with respect to the subject matter hereof, and supersedes all prior or contemporaneous agreements or understandings, whether written or verbal, and may not be altered or amended except by a written instrument signed by an authorized representative of the parties hereto. All of the terms and provisions of this MOU shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, legal representatives, successors and assigns. This MOU may be executed and delivered (including by facsimile transmission) in one or more counterparts, and by the different parties hereto in separate counterparts, each of which when executed shall be deemed to be an original, but all of which taken together shall constitute one and the same agreement.

EXECUTED as a sealed instrument as of the date first written above.

CITY OF BOSTON

By: _____
Michael Galvin
Chief
Basic City Services

BOSTON EDISON COMPANY d/b/a NSTAR ELECTRIC

By: _____
Joseph R. Nolan
Senior Vice President
Customer & Corporate Relations

Approved as to Form:

for _____
Merita A. Hopkins
Corporation Counsel

APPENDIX A: WORK PRACTICES & PROCEDURES

Work Hours: The City reserves the right to require more restrictive work hours for sub-sections of the working corridors when there is a residential area within a larger commercial area. However, such restrictions shall not exceed those set forth in Appendix B, which require work hours in residential areas to be limited to 9AM to 9PM.

Noise Control: NSTAR Electric and its contractors will comply with the City's noise regulations and carefully select methods and equipment that keep noise levels within allowed levels. Mitigation measures such as fiberglass plates should be investigated for use in areas with extreme noise sensitivity, and used to the extent possible to cover trenches in noise-sensitive areas.

Dirt and Dust Control: NSTAR Electric and its contractors will utilize mechanical street sweepers daily to keep streets clear of dirt and reduce fugitive dust.

Traffic Management Plans: NSTAR Electric will provide Boston Traffic Department ("BTD"), for its review and approval, Traffic Management Plans that are prepared, reviewed and stamped by a licensed professional engineer within the State of Massachusetts. NSTAR Electric and its contractors shall adhere to these plans unless a modification is specifically authorized by BTD.

Construction and Special Events: NSTAR Electric and its contractors will coordinate with other non-related construction work within the affected area and any special events such as community festivals. A listing of such events will be provided to the Company within 30 days of the execution of this MOU, or with no less than 21 days notice to the Company if the event is not included in the listing.

Project Coordination: NSTAR Electric and its contractor will meet weekly with the City to review and coordinate upcoming work planned by NSTAR Electric and its contractors. Variations requested by NSTAR Electric and its contractors from the approved Traffic Management Plans will be reviewed as part of these meetings.

Street Repair and Re-Paving: NSTAR Electric and/or its contractors will repair the trench immediately following trench work. Permanent repaving of the trench (grind and overlay) will be completed when sizeable sections of roadway are repaired (i.e., several thousand feet per mile to the extent possible).

Traffic Signals: To prevent delays in installation of the traffic signal mitigation work beyond the completion of other NSTAR Electric work, contractors will order traffic signal equipment within 30 days from contract award by NSTAR Electric. BTD is required to review and approve the scheduled delivery dates on these purchase orders.

Design Review and Approvals: NSTAR Electric and its contractors will design traffic signal and communications improvements in accordance with currently effective BTD design standards (attached as Reference 3) and will be subject to BTD review and approval. NSTAR Electric and its contractors will utilize a qualified traffic engineering firm for construction oversight and completion certification.

Police Detail Coordination: NSTAR Electric's lead contractor will coordinate, administer and pay for all required police details for the Project. In the event that NSTAR Electric's lead contractor fails to make payment to the City for any necessary police details used on the Project, NSTAR Electric will reimburse the City.

Community Relations Program: As part of this MOU, NSTAR Electric and its contractors will adhere to the community relations requirements for Project, as identified in the Project's Request for Proposals as "ATTACHMENT E – OWNER'S COMMUNITY RELATIONS REQUIREMENTS AND OBJECTIVES."

APPENDIX B
NSTAR ELECTRIC 345KV PROJECT
WORK HOUR PARAMETERS WITHIN THE CITY OF BOSTON

WORK HOURS - WEEKDAYS

Street	Limits	Category	Hours	Hours/Day
Cummins Highway	Mattapan Sq to Harvard St	Residential narrow	9AM to 9PM	12
Cummins Highway	Harvard St to American Legion Highway	Commercial wide	9AM to 6 AM	21
American Legion Highway	Hyde Park Ave. to Cummins Highway	Comm'l/Residential wide	9AM to 9PM	12
American Legion Highway	Cummins Highway to Mount Hope Street (inbound side)	Residential narrow	9AM to 9PM	12
American Legion Highway	Mount Hope Street to beyond Morton St (inbound side)	Commercial wide	9AM to 6 AM	21
American Legion Highway	Beyond Morton st to Blue Hill Ave (inbound side)	Residential narrow	9AM to 9PM	12
Blue Hill Avenue	American Legion Highway to Old Road (inbound side)	Residential wide	9AM to 9PM	12
Old Road	Blue Hill Avenue to Columbia Rd (one way)	Residential narrow	9AM to 9PM	12
Columbia Road	Old Road to south of Upharms Corner (inbound side)	Residential wide	9AM to 9PM	12
Columbia Road	through Upharms Corner	Commercial/Residential narrow	10AM to 3PM	5
Columbia Road	north of Upharms Corner to Edward Everett Square (inbound side)	Commercial/Residential wide	9AM to 9PM	12
Columbia Road	Edward Everett Square to Southeast Expressway	Commercial/Residential wide	9AM to 9PM	12
Columbia Road	Southeast Expressway to Day Blvd	Commercial/ narrow	10AM to 3PM	5
Day Blvd	Columbia Rd to I St	Parks on both sides	10AM to 6AM	20
I Street	Day Blvd to East Third Street	Residential	9AM to 9PM	12
East Third Street	I Street to K Street	Residential	9AM to 9PM	12
K Street	East Third Street to Substation	Commercial/Residential	9AM to 9PM	12

WORK HOURS - WEEKENDS

Street	Limits	Category	Hours	Hours/Day
Cummins Highway	Mattapan Sq to Harvard St	Residential narrow	9AM to 9PM	12
Cummins Highway	Harvard St to American Legion Highway	Commercial wide	24 hours	24
American Legion Highway	Hyde Park Ave. to Cummins Highway	Comm'l/Residential wide	9AM to 9PM	12
American Legion Highway	Cummins Highway to Mount Hope Street (inbound side)	Residential narrow	9AM to 9PM	12
American Legion Highway	Mount Hope Street To beyond Morton St (inbound side)	Commercial wide	24 hours	24
American Legion Highway	Beyond Morton st to Blue Hill Ave (inbound side)	Residential narrow	9AM to 9PM	12
Blue Hill Avenue	American Legion Highway to Old Road (inbound side)	Residential wide	9AM to 9PM	12
Old Road	Blue Hill Avenue to Columbia Rd (one way)	Residential narrow	9AM to 9PM	12
Columbia Road	Old Road to south of Upharms Corner (inbound side)	Residential wide	9AM to 9PM	12
Columbia Road	through Upharms Corner	Commercial/Residential narrow	9AM to 9PM	12
Columbia Road	north of Upharms Corner to Edward Everett Square (inbound side)	Commercial/Residential wide	9AM to 9PM	12
Columbia Road	Edward Everett Square to Southeast Expressway	Commercial/Residential wide	9AM to 9PM	12
Columbia Road	Southeast Expressway to Day Blvd	Commercial/ narrow	9AM to 9PM	12
Day Blvd	Columbia Rd to I St	Parks on both sides	10AM to 6AM	20
I Street	Day Blvd to East Third Street	Residential	9AM to 9PM	12
East Third Street	I Street to K Street	Residential	9AM to 9PM	12
K Street	East Third Street to Substation	Commercial/Residential	9AM to 9PM	12

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into on this 21ST day of March, 2005, by and between Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric" or the "Company") and the Town of Milton (the "Town"), by and through its Board of Selectmen. This MOU governs various aspects of NSTAR Electric's proposal to locate a 345 kilovolt ("kV") transmission line through parts of the Town, as approved by the Energy Facilities Siting Board (the "EFSB") and the Department of Telecommunications and Energy (the "DTE"), in the proceedings docketed as EFSB 04-1/D.T.E. 04-5/D.T.E. 04-7.

WHEREAS, NSTAR Electric is proposing to construct a three-circuit 345 kV underground transmission facility approximately 18 miles in length with a point of origin at a new switching station to be constructed along an existing 345 kV transmission line located in the Town of Stoughton and a point of termination for one circuit at the Company's Hyde Park substation, and for two circuits at the Company's K Street substation in South Boston (the "Project");

WHEREAS, approximately 3.7 miles of the Project will be located within the Town, primarily along Route 138; and

WHEREAS, both NSTAR Electric and the Town desire that, should the proposed Project be authorized by the applicable regulatory agencies and government authorities and thereafter be constructed by NSTAR Electric, it be done in a manner that minimizes impacts to the environment and disruption to the public, as well as provides reasonable mitigation to the Town and its citizens.

NOW, THEREFORE, NSTAR Electric and the Town agree as follows:

1. NSTAR Electric Commitments: NSTAR Electric agrees to the following in connection with the construction and operation of the Project within the Town:

   (a) Provide two, spare 3-inch PVC conduits along the side of the 345 kV transmission line trench exiting to separate hand holes for the Town's future use along Route 138 in Milton. Conduits will run the full distance along Route 138 through Milton. Hand holes will be located at the roadside.

   (b) Install a paved and marked bike path along Route 138 from Neponset Valley Parkway to the Trailside Museum.

   (c) Furnish and install two roofed waiting enclosures for Curry College students waiting for public transportation at the College entrance, one on each side of Route 138. The waiting enclosures will be constructed on public property and NSTAR Electric will not be responsible for procuring easements, property or property access rights for the enclosures.

(d) Provide a cash donation to the Town in the amount of $1,735,500 for the Town to undertake the activities listed below. The order in which the Town undertakes these activities is at its sole discretion and the Town makes no guarantee that all of the activities can be completed with the funding provided.

(1) Installation of traffic signaling at the intersection of Route 138 and Neponset Valley Parkway. This includes making the intersection compliant with the Americans with Disabilities Act and adding left-turn lanes on Route 138 in accordance with the Route 138 Corridor Study, subject to approval by the Massachusetts Highway Department;

(2) Implementation of signage that is part of the Route 138 Corridor Improvement Study;

(3) Design and reconstruction of the intersection of Canton Avenue and Route 138 for approximately 100 yards along Canton Avenue (to the Brush Hill Road intersection) to slow traffic exiting Route 138 onto Canton Avenue. This reconstruction would be completed in advance of Project construction in order to improve traffic conditions for vehicles using Canton Avenue as a detour during Project construction;

(4) Design and add a traffic signal at the intersection of Blue Hill Parkway and Canton Avenue to handle traffic detoured as a result of construction along Route 138. This traffic signal installation will be completed before Project construction;

(5) Provide reasonable supplemental funding for emergency generators at the Town's emergency operations buildings; and

(6) Design and installation of a pedestrian-controlled traffic signal along Route 138 at the Route 138 entrance to Curry College. This signal would normally be off or blinking, but would be available to pedestrians to stop traffic when they need to cross Route 138 to enter or exit the College.

2. Town Commitments: The Town agrees to the following in connection with the construction and operation of the Project within the Town:

(a) Allow an agreed upon work-hour schedule as determined in coordination with the Massachusetts Highway Department in accordance with the following:

(i) Construction activities will be permitted to occur on Saturdays and holidays, as needed;

(ii) Construction activities within the traveled portions of Route 138 will cease during the morning and afternoon peak traffic hours as determined by the Massachusetts Highway Department for any area significantly affected by traffic management issues;

(iii) Allow construction in residential areas from 9:00 a.m. to 9:00 p.m., to be adjusted for rush-hour traffic volumes depending on the side of the road where construction is taking place;

(iv) For areas where there are significant impacts to commercial businesses, work hours would be permitted in the evening from 9:00 p.m. to 6:00 a.m. the next day in order to accommodate access to businesses during the normal business day;

(v) Construction activities may continue into the evening hours in commercial areas and all work crews will be off the traveled portions of Route 138 before 6:00 a.m.;

(vi) Construction work in the winter months will be allowed to continue provided that, in advance of or during snow storms or snow emergencies, NSTAR Electric would prohibit its contractor from constructing or using steel road plates to cover excavations and all excavations will be backfilled. NSTAR Electric will work only at times when hot paving can be provided for surface restoration;

(vii) The work-hour scheduling as described above applies to the construction activities of excavation, construction of the manholes and pipe trench, and cable pulling; and

(viii) Notwithstanding the foregoing, cable splicing will be allowed to occur on a continuous basis, 24-hours per day.

(b) Supply the Project construction contractor with Police Officers for Police Details, as needed for work along Route 138. Either the Company or its contractor will pay for the police details.

(c) Continue to support the Project during construction with the community, regulators and the Massachusetts Highway Department.

(d) Engage in timely reviews for all local approvals, licenses and permits.

EXECUTED as a sealed instrument.

TOWN OF MILTON

By: Board of Selectmen

BOSTON EDISON COMPANY d/b/a NSTAR ELECTRIC

By: _____

Title: Senior Vice President

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into on this 24 day of March 2005, by and between Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric" or the "Company") and the Town of Canton (the "Town"), by and through its Board of Selectmen. This MOU governs various aspects of NSTAR Electric's proposal to locate a 345 kilovolt ("kV") transmission line through parts of the Town, as such proposal has been approved by the Energy Facilities Siting Board (the "EFSB") and the Department of Telecommunications and Energy (the "DTE") in the proceedings docketed as EFSB 04-1/D.T.E. 04-5/D.T.E. 04-7.

WHEREAS, NSTAR Electric is proposing to construct a three-circuit 345 kV underground transmission facility approximately 18 miles in length with a point of origin at a new switching station to be constructed along an existing 345 kV transmission line located in the Town of Stoughton and a point of termination for one circuit at the Company's Hyde Park substation, and for two circuits at the Company's K Street substation in South Boston (the "Project");

WHEREAS, approximately 5.1 miles of the Project will be located within the Town, along Route 138; and

WHEREAS, both NSTAR Electric and the Town desire that, subject to completion of authorization of the proposed Project by the applicable regulatory agencies and government authorities and thereafter be constructed by NSTAR Electric, it be done in a manner that minimizes impacts to the environment and disruption to the public, as well as provides reasonable remediation to the Town and its citizens.

NOW, THEREFORE, NSTAR Electric and the Town agree as follows:

1. NSTAR Electric Commitments: NSTAR Electric agrees to the following in connection with the construction and operation of the Project within the Town:

   (a) Provide a temporary trench repair for Route 138, from the Stoughton-Canton town line to Route 128.

   (b) Repave Route 138 from curb-to-curb from Route 128 to the Milton-Canton town line. The cost of this repaving is presently estimated to be $338,000.

   (c) Provide a cash donation to the Town in the amount of $3.4 million to be used for improvements to be designed and constructed by the Town in connection with improving the Route 138 corridor or for any other lawful municipal purpose as determined by the Board of Selectmen. NSTAR Electric will pay eighty (80) percent of this amount no later than thirty (30) days after commencing construction in the Town. The remaining twenty (20) percent will be paid no later than thirty (30) days after the completion of construction in the Town. NSTAR

Electric currently anticipates the start date for construction will be on or around May 1, 2005 and the completion date will be on or around September 1, 2005. These dates are estimates and are subject to change.

2. Town Commitments: The Town agrees to the following in connection with the construction and operation of the Project within the Town:

(a) Design and construction of all of the Town's planned improvements for Route 138 will occur on a schedule that meets the Town's needs and coordinates with NSTAR Electric's construction schedule. Improvements include, but are not limited to, final resurfacing of Route 138 to an extent to be negotiated between the Town and the Massachusetts Highway Department. This construction is to be funded by the payment described in Section 1(c), above.

(b) Allow an agreed upon work-hour schedule as determined in coordination with the Massachusetts Highway Department in accordance with the following:

(i) Construction activities will be permitted to occur on Saturdays and holidays, as needed;

(ii) Construction activities within the traveled portions of Route 138 will cease during the morning and afternoon peak traffic hours as determined by the Massachusetts Highway Department for any area significantly affected by traffic management issues;

(iii) Allow construction in residential areas from 9:00 a.m. to 9:00 p.m., to be adjusted for rush-hour traffic volumes depending on the side of the road where construction is taking place;

(iv) For areas where there are significant impacts to commercial businesses, work hours would be permitted in the evening from 9:00 p.m. to 6:00 a.m. the next day in order to accommodate access to businesses during the normal business day;

(v) Construction activities may continue into the evening hours in commercial areas and all work crews will be off the traveled portions of Route 138 before 6:00 a.m.;

(vi) Construction work in the winter months will be allowed to continue provided that, in advance of or during snow storms or snow emergencies, NSTAR Electric would prohibit its contractor from constructing or using steel road plates to cover excavations and all excavations will be backfilled. NSTAR Electric will work only at times when hot paving can be provided for surface restoration;

(vii) The work-hour scheduling as described above applies to the construction activities of excavation, construction of the manholes and pipe trench, and cable pulling; and

(viii) Notwithstanding the foregoing, cable splicing will be allowed to occur on a continuous basis, 24-hours per day.

(c) Provide Town police officers for traffic management in compliance with NSTAR Electric's traffic management plan. NSTAR Electric will fund the cost of off-duty police details either directly or through its construction contractor.

EXECUTED as a sealed instrument.

TOWN OF CANTON

By: Board of Selectmen

3/24/05

BOSTON EDISON COMPANY d/b/a NSTAR ELECTRIC

By: Joseph R. Nolan

Title: Senior Vice President

LEONARD KOPELMAN
DONALD G. PAIGE
ELIZABETH A. LANE
JOYCE FRANK
JOHN W. GIORGIO
BARBARA J. SAINT ANDRE
JOEL B. BARD
JOSEPH L. TEHAN, JR.
THERESA M. DOWDY
DEBORAH A. ELIASON
RICHARD BOWEN
DAVID J. DONESKI
JUDITH C. CUTLER
KATHLEEN E. CONNOLLY
DAVID C. JENKINS
MARK R. REICH
BRIAN W. RILEY
DARREN R. KLEIN
JONATHAN M. SILVERSTEIN
ANNE MARIE HYLAND
JASON R. TALERMAN
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THOMAS W. McENANEY
KATHARINE GOREE DOYLE
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JEFFREY A. HONIG
MICHELE E. RANDAZZO
GREGG J. CORBO
RICHARD T. HOLLAND
ELIZABETH R. CORBO
MARIA C. ROTA
VICKI S. MARSH
JOHN J. GOLDROSEN
SHIRIN EVERETT
BRIAN E. GLENNON, II
JONATHAN D. EICHMAN
JOSEPH S. FAIR
LAURA H. PAWLE
CAROLYN M. MURRAY
JACKIE COWIN
SARAH N. TURNER
JEFFREY T. BLAKE
R. ERIC SLAGLE

September 29, 2004

BY HAND

David S. Rosenzweig, Esq.
Keegan, Werlin & Pabian, LLP
265 Franklin Street
Boston, MA 02110

Re: Boston Edison Company d/b/a NSTAR Electric
EFSB 04-1/D.T.E. 04-5/D.T.E. 04-7
Host Community Agreement – Town of Stoughton

Dear Mr. Rosenzweig:

I have enclosed two (2) original Host Community Agreements, which were signed by the Stoughton Board of Selectmen on September 28, 2004. The Town has retained two originals for its records as well. I am aware that Presiding Officer Selma Urman has provided the other parties to the EFSB proceeding until Thursday to file a response to the Town's motion to withdraw. Assuming that this motion will be granted, please thereafter deliver to me a check, payable to the Town of Stoughton, for $500,000.00 in accordance with the terms of paragraph 9 of the enclosed Agreement. If you have any other questions in this regard, please feel free to contact me.

Very truly yours,

Brian W. Riley

BWR/das
Enc.
cc: Town Manager (w/o enc.)
Kenneth M. Barna, Esq.
232515/STOU/0249

HOST COMMUNITY AGREEMENT

This Host Community Agreement (the "Agreement") is entered into on this 24th day of September, 2004, by and between Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric"), with a principal place of business at One NSTAR Way, Westwood, Massachusetts 02090, and the Town of Stoughton (the "Town"), by and through the Stoughton Board of Selectmen, located at 10 Pearl Street, Stoughton, Massachusetts 02072 (together, NSTAR Electric and the Town are referred to herein as the "Parties" and individually as a "Party"). The Agreement governs various aspects of NSTAR Electric's proposal to locate a 345 kilovolt ("kV") electric switchyard in Stoughton on Route 138 on 14 acres of property located at the intersection of Route 138 and York Street in Stoughton, MA, herein referred to as "the A.A. Will Site", as such proposal is currently pending before the Energy Facilities Siting Board (the "EFSB") and the Department of Telecommunications and Energy (the "DTE"), in the proceedings docketed as EFSB 04-1/D.T.E. 04-5.

WHEREAS, NSTAR Electric is proposing to construct a three-circuit 345 kV underground transmission facility approximately 18 miles in length with a point of origin at a new switching station to be constructed along an existing 345 kV transmission line located in the Town and a point of termination for one circuit at the Company's Hyde Park substation, and for two circuits at the Company's K Street substation in South Boston (the "Project");

WHEREAS, the preferred location for the origination point for the Project is at the A.A. Will Site in the Town; and

WHEREAS, both NSTAR Electric and the Town desire that, should the proposed Project be authorized by the applicable regulatory agencies and thereafter be constructed by NSTAR Electric, it be done in a manner that minimizes impacts to the environment and disruption to the public, as well as provides reasonable mitigation to the Town and its citizens.

NOW THEREFORE, for good and valuable consideration, the adequacy of which is hereby acknowledged, the Parties agree as follows:

1. Project Design – Site Cleanup: NSTAR Electric agrees to perform site clean-up at the A.A. Will Site prior to construction, including the removal of two underground storage tanks and the remediation of the existing septic drain. NSTAR Electric will also remove all existing buildings, as well as existing piles of gravel, soil, and concrete.

2. Project Design – Site Grading and Drainage: NSTAR Electric agrees to conduct site grading to remove uneven terrain. NSTAR Electric also agrees to develop and implement a drainage plan for the A.A. Will Site to control drainage and sedimentation emanating from the site and will install erosion controls in order to improve on-site and off-site runoff of groundwater and sediments.

3. Project Design – Visual Impacts: NSTAR Electric agrees to take reasonable steps to ensure that, to the extent feasible, abutters and passersby to the A.A. Will site will not have an unobstructed view of the switchyard facilities, except for the take-off towers and structures and lightning masts. In that regard, NSTAR Electric agrees to develop and adopt a design for its new 345 kV electric switching station at the A.A. Will Site that will be based upon and consistent with the mitigation proposed by NSTAR Electric in the EFSB proceeding, including the elimination of the A-frame structures immediately adjacent to each of the four voltage compensators. In place of the A-frame structures, NSTAR Electric will use a rigid-bus design and supports that would substantially decrease the overall height of much of the station horizontal bus work. In addition, NSTAR Electric will use existing site materials to the maximum extent possible to construct a natural earth berm roughly parallel to Route 138 and set back from the road for safety purposes. Vegetation will be placed on the berm to provide a natural buffer to the line of sight from Route 138. The berm will be terraced into the landscape to raise the elevation of vegetation to provide additional natural screening. NSTAR Electric will also install natural berms and/or vegetative screening as needed along the York Street boundary of the site and, if feasible, on the ridge along southern side of the existing 345 kV overhead right-of-way. NSTAR Electric agrees to solicit input from the Town as to the layout and type of vegetative screening to be used on the site for screening purposes; however, NSTAR Electric shall retain sole discretion to determine the landscaping design and materials used for screening purposes. "Reasonable steps" as that term is used herein shall not include the construction of, or a portion of, a perimeter wall to screen the facility from view of passersby.

4. Project Design – Noise Impacts: NSTAR Electric agrees to take reasonable steps to ensure that, to the extent feasible, the switchyard facilities will not generate noise at perceptible levels to abutters to the A.A. Will Site. In that regard, NSTAR Electric agrees to specify voltage compensators with a noise specification of 66 dBA measured at full load one meter from the device, which meets Stoughton (and other regulatory) noise standards for equipment. In consideration of nearby residents who may be close enough to one of the station voltage compensators to hear them during the quietest overnight hours, NSTAR Electric agrees to construct a three-sided sound attenuation wall around the eastern-most shunt reactor (the one closest to the Charles Avenue residents) in order to reduce noise at the closest receptor(s) to 3 dBA or less above the lowest ambient noise levels. NSTAR Electric shall retain sole discretion to design and construct the sound attenuation wall. "Reasonable steps" as that term is used herein shall not include the construction of, or a portion of, a perimeter wall to reduce sound associated with switchyard facilities.

5. Project Design – Intersection of Route 138 and York Street: At the intersection of Rte 138 and York Street, NSTAR Electric agrees to install: (a) a traffic signal in accordance with the Route 138 Corridor Planning Study conducted by the Massachusetts Highway Department ("MHD") and with concurrence of MHD; and (b) an ADA-compliant sidewalk on the south side of York Street running between Washington Street and Pine Street, to the extent that the easement or property necessary to locate such sidewalk is made available to NSTAR Electric. In no case shall NSTAR Electric be

responsible for securing any easement or property for the purpose of locating the sidewalk.

6. Conveyance of Land for Town-Owned Pump-House Facility: NSTAR Electric agrees to convey to the Town a minimum of 10,000 square feet of property adjacent to the Town-owned pump-house facility to allow for the possible expansion of the facility. The Parties commit to coordinating effort to identify and convey the land subject to the drainage-plan considerations.

7. Future Use of A.A. Will Site: NSTAR Electric agrees that future expansion at the A.A. Will Site will not involve the development of an electric generating facility or a distribution substation without the prior approval of the Town; provided, however, NSTAR Electric may in the future expand the switching station facilities at the A.A. Will Site as needed (and subject to required permitting approvals) should a new transmission line be added on site.

8. Conservation Easement: NSTAR Electric agrees to grant the Town a conservation easement to ensure no further development on the 1.9-acre parcel at the Eastern end of the A.A. Will Site.

9. Further Mitigation: To mitigate any impacts not specifically addressed herein associated with the construction of a 345 kV electric switchyard on Route 138 at the A.A. Will Site, NSTAR Electric will make available funds totaling $1.25 million for the Town's use and appropriation, including payment of legal and consulting fees relating to the EFSB proceeding. NSTAR Electric agrees to make these funds available pursuant to the following schedule: (1) 40 percent, or $500,000, will be made available upon approval and execution of this Agreement by a majority of the Board of Selectmen and the Town's formal withdrawal from the EFSB proceeding; (2) 30 percent, or $375,000, will be made available when all permits required from the Town to construct the Project are obtained by NSTAR Electric; and (3) 30 percent, or $375,000, will be made available upon completion of the station.

10. Permit Filings: The Town agrees that it will act reasonably and in good faith with respect to any building permits, permits required from the Town Fire Department, the Conservation Commission or other similar authorizations that are requested by NSTAR Electric from the Town or its permitting authorities, so long as they are submitted in accordance with its petition filed with the EFSB and DTE, as amended in accordance herewith. The Town shall also facilitate any other permits or other associated approvals as may be appropriate or reasonably requested by NSTAR Electric. This paragraph shall not be construed as limiting the Town's right to obtain additional design details on the Project.

11. Project Scheduling: The Town agrees to allow Project construction to occur for up to 12-hours per day, which will generally be during the five-day work week of Monday through Friday, subject to the limitation that the Company agrees not to undertake construction-related activities that generate noise after 7:00 p.m., except in the event that activities require a 24-hour operation, such as vacuum testing and oil-filling of

the shunt reactors and filling of the transmission line pipes with dielectric fluid. Any Project construction that is needed by NSTAR Electric during weekends or holidays will be limited in scope and duration and will be the subject of prior notice to, and coordination with, the Town.

12. EFSB and Permitting Proceedings: The Town agrees to withdraw from the EFSB proceeding immediately, including seeking the withdrawal of all testimony and associated exhibits from record. The Town agrees to relinquish all rights to appeal, challenge, or collateral attack of the EFSB's final decision in the proceeding, or the appeal, challenge or collateral attack of any approval of any other state or local agency or permitting authority, including without limitation, the Town of Stoughton Conservation Commission.

13. Notices: Any notice permitted or required under the provisions of this Agreement to be given or secured by either of the Parties hereto upon the other Party shall be in writing and signed in the name or on behalf of the Party giving or serving notice. Notice shall be deemed to have been received at the time of actual service or three (3) business days after the date of a certified mailing properly addressed. Notice to NSTAR Electric shall be deemed sufficient if sent to Henry V. Oheim, Project Director, One NSTAR Way, Westwood, MA 02090, or such other address specified by NSTAR Electric in writing and served upon the Town in accordance with this paragraph. Notice to the Town shall be deemed sufficient if sent to the Board of Selectmen, Town of Stoughton, 10 Pearl Street, Stoughton, Massachusetts 02072, or such other address specified by the Town in writing and served upon NSTAR Electric in accordance with this paragraph.

14. Default: Failure by NSTAR Electric to perform any term or provision of this Agreement shall not constitute a default under this Agreement unless NSTAR Electric fails to commence to cure, correct or remedy such failure within thirty (30) days of the receipt of written notice of such failure from the Town to NSTAR Electric and thereafter fails to complete such cure, correction or remedy within one hundred-twenty (120) days of the receipt of such written notice, or, with respect to defaults that cannot be remedied within such one hundred-twenty (120) day period, within such additional period of time as is reasonably required to remedy such default, provided NSTAR Electric exercises due diligence in the remedying such default. With respect to a default by either NSTAR Electric or the Town, said default shall suspend the ongoing obligations of the non-defaulting party under this Agreement and the defaulting party shall be subject to the full set of equitable and legal remedies that may be imposed by a court of competent jurisdiction.

15. Force Majeure: It is distinctly understood and agreed that the Parties hereto shall make a reasonable and good faith effort to perform their obligations under this Agreement. If and to the extent that either Party is prevented from performing its obligations hereunder by an event of force majeure, such Party shall be excused from performing hereunder and shall not be liable in damages or otherwise, and the Parties instead shall negotiate in good faith with respect to appropriate modifications to the terms hereof. For purposes of this Agreement, the term force majeure shall mean any

supervening cause beyond the reasonable control of the affected Party, including without limitation requirement of statute or regulation; action of any court, regulatory authority, or public authority having jurisdiction; storm, flood, fire, earthquake, explosion, civil disturbance, terrorism, labor dispute, or act of God or the public enemy.

16. Corporate Authority: At the time of execution of this Agreement, NSTAR Electric shall provide to the Town reasonable documentation of the authority and capacity of the person executing this Agreement on behalf of NSTAR Electric.

17. Successors and Assigns: This Agreement is binding upon, and inures to the benefit of, NSTAR Electric and the Town, their successors and assigns to the full extent permitted by law.

18. Amendments: Any and all amendments to this Agreement are valid only if they are in writing and signed by both Parties.

19. Miscellaneous: This Agreement represents the entire agreement of NSTAR Electric and the Town with respect to the construction, operation and maintenance of the Project in the Town. This Agreement shall be governed by, and construed in accordance with, the laws of the Commonwealth of Massachusetts, exclusive of the conflicts of law rules of the Commonwealth. If any provision of this Agreement shall be found invalid for any reason, such invalidity shall be construed as narrowly as possible and the balance of the Agreement shall be deemed to be amended to the minimum extent necessary to provide to the Town and to NSTAR Electric substantially the benefits set forth in this Agreement. If any applicable federal or state law mandates the inclusion of any term or provision into this Agreement, this paragraph shall be understood to import such term or provision into this Agreement.

IN WITNESS WHEREOF, the Town of Stoughton and NSTAR Electric have caused this Agreement to be executed by their duly authorized officials, officers and/or representatives, as of the date and year first-above written.

TOWN OF STOUGHTON, MASSACHUSETTS

By: Board of Selectmen

BOSTON EDISON COMPANY d/b/a NSTAR ELECTRIC

By: _____

Title: SVP OPERATIONS

Summary of Stoughton Settlement Benefits

Design Component	Description
Site Clean-Up	Remove two existing underground storage tanks; remove and remediate non-compliant septic drain; remove existing buildings; remove existing piles of gravel, soil, and concrete.
Site Grading and Landscaping	Conduct site grading to remove uneven terrain. Construct a natural earth berm roughly parallel to Route 138 and set back from the road for safety purposes on which vegetation can be placed to provide a natural buffer to the line of sight from Route 138 to the station. The berm will be terraced into the landscape to raise the elevation of vegetation to provide additional natural screening. Install vegetative screening as needed on setback along Rte 138, along York Street boundary of site and, if feasible, on ridge along southern side of the existing 345 kV overhead right-of-way.
Drainage Improvements	Implement a drainage plan for approximately 14 acres to control drainage and sedimentation emanating from site; install erosion controls.
Switchyard Design Change to Eliminate A-Frames	Switchyard design will be modified to eliminate the use of the A-frame structures immediately adjacent to each of the four voltage compensators.
Elimination of Traffic for AA Will	Switchyard facilities eliminate continuous traffic entering site (both passenger and commercial vehicles) once construction is completed.
Sound Attenuation Walls	Install a sound attenuation wall for the eastern most shunt reactor located in proximity to residential abutters to limit noise the the closest abutter to 3 dBA or less above ambient. Company has ordered ultra-low noise (66 dBA measured one meter from the device) voltage compensation reactors at additional cost to limit sound.
Improvements to York Street/Route 138 Intersection	Improvements to the intersection at York Street and Route 138, including: (a) a traffic signal per the Route 138 Corridor Planning Study if agreed to by MHD; and (2) an ADA-compliant sidewalk on the south side of York Street running between Washington Street and Pine Street.
Town-Owned Pump Facilities	Convey to Town no less than 10,000 square feet of property abutting the Town-owned pump facilities to allow for expansion of pumping station site.
Future use of A.A. Will Site	Future expansion at the A.A. Will Site will not involve the development of an electric generating facility or a distribution substation without the prior approval of the Town; provided, however, NSTAR Electric may in the future expand the switching station facilities at the A.A. Will Site as needed (and subject to required permitting approvals) should a new transmission line be added on site.
Conservation Easement	Grant the Town a conservation easement to ensure no further development on the 1.9 acre parcel at the eastern end of the A.A. Will Site.
Mitigation Funds	To mitigate any impacts not specifically addressed herein associated with the construction of a 345 kV electric switchyard on Route 138 at the A.A. Will Site, NSTAR Electric will provide funds totaling $1.25 million for the Town's use and appropriation, including payment of legal and consulting fees relating to EFSB proceeding. These amounts are subject to the payment schedule established in the Host Community Agreement.

Summary of Stoughton Settlement Benefits

Design Component	Description
Site Clean-Up	Remove two existing underground storage tanks; remove and remediate non-compliant septic drain; remove existing buildings; remove existing piles of gravel, soil, and concrete.
Site Grading and Landscaping	Conduct site grading to remove uneven terrain. Construct a natural earth berm roughly parallel to Route 138 and set back from the road for safety purposes on which vegetation can be placed to provide a natural buffer to the line of sight from Route 138 to the station. The berm will be terraced into the landscape to raise the elevation of vegetation to provide additional natural screening. Install vegetative screening as needed on setback along Rte 138, along York Street boundary of site and, if feasible, on ridge along southern side of the existing 345 kV overhead right-of-way.
Drainage Improvements	Implement a drainage plan for approximately 14 acres to control drainage and sedimentation emanating from site; install erosion controls.
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Sound Attenuation Walls	Install a sound attenuation wall for the eastern most shunt reactor located in proximity to residential abutters to limit noise the closest abutter to 3 dBA or less above ambient. Company has ordered ultra-low noise (66 dBA measured one meter from the device) voltage compensation reactors at additional cost to limit sound.
Improvements to York Street/Route 138 Intersection	Improvements to the intersection at York Street and Route 138, including: (a) a traffic signal per the Route 138 Corridor Planning Study if agreed to by MHD; and (2) an ADA-compliant sidewalk on the south side of York Street running between Washington Street and Pine Street.
Town-Owned Pump Facilities	Convey to Town no less than 10,000 square feet of property abutting the Town-owned pump facilities to allow for expansion of pumping station site.
Future use of A.A. Will Site	Future expansion at the A.A. Will Site will not involve the development of an electric generating facility or a distribution substation without the prior approval of the Town; provided, however, NSTAR Electric may in the future expand the switching station facilities at the A.A. Will Site as needed (and subject to required permitting approvals) should a new transmission line be added on site.
Conservation Easement	Grant the Town a conservation easement to ensure no further development on the 1.9 acre parcel at the eastern end of the A.A. Will Site.
Mitigation Funds	To mitigate any impacts not specifically addressed herein associated with the construction of a 345 kV electric switchyard on Route 138 at the A.A. Will Site, NSTAR Electric will provide funds totaling $1.25 million for the Town's use and appropriation, including payment of legal and consulting fees relating to EFSB proceeding. These amounts are subject to the payment schedule established in the Host Community Agreement.

KEEGAN, WERLIN & PABIAN, LLP

ATTORNEYS AT LAW

265 FRANKLIN STREET

BOSTON, MASSACHUSETTS 02110-3113

(617) 951-1400

TELECOPIERS

(617) 951-1354

(617) 951-0586

MEMORANDUM

TO: **Brian Riley, Esq.**

FROM: **Keegan, Werlin & Pabian, LLP**

SUBJECT: **NSTAR Electric Settlement with the Town of Stoughton**

DATE: **September 21, 2004**

Attached is a copy of the final proposed agreement between Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric") and the Town of Stoughton (the "Town"). As you requested, listed below are the major features of this agreement:

- **Mitigation Funds**: NSTAR Electric will make available funds totaling $1.25 million for the Town's use and appropriation, including payment of legal and consulting fees relating to the EFSB proceeding.

- **Site Clean-Up and Improvement**: NSTAR Electric will make major improvements to the A.A. Will Site including site clean-up, removal of two abandoned underground storage tanks and the existing non-compliant septic drain. NSTAR Electric will also remove existing mounds of gravel, soil, and concrete and grade the site to remove uneven terrain. NSTAR Electric will implement a drainage plan to control drainage and sedimentation emanating from the site and will install erosion controls in order to improve on-site and off-site runoff of groundwater and sediments.

- **Visual Effects**: Subject to the terms of the agreement, NSTAR Electric will design landscaping and other site features so the switchyard facilities will not be directly visible by abutters to the A.A. Will Site, with the exception of the take-off towers and lightning masts. To achieve this objective, NSTAR Electric will construct natural earth berms and install vegetation along the visible perimeter of the site and on the earthen berms to provide additional natural screening.

- **Noise Effects**: Subject to the terms of the agreement, NSTAR Electric will ensure that the switchyard facilities will not generate noise at levels in excess of Town of Stoughton standards to abutters to the A.A. Will Site. NSTAR Electric

will construct a sound attenuation wall around the sound generating equipment parts in order to reduce noise at the closest receptor(s) to 3 dBA or less above the lowest ambient noise levels.

- **Safety**: NSTAR Electric will construct and maintain the switchyard facility in accordance with OSHA and other electric utility standards. NSTAR Electric will surround the switchyard facility with a ten-foot high security fence topped with an additional one foot section of barbed wire.

- **Improvements to Intersection of Rte 138 and York Street**: Subject to the terms of the agreement, NSTAR Electric will install at the intersection of Rte 138 and York Street: (a) a traffic signal in accordance with the Route 138 Corridor Planning Study conducted by the Massachusetts Highway Department and with its concurrence; and (2) an ADA-compliant sidewalk on the south side of York Street running between Washington Street and Pine Street.

- **Land Gift to the Town**: NSTAR Electric will convey to the Town a minimum of 10,000 square feet of property adjacent to the Town-owned pump-house facility to allow for the possible expansion of the facility. NSTAR Electric will also grant the Town a conservation easement to ensure no further development on the 1.9-acre parcel at Eastern end of the A.A. Will Site.

- **Property Tax Payments**: NSTAR Electric will pay annual property taxes currently estimated to be approximately $600,000.

NSTAR Electric is entering into this agreement with the Town to demonstrate its commitment to work with the Town of Stoughton to ensure that the Project is constructed and operated in a manner that minimizes impacts to the environment and disruption to the public. Please do not hesitate to contact us should you require additional information.

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into on this ____ day of March, 2005, by and between Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric" or the "Company") and the Department of Conservation and Recreation (the "Department"). This MOU governs various aspects of NSTAR Electric's proposal to locate a 345 kilovolt ("kV") transmission line along Department-controlled roads, as such proposal was approved by the Energy Facilities Siting Board (the "EFSB") and the Department of Telecommunications and Energy (the "DTE"), in the proceedings docketed as EFSB 04-1/D.T.E. 04-5/D.T.E. 04-7.

WHEREAS, NSTAR Electric is proposing to construct a three-circuit 345 kV underground transmission facility approximately 18 miles in length with a point of origin at a new switching station to be constructed along an existing 345 kV transmission line located in the Town of Stoughton and a point of termination for one circuit at the Company's Hyde Park substation, and for two circuits at the Company's K Street substation in South Boston (the "Project");

WHEREAS, approximately 1.7 miles of the Project will be located within Department-controlled roadways; and

WHEREAS, both NSTAR Electric and the Department desire that, given the approvals of the Project by the applicable regulatory agencies and government authorities, construction of the Project be done in a manner that minimizes impacts to the environment and disruption to the public.

NOW, THEREFORE, NSTAR Electric and the Department agree as follows:

1. NSTAR Electric Commitments: NSTAR Electric agrees to the following in connection with the construction and operation of the Project within roadways under the care, custody and control of the Department:

   (a) At least thirty (30) days prior to any discharge into storm drains controlled by the Department, NSTAR Electric shall provide the Department a copy of its Stormwater Management Plan for the Project. NSTAR Electric or its contractors shall also provide to the Department any required forms or reports that are sent to the Environmental Protection Agency regarding stormwater management relating to the Project;

   (b) NSTAR Electric agrees to provide curb-to-curb paving along both sides of Department-controlled roadways affected by the Project. The estimated cost of this curb-to-curb paving is $668,000. NSTAR Electric also agrees to repair any and all drains in Department-controlled roadways that are damaged during construction of the Project; and

(c) NSTAR Electric agrees to provide a one-time cash donation to the Department in the amount of $300,000 as further mitigation for impacts resulting from the Project, where such donation may be used by the Department in its sole discretion. The donation provided hereunder will be deposited by the Department in the Urban Parks Trust Fund for use at the sole discretion of the Department.

2. Department Commitments: The Department agrees to the following in connection with any and all permits for the construction and operation of the Project within Department-controlled roadways:

(a) Allow an agreed upon work-hour schedule in accordance with the schedule agreed upon with the City of Boston, which is appended hereto to as Appendix A:

(i) In residential areas, construction will be allowed from 9:00 a.m. to 9:00 p.m., including Saturdays and holidays, without rush hour restrictions;

(ii) In commercial and other non-residential areas:

(1) Construction will be allowed around the clock;

(2) Construction activities will be suspended during the morning peak traffic hours (6:00 a.m. to 9:00 a.m.) unless: (A) construction is occurring on the opposite side of the of the predominant traffic flow; and (B) adequate traffic flow can be maintained with two lanes open to traffic; and

(3) There will be no such traffic restrictions on Saturdays or holidays.

(iii) There will be no construction activities on Day Boulevard during daytime hours between Memorial Day and Labor Day.

(iv) Construction work in the winter months would be allowed to continue provided that in advance of or during snow storms or snow emergencies, NSTAR Electric would prohibit the contractor from constructing or using steel road plates to cover excavations and all excavations will be backfilled. NSTAR Electric will work only at times when hot paving can be provided for surface restoration.

(v) The work-hour scheduling as described above applies to the construction activities of excavation, construction of the manholes and pipe trench, and cable pulling; and

(vi) Notwithstanding the foregoing, cable splicing will be allowed to occur on a continuous basis, 24-hours per day.

(b) Engage in a timely review of the Company's request for a permit. In that regard, the Department agrees that, for those roadways, parking

lots, bridges, or other affected facilities under the care, custody and control of the Department, all of NSTAR Electric's proposed construction work and the rights for occupancy will be authorized under one permit for the Project.

3. NSTAR Electric and the Department agree that the commitments set forth above are applicable to the Project's "Preferred Route," including roadways under the care, custody and control of the Department, as approved by the EFSB.

EXECUTED as a sealed instrument.

DEPARTMENT OF CONSERVATION AND RECREATION

By: _____

Title: _____

BOSTON EDISON COMPANY d/b/a NSTAR ELECTRIC

By: _____

Title: _____

Exhibit No. 10

NSTAR ELECTRIC GAS
One NSTAR Way
Westwood, Massachusetts 02090

August 15, 2005

Mr. James L. Cross
Vice President, System Planning
ISO New England
One Sullivan Road
Holyoke, MA 01040-2841

Re: TCA Application #NSTAR-04-TCA-01-Rev. 1, dated August 24, 2004

Dear Mr. Cross:

This letter responds to your letter of August 8, 2005, requesting additional information to document NSTAR's comments to ISO's draft letter concerning the captioned subject. As noted in NSTAR's letter to ISO-New England dated July 22, 2005, there were two suggested revisions to the amounts of costs the ISO indicated should be "localized." NSTAR suggested the mitigation amount to be paid to the Massachusetts Department of Conservation and Recreation (DCR) should be increased to reflect the final agreement and the costs included in the funding paid to the Town of Canton for paving that NSTAR would have normally provided as part of the project should be reflected as regional costs.

Funds Paid to DCR

The Massachusetts Department of Conservation and Recreation (DCR) has care and control of a variety of roads, parks, and other properties in and around Boston. Some of the roads and properties coincide with the 345 kV transmission line route. When NSTAR responded to ISO's request to provide copies of the Memoranda of Understanding (MOU) between NSTAR and the various municipalities controlling the roadways over which the 345 kV Transmission Reliability Project is to be built, the MOU with DCR was unsigned and still under negotiation. Once negotiations were completed, the amount paid to DCR increased from $300,000 to $500,000. This is documented in the attached executed MOU between NSTAR and DCR. By the terms of the MOU, NSTAR received a single permit to access and locate the transmission lines on all affected DCR properties, including approximately 2 miles of roads within the City of Boston and a parking lot near Franklin Park. The permit avoided extensive permitting for each property that would normally be secured separately and involve legislative action by the Massachusetts Legislature with no guaranteed outcome. In addition, DCR granted NSTAR's request for extended work hours well in excess of the standard work hours along these roads.

Paving Funds Paid to the Town of Canton

The Memorandum of Understanding (MOU), executed March 24, 2005, by and between Boston Edison Company d/b/a NSTAR Electric and the Town of Canton concerning NSTAR's 345 kV Transmission Reliability Project, states, in part, in Section 1[c] that NSTAR "provide(s) a cash donation to the Town in the amount of **$3.4 million to be used for improvements to be designed and constructed by the Town in connection with improving the Route 138** corridor or for any other lawful municipal purpose as determined by the Board

NSTAR ELECTRIC GAS
One NSTAR Way
Westwood, Massachusetts 02090

of Selectmen." Section 2[a] of this same MOU states, in part, that the Town is committed to: "Design and construction of all of the Town's planned improvements on Route 138 will occur on a schedule that meets the Town's needs and coordinates with NSTAR Electric's construction schedule. Improvements include, but are not limited to, **final resurfacing of Route 138** to an extent to be negotiated between the Town and the Massachusetts Highway Department." (Emphasis added)

In negotiating this agreement with the Town of Canton, NSTAR had planned to resurface Route 138 with grind and overlay through all of Canton. Section 1[b] of the MOU addresses resurfacing Route 138 from Route 128 NORTH to the Canton-Milton town line. Sections 1[c] and 2[a] of the MOU, repeated in part above, address Route 138 from Route 128 SOUTH to the Canton-Stoughton town line. This latter section of Route 138 is where Canton intends to implement the modifications in accordance with the Route 138 Corridor Improvement Study as well as other improvements. The Town's schedule for construction follows NSTAR's construction schedule so, rather than NSTAR resurfacing the road following completion of transmission line construction only to have the Town re-excavate it shortly thereafter or to delay the project to coincide with the Town's plans, NSTAR, Canton, and the Massachusetts Highway Department agreed that NSTAR would allocate its re-surfacing budget to Canton for this segment of Route 138 and Canton would resurface the road upon completion of it's work.

The amount allocated for resurfacing this segment of Route 138 was $1,315,500 and this was included in the total amount paid to the Town of Canton discussed in section 1[c] of the MOU. The resurfacing allocation was budgeted based on a resurfacing cost of $75.00 per linear foot (assumes an average road width of 38 feet) times the road length from Route 128 SOUTH to the Canton-Stoughton town line of 17,540 feet. The cost per foot for resurfacing was benchmarked against local paving contractor costs. A copy of the executed Canton-NSTAR MOU is provided for your information.

Please contact me if you have any additional questions or need any additional information.

Sincerely,

Paul D. Vaitkus
Vice President-Engineering

cc: Mr. Stephen G. Whitley

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into on this 29th day of April, 2005, by and between Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric" or the "Company") and the Department of Conservation and Recreation (the "Department"). This MOU governs various aspects of NSTAR Electric's proposal to locate a 345 kilovolt ("kV") transmission line along Department-controlled roads, as such proposal was approved by the Energy Facilities Siting Board (the "EFSB") and the Department of Telecommunications and Energy (the "DTE"), in the proceedings docketed as EFSB 04-1/D.T.E. 04-5/D.T.E. 04-7.

WHEREAS, NSTAR Electric is proposing to construct a three-circuit 345 kV underground transmission facility approximately 18 miles in length with a point of origin at a new switching station to be constructed along an existing 345 kV transmission line located in the Town of Stoughton and a point of termination for one circuit at the Company's Hyde Park substation, and for two circuits at the Company's K Street substation in South Boston (the "Project");

WHEREAS, approximately 1.7 miles of the Project will be located within Department-controlled roadways; and

WHEREAS, both NSTAR Electric and the Department desire that, given the approvals of the Project by the applicable regulatory agencies and government authorities, construction of the Project be done in a manner that minimizes impacts to the environment and disruption to the public.

NOW, THEREFORE, NSTAR Electric and the Department agree as follows:

1. NSTAR Electric Commitments: NSTAR Electric agrees to the following in connection with the construction and operation of the Project within roadways under the care, custody and control of the Department:

   (a) At least thirty (30) days prior to any discharge into storm drains controlled by the Department, NSTAR Electric shall provide the Department a copy of its Stormwater Management Plan for the Project. NSTAR Electric or its contractors shall also provide to the Department any required forms or reports that are sent to the Environmental Protection Agency regarding stormwater management relating to the Project;

   (b) NSTAR Electric agrees to provide curb-to-curb paving along both sides of Department-controlled roadways affected by the Project. The estimated cost of this curb-to-curb paving is $668,000. NSTAR Electric also agrees to repair any and all drains or other improvements or infrastructure in or along Department-controlled roadways that are damaged during construction of the Project; and

(c) NSTAR Electric agrees to provide a one-time cash donation to the Department in the amount of $500,000 as further mitigation for impacts resulting in the South Boston area from the Project, where such donation may be used by the Department in its sole discretion. The donation provided hereunder will be deposited by the Department in the Urban Parks Trust Fund for use at the sole discretion of the Department.

(d) NSTAR Electric agrees to fund and complete a "bridge rating" of the physical condition, maintenance needs and load capacity of two Department-owned bridges in accordance with the procedures and standards of the American Association of State Highway and Transportation Officials (AASHTO), and to provide the Department with the bridge rating report. These DCR-owned bridges are referred to as the Mattapan Square bridge and the Columbia Road bridge.

2. Department Commitments: The Department agrees to the following in connection with any and all permits for the construction and operation of the Project within Department-controlled roadways:

(a) Allow an agreed upon work-hour schedule in accordance with the schedule agreed upon with the City of Boston, which is appended hereto to as Appendix A:

(i) Except as specified in the Final Traffic Management Plan (FTMP) to be incorporated by the Department into the construction permit, in residential areas, construction will be allowed from 9:00 a.m. to 9:00 p.m., including Saturdays and holidays, without rush hour restrictions;

(ii) Along Day Boulevard:

(1) Construction will be allowed around the clock, subject to the requirements of the FTMP;

(2) Construction activities will be suspended during the morning peak traffic hours (6:00 a.m. to 9:00 a.m.) unless: (A) construction is occurring on the opposite side of the of the predominant traffic flow; and (B) adequate traffic flow can be maintained with two lanes open to traffic; and

(3) There will be no such traffic restrictions on Saturdays or holidays, unless expressly identified in the FTMP.

(4) Around-the-clock construction is not anticipated along any other Department-controlled properties for normal excavation; provided, however, should around-the-clock construction be desirable, NSTAR Electric and/or its contractor(s) will seek specific permission from Department officials.

(iii) There will be no construction activities on Day Boulevard during daytime hours between Memorial Day and Labor Day.

(iv) Construction work in the winter months would be allowed to continue provided that in advance of or during snow storms or snow emergencies, NSTAR Electric would prohibit the contractor from constructing or using steel road plates to cover excavations, and all excavations will be backfilled and compacted in 6-inch lifts and patched with two inches of binder. NSTAR Electric will work only at times when hot paving can be provided for surface restoration.

(v) The work-hour scheduling as described above applies to the construction activities of excavation, construction of the manholes and pipe trench, and cable pulling; and

(vi) Notwithstanding the foregoing, cable splicing will be allowed to occur on a continuous basis, 24-hours per day, provided that any such activities will be conducted in accordance with the FTMP, if applicable.

(b) Engage in a timely review of the Company's request for a permit. In that regard, the Department agrees that, for those roadways, parking lots, bridges, or other affected facilities under the care, custody and control of the Department, all of NSTAR Electric's proposed construction work and the rights for occupancy will be authorized under one permit for the Project.

3. NSTAR Electric and the Department agree that the commitments set forth above are applicable to the Project's "Preferred Route," including roadways under the care, custody and control of the Department, as approved by the EFSB.

EXECUTED as a sealed instrument.

DEPARTMENT OF CONSERVATION AND RECREATION

By: Stephen R. Pritchard

Title: Acting Commissioner

BOSTON EDISON COMPANY d/b/a NSTAR ELECTRIC

By: Joseph R. Nyla Jr.

Title: Senior Vice-President

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into on this 24 day of March 2005, by and between Boston Edison Company d/b/a NSTAR Electric ("NSTAR Electric" or the "Company") and the Town of Canton (the "Town"), by and through its Board of Selectmen. This MOU governs various aspects of NSTAR Electric's proposal to locate a 345 kilovolt ("kV") transmission line through parts of the Town, as such proposal has been approved by the Energy Facilities Siting Board (the "EFSB") and the Department of Telecommunications and Energy (the "DTE") in the proceedings docketed as EFSB 04-1/D.T.E. 04-5/D.T.E. 04-7.

WHEREAS, NSTAR Electric is proposing to construct a three-circuit 345 kV underground transmission facility approximately 18 miles in length with a point of origin at a new switching station to be constructed along an existing 345 kV transmission line located in the Town of Stoughton and a point of termination for one circuit at the Company's Hyde Park substation, and for two circuits at the Company's K Street substation in South Boston (the "Project");

WHEREAS, approximately 5.1 miles of the Project will be located within the Town, along Route 138; and

WHEREAS, both NSTAR Electric and the Town desire that, subject to completion of authorization of the proposed Project by the applicable regulatory agencies and government authorities and thereafter be constructed by NSTAR Electric, it be done in a manner that minimizes impacts to the environment and disruption to the public, as well as provides reasonable remediation to the Town and its citizens.

NOW, THEREFORE, NSTAR Electric and the Town agree as follows:

1. NSTAR Electric Commitments: NSTAR Electric agrees to the following in connection with the construction and operation of the Project within the Town:

   (a) Provide a temporary trench repair for Route 138, from the Stoughton-Canton town line to Route 128.

   (b) Repave Route 138 from curb-to-curb from Route 128 to the Milton-Canton town line. The cost of this repaving is presently estimated to be $338,000.

   (c) Provide a cash donation to the Town in the amount of $3.4 million to be used for improvements to be designed and constructed by the Town in connection with improving the Route 138 corridor or for any other lawful municipal purpose as determined by the Board of Selectmen. NSTAR Electric will pay eighty (80) percent of this amount no later than thirty (30) days after commencing construction in the Town. The remaining twenty (20) percent will be paid no later than thirty (30) days after the completion of construction in the Town. NSTAR

Electric currently anticipates the start date for construction will be on or around May 1, 2005 and the completion date will be on or around September 1, 2005. These dates are estimates and are subject to change.

2. Town Commitments: The Town agrees to the following in connection with the construction and operation of the Project within the Town:

(a) Design and construction of all of the Town's planned improvements for Route 138 will occur on a schedule that meets the Town's needs and coordinates with NSTAR Electric's construction schedule. Improvements include, but are not limited to, final resurfacing of Route 138 to an extent to be negotiated between the Town and the Massachusetts Highway Department. This construction is to be funded by the payment described in Section 1(c), above.

(b) Allow an agreed upon work-hour schedule as determined in coordination with the Massachusetts Highway Department in accordance with the following:

(i) Construction activities will be permitted to occur on Saturdays and holidays, as needed;

(ii) Construction activities within the traveled portions of Route 138 will cease during the morning and afternoon peak traffic hours as determined by the Massachusetts Highway Department for any area significantly affected by traffic management issues;

(iii) Allow construction in residential areas from 9:00 a.m. to 9:00 p.m., to be adjusted for rush-hour traffic volumes depending on the side of the road where construction is taking place;

(iv) For areas where there are significant impacts to commercial businesses, work hours would be permitted in the evening from 9:00 p.m. to 6:00 a.m. the next day in order to accommodate access to businesses during the normal business day;

(v) Construction activities may continue into the evening hours in commercial areas and all work crews will be off the traveled portions of Route 138 before 6:00 a.m.;

(vi) Construction work in the winter months will be allowed to continue provided that, in advance of or during snow storms or snow emergencies, NSTAR Electric would prohibit its contractor from constructing or using steel road plates to cover excavations and all excavations will be backfilled. NSTAR Electric will work only at times when hot paving can be provided for surface restoration;

(vii) The work-hour scheduling as described above applies to the construction activities of excavation, construction of the manholes and pipe trench, and cable pulling; and

(viii) Notwithstanding the foregoing, cable splicing will be allowed to occur on a continuous basis, 24-hours per day.

(c) Provide Town police officers for traffic management in compliance with NSTAR Electric's traffic management plan. NSTAR Electric will fund the cost of off-duty police details either directly or through its construction contractor.

EXECUTED as a sealed instrument.

TOWN OF CANTON

By: Board of Selectmen

3/24/05

BOSTON EDISON COMPANY d/b/a NSTAR ELECTRIC

By: Joseph R. Nolan

Title: Senior Vice President