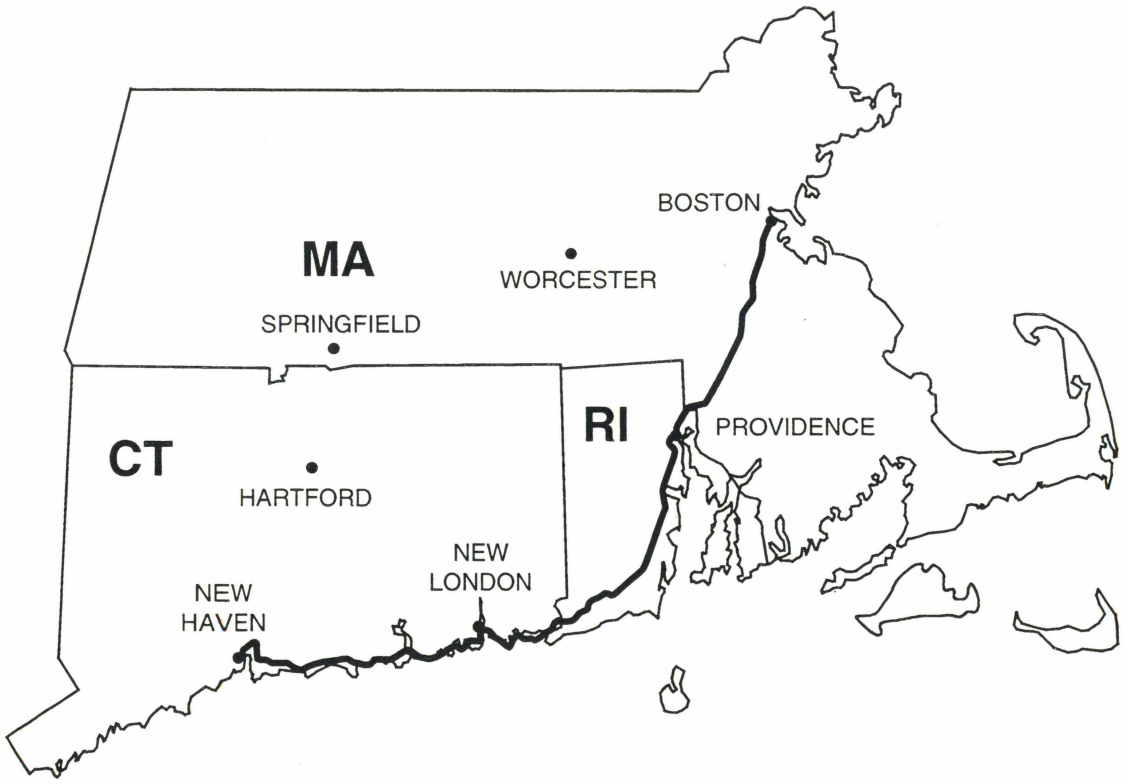
13

U. S. Department
of Transportation
Federal Railroad Administration

Final Environmental Impact Report Supplement

Office of Railroad Development
Washington, D.C. 20590

Northeast Corridor Improvement Project
Electrification - New Haven, CT to Boston, MA



Research and Special Programs Administration
John A. Volpe National Transportation Systems Center
Cambridge, MA 02142-1093

Massachusetts EOEA
Number: 9134

DOT/FRA/RDV-94/01-E
DOT-VNTSC-FRA94-8.1

Final Report
February 1995

13 - Electrification 4373

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	February 1995	Final Report

4. TITLE AND SUBTITLE
Northeast Corridor Improvement Project Electrification-New Haven, CT to Boston, MA Final Environmental Impact Report Supplement

5. FUNDING NUMBERS
RR495/R4215

6. AUTHOR(S)

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Daniel, Mann, Johnson, and Mendenhall/
Frederic R. Harris, Inc.*
66 Long Wharf
Boston, MA 02110

8. PERFORMING ORGANIZATION REPORT NUMBER
DOT-VNTSC-FRA-94-8.1

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Department of Transportation
Federal Railroad Administration
400 Seventh Street, SW
Washington, DC 20590

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
DOT-FRA-RDV-94-01-E

11. SUPPLEMENTARY NOTES

*under contract to:
U.S. Department of Transportation
Volpe National Transportation Systems Center
Kendall Square
Cambridge, MA 02142

12a. DISTRIBUTION/AVAILABILITY STATEMENT
This document is available to the public through the National Technical Information Service, Springfield, VA 22161

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

This document is a supplement to the final environmental impact report (FEIR) published in October 1994 on the proposal by the National Railroad Passenger Corporation (Amtrak) to complete the electrification of the Northeast Corridor main line by extending electrification from New Haven, CT to Boston, MA. The purpose of this supplement is to provide additional information relative to: the Roxbury Substation Alternatives Analysis; an expanded discussion on mitigation of potential adverse impacts; draft Section 61 findings; the Memorandum of Understanding between Amtrak and the Massachusetts Bay Transportation Authority (MBTA) for Route 128 Station; Amtrak's draft outreach program; and to address other Massachusetts Environmental Policy Act concerns.

14. SUBJECT TERMS
National Environmental Policy Act, Environmental Impact Statement, Northeast Corridor Improvement Project, Scoping Alternatives, Electrification, Catenary System, Federal Railroad Administration, Amtrak

15. NUMBER OF PAGES
108

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	

U.S. Department
of Transportation
**Federal Railroad
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

February 15, 1995

The Honorable Trudy Coxe
Secretary
Executive Office of Environmental Affairs
The Commonwealth of Massachusetts
100 Cambridge Street
Boston, Massachusetts, 02202

Re: Northeast Corridor Electrification EIR

Dear Secretary Coxe:

On November 10, 1994, the Federal Railroad Administration (FRA) provided you with a copy of the final environmental impact statement and final environmental impact report (FEIR) on the proposal by the National Railroad Passenger Corporation (Amtrak) to extend intercity electric train operation from New Haven, CT to Boston, MA. In due course, the MEPA Unit published a notice of availability of the FEIR in the *Environmental Monitor*.

Subsequent to the release of the FEIR, the MEPA Unit staff suggested that FRA make certain additional background materials available for public review. Enclosed is a supplement to the FEIR that contains the background material identified by the MEPA Unit staff. FRA requests that you arrange for printing a notice of availability of the FEIR and this supplement in the next publication of the State's *Environmental Monitor*.

FRA is providing this information solely because the MEPA Unit staff believes that it would facilitate a more informed review of the FEIR on Amtrak's proposed electrification project. This action in no way reflects any reservations or concerns on the part of FRA regarding the quality and completeness of the FEIR.

FRA appreciates the support that we have received from the MEPA Unit staff in facilitating the review of the FEIR. Should your continuing review of the FEIR identify any issues that require further elaboration, FRA will provide such elaboration in a timely manner.

Sincerely,

Mark E. Yachmetz
Chief
Passenger Programs Division

INTRODUCTION

The National Railroad Passenger Corporation (Amtrak) proposes to complete the electrification of the Northeast Corridor main line by extending electric traction from New Haven, CT, to Boston, MA. The Federal Railroad Administration (FRA) prepared a combined environmental impact statement (required by the National Environmental Policy Act of 1969) and environmental impact report (required by the Massachusetts Environmental Policy Act) analyzing this proposed project. This combined document, the *Final Environmental Impact Statement/Report and 4(f) Statement, Northeast Corridor Improvement Project, Electrification -- New Haven, CT to Boston MA* (FEIS/R) was published and made available for public review by the FRA in November, 1994.

After reviewing the FEIS/R, the MEPA Unit of the Commonwealth of Massachusetts' Executive Office of Environmental Affairs requested that, as part of the FEIR review process, FRA make available for public review and comment certain supplemental materials regarding certain specific issues addressed in the FEIS/R.

This document presents those materials. This material does not alter the analysis or conclusions contained in the FEIS/R. Rather, this material provides the background for certain analyses and conclusions contained in the FEIS/R as they relate to issues within Massachusetts. It is provided solely for the purpose of facilitating an informed review of the FEIS/R. FRA has requested that Massachusetts' Secretary for Environmental Affairs cause to be published in the *Environmental Monitor* notification that this supplemental material is available for public review.

The following persons may be contacted for additional information concerning this document:

Mr. Glenn Goulet
U.S.DOT/RSPA
John A. Volpe National
Transportation Systems Center
55 Broadway, Kendall Square
Cambridge, MA 02142
(617) 494-2002

Mr. William Gage
Executive Office of Environmental Affairs
MEPA Unit
100 Cambridge Street
Boston, MA 02202
(617) 727-5830 ext 308

Mr. Mark Yachmetz
Office of Railroad Development (RDV-13)
Federal Railroad Administration
400 Seventh Street, S.W.
Washington, D.C. 20590
(202) 366-0686

METRIC/ENGLISH CONVERSION FACTORS

ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in)	=	2.5 centimeters (cm)
1 foot (ft)	=	30 centimeters (cm)
1 yard (yd)	=	0.9 meter (m)
1 mile (mi)	=	1.6 kilometers (km)

AREA (APPROXIMATE)

1 square inch (sq in, in^2)	=	6.5 square centimeters (cm^2)
1 square foot (sq ft, ft^2)	=	0.09 square meter (m^2)
1 square yard (sq yd, yd^2)	=	0.8 square meter (m^2)
1 square mile (sq mi, mi^2)	=	2.6 square kilometers (km^2)
1 acre = 0.4 hectare (he)	=	4,000 square meters (m^2)

MASS - WEIGHT (APPROXIMATE)

1 ounce (oz)	=	28 grams (gm)
1 pound (lb)	=	0.45 kilogram (kg)
1 short ton = 2,000 pounds (lb)	=	0.9 tonne (t)

VOLUME (APPROXIMATE)

1 teaspoon (tsp)	=	5 milliliters (ml)
1 tablespoon (tbsp)	=	15 milliliters (ml)
1 fluid ounce (fl oz)	=	30 milliliters (ml)
1 cup (c)	=	0.24 liter (l)
1 pint (pt)	=	0.47 liter (l)
1 quart (qt)	=	0.96 liter (l)
1 gallon (gal)	=	3.8 liters (l)
1 cubic foot (cu ft, ft^3)	=	0.03 cubic meter (m^3)
1 cubic yard (cu yd, yd^3)	=	0.76 cubic meter (m^3)

TEMPERATURE (EXACT)

[(x-32)(5/9)] °F = y °C

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeter (mm)	=	0.04 inch (in)
1 centimeter (cm)	=	0.4 inch (in)
1 meter (m)	=	3.3 feet (ft)
1 meter (m)	=	1.1 yards (yd)
1 kilometer (k)	=	0.6 mile (mi)

AREA (APPROXIMATE)

1 square centimeter (cm^2)	=	0.16 square inch (sq in, in^2)
1 square meter (m^2)	=	1.2 square yards (sq yd, yd^2)
1 square kilometer (km^2)	=	0.4 square mile (sq mi, mi^2)
10,000 square meters (m^2)	=	1 hectare (he) = 2.5 acres

MASS - WEIGHT (APPROXIMATE)

1 gram (gm)	=	0.036 ounce (oz)
1 kilogram (kg)	=	2.2 pounds (lb)
1 tonne (t) = 1,000 kilograms (kg)	=	1.1 short tons

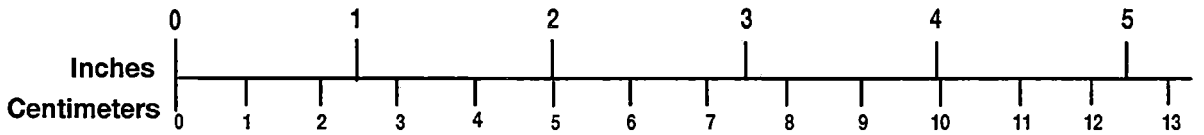
VOLUME (APPROXIMATE)

1 milliliter (ml)	=	0.03 fluid ounce (fl oz)
1 liter (l)	=	2.1 pints (pt)
1 liter (l)	=	1.06 quarts (qt)
1 liter (l)	=	0.26 gallon (gal)
1 cubic meter (m^3)	=	36 cubic feet (cu ft, ft^3)
1 cubic meter (m^3)	=	1.3 cubic yards (cu yd, yd^3)

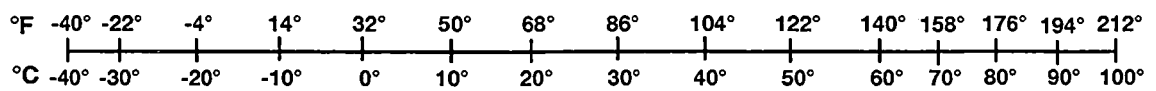
TEMPERATURE (EXACT)

[(9/5) y + 32] °C = x °F

QUICK INCH - CENTIMETER LENGTH CONVERSION



QUICK FAHRENHEIT - CELSIUS TEMPERATURE CONVERSION



For more exact and or other conversion factors, see NBS Miscellaneous Publication 286, Units of Weights and Measures.
Price $2.50 SD Catalog No. C13 10286

Updated 1/23/95

Table of Contents

List of Figures

List of Tables

I. BOSTON-AREA SUBSTATION ALTERNATIVES ANALYSIS

1. Purpose of the Proposed Electrification Project

Amtrak proposes to extend electric traction power to Amtrak's Northeast Corridor (NEC) main line between New Haven, CT, and Boston, MA. This would complete the electrification of the Northeast Corridor and permit the operation of electric trains over the entire length of the NEC from Boston to Washington, DC.

The Proposed Action is part of the continuing program of improvements to the main line of the NEC that was authorized by Congress to improve rail passenger service on the Washington-New York City-New Haven-Boston route through reduced travel times and increased reliability.

The electrification of the route segment between New Haven and Boston, the only remaining non-electric segment on the NEC main line, will help achieve the program goal of reduced travel times and increased reliability in two ways:

- Electric powered trains have operating characteristics (e.g., maximum speed and acceleration and deceleration rates) that make them superior to the diesel-electric trains currently serving the New Haven to Boston route.

- Completion of electrification north of New Haven will eliminate the time-consuming change from diesel to electric locomotives that presently takes place in New Haven, and permit through train service between Boston and Washington.

Reduced travel times and increased reliability will increase the attractiveness of rail travel over alternative means, primarily private automobile and commercial airline. There are attendant benefits to the potential diversion of traffic from both of these modes. These include reduced vehicular traffic on major highways in the northeast and on surface roads around the region's major airports as well as reduced air traffic at regional airports. This, in turn, may delay or eliminate the need for new or expanded highway and airport facilities in the Boston and New York City metropolitan areas. Reductions in air and vehicular traffic, as well as the replacement of diesel locomotives with electric locomotives between New Haven and Boston, will also result in improved air quality and other environmental benefits.[1]

2. Description of the Proposed Electrification System

The proposed electrification design is known as a 2 x 25 kilovolt (kV) autotransformer overhead catenary system. This design includes a contact wire and a feeder, each of which is energized at 25 kV, supported on poles above the rail line. Amtrak's proposed system would obtain electrical power from four substations spaced 44 to 53 miles apart along the route, with the northernmost substation located in the Boston area. The limited number of substations required was one of the reasons this particular design was chosen. (By way of comparison, Amtrak's existing electrification system between Washington and New York City, which was built in the mid 1930s, has substations spaced every 6 to 10 miles.)

Substations, sited in proximity to the right-of-way, contain transformers which "step down" the 115 kV power from local utility transmission lines to 25 kV. The 25 kV feed is then connected to the catenary and feeder systems for use by the locomotive. The system has stringent voltage level and reliability requirements. To meet these requirements, other electrification facilities will be developed including switching stations, which assist in providing backup power should an adjacent substation experience an outage, and paralleling stations, which serve to equalize the voltage along the tracks.

The current impetus for developing the electrification system is Amtrak's plans to establish high-speed rail service between Boston and New York City with trip times under three hours. However the Massachusetts Bay Transportation Authority (MBTA) plans, at some unspecified future date, to convert its commuter rail operations to electric operation. Electric commuter service offers performance benefits (quicker acceleration and higher speed) and environmental benefits (less noise and air pollution) than the currently used diesel locomotives. In recognition of these plans, Amtrak's designers are sizing and selecting locations for facilities to accommodate the future conversion of MBTA to electric operation[2].

The system is being designed for Amtrak by the Morrison Knudsen Corporation, L.K. Comstock Corporation, and the Spie Group (MK), a joint venture of three engineering and construction firms contracted by Amtrak to design and install all railroad electric power system components necessary to operate high-speed electric locomotive-hauled passenger trains between Boston and New Haven.

2.1 Boston Area Substation

The Boston Terminal Area (BTA), including the South Station complex, a storage yard and the Southhampton service facility, will create a heavy load on the electric traction power system. As a consequence, it is important to have a substation in close proximity to the end of the line. In addition, a strong power supply in the near vicinity of the Southwest Corridor could avoid the use of the feeder between the substation and South Station, and eliminate this component from the overhead catenary system in that area. The benefit to this change is that, without the feeder, the overhead catenary system would require less clearance under the numerous low bridges and tunnels through the Southwest Corridor and on to South Station. This would minimize the disruption associated with raising bridges and would also lessen the potential conflicts between this project and the Central Artery/Tunnel project being undertaken by the Massachusetts Highway Department.

Amtrak's initial plans for the electrification system included the proposed location of the northernmost substation site in the Roxbury Crossing area of Boston across the street from an existing MBTA substation that serves the Orange Line. Amtrak's designers selected this site for three main reasons. First, vacant land, under MBTA ownership, was available adjacent to the tracks, precluding the issue of acquiring occupied or private property. Second, an ample 115 kV power supply with backup capabilities exists at the property line under Tremont Street, eliminating the need for extending power lines long distances under city streets. Third, the location at Roxbury eliminated the need for any additional electrical facilities between Readville (MP 219.08) and South Station (MP 228) either as part of Amtrak's electrification project, or at some future date when the MBTA converts to electric traction.

Amtrak's preliminary design of the electrification system, including the placement of the substation at the Roxbury Crossing site, was presented in the draft environmental impact statement/report (DEIS/R) published for this project in October 1993. A substantial number of comments were received expressing concerns with respect to the location of a substation at the Roxbury Crossing site. Based on these comments, Amtrak and its design team undertook a comprehensive review of potential alternative sites to the facility proposed at Roxbury Crossing.

In addition, FRA retained De Leuw Cather and Company, a transportation engineering and design firm experienced in railroad electrification, to conduct an independent assessment of potential sites for the Boston area substation. FRA's environmental consultant, Daniel, Mann, Johnson, and Mendenhall, Inc., and Frederic R. Harris, Inc. (DMJM/Harris) undertook a review of the potential sites identified by Amtrak, MK and De Leuw Cather. The results of this review are presented below.

3. Identification and Preliminary Review of Alternative Sites

The analysis conducted by Amtrak and its design team and separately by FRA and its consultant identified five potential alternatives to Roxbury Crossing as the site of the northernmost substation. These are identified in Table I-1.

Table I-1. Massachusetts Substation Alternatives

SITE	MILEPOST	LOCATION
Canton	212.9	Canton, MA
Hyde Park	220.5	Boston, MA
Clarendon Hills	221.8	Boston, MA
Terrace Street	225.2	Boston, MA
Roxbury Crossing	226.02	Boston, MA
South Station	228.50	Boston, MA

A preliminary evaluation was performed for each alternative site. The evaluation criteria selected for this alternatives analysis focused on technical issues as well as environmental concerns.

3.1 Technical Considerations

Criteria: The feasibility of any potential site for use as a substation is highly dependent on certain technical constraints. Those used in the review of potential sites for the northernmost substation were:

- proximity to a 115 kV power source,
- reliability of the power source. That is, the power source should not be tapped by any other users, thus ensuring a constant reliable source which would be unaffected by other users, and vice-versa,
- distance from the end of the line, South Station, and the ability to avoid the use of a feeder line,
- the minimization of additional electrical facilities (switching stations and paralleling stations, and
- the availability of adequate vacant land to site the facility adjacent to the rail line.

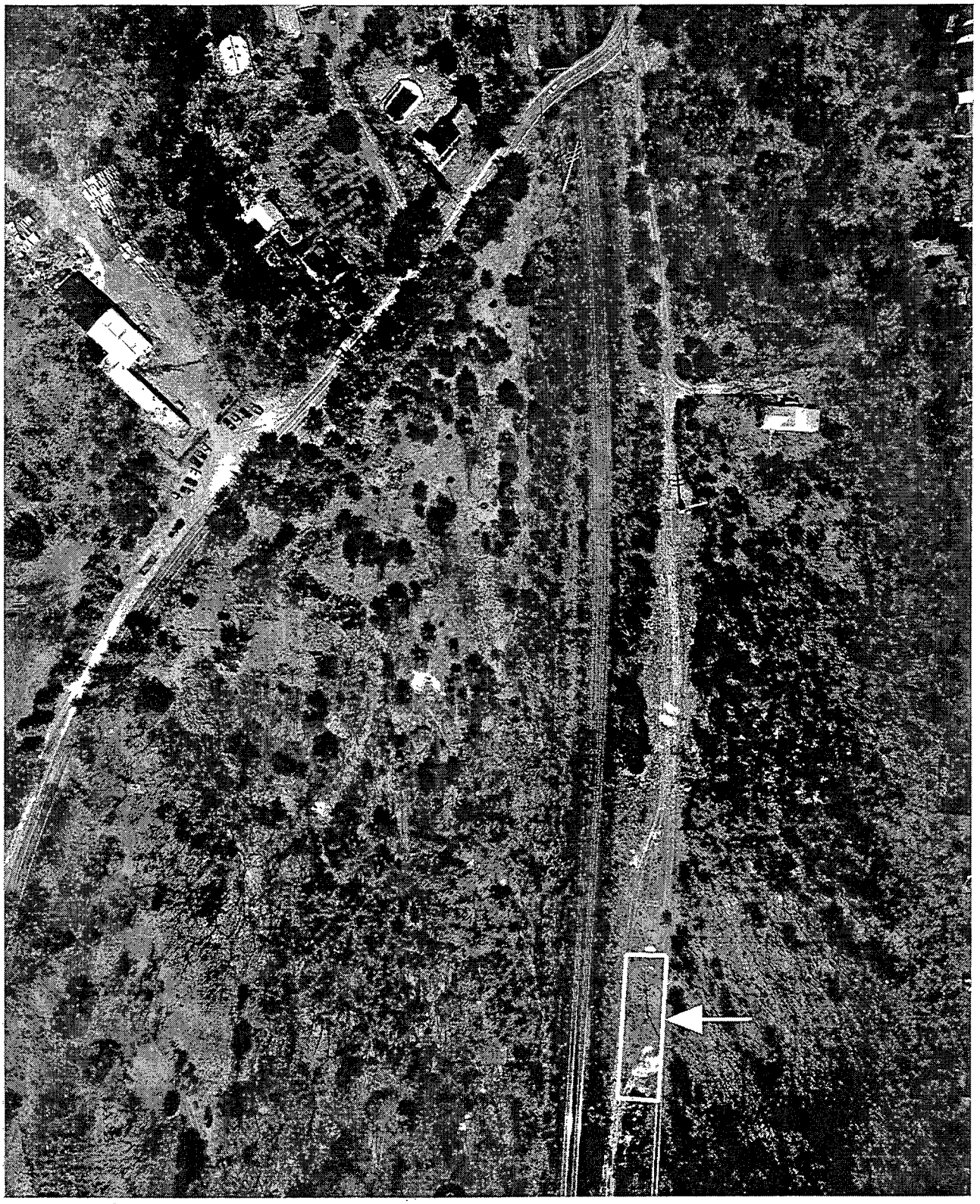
Each of the alternative sites identified by Amtrak, MK and De Leuw Cather was evaluated against these criteria. A summary of this evaluation is presented below:

Canton. The alternative substation at Canton would be placed in the location currently proposed for a paralleling station (see Figure I-1). There are several technical difficulties associated with this site. Due to the 16 mile distance between Canton and the BTA, the system would not be able to operate as a simple catenary system but would require a 2 x 25 autotransformer system with a paralleling station in the vicinity of Roxbury and perhaps an additional paralleling station at South Station. Further, the requirement for an autotransformer feeder as part of the overhead catenary system would result in clearance problems with the overhead bridges/tunnels between Roxbury and South Station and coordination issues with the Massachusetts Highway Department's Central Artery/Tunnel project.

The tie in to utility service would consist of a direct overhead connection with the Boston Edison 115 kV transmission line. This connection is at the radial end of the transmission network, which will affect both the Boston Edison system ability to deal with large and erratic needs of the traction power system (i.e. operating the trains) as well add equipment to the substation to try to mitigate these problems. In other words, the capacity in the transmission in this area would add complexity to the design and could possibly weaken the overall electrification system performance.

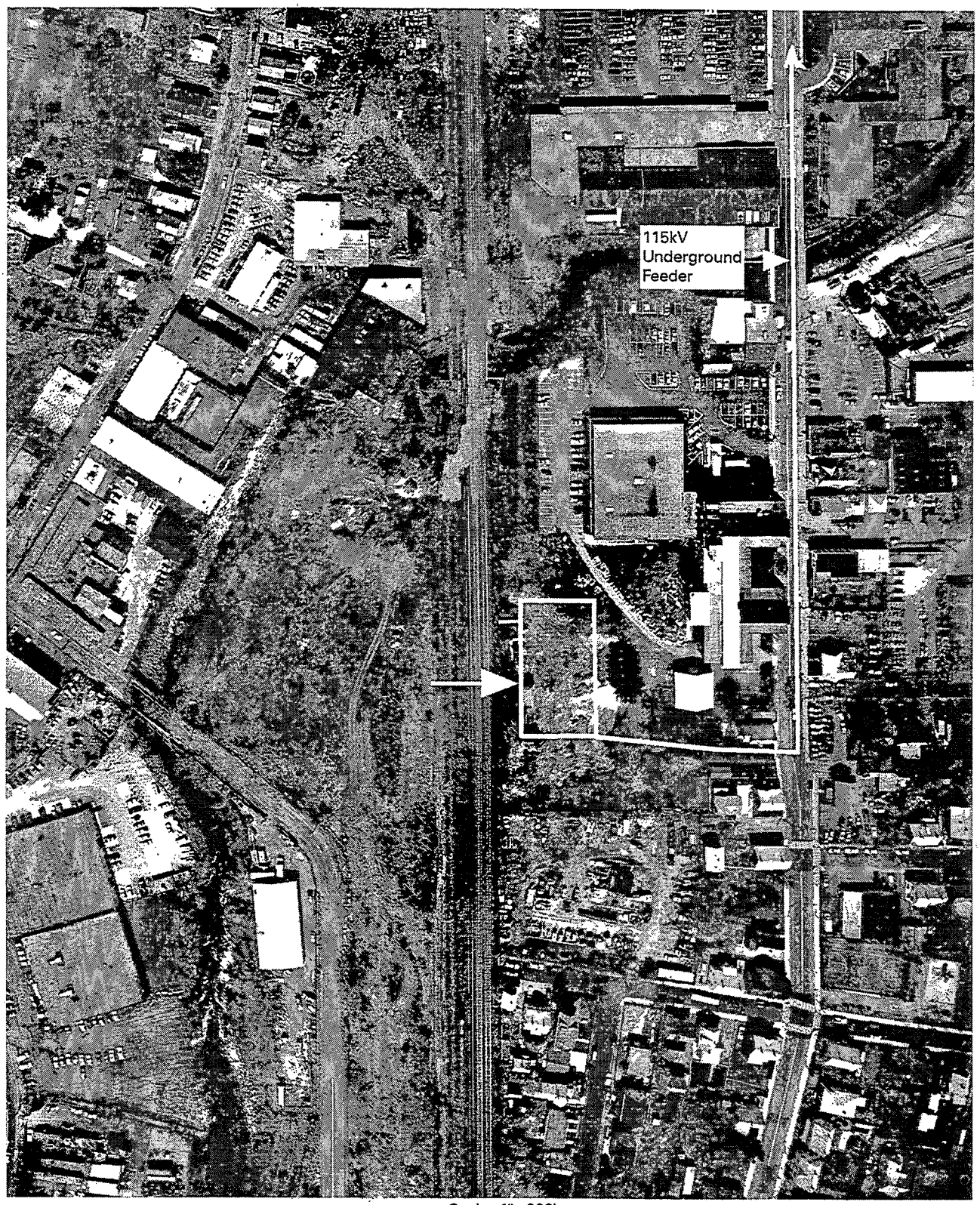
In addition, overall system reliability would be impacted as this utility service line does not provide the redundant backup service.

Hyde Park. The alternative Hyde Park substation location is shown on Figure I-2. This substation configuration would be similar to Canton in that it would require a paralleling station in the vicinity of Roxbury and perhaps South Station as well. It would also require a feeder line



Scale: 1"=200'

	CANTON - MP 212.9	Figure
	Northeast Corridor Improvement Project Electrification - New Haven CT to Boston MA	I-1



Scale: 1"=200'

	HYDE PARK - MP 220.5	Figure
	Northeast Corridor Improvement Project Electrification - New Haven CT to Boston MA	I-2

as part of the overhead catenary system between that paralleling station and the end of the line with the same clearance issues identified for the Canton alternative.

The utility corridor for this site would consist of a 1.5-mile underground feeder along Hyde Park Avenue to the existing Boston Edison 115 kV line in the vicinity of the Hyde Park Commuter Rail Station. It is anticipated that the Edison substation would have to be upgraded to accommodate the increased demand caused by the electrification project[3].

A major problem with the site is the current plan by MBTA and Amtrak to construct a rail interlocking at this location. Therefore the required phase breaks could not be located adjacent to the substation, requiring a long stretch of parallel feeders to locate the phase breaks at a suitable location.

Clarendon Hills. The alternative Clarendon Hills substation location is shown on Figure I-3. The site is approximately 1,200 feet from Boston Edison's 115 kV Clarendon Hills substation. Some expansion of the substation would likely be required to tap the lines and provide switching.

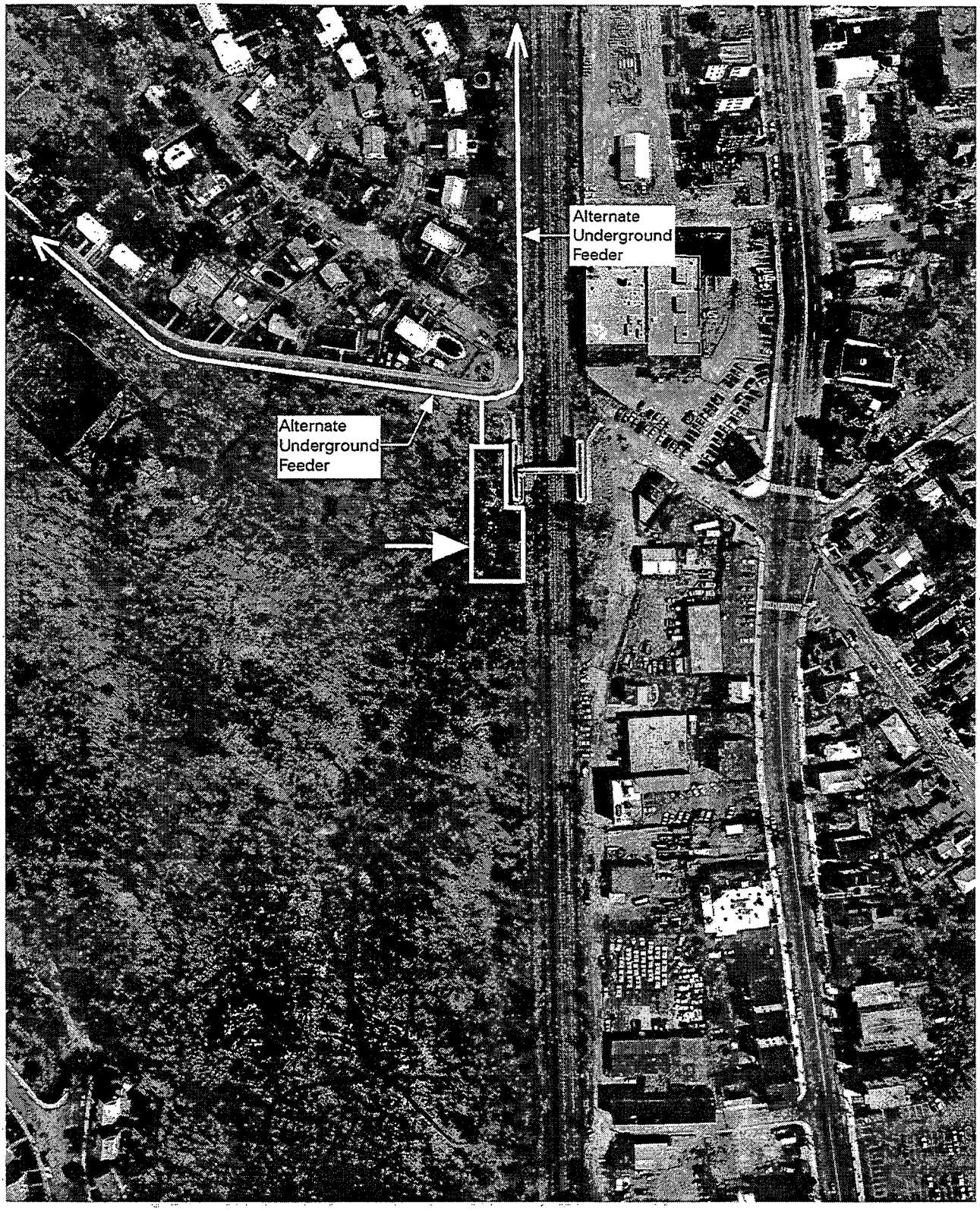
The preliminary investigation indicates this site may meet the electrification design standards without adding paralleling stations further north. However, as this location is approaching the outer limit for distance between the northernmost substation and BTA (6 miles or less is the design requirement), it is possible that an additional paralleling station would be required in the Roxbury area.

There are two potential underground utility corridor routes. One would cross the tracks and travel north, along the right-of-way, for approximately 1,200 feet to the existing Boston Edison Company substation north of Metropolitan Avenue. The other would travel west, within Dale Street, for approximately 2,000 feet to connect to an existing underground 115 kV line at Maynard Street.

Terrace Street. As shown on Figure I-4, this substation alternative was proposed to be housed in an unoccupied old manufacturing building on Terrace Street in Roxbury (the Ditson Building). Unlike the previous three substation configurations, this substation can tap into the same 115 kV power supply in Tremont Street that would be used for the Roxbury Crossing substation. No additional paralleling stations further north would be anticipated.

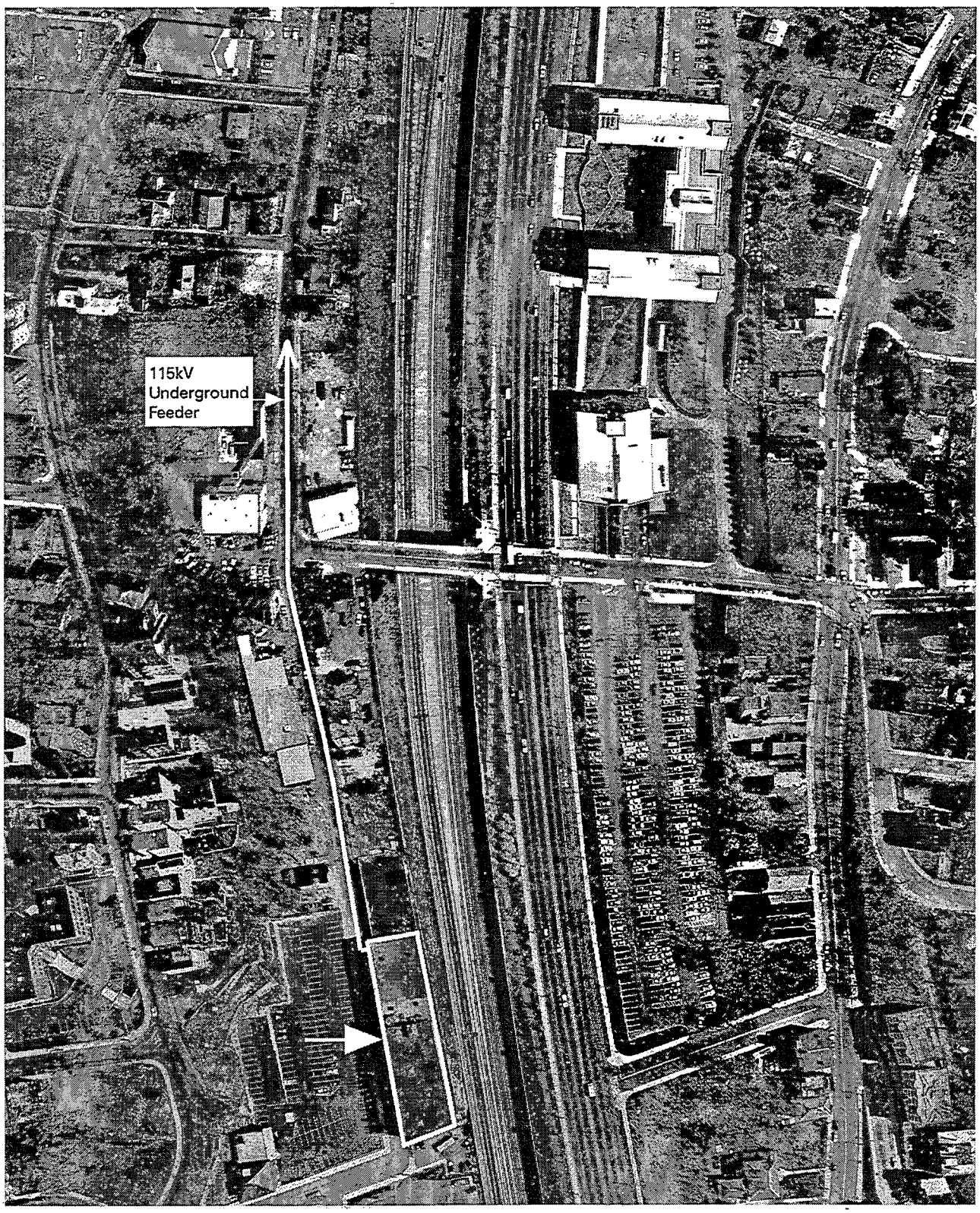
Although no design is currently available, significant difficulties are anticipated in retrofitting this building. Substantial physical changes to the building's interior would be required to house the substation. The typical floor height for an indoor substation is 30 feet; therefore, at least three substation floors could be needed. Given space constraints it is possible that an additional deck would be needed on top of the building or that portions of the exterior walls removed.

Structural support system modifications would be required to accommodate the height and weight of the transformers and switch gear, as well as bring the facility into compliance with the latest codes and standards regarding indoor substations. Systems unique to indoor substations would include fire suppression equipment, fire walls, personnel protection, smoke removal systems, evacuation facilities, lighting systems, and other safety apparatus. Placement of the 115 kV



Scale: 1"=200'

	CLARENDON HILLS - MP 221.8	Figure
	Northeast Corridor Improvement Project Electrification - New Haven CT to Boston MA	I-3



Scale: 1"=200'

	TERRACE STREET - MP 225.2	Figure
	Northeast Corridor Improvement Project Electrification - New Haven CT to Boston MA	I-4

substation in a confined, enclosed space could require gas insulated switch gear, which would make this facility unique, requiring atypical parts, maintenance equipment, and personnel training.

Although the feeder route for this site is only 0.5 mile long, a redundant backup system would require approximately 2.0 miles of feeder wire, or four 0.5-mile wires[4]. This could have an negative impact on system performance.

South Station. This substation would be situated near South Station in the area currently undergoing construction for the Central Artery/Tunnel project. A site plan is not provided here, as Amtrak's research into this area indicated that, due to CA/T's schedule for design and construction, vacant suitable land (approx. 0.5 acre) for a substation would not be available in time for the start of electrification operations.

The corresponding utility corridor for this substation alternative would likely consist of a direct underground connection with nearby 115 kV lines that cross the Broadway Bridge. A preliminary review indicated that these lines are fairly well loaded at present and may not be able to accommodate the loading characteristics required for traction power supplies. In addition, a paralleling station will likely be required in the Roxbury area.

Also, the distance between this site and the Rhode Island substation would more than likely surpass design tolerances. Therefore, the system would likely require an intermediate substation and switching station.

3.2 Environmental Considerations

Criteria: Concurrent with the investigation of technical requirements and constraints, specific environmental impact criteria identified in the concerns raised by comments on the DEIS/R were applied to each substation alternative. These criteria are:

- Land use and regulations
- Socioeconomic (property value, environmental equity)
- Visual
- Populations exposed to electromagnetic fields

As with the technical criteria, each of the identified alternative substation sites was evaluated against these criteria. This evaluation is summarized below:

3.2.1 Land Use and Regulations

This section discusses the existing land use characteristics and zoning of the substation alternatives. The information presented is based on the Town of Canton, MA, Zoning Map, and the Boston Redevelopment Authority Zoning Map, as amended.

Canton. The Canton site, located at milepost 212.90, is situated directly beneath a Boston Edison 115 kV double circuit transmission line which runs parallel to the rail line. The site is cleared and grubbed due to its position within the utility corridor right-of-way. The surrounding area is generally undeveloped and heavily vegetated. The Canton site is located within a Single Residence B zone (SRB) which is a residential zone requiring a minimum of 15,000 square foot lot sizes. The nearest residence is approximately 800 feet northeast. Therefore, if the vegetative buffer is maintained, the substation should not impact the adjacent residences.

As the 115 kV power supply is directly overhead, no land use impacts are anticipated from the utility connection.

Hyde Park. This site, located at MP 220.50, is situated in the Hyde Park Industrial Center off Hyde Park Avenue in Boston. The site is located south of the Acme Industrial Equipment Company on a vacant parcel adjacent to the rail line. The site is currently utilized for storage of small amounts of fill and other materials. The surrounding area contains light manufacturing, commercial and business uses, and vacant land. The Hyde Park site is located within a light manufacturing zone (M-1)[5]. A substation is consistent with this zoning and no land use impacts are expected from placing the substation in this area.

The corresponding utility corridor for this site would consist of a 1.5-mile underground feeder along Hyde Park Avenue to the existing Boston Edison 115 kV line in the vicinity of the Hyde Park Commuter Rail Station. No land use impacts are anticipated from the installation of this utility connection.

Clarendon Hills. This site, located at MP 221.80, would be located on an undeveloped parcel west of the rail right-of-way and a pedestrian overpass near the intersection of Metropolitan Avenue and Dale Street. Residential uses are located directly to the north of the site approximately 200 feet away. While this area is zoned for two-family residential development (R-.5), the majority of the homes located directly north of the site are single family in nature.

The site is situated east and northeast of the Dale Street Park (Commonwealth of Massachusetts) and Sherrin Street Park (City of Boston), respectively, where active and passive recreational activities occur. This land is considered a valuable urban wild area by the City of Boston Environment Department.

The use of this site for a substation could have some land use constraints. The Clarendon Hills site currently contains a 40-foot sewer easement which runs parallel to the NEC[6]. Amtrak would be required to work with the Boston Water and Sewer Commission prior to construction of a facility on this site. In addition, a plan to construct residential development on this parcel is currently under review by the Massachusetts Executive Office of Transportation and Construction[7].

Of the two possible utility connections, both would be located within street rights-of-way, therefore no land use impacts are anticipated.

Terrace Street. This site, located at MP 225.20, is situated in the Mission Hill area of Boston off Tremont Street. The substation would be located inside the vacant Oliver Ditson Building

on Terrace Street in Boston. The building is currently vacant and is located among a mix of industrial and residential uses. The Terrace Street site is located within a light manufacturing zone (M-2). No land use impacts are anticipated from this alternative.

The corresponding utility corridor for this site would consist of a 0.5-mile underground feeder along Terrace Street to an existing 115 kV line in Tremont Street. No land use impacts are anticipated from construction of this utility feed.

Roxbury Crossing. This site, located at MP 226.02, is situated in an industrial district, and would be located on a primarily undeveloped site, with the exception of an existing pumping station. The site is abutted by: Gurney Street to the north; the railroad to the south; Tremont Street to the east; and Station Street to the west. Uses directly abutting the site are industrial and commercial with residential uses beyond. Given the nearby industrial and transportation uses, the placement of a substation in this area would not impact land use.

The corresponding underground utility connection would traverse the site southward and connect directly with an existing 115 kV line located in Tremont Street. No impacts are anticipated from the installation of this connection.

South Station. The surrounding area contains industrial uses including rail and railroad support facilities. The South Station area is located within a retail business and office zone (B-10). No available parcel of land has been identified for a substation. If land were available, a substation would not be incompatible with the general uses, given the prevalent transportation and industrial use.

The corresponding utility corridor for a site in this area would consist of a direct underground connection with nearby 115 kV lines that cross the Broadway Bridge. No land use impacts are anticipated from the installation of this connection.

3.2.2 Socioeconomics

Real Estate Values. As stated in Volume I, Chapter 4 of the FEIS/R, no evidence was found that stated property values would be impacted by electrical substations. As most sites are situated in industrial areas, or would be well buffered from residential or other sensitive receptors, it is anticipated that none of these sites would have an impact on surrounding real estate values. The Clarendon Hills site, however, which is the closest to residential uses and recreational sensitive receptors, should not have an impact on these uses if effectively buffered from them.

Tax Revenues. As Amtrak is exempt from local taxation,[8] taxes would no longer be collected on the property selected for substation placement, although this would have an insignificant impact on municipal tax revenues. In the cases of the Roxbury and South Station sites and, to a large extent at the Clarendon Hills site, the properties are already publicly owned. The remaining sites involve the acquisition of comparatively little (less than 0.5 acre) of privately-owned property.

Minority Populations. As stated above, the six alternative substation configurations are located in various environments. Table I-2 displays median household income and race distribution for

each alternative. The information provided was compiled from U.S. Census Bureau data for each location.

Because the area of each census tract is not geographically consistent, only general comparisons can be made. As indicated, the Roxbury Crossing site has the lowest median income and the Terrace Street site has the highest minority population.

3.2.3 Visual Resources

Hyde Park: This site is completely surrounded by industrial and commercial uses and a substation at this location would not visually impact surrounding areas.

Clarendon Hills: Since the site is south of residential uses (and a pedestrian overpass) some type of screening would be necessary to shield the facility from these uses. Because recreational uses are buffered from the site by vegetation, these uses would not be impacted if a vegetative buffer was maintained.

Terrace Street: Due to the fact that the proposed facility would be located inside an existing building, no visual impacts would be expected.

Roxbury Crossing: Although this site is adjacent to the tracks and located in an industrial district, a substation at this location would not be consistent with the character of the surrounding area. To limit the visual intrusion of this facility, the substation should be enclosed in a structure that is compatible in material and style with the neighborhood.

South Station: This area is surrounded by industrial and rail dependent uses in addition to highway infrastructure. It is not anticipated that visual impacts would be created by this facility, although it would depend on its proximity to the South Station headhouse.

Table I-2. Alternative Substation Sites Census Information

SITE	POPULATION	MEDIAN INCOME	RACE BY %	
Canton	6,948	$43,315	White Black Amer. Indian Asian, Pac. Isl. Other	96.8 1.4 0.2 1.4 0.2
Hyde Park	5,407	$26,440	White Black Amer. Indian Asian, Pac. Isl. Other	71.4 24.1 0.2 0.9 3.3
Clarendon Hills	8,307	$33,664.00	White Black Amer. Indian Asian, Pac. Isl. Other Race	84.0 11.2 0.2 1.8 2.8
Terrace Street	1,818	$26,250	White Black Amer. Indian Asian, Pac. Isl. Other	22.5 68.4 0.2 0.4 8.5
Roxbury Crossing	2,736	$16,654.00	White Black Amer. Indian Asian, Pac. Isl. Other	13.4 38.1 0.4 1.9 46.2
South Station	2,026	$13,477	White Black Amer. Indian Asian, Pac. Isl. Other	49.6 4.1 0.0 45.6 0.6

Note: percentages may not total 100 due to rounding
Source: Massachusetts State Data Center, 1994

3.2.4 Electromagnetic Fields and Interference

Potential Population Exposure to Electromagnetic Fields. Current populations potentially exposed to EMF resulting from the location of the proposed substation at each of the alternative sites have been based on visual assessments or, if the potentially affected area was large, on zoning criteria[9]. Future populations were then calculated based on Massachusetts projected growth rate of 6.4 percent presented in the 1990 United States Census.

The South Station substation alternative was not evaluated because it is not known whether this site would be in close proximity to commercial or transportation facilities.

Canton: The Canton alternative substation location is located south of High Street and west of Thayer Road along a Boston Edison transmission line. Houses along Thayer Street parallel the Boston Edison right-of-way, but are separated from the right-of-way by approximately 300 to 400 feet of woods and are, therefore, outside of the study limit. A single residence is located off the access to the right-of-way directly north of the alternative substation location. Based on the indicated alternative location, it would appear that this residence would be over 150 feet away from the substation. However, actual design may involve the placement of tie lines and other electrical system components nearer this residence, therefore it has been included in the Zone 3 population estimates with an assumed population of four.

Due to power requirements, it is expected that this alternative location would require additional paralleling stations near Roxbury Crossing and South Station. As the locations are not determined, the populations associated with these other sites are not included in the population estimates for this alternative. The numbers of potentially exposed persons around the Canton alternative location are shown in Table I-3.

Hyde Park: The Hyde Park alternative substation location is located west of Hyde Park Avenue, slightly north of Dacy Street. Adjacent to the site are several industrial buildings and a multifamily residence. The substation would require a 115 kV feeder line which would extend north along Hyde Park Avenue approximately 8,000 feet to the existing Boston Edison 115 kV power source. Due to the length of the feeder line and the densely populated neighborhoods, a significant increase in the population potentially exposed to EMF would result from placing the substation at this alternative location.

Because a large area potentially would be affected by this alternative, population estimates were established via zoning criteria. The method used was similar to that described in the Technical Study on EMF in the DEIS/R. Due to power requirements, it is expected that this alternative location would require paralleling stations near the proposed Roxbury site and South Station. These locations are undetermined, therefore populations associated with these other sites are not included in the population estimates for this alternative. The numbers of potentially exposed persons around the Hyde Park alternative location are shown in Table I-3.

Clarendon Hills: As this site was recently introduced into the analysis, a quantitative population assessment has not yet been performed. However, given the character of the surrounding areas some general assumptions can be made. Since the facility would be located in a primarily urban

and very developed area, future exposed populations would likely not change significantly from those which are existing. Also, given the existence of parkland nearby, a notable number of exposures would be classified as short-term, or occasional, as are discussed in Volume I, Section 4.5 of this FEIS/R.

A field inspection of the area was conducted to estimate the number of residences in close proximity to the substation and alternative utility feed routes. The substation would not be within 150 feet of the closest residences. The two utility feed routes, however, would be within range, with the Dale Street route adjacent to approximately 40 residences and the ROW route adjacent to approximately 6 residences.

Terrace Street: The Terrace Street alternative substation location is located at the southern end of Terrace Street at the intersection of Terrace Place. Current population estimates assume that the abandoned factory would be utilized for the substation and, therefore, would not be occupied. The feeder is anticipated to tie into Boston Edison on Tremont Street approximately 2,000 feet to the north. Population estimates are based on an inspection of the area and aerial photographs. The numbers of potentially exposed persons around the Terrace Street alternative location are shown in Table I-3.

Roxbury Crossing: The numbers of potentially exposed persons around the MBTA substation and the proposed Amtrak substation have been estimated in accordance with the procedures and exposure zones established in the DEIS/R. The three zones represent the areas 0 to 50 feet (Zone 1), 50 to 100 feet (Zone 2), and 100 to 150 feet (Zone 3) away from the boundary of the proposed Amtrak substation. The projected values are for the year 2010. The results are summarized in Table I-3.

Table I-3. Affected Population at Proposed Substation Locations

	CURRENT COMMERCIAL/ INDUSTRIAL			PROJECTED COMMERCIAL/ INDUSTRIAL			CURRENT RESIDENTIAL POPULATION			PROJECTED RESIDENTIAL POPULATION		
SITE	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3
Canton	0	0	0	0	0	0	0	0	4	0	0	4
Hyde Park	25	529	529	27	563	563	130	260	260	139	277	277
Clarendon Hills[1]	-	-	-	-	-	-	-	-	-	-	-	-
Terrace Street	24	48	48	26	51	51	18	36	36	19	38	38
Roxbury Crossing	2	8	8	3	9	9	0	0	0	0	0	0

Note: [1] Quantitative assessment will be conducted by FRA prior to selection of the preferred alternative.
Source: Roy F. Weston, Inc., 1994

3.3 Evaluation Results

The alternatives are summarized by impact category in Table I-4. As indicated, all sites have shortcomings, either technical or environmental.

The Roxbury Crossing site is the technically superior site. The purpose of this alternatives review was to determine whether there was a suitable alternative that avoided the location of the substation at that site. Three of the alternative sites for substations that were identified, Canton, Hyde Park and South Station, would require the use of the Roxbury Crossing site, or some property in very close proximity to it, for an paralleling station. Since these alternatives did not avoid the impacts in the Roxbury area, they were not pursued.

Of the remaining three alternative sites evaluated, the Terrace Street site, while technically feasible, offered substantial difficulties in adapting a historic structure for use as a substation. Amtrak expressed technical concerns regarding the size of the building, its ability to move the transformers into the building, and its belief that substantial alterations would be required to both the interior and exterior of the building to accommodate the necessary equipment. In addition, this would become a "one of a kind" facility with equipment unique to Amtrak's electric facilities, making it more difficult and expensive to maintain. Based upon these considerations, this site was not pursued further.

The preliminary evaluation of alternative sites for the northernmost substation, resulted in two sites that were carried forward for further evaluation in the FEIS/R. These are the original Roxbury Crossing site and the Clarendon Hills site.

Table I-4. Summary Matrix, Roxbury Crossing Substation Siting Alternatives Analyses

SUBSTATION CONFIGURATION			POTENTIAL IMPACTS			
Substation	**Utility Feeds/ Connections**	**Additional Facility Sites[1]**	**Land Use**	**Minority/ Low Income Populations[2]**	**Visual**	**EMF Exposure, 2010 Population (0-150 ft)**
Roxbury Crossing	None (connection at property line/ Tremont Street)	None	None	Yes	Yes (screening required per DEIS/R)	21 (commercial)
Canton	None (connection to overhead power supply)	1 or 2 facilities	None	No	Yes, maintain vegetative buffer	4 (residential)
Hyde Park	1.5-mile underground feed along Hyde Park Avenue	Roxbury, South Station	None (industrial use)	No	None	1,846 (res & comm)
Clarendon Hills	0.4 mile along Dale Street, or 0.2 mile along ROW	Possible Roxbury, South Station	Yes - sewer easement, existing development plan under review	No	Yes - maintain vegetative buffer	Approximate 40 residences for Dale St feed; 6 residences for rail ROW feed[3]
Terrace Street	0.5 mile to Tremont Street	None	None	Yes	None (inside building)	223 (res & comm)
South Station	Underground connection with nearby 115 kV line at Broadway Bridge	Intermediate sub- and switching stations	Yes - conflict with CA/T project	Yes	None likely	N/A

Notes:
[1] All sites require a paralleling station at Canton, the siting of which is evaluated in this FEIS/R.
[2] Yes designation if non-white population greater than 50%, or median income below 1994 Federal Poverty Level.
[3] Qualitative assessment due to recent introduction to the environmental study.

4. Expanded Evaluation of Alternative Substation Sites in Roxbury Crossing and Clarendon Hills

Based on the impact criteria used in the preliminary screening evaluation, further environmental review of the Roxbury Crossing and Clarendon Hills alternative sites was undertaken. This included an assessment of the potential impacts to historic and archaeological resources and natural resources, as well as the potential for impact from the disturbance of any hazardous waste that may be present at the sites.

4.1 Historic and Archaeological Resources

As part of the EIS/R, an historic resources survey was conducted along the NEC right-of-way. The purpose of the survey was to assess whether Amtrak's proposed project facilities, such as substations, would adversely effect resources listed on, or eligible for listing on, the National Register of Historic Places (National Register). An archaeological survey was also performed to determine if archaeological sites which may be eligible for the National Register are present and subject to possible impact. The information presented is drawn from the DEIS/R Volume III, the FEIS/R Volume I, and the Massachusetts Historic Resources Technical Report, Addendum.

Roxbury Crossing. The proposed Roxbury Crossing substation site is located adjacent to the Stony Brook Brewery Historic District (MP 225.10-225.30), and within the Parker Hill/Mission Hill North Slope Historic District (MP 225.50-226.80). Absent any screening, the Roxbury substation would have a visual impact on one of the Stony Brook Brewery Buildings, located northwest of the proposed substation. Formal consultations held with the Massachusetts Historic Commission (MHC) resulted in a Memorandum of Agreement (Volume I, Appendix D of the FEIS/R). The memorandum stipulates that Amtrak and FRA shall consult with MHC during the design phase to arrive at an acceptable methodology for visually screening the substation from the neighborhood.

A preliminary archaeological survey (site walkover and archives search) was conducted for this site. As stated in the survey report[10], of which copies were transmitted to MHC and EOEA, this area appears to have been disturbed by 20th-century construction/land modification activities, and the soil may have been contaminated by a gas station on the site. Because of the disturbance, the project area is unlikely to yield intact cultural material. Therefore, no further archaeological survey is recommended at the project area.

Clarendon Hills. According to the historic resources inventory, only one historic site is located near the proposed substation site. The Hyde Park Pumping Station, a recommended eligible site for the National Register, is located approximately 2,000 feet northeast of the proposed site, and across the right-of-way. Although the area of potential effects included properties whose settings might be visually impacted by the proposed substation, the distance from the resource, and its placement on the opposite side of the tracks (and partially shielded by the pedestrian overpass), would likely result in a finding of no effect from the MHC. Formal consultation with MHC would be undertaken as part of a future detailed assessment.

No archaeological resources are anticipated at the study site, or nearby, based on review of the DEIS/R Volume III technical study archaeology maps. Formal consultation with MHC should be undertaken prior to final site selection.

4.2 Natural Resources

This section includes a description of existing natural resource conditions at each site and anticipated impacts to those resources. The natural resources discussed include wetlands, critical wildlife habitat, endangered species, floodplains, coastal resources and water quality.

Roxbury Crossing. There are no wetlands associated with the Roxbury Crossing substation site, its utility connection, or the 100 foot buffer around them.

Site characteristics of the site include an urban environment with a train station and numerous businesses and homes in the immediate area. The proposed site of the substation is an empty lot with a 6-8 foot chain link fence surrounding it and very limited vegetation. The site represents an area of minimal value to wildlife due to lack of food, cover, and access. Located in a heavily developed area, neither the substation nor utility connector would be expected to impact upon the limited wildlife habitat values of the area.

A Massachusetts Natural Heritage Database Search indicated no rare species or adverse natural communities. The substation site and adjacent feeder lines do not impact any floodplains, according to the FEMA Flood Insurance Rate Maps (FIRM) for this area. Also, site is located outside the coastal zone. Finally, no water resource impacts are expected, due to the lack of wells and surface water resources in the project vicinity.

Clarendon Hills. There are no wetlands associated with the substation site, located in the area southeast of Dale Street. The National Wetlands Inventory map for Boston South (1977) indicates a large scrub/shrub and emergent wetland occurs off-site on the south side of the substation site. However, field examination of the area did not reveal wetlands within the 100 foot buffer zone of the proposed substation location.

Because of its forested character, the site was screened for wildlife habitat value and the presence of endangered species. Although this wooded site is located within an urban area and most likely provides habitat for numerous small game and songbird species, it is not anticipated that development of the site would impact the overall availability of habitat in the vicinity. The Atlas of Estimated Habitats of State-Listed Rare Wetlands Wildlife[11] was consulted and no sensitive areas were found adjacent to the proposed site.

The proposed site does not impact any floodplains, according to the relevant FEMA FIRM maps, and the site is located outside the coastal zone.

Finally, the Massachusetts Department of Environmental Protection (MADEP), Water Resources Department[12] noted no water or aquifer protection districts occurring in Boston. Surface waters adjacent to the site include a stream which flows into Stony Brook, south and west of the proposed location. However, no surface water resource impacts are expected due to the lack of wells and water resources in the immediate project vicinity.

4.3 Hazardous Materials

Concern was raised about the potential for the disturbance of hazardous waste during construction of the substation alternatives, as well as the potential for generation of hazardous waste from operation of these facilities.

4.3.1 Potential for Existing Site Contamination

Construction of the substation would involve some soil excavation and site grading. The Roxbury Crossing and Clarendon Hills sites, could have a history of chemical contamination, which would then affect handling of material during construction as well as disposal costs.

As part of the FEIS/R, the Roxbury Crossing Site was screened by Amtrak using environmental databases and deed searches. The Clarendon Hills site was evaluated by FRA, utilizing site walkovers, environmental database searches and file searches at MADEP, Woburn. The following sections describe the methodology used and evaluates potential impacts.

Roxbury Crossing
For Roxbury Crossing, ownership histories and database searches provided by Amtrak were examined to determine whether the site had the potential to contain chemical contamination which could be disturbed during construction. The ownership history was evaluated to determine whether former land use activities on this site (e.g. chemical or manufacturing companies) may have involved a release of hazardous waste. Ownership dating back to 1955 includes the MBTA (current owners), Boston Edison and Tremont Clothing. The archaeological reconnaissance survey for this project noted that a gas station was sited on the parcel, prior to 1955.

Amtrak also conducted a computer search of several databases to determine whether this site had a history of contamination or had been reported for a release of hazardous materials into the environment. This search included a review of eight Federal and state environmental databases, including Federal and state superfund sites, state hazardous waste sites and underground storage tank sites.

The environmental database search did not produce any listed releases of hazardous waste, either on the site or in close proximity to it. However, the site ownership review indicated former transportation and commercial uses, which may then lead to slight levels of contamination present on the site. Further, Roxbury Crossing is located in a heavily urbanized area adjacent to a rail corridor. Prior to disposal of excavated soil and other construction materials from this site, a sampling program would be developed to assess compliance with all appropriate Federal and state regulations.

Clarendon Hills
Site Walkover. In July, 1994 the site and surrounding areas were inspected for the existence of visible ground contamination, existence of structures such as storage tanks, proximity to nearby uses, vegetation and topography. The results of this inspection are discussed below.

The site is primarily level sloping slightly to the south, and contains heavy vegetation. Manhole covers indicating the presence of an underground sewer line were visible on the property.

Although no subsurface testing was performed, no indications of the presence of underground storage tanks were observed, i.e., fill or vent pipes, during the site inspection. No aboveground storage tanks were observed on the site.

Records Review. The purpose of the this review was: 1) to identify whether the study site showed up as containing hazardous materials (past or present), and 2) to locate listed sites or spills that might impact this site through the flow of groundwater. An environmental filesearch was conducted with the New England Datamap Technology Corporation to compile a list of hazardous sites and spills located within 1/2 mile of the study site. The search included the following databases:

- National Priority List
- CERCLIS List
- RCRIS TSD/Large Generator List
- RCRIS Small Generator List
- State Priority List
- State Spills List - 1990s
- Registered Underground Storage Tanks

Federal, State and Local Records. Although the search described above initially targeted areas within a one-half mile radius of the site, the computer automatically searched the entire zip code in which the study site was located. Therefore, the total number of files found was much larger than necessary. In addition, all registered underground storage tanks, and all hazardous materials spills were included regardless of case status. The search produced 86 files, 10 of which were State listed sites. All sites outside the one-half mile radius were automatically deleted in addition to all spill sites that were satisfactorily remediated. Underground storage tanks, while also initially excluded, are discussed further below. After these list modifications were made approximately 10 files remained. The study site was not found on any of the databases searched.

Underground Storage Tanks. Underground storage tanks (USTs), while listed in the filesearch, are not considered contaminated sites unless spills or leaks have been reported.
Despite this, it is important to identify UST locations and check individual tank characteristics. Tanks which are of steel construction and very old could be potential contamination hazards to nearby properties. Therefore, all USTs within 1/2 mile of the study site were analyzed for these components. Of the 10 USTs identified, three were outside the 1/2 mile limit and were eliminated from further study. Of those remaining three were 20 or more years old and of steel construction. One tank listed as being of steel construction and 24 years old is located within 1000 feet of the study site at 222 Providence Avenue. Although no problems have been reported at this site, preliminary sampling should be performed prior to site acquisition. The Hyde Park pumping station diesel storage tank could also have a negative effect on the site if leakage has occurred. It is located approximately 2,000 feet northeast of the site at approximately the same elevation. But given the topography and direction of surface water flow (northeast), it is estimated that groundwater at this location would flow away from the study site. The other UST is located approximately 3,000 feet south of the study site on Hyde Park Avenue near West Street. Given the estimated direction of groundwater flow, it is possible that a release here would impact the study site.

MADEP File Review. Once the New England Datamap output was streamlined to 10 sites, the remaining sites were reviewed at the Massachusetts Department of Environmental Protection in Woburn. After reviewing these files, it was determined that only three sites were of concern; one which cannot be located because of insufficient information. The next site is the reported spill of heating oil around the fill pipe of a tank located directly across the ROW at the Boston Edison Hyde Park Service Center. While all contaminated soil found on site has been cleaned up, there was no boring, or groundwater information available to determine if additional contaminants were transported from this site to other areas. This release has a low potential for having impacted the study site, but supports the assertion that sampling should be performed. The final site involves a leaking UST at the George Wright Golf Course approximately 3000 feet southwest of the study site. In this case, all the fuel discharged from the storage tank could not be collected because some was released into the groundwater. Given the expected groundwater flow direction, it is possible this release could have contaminated the study site.

The results of the file searches indicate a slight possibility for soil and/or groundwater contamination at the site. Therefore, prior to disposal of excavate or other site material, a sampling program would be developed to assess compliance with all appropriate Federal and state regulations.

4.3.2 Operations at Electrification Facilities Sites

There was concern that the operation of the substations could result in the release of hazardous materials to the environment, particularly sensitive areas such as sole source aquifers or wetlands. Amtrak's substation design was reviewed to determine whether potentially hazardous material could be released into the environment. There are no diesel generators proposed at either substation alternative, consequently there would be no fuel storage tanks. Transformers used at a substation would contain mineral oil, with a estimated quantity of 40,000 liters. The mineral oil would conform to American Standards for Testing and Materials Specification D 3487 and would not contain detectable levels of PCBs.

Should there be a failure of a transformer at the substation, there could be a release of mineral oil. However, the oil would be contained because the design incorporates concrete retention pits underneath the substation. Further, in the event there is a loss of oil in the transformer, the control unit will sense the drop in oil pressure and trigger a silent, low-pressure alarm, which would be observed at Amtrak's communications center. As the mineral oil is not hazardous, and as the concrete pit would retain the oil until it was pumped out, there are no impacts anticipated to surrounding resources.

4.4 Evaluation Results

The results of the expanded evaluation support FRA's preliminary assessment that a substation at Clarendon Hills could be an environmentally superior alternative to Roxbury Crossing. Some findings, such as the potential for hazardous waste, are virtually identical between the two alternatives while others, such as minimization of impacts to historic resources, favor the Clarendon Hills site.

Although Clarendon Hills meets several of environmental criteria set forth in this evaluation, it is recognized that further review of the two sites is necessary. In particular, given the level of interest in the Roxbury Crossing site, additional input from the neighbors of these sites are needed. Also, consultation with regulatory agencies such as the Massachusetts Historic Commission may be warranted. Finally, a thorough technical analysis of the power requirements and the potential effects Clarendon Hills may have on other elements of the electrification design must be performed prior to final site selection.

In the context of the overall electrification project, the FEIS/R considered the siting of the northernmost substation to be a comparatively small part, and thus did not require resolution of this issue before making a decision on whether to proceed with the project as a whole. The draft record of decision contained in Volume I of the FEIS/R, FRA proposed to approve Amtrak's electrification project proposal, but deferred its decision on the location of the northernmost substation until all future assessments and coordination activities, as specified below, are completed.

5. Future Activities

FRA believes the best way to determine the location of the Boston area substation site is through an open process of review and evaluation of the alternative sites involving Amtrak, the local communities, and appropriate agencies of the City and State including EOEA and the MBTA. As a consequence, although the FEIS/R discussed the impacts of locating the substation at Roxbury Crossing, FRA is deferring its decision on the location of the northernmost substation.

FRA's deferral of the decision on the specific location of the northernmost substation is the appropriate course with respect to this project. The Proposed Action, extension of electrification from New Haven to Boston is a complex undertaking, covering 156 miles in three States, and numerous counties, cities and towns. The Proposed Action involves over 350 track miles of overhead catenary system and 26 electrical facilities. The FEIS/R analyzes the impacts of the entire program at a level of detail appropriate for an informed policy decision on whether or not to proceed with this undertaking. This does not necessarily require that all final design issues are resolved. Indeed, the regulations implementing NEPA not just recognize, but encourage the use, where appropriate, of environmental documents that address broad program issues, to be supplemented by more focused, site specific reviews. (See 40 CFR § 1502.20).

It is FRA's view that such is the case with the location of the northernmost substation site. The nature of the overall program requires that a substation be located somewhere between Canton Junction and South Station. The FEIS/R addresses the environmental impacts of locating that substation at the technically superior site, Roxbury Crossing. Based on a review of the feasible alternatives to the Roxbury site, it is clear that the potential impacts, while somewhat different on a site specific level, would not significantly alter the cumulative affect of the project at the program level. FRA believes that the environmental analysis is now adequate to make a decision on the overall program.

NEPA-based decisions are normally made at the earliest stage of design that permits an evaluation of the overall impacts. If the decision is to proceed with the project, then Amtrak and its designers can undertake the detailed design efforts necessary to resolve such site specific

issues as the detailed location, and configuration of the northernmost substation and identify the site specific impacts and measures to mitigate those impacts. FRA will then prepare appropriate site specific environmental documentation. The following describes the process that FRA envisions in resolving the issues associated with the northernmost substation site.

FRA and Amtrak will work with the various interested parties over the next several months to resolve the siting and design of this substation. At the conclusion of this process, appropriate supplemental documentation will be prepared. The analyses will feature these elements:

- Clarendon Hills Power Study
- Detailed Evaluation of Feasible Substation Configurations
- Additional Public Participation
- Selection of Preferred Alternative

The power study, to be completed by Amtrak's electrification designers in the Spring of 1995, will be a more detailed examination of the technical feasibility of the Clarendon Hills substation alternative, including its effects on overall electrification system performance and the requirements for tapping into local Boston Edison power supply (e.g. whether the local substation must be upgraded). The power study will also assess the Clarendon Hills substation's effects on the catenary configuration, that is, whether a 2 x 25 kV autotransformer system with its additional feeder, attendant clearance problems, and additional paralleling stations, would be required north of this substation.

Amtrak and its designers will develop a detailed layout of the substation components, looking at optimizing the equipment configuration to fit within any site constraints. This detailed layout will also include suggested methods and materials for screening the substation from public view.

Public participation is a significant part of this detailed assessment. Public information meetings have already been held in the Roxbury Crossing area, and it is anticipated that additional public coordination meeting will be held in the potentially affected area, with community residents invited to participate. These meetings will feature a thorough presentation of the proposed substation, its potential impacts, and recommended measures to mitigate impacts. FRA will encourage active public input at these meetings, particularly with the recommendation of mitigation measures such as architectural treatments to make the substations less visually intrusive. (Amtrak's proposed public outreach program is contained in section VI of this supplemental document. The public is invited to comment on it to MEPA, FRA and to Amtrak.)

At the completion of these activities, a preferred substation alternative will be selected. A document describing the power study, substation layout and public outreach will be issued as a supplement to the FEIR.

Terrace Street Site: Since the publication of the FEIS/R, FRA has received several comments suggesting that the Terrace Street site receive additional consideration. The FEIS/R recognizes that this site might be technically feasible but that there were a number of constraints that made it less desirable. However, since it does represent a technically feasible site, FRA and Amtrak believe that it should receive further review as part of the detailed evaluation of alternative substation configurations discussed above.

ENDNOTES

1. More detail on the purpose and expected benefits of the Proposed Action can be found in *Final Environmental Impact Statement/Report and 4(f) Statement Northeast Corridor Improvement Project Electrification -- New Haven, CT to Boston, MA* Volume I, Executive Summary, Chapter 1 and Chapter 4.

2. Pursuant to the agreement between Amtrak and the MBTA covering intercity rail service on the NEC in Massachusetts, all improvements to the NEC undertaken by Amtrak, including the proposed electrification project, become the property of the MBTA.

3. Conversation between S. Gazillo, MK/LKC/Spie with C. Koutalidis, June, 1994

4. Conversation with S. Gazillo, MK/LKC/Spie with J. Duncan, DMJM/Harris, 11 May 1994

5. Boston Redevelopment Authority Zoning Map, 1994.

6. Conversation with A. Correia, Boston Water and Sewer Commission with J. Duncan, DMJM/Harris, August, 1994.

7. Conversation with A. Warren, MBTA Real Estate, with J. Duncan, DMJM/Harris, August 1994.

8. Rail Passenger Service Act.

9. More detail on the methodology for estimating EMF exposure can be found in Volume I, Section 3.5 of the FEIS/R

10. Northeast Corridor Improvement Project, Archaeological Survey/Technical Report, September, 1994

11. National Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife, 1993.

12. Conversation between MADEP staff and J. Fougere, July, 1994.

II. ELABORATION ON PROPOSED MITIGATION

Chapter 5 of the *Final Environmental Impact Statement/Report and 4(f) Statement Northeast Corridor Improvement Project Electrification -- New Haven, CT to Boston, MA* (FEIS/R) discusses a number of measures that FRA proposes to require Amtrak to undertake as a condition of proceeding with this project. Mitigation of impacts in Massachusetts is treated somewhat differently than in Rhode Island and Connecticut because the Commonwealth, through the Massachusetts Bay Transportation Authority (MBTA) owns the Northeast Corridor (NEC) in Massachusetts and is its primary user. The FEIS/R recognizes this relationship and encourages Amtrak and the MBTA to cooperatively develop mitigation to address concerns in such areas as noise and vibration and fencing, that arise from both Amtrak's and the MBTA's operations over the NEC. This section elaborates on the discussion of mitigation contained in Chapter 5 to discuss those measures that would take place in the event that Amtrak and the MBTA do not agree on such an effort.

1. Noise and Vibration Mitigation and Monitoring

The Proposed Action has the potential to impact the project in three areas: construction, operation of facilities, and train operations.

1.1 Construction

Noise from Construction: The period of time necessary to erect the catenary system and to undercut the track at bridges is short, averaging one to four days. Because of the short duration, no significant impacts are expected to result. Amtrak will mitigate construction noise impacts by including specific noise control requirements in construction contract specifications. The specifications will require contractors to: (1) select the equipment and techniques that generate the lowest noise levels, (2) use equipment with effective mufflers, (3) certify compliance with noise monitoring, and (4) select haul routes that minimize truck noise in residential areas. Amtrak will also establish a community liaison program to ensure residents are kept informed of construction activities and have a means to register complaints.

Vibration from Construction: The project-generated construction vibration impacts are expected to be relatively minor. Catenary installation and bridge undercutting are expected to last no more than a few days at any one location, and therefore construction vibration from these activities would not exceed the impact threshold. Amtrak will mitigate these impacts by incorporating into construction contracts restrictions on the procedures and time permitted for vibration-intensive activities, such as pile-driving.

1.2 Noise from Operation of Facilities

The primary sources of noise at the electrification facilities would be from transformers and ventilation equipment associated with the Proposed Action. Noise from paralleling stations proposed for Attleboro, East Foxboro, and Readville and the switching station proposed at Norton may exceed the impact threshold at a total of 11 residences. (See Table 4.4-5 of the FEIS/R, Volume I, pg. 4-25). Amtrak will mitigate these impacts by ensuring that final

design of these facilities incorporates sound-absorptive barrier walls, quiet fans, or fan silencers to reduce expected noise levels to below impact thresholds.

1.3 Noise and Vibration from Train Operations

The noise and vibration impact that will result from future Amtrak intercity train operations is subject to a number of variables. The first is the actual performance of the equipment being acquired, Figures 4.4.1 and 4.4.2 of the FEIS/R show a significant range between different designs of specific trains. The other variable is the number of intercity trains. The Proposed Action itself will have a relatively small impact on existing noise at existing levels of service. Generally speaking, electric trains will be quieter than the non-electric equipment it will replace. The greater potential for impact is from the increased frequency of trains. That increased frequency of trains is not a direct result of the Proposed Action per se, but rather is the impact from NECIP as a whole. The extent to which higher levels will be achieved, and when they will be achieved is unknown.

The best approach to mitigating any impact is to lessen the impact itself which is referred to as source control. In this case that means lowering the noise and vibration emissions from the trains.

The next approach involves measures to lessen the impact of the resulting emissions. This may include path control for noise which would consist of the installation of solid, wayside noise barriers along the ROW. These barriers, which should be at least 200 feet long and are designed to block the direct sound path between the trains and noise-sensitive sites, would likely be one of the most effective measures to mitigate the projected noise impact. Although noise barriers are the most effective means of blocking noise, they could have adverse secondary impacts on sensitive views.

Receiver controls for noise include sound-insulation treatment of buildings. Sound insulation treatment includes additional window glazing, improvements in weather stripping around doors and windows, and sealing any holes in exterior surfaces. One disadvantage of sound-insulation treatment is that it works indoors only when doors and windows are closed and has no effect on noise in exterior areas. However, it may be the best choice for sites where noise barriers are not feasible, and for schools or churches where indoor noise sensitivity is most important.

Vibration levels could be reduced by any of these five measures: 1) installation of ballast mats, 2) installation of floating concrete slabs, 3) switching from concrete to wood ties, 4) construction of deep trenches parallel to the tracks between the tracks and sensitive receptors, and 5) reducing speeds in vibration sensitive areas. The ballast mats could be installed under the existing ballast at the locations where the greatest vibration impact is expected. These mats have been shown to be effective in Europe and along rapid transit lines in Boston.

1.3.1 Mitigation Requirements -- Source Controls: A major opportunity exists in the design of new equipment. In this regard, Amtrak will, as part of its acquisition of new high-speed trainsets for use on the Northeast Corridor, give significant weight in the evaluation of competing designs to those that can demonstrate lower levels noise and vibration emissions.

Additional opportunities exist in equipment maintenance. Amtrak will develop as part of its NEC operating plan an improved equipment maintenance program that includes addressing maintenance issues that translate into noise emissions, including the installation of equipment to detect wheel flats on a continuing basis, as well as periodic wheel truing and rail grinding.

1.3.2 Mitigation Requirements -- Train Operations: The approach to noise and vibration mitigation in Massachusetts is different than in the other States because, in Massachusetts, Amtrak does not own the rail line, rather, it is a tenant of the MBTA. Furthermore, MBTA operates more trains, louder trains and trains later at night than Amtrak on the same track. In addition, after electrification, the noise emission characteristics of Amtrak trains will differ from the equipment used by MBTA. All of this points to the need for a joint noise mitigation effort. It would make little sense to mitigate intercity train noise without addressing commuter noise.

The proposed mitigation contained in the FEIS/R directs Amtrak to participate with the MBTA in the evaluation of the noise emissions from operations on the NEC main line in Massachusetts and reach agreement with the MBTA on the allocation of financial responsibility for the mitigation identified. Amtrak has assumed a proactive approach in developing such an agreement by submitting a draft of such an agreement to the MBTA (copy attached).

Should these parties be unable to reach agreement, FRA will require that Amtrak implement a program similar to that being required in Rhode Island and Connecticut. This mitigation and monitoring plan is based on the findings summarized in the Final Environmental Impact Statement/Report (FEIS/R) for the Northeast Corridor Improvement Project Electrification issued on October 31, 1994. The plan consists of the following three components:

1. Initial noise and vibration mitigation
2. Noise and vibration monitoring program
3. Long-term noise and vibration mitigation

The components of this plan are described below.

1.3.3 Initial Noise and Vibration Mitigation

Prior to the initiation of electric service in Massachusetts, Amtrak will mitigate the noise and vibration impacts from high-speed intercity rail service that were identified for the "Initial Build" scenario, representing the conditions on "day one" of electrification. These measures will be evaluated in consultation with the owners of the properties identified in the FEIS/R as impacted by the "Initial Build," and with appropriate state and local agencies. Based on this evaluation, measures that are found to be feasible and reasonable will be implemented prior to initiation of electrified service in the Massachusetts portion of the corridor.

Approximate locations for initial noise and vibration mitigation have been identified and are listed in Table II-1, along with estimated mitigation lengths. Noise mitigation assumes the installation of 8-ft high wayside noise barriers and vibration mitigation assumes the installation of 12.5-ft wide ballast mats under each of the two high-speed tracks at the

indicated locations. However, this does not preclude Amtrak from implementing other measures that are at least as effective. Detailed costs are not shown as FRA believes costs will not be the driving factor for the installation of these or similar measures. Nevertheless, for the purpose of estimating mitigation costs, noise barriers are assumed to cost $20 per square foot of barrier wall and ballast mats are assumed to cost $15 per square foot.

It should be noted that although the effectiveness of wayside barriers as a noise mitigation measure is well documented, the proposed use of ballast mats for vibration impact mitigation is not a proven measure for high-speed railroad applications. Therefore, FRA proposes that ballast mats be installed in a 300 to 500 ft-long test section within the 2429 ft-long segment indicated above in Table II-1, and vibration tests performed adjacent to this section before and after the mats are installed. (Should Amtrak for operational or safety reasons prefer not to test the ballast mats under an active track, FRA will make its Transportation Test Center at Pueblo, Colorado available for this purpose.)

Table II-1. Potential Train Noise and Vibration Mitigation under Initial Build Scenario

Municipality	Potential Mitigation Locations (by milepost)		Side of Corridor (EB or WB)	Length (ft)
	From	To		
NOISE BARRIER LOCATIONS:				
Attleboro	196.89	196.98	EB	475
Boston	219.72	219.75	EB	158
			MASSACHUSETTS TOTAL:	*633*
BALLAST MAT LOCATIONS:				
Boston	227.04	227.50	--	2429
			MASSACHUSETTS TOTAL:	*2429*

The tests will be performed based on the methods described in Section 4.7.4(a) in Volume II of the FEIS/R, with the objective of evaluating the site-specific effectiveness of ballast mats as a vibration mitigation measure. If the results indicate that the mats are effective in reducing ground-borne vibration, they will be installed along the remainder of the 2429 ft-long corridor segment to the extent feasible and reasonable. If they are not effective, other measures will be implemented.

1.3.4 Noise and Vibration Monitoring Program

Amtrak will implement a train noise and vibration monitoring program designed to address the uncertainty regarding the actual noise and vibration from high-speed rail operation and the potential that additional sensitive receptors would be impacted by noise and vibration as rail traffic increases. The program will include baseline monitoring at representative locations prior to the initiation of electric service in Massachusetts, followed by periodic monitoring at the same locations to evaluate potential increases in train noise and vibration with respect to the impact thresholds defined in the FEIS/R.

The monitoring sites have been selected based on the findings of the FEIS/R, as well as on a review of public comments, and are representative of the areas identified as susceptible to adverse noise or vibration impacts under worst-case conditions. Although every effort was made to consider public comments during the process of selecting monitoring locations, these sites were necessarily limited to areas where the projected noise and vibration from Amtrak's high-speed rail service exceed the impact thresholds. The objectives of the monitoring program are to determine if the noise and vibration mitigation measures are truly warranted in such areas and, in the case of vibration, if the mitigation will be effective. The proposed noise and vibration monitoring locations and methods are outlined below. Cumulatively, this monitoring program is estimated to cost $15,000 per year.

Noise Monitoring Program

Monitoring Sites: Fifteen (15) noise monitoring locations have been selected to represent areas along the corridor where noise impact has been identified in the FEIS/R under the "Worst Case Build" scenario, which assumes the maximum projected train lengths and frequencies as well as the maximum train noise emission levels based on existing Amtrak equipment. These monitoring sites, designated N1 through N15, are identified by approximate corridor milepost location in Table II-2 and are also shown on the attached NECIP land use maps (Sheets 21 through 29). Table II-2 further defines the monitoring locations according to the side of the corridor (eastbound or westbound) as well as the approximate distance of the monitoring site from the corridor centerline. The table also indicates the potential noise mitigation areas (see Table II-4 for descriptions of these numbered areas) that are represented by each monitoring site.

Baseline Noise Monitoring: A series of measurements will be made during the summer season to establish baseline noise conditions before electrification is initiated. At each of the 15 representative sites, the A-weighted sound level will be monitored for one continuous 48-hour weekday period using a portable noise monitor to determine the L_{dn} and $L_{eq}(24)$ for each of the two days. The measurements will be made during a representative period when it can be verified that the train operations are normal, and that no unusual activities, such as track maintenance, will occur. Since train noise is of concern, the noise data will be correlated with the train passages.

Periodic Noise Monitoring: At a minimum, noise measurements will be done annually, using the same procedures as for the baseline measurements, for the first five years of operation and periodically thereafter to reflect significant changes in high speed rail operations. Following each set of measurements, the field data will be analyzed and reported, the component of the total noise environment attributable to high speed intercity trains determined, and it will be determined whether the FEIS/R impact criteria are being exceeded based on a comparison with baseline noise levels. A summary report will be prepared at the end of each measurement phase that includes a table of the measured L_{dn} and $L_{eq}(24)$ values, highlighting any sites where the measured levels exceed the impact threshold.

Table II-2. Selected Noise Monitoring Locations in Massachusetts

Monitoring Site No.	Approximate Milepost Location	Distance to NEC Centerline	Side of Corridor (EB or WB)	Noise Mitigation Areas Represented†
N-1	191.50	50 ft	EB	1, 2, 3
N-2	193.13	125 ft	WB	**4**, 5, 6
N-3	195.40	125 ft	EB	**7**, 8, 9, 10
N-4	197.70	75 ft	EB	11††, 12, **13**
N-5	201.20	150 ft	WB	14, 15, **16**, 17
N-6	203.54	75 ft	EB	18, 19, **20**, 21, 22
N-7	204.40	75 ft	WB	23, **24**
N-8	205.60	100 ft	WB	25, 26, **27**, 28, 29, 30
N-9	209.20	125 ft	WB	31, 32, **33**, 34, 35, 36, 37
N-10	211.26	150 ft	EB	**38**, 39, 40, 41
N-11	213.31	75 ft	EB	**42**, 43, 44
N-12	218.67	50 ft	WB	**45**, 46††
N-13	220.65	100 ft	WB	47, **48**
N-14	221.07	75 ft	EB	**49**, 50
N-15	222.05	100 ft	WB	51, 52, **53**

† See Table 4 for key to noise mitigation area numbers; numbers in **bold** indicate mitigation areas in which monitoring sites are located.

†† Initial Build noise barrier location

1.3.5 Vibration Monitoring Program

Vibration Monitoring Sites: Ten (10) ground vibration monitoring locations have been selected to represent areas along the corridor where ground-borne vibration impact has been identified in the FEIS/R under the "Worst Case Build" scenario, which assumes the maximum projected train lengths and frequencies and the maximum train vibration emission levels based on existing Amtrak equipment. These monitoring sites, designated V1 through V10, are identified by approximate corridor milepost location in Table II-3 and are also shown on the attached NECIP land use maps (Sheets 21 through 29). Table II-3 further defines the monitoring locations according to the side of the corridor (eastbound or westbound) as well as the approximate distance of the monitoring site from the corridor centerline. The table also indicates the potential vibration mitigation areas (see Table II-5 for descriptions of these numbered areas) that are represented by each monitoring site.

Baseline Vibration Monitoring: A series of measurements will be made during the summer season to establish baseline vibration conditions before electrification is initiated. At each of the 10 representative sites, seismographs will be used to monitor the peak ground vibration velocity for one continuous 48-hour weekday period.

Prior to the 48-hour monitoring at each site, a test will be made during at least one representative Amtrak train passage to determine the overall rms vibration velocity level at a location adjacent to the seismograph sensor. Comparison of the side-by-side measurement results will provide a relationship between the rms vibration velocity level (V_{dB}), used for purposes of the FEIS/R criteria, and the peak particle velocity obtained from the seismograph.

Table II-3. Selected Vibration Monitoring Locations in Massachusetts

Monitoring Site No.	Approximate Milepost Location	Distance to NEC Centerline	Vibration Mitigation Areas Represented†
V-1	191.50	50 ft	1, 2, 3
V-2	196.65	50 ft	4, 5, 6, 7, 8
V-3	203.54	75 ft	9, 10, 11, 12, **13**, 14, 15
V-4	205.60	100 ft	**16**, 17, 18, 19
V-5	209.20	125 ft	20, 21, **22**, 23, 24, 25, 26
V-6	213.31	75 ft	**27**, 28, 29, 30
V-7	218.67	50 ft	**31**
V-8	219.72	25 ft	**32**
V-9	222.75	75 ft	**33**
V-10	226.50	100 ft	34, 35, 36, **37**, 38, 39††

† See Table 5 for key to vibration mitigation area numbers; numbers in **bold** indicate mitigation areas in which monitoring sites are located.
†† Initial Build ballast mat location

The measurements will be made during a representative period when it can be verified that the train operations are normal, and that no unusual activities, such as track maintenance, will occur. Since train vibration is of concern, the vibration data will be correlated with the train passages.

Periodic Vibration Monitoring: At a minimum, vibration measurements will be done annually for the first five years of operation and periodically thereafter to reflect significant changes in high speed rail operations. In addition, measurements will be done after any modifications (change in train equipment, increase in scheduled trains, raising speed limit, etc.) that may cause a significant increase in vibration.

Following each set of measurements, the field data will be analyzed and reported, the component of the total noise environment attributable to high speed intercity trains determined, and it will be determined whether the FEIS/R impact criteria are being exceeded.

If the (linear) average vibration velocity for Amtrak trains over a 24-hour period exceeds the FEIS criteria with respect to both absolute level and baseline conditions, then vibration mitigation is warranted. A summary report will be prepared at the end of each measurement phase that includes a table of the measured vibration velocity values, highlighting any sites where the measured levels exceed the impact threshold.

Ballast Mat Testing: Tests of a ballast mat trial section will be made at each monitoring site where the above measurements indicate that vibration mitigation is warranted. Ballast mats will be installed in a 300 to 500 ft-long test section centered at the monitoring site location, and vibration tests will be performed adjacent to this section before and after the mats are installed. The tests will be performed based on the methods described in Section 4.7.4(a) in Volume II of the FEIS/R, with the objective of evaluating the site-specific effectiveness of ballast mats as a vibration mitigation measure.

1.3.6 Long-Term Noise and Vibration Mitigation

Based on the results of the noise and vibration monitoring program, Amtrak will evaluate measures to mitigate the noise and vibration impacts from high-speed intercity rail service. Potential locations and lengths for long-term noise and vibration mitigation measures, under the worst case scenario are provided in Table II-4 and Table II-5, respectively. Noise mitigation assumes the installation of 8-ft high wayside noise barriers at the indicated locations and vibration mitigation assumes the installation of 12.5-ft wide ballast mats under each of the two high-speed tracks at the indicated locations. Descriptions of these types of mitigation measures have been included in the FEIS/R.

Various alternative mitigation measures will be evaluated for those locations represented by monitoring sites where the monitoring indicates that noise and vibration resulting from high-speed rail operation causes the noise environment to exceed the FEIS/R criteria thresholds. These measures will be evaluated in consultation with the owners of the properties identified in the FEIS/R as impacted by the "Worst Case Build," and with appropriate state and local agencies. Based on this evaluation, measures that are found to be feasible and reasonable will be implemented.

Table II-4. Potential Train Noise Mitigation under Worst Case Build Scenario

Municipality	Noise Mitigation Area Number	Potential Noise Barrier Locations (by milepost)		Side of Corridor (EB or WB)	Length (ft)
		From	To		
ATTLEBORO	1	191.36	192.08	EB	3802
	2	192.14	192.30	EB	845
	3	192.07	192.40	WB	1742
	4	193.05	193.48	WB	2270
	5	193.61	193.90	EB	1531
	6	193.70	193.81	WB	581
	7	194.91	195.48	EB	3010
	8	194.88	195.14	WB	1373
	9	195.69	196.29	EB	3168
	10	195.84	196.24	WB	2112
	11*	196.60	197.02	EB	2218
	12	197.25	198.12	WB	4594
	13	197.52	197.93	EB	2165
MANSFIELD	14	200.19	200.42	EB	1214
	15	200.27	200.52	WB	1320
	16	200.71	201.76	WB	5544
	17	201.09	201.59	EB	2640
	18	202.24	202.45	EB	1109
	19	202.50	202.93	EB	2270
	20	203.22	203.69	EB	2482
	21	203.34	203.66	WB	1690
	22	203.72	203.99	WB	1426
	23	204.08	204.47	EB	2059
	24	204.31	204.69	WB	2006
FOXBOROUGH	25	205.06	205.99	EB	4910
	26	205.18	205.48	WB	1584
	27	205.50	205.79	WB	1531
	28	206.03	206.53	EB	2640
	29	206.15	206.30	WB	792
	30	206.79	207.27	EB	2534

Table II-4. Potential Train Noise Mitigation under Worst Case Build Scenario (cont.)

SHARON	31	207.93	208.57	WB	3379
	32	208.50	208.69	EB	1003
	33	208.85	209.41	WB	2957
	34	209.03	209.22	EB	1003
	35	209.44	209.71	EB	1426
	36	209.75	209.95	EB	1056
	37	210.71	210.97	EB	1373
	38	211.21	211.35	EB	739
	39	211.37	211.50	EB	686
	40	211.53	211.70	EB	898
	41	211.85	212.05	WB	1056
CANTON	42	212.81	213.76	EB	5016
	43	212.90	213.04	WB	739
	44	213.32	213.53	WB	1109
DEDHAM	45	218.44	218.87	WB	2270
BOSTON	46†	219.53	219.76	EB	1214
	47	220.02	220.16	WB	739
	48	220.30	221.09	WB	4171
	49	220.68	221.09	EB	2165
	50	221.52	221.66	EB	739
	51	221.64	221.96	WB	1690
	52	221.97	222.30	EB	1742
	53	221.99	222.21	WB	1162
				TOTALS:	105,494

† Initial Build noise barrier location

Table II-5. Potential Train Vibration Mitigation under Worst Case Build Scenario

Municipality	Vibration Mitigation Area Number	Potential Ballast Mat Locations (by milepost)		Length (ft)
		From	To	
ATTLEBORO	1	191.37	191.72	1848
	2	191.75	192.07	1690
	3	192.09	192.33	1267
	4	195.14	195.44	1584
	5	195.87	196.09	1162
	6	196.11	196.18	370
	7	196.59	196.99	2112
	8	197.30	198.08	4118
MANSFIELD	9	200.27	200.42	792
	10	201.50	201.57	370
	11	202.37	202.43	317
	12	202.59	202.67	422
	13	203.38	203.63	1320
	14	204.09	204.18	475
	15	204.27	204.55	1478
FOXBOROUGH	16	205.54	205.73	1003
	17	206.15	206.29	739
	18	206.91	206.99	422
	19	207.03	207.26	1214
SHARON	20	208.16	208.25	475
	21	208.54	208.66	634
	22	209.01	209.69	3590
	23	211.22	211.34	634
	24	211.39	211.49	528
	25	211.56	211.68	634
	26	211.87	211.99	634
CANTON	27	213.16	213.39	1214
	28	213.50	213.74	1267
	29	214.01	214.34	1742
	30	214.48	215.27	4171
DEDHAM	31	218.48	218.84	1901

Table II-5. Potential Train Vibration Mitigation under Worst Case Build Scenario (cont'd)

Municipality	Vibration Mitigation Area Number	Potential Ballast Mat Locations (by milepost)		Length (ft)
		From	To	
BOSTON	32	219.54	219.77	1214
	33	220.03	223.84	20117
	34	223.95	224.02	370
	35	224.08	224.71	3326
	36	225.74	226.08	1795
	37	226.43	226.71	1478
	38	226.74	226.94	1056
	39*	227.04	227.50	2429
			TOTALS:	71,914

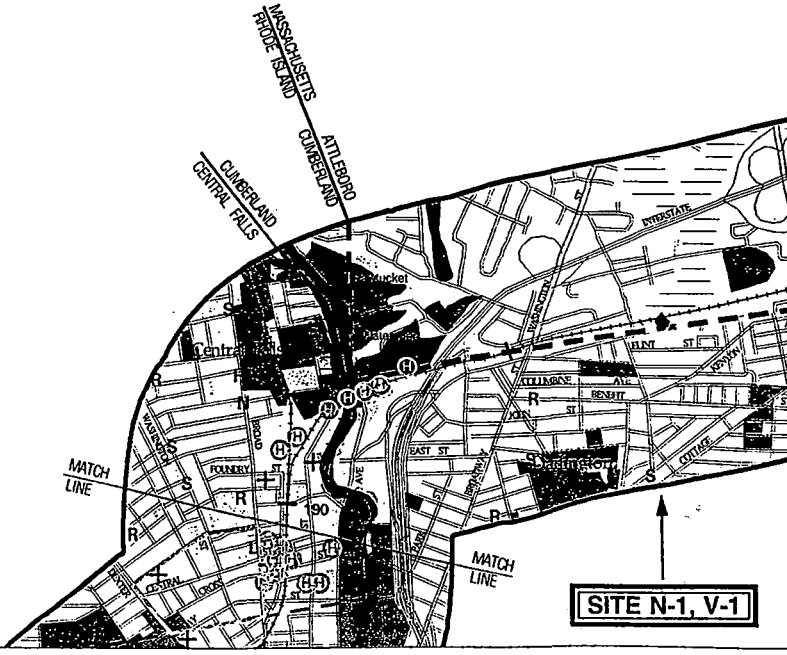
* Initial Build ballast mat location

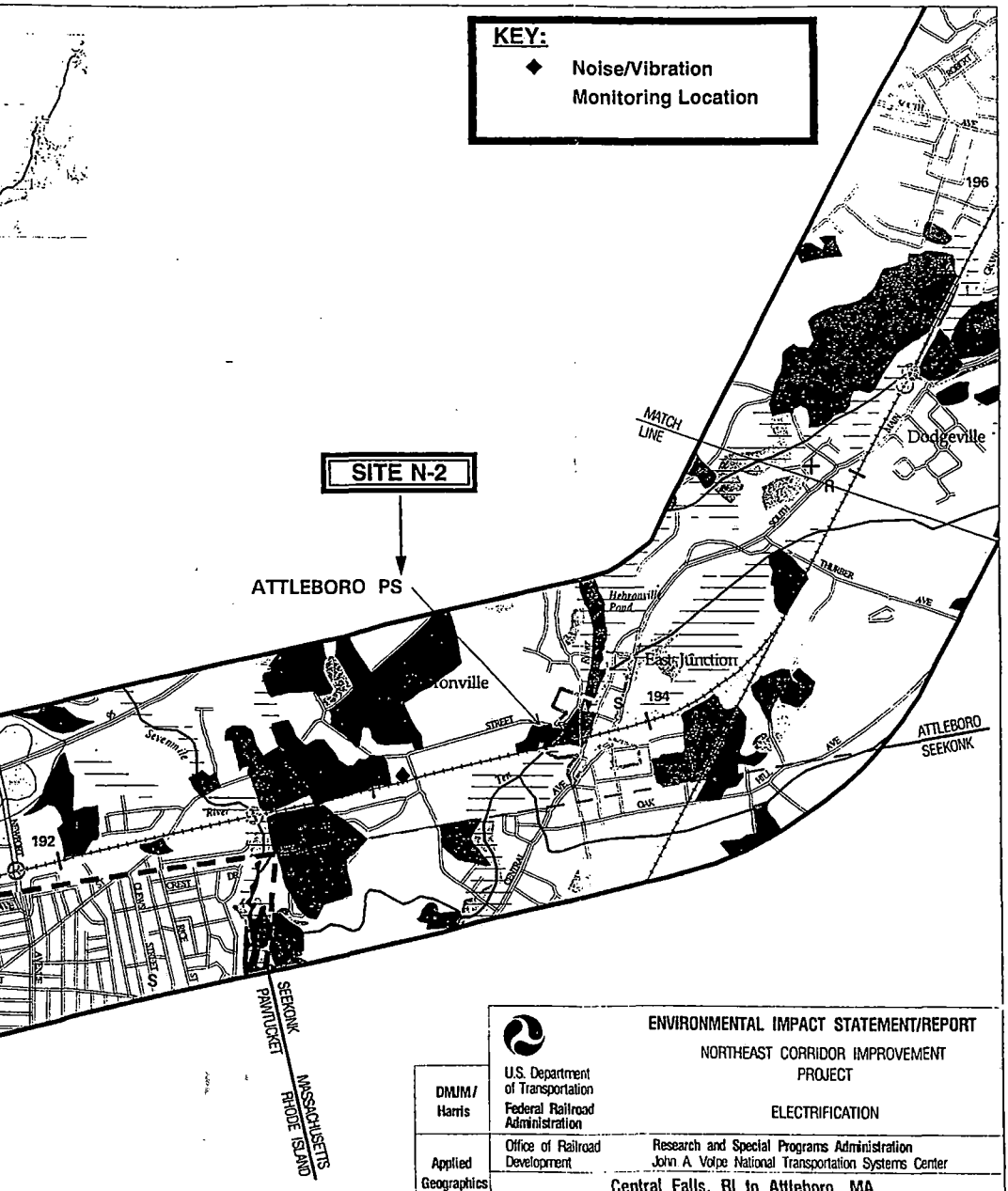
In its comments on the DEIS/R, MEPA pointed out that certain funds remained from an appropriation to Amtrak to mitigate noise in the Boston area, and suggested that those funds be expended now as part of a noise reduction program. FRA does not disagree with MEPA's comment; however, since these funds were provided to Amtrak by another agency, FRA cannot mandate how such funds are used. Therefore, FRA strongly recommends that Amtrak and MBTA use these funds to develop and construct prototype noise barriers to be used in technical evaluations and in discussions with City and community officials and residents on the acceptability of various designs. It is recommended that, because of the noise impact experienced from existing rail operations on the NEC, that these prototype barriers be demonstrated in the vicinity of mileposts 196 -- 197 and mileposts 219 -- 220.

LEGEND	
NEC PROJECT COMPONENTS	
NEC Railroad & Milepost	Rail Passenger Station
Electrification Facility (proposed)	Electrical Substation (existing)
Substation (SS)	Electrical Feeder (proposed)
Switching Station (SwS)	Electrical Feeder (existing)
Paralleling Station (PS)	Bridge Modification (proposed)
SENSITIVE RECEPTORS	
S School	H Hospital
R Recreation Area	N Nursing Home
L Library	F Funeral Home
Church	C Cemetery
REGULATED AREAS	
Floodplain	National Register Historic Resource
Coastal Zone Boundary	Historic District Boundary
LAND USE / LAND COVER	
Residential	Water
Commercial	Wetlands
Industrial	Transportation & other
Protected Open Space	Forest, Vacant, Undeveloped
Agriculture	Recreation & Institutional

0 1/4 1/2 Mile
SCALE 1:24,000

N





ENVIRONMENTAL IMPACT STATEMENT/REPORT

NORTHEAST CORRIDOR IMPROVEMENT PROJECT

ELECTRIFICATION

DMJM/ Harris

Applied Geographics

U.S. Department of Transportation
Federal Railroad Administration

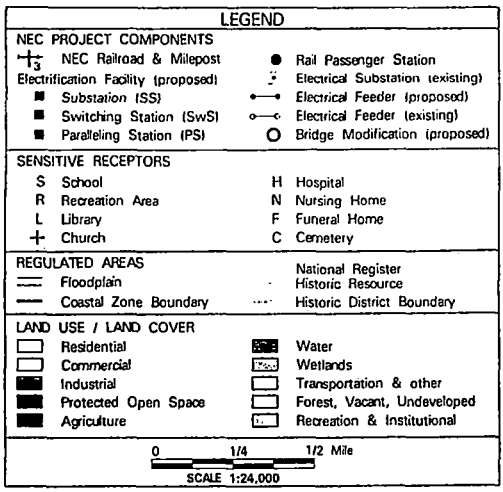
Office of Railroad Development

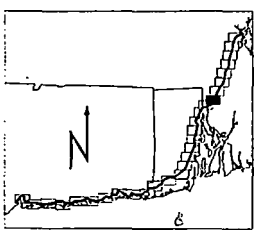
Research and Special Programs Administration
John A. Volpe National Transportation Systems Center

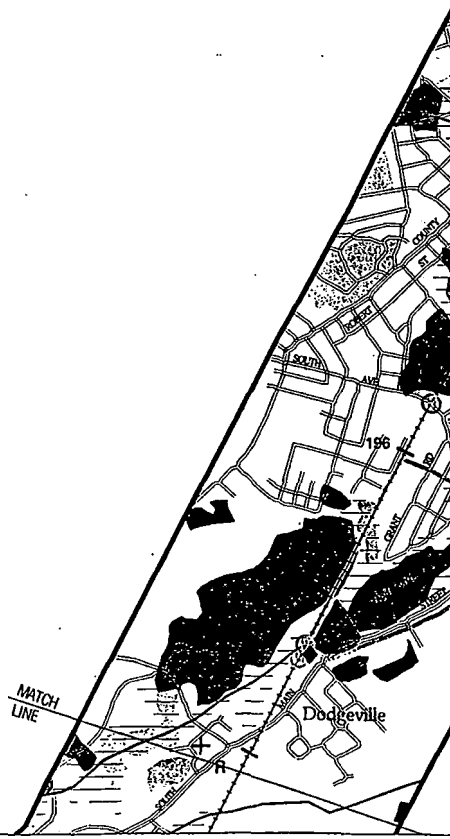
Central Falls, RI to Attleboro, MA

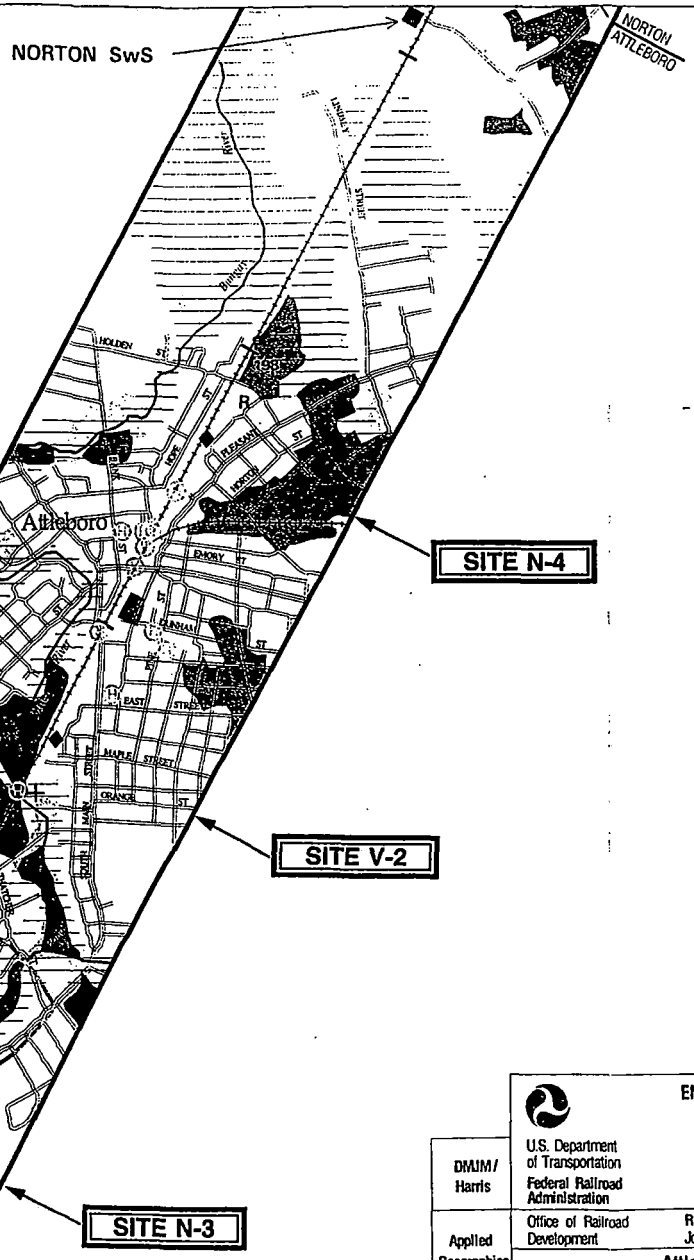
August 1993

Sheet 21 of 29


LEGEND
NEC PROJECT COMPONENTS
NEC Railroad & Milepost
Rail Passenger Station
Electrification Facility (proposed)
Electrical Substation (existing)
Substation (SS)
Electrical Feeder (proposed)
Switching Station (SwS)
Electrical Feeder (existing)
Paralleling Station (PS)
Bridge Modification (proposed)
SENSITIVE RECEPTORS
S School
H Hospital
R Recreation Area
N Nursing Home
L Library
F Funeral Home
Church
C Cemetery
REGULATED AREAS
National Register
Floodplain
Historic Resource
Coastal Zone Boundary
Historic District Boundary
LAND USE / LAND COVER
Residential
Water
Commercial
Wetlands
Industrial
Transportation & other
Protected Open Space
Forest, Vacant, Undeveloped
Agriculture
Recreation & Institutional
0
1/4
1/2 Mile
SCALE 1:24,000


N


MATCH
LINE
Dodgeville
196
SOUTH
COUNTY
ST
GRANT
R



DMJM / Harris	U.S. Department of Transportation Federal Railroad Administration	ENVIRONMENTAL IMPACT STATEMENT/REPORT *NORTHEAST CORRIDOR IMPROVEMENT PROJECT* ELECTRIFICATION
Applied Geographics	Office of Railroad Development	Research and Special Programs Administration John A Volpe National Transportation Systems Center
	August 1993	**Attleboro, MA to Norton, MA** Sheet 22 of 29

LEGEND

NEC PROJECT COMPONENTS

- NEC Railroad & Milepost
- Electrification Facility (proposed)
- Substation (SS)
- Switching Station (SwS)
- Paralleling Station (PS)
- Rail Passenger Station
- Electrical Substation (existing)
- Electrical Feeder (proposed)
- Electrical Feeder (existing)
- Bridge Modification (proposed)

SENSITIVE RECEPTORS

- S School
- R Recreation Area
- L Library
- ✝ Church
- H Hospital
- N Nursing Home
- F Funeral Home
- C Cemetery

REGULATED AREAS

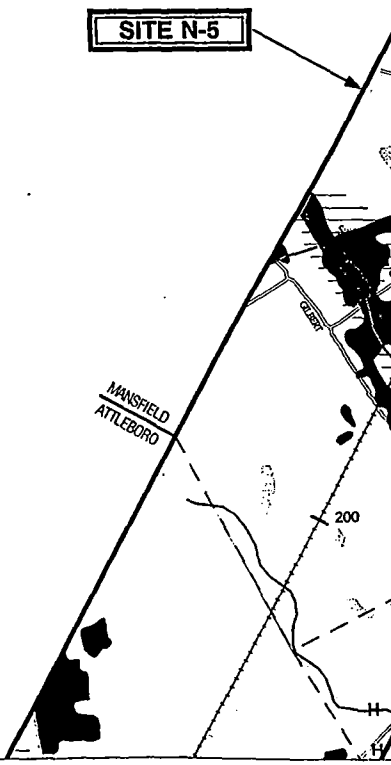
- Floodplain
- Coastal Zone Boundary
- National Register Historic Resource
- Historic District Boundary

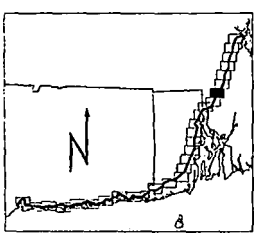
LAND USE / LAND COVER

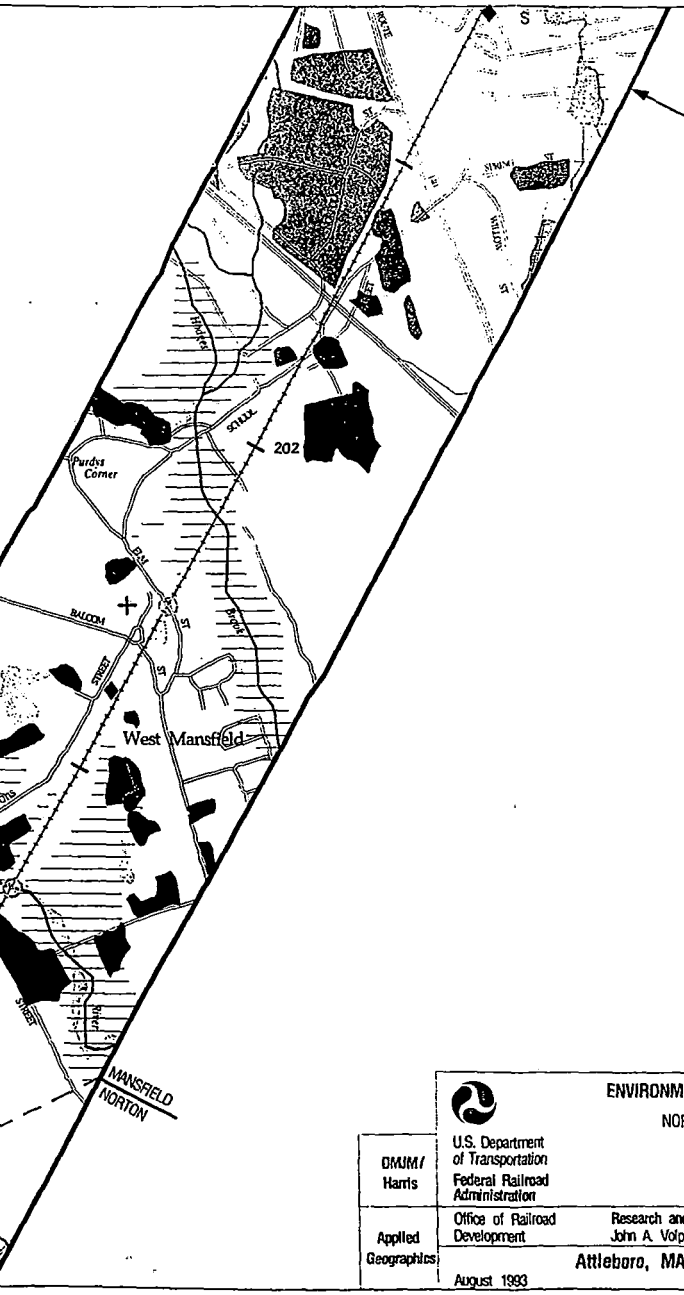
- Residential
- Commercial
- Industrial
- Protected Open Space
- Agriculture
- Water
- Wetlands
- Transportation & other
- Forest, Vacant, Undeveloped
- Recreation & Institutional

0 1/4 1/2 Mile

SCALE 1:24,000







ENVIRONMENTAL IMPACT STATEMENT/REPORT

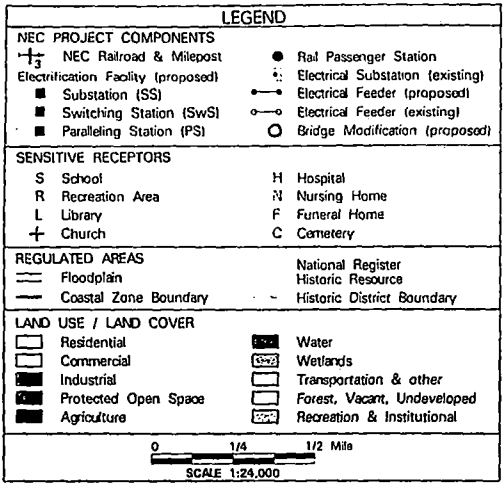
NORTHEAST CORRIDOR IMPROVEMENT PROJECT

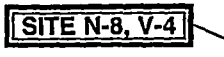
ELECTRIFICATION

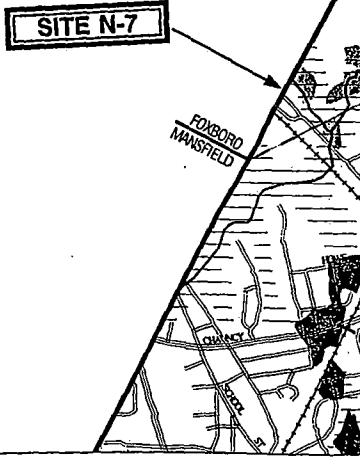
DMJM/ Harris	U.S. Department of Transportation Federal Railroad Administration	
Applied Geographics	Office of Railroad Development	Research and Special Programs Administration John A. Volpe National Transportation Systems Center

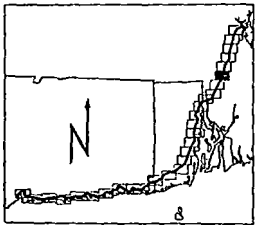
Attleboro, MA to Mansfield, MA

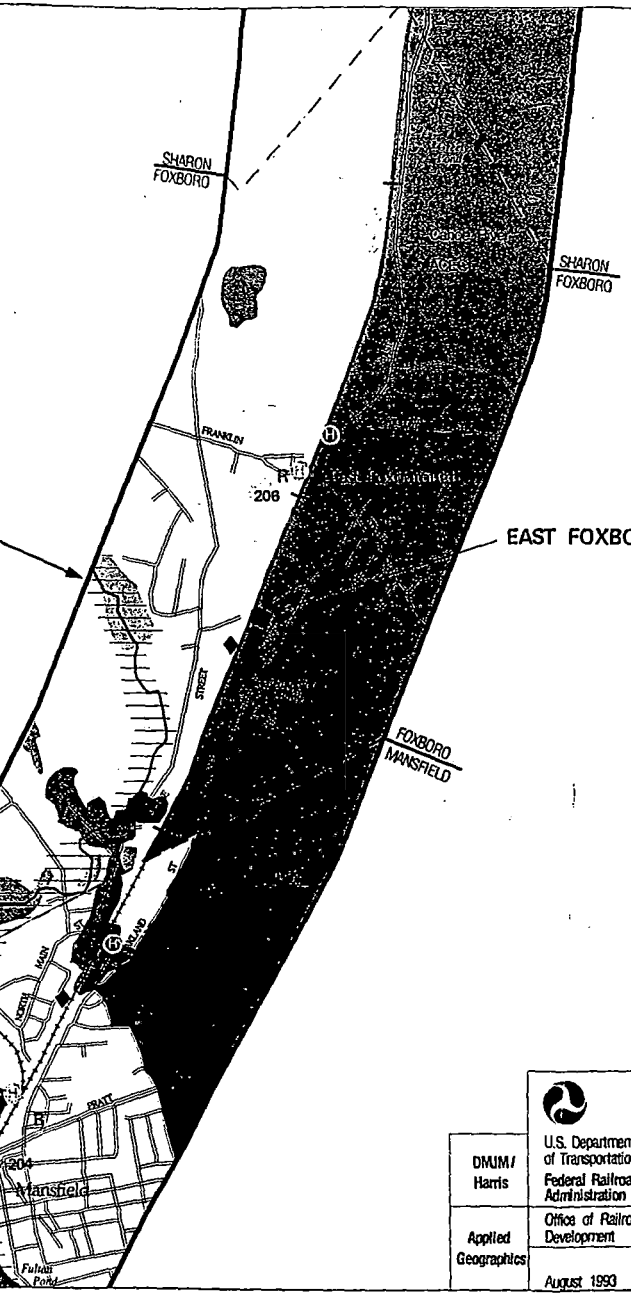
August 1993


LEGEND
NEC PROJECT COMPONENTS
NEC Railroad & Milepost
Electrification Facility (proposed)
Substation (SS)
Switching Station (SwS)
Paralleling Station (PS)
Rail Passenger Station
Electrical Substation (existing)
Electrical Feeder (proposed)
Electrical Feeder (existing)
Bridge Modification (proposed)
SENSITIVE RECEPTORS
S School
R Recreation Area
L Library
Church
H Hospital
N Nursing Home
F Funeral Home
C Cemetery
REGULATED AREAS
Floodplain
Coastal Zone Boundary
National Register Historic Resource
Historic District Boundary
LAND USE / LAND COVER
Residential
Commercial
Industrial
Protected Open Space
Agriculture
Water
Wetlands
Transportation & other
Forest, Vacant, Undeveloped
Recreation & Institutional
0 1/4 1/2 Mile
SCALE 1:24,000


SITE N-8, V-4


SITE N-7
FOXBORO
MANSFIELD
QUINCY
95


N
8



	U.S. Department of Transportation	ENVIRONMENTAL IMPACT STATEMENT/REPORT
		NORTHEAST CORRIDOR IMPROVEMENT PROJECT
DMJM/ Harris	Federal Railroad Administration	ELECTRIFICATION
Applied Geographics	Office of Railroad Development	Research and Special Programs Administration John A. Volpe National Transportation Systems Center
	August 1993	Mansfield, MA to Sharon, MA Sheet 24 of 29

LEGEND

NEC PROJECT COMPONENTS

- NEC Railroad & Milepost
- Rail Passenger Station
- Electrification Facility (proposed)
- Electrical Substation (existing)
- Substation (SS)
- Electrical Feeder (proposed)
- Switching Station (SwS)
- Electrical Feeder (existing)
- Paralleling Station (PS)
- Bridge Modification (proposed)

SENSITIVE RECEPTORS

- S School
- H Hospital
- R Recreation Area
- N Nursing Home
- L Library
- F Funeral Home
- Church
- C Cemetery

REGULATED AREAS

- Floodplain
- National Register Historic Resource
- Coastal Zone Boundary
- Historic District Boundary

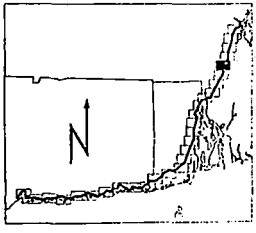
LAND USE / LAND COVER

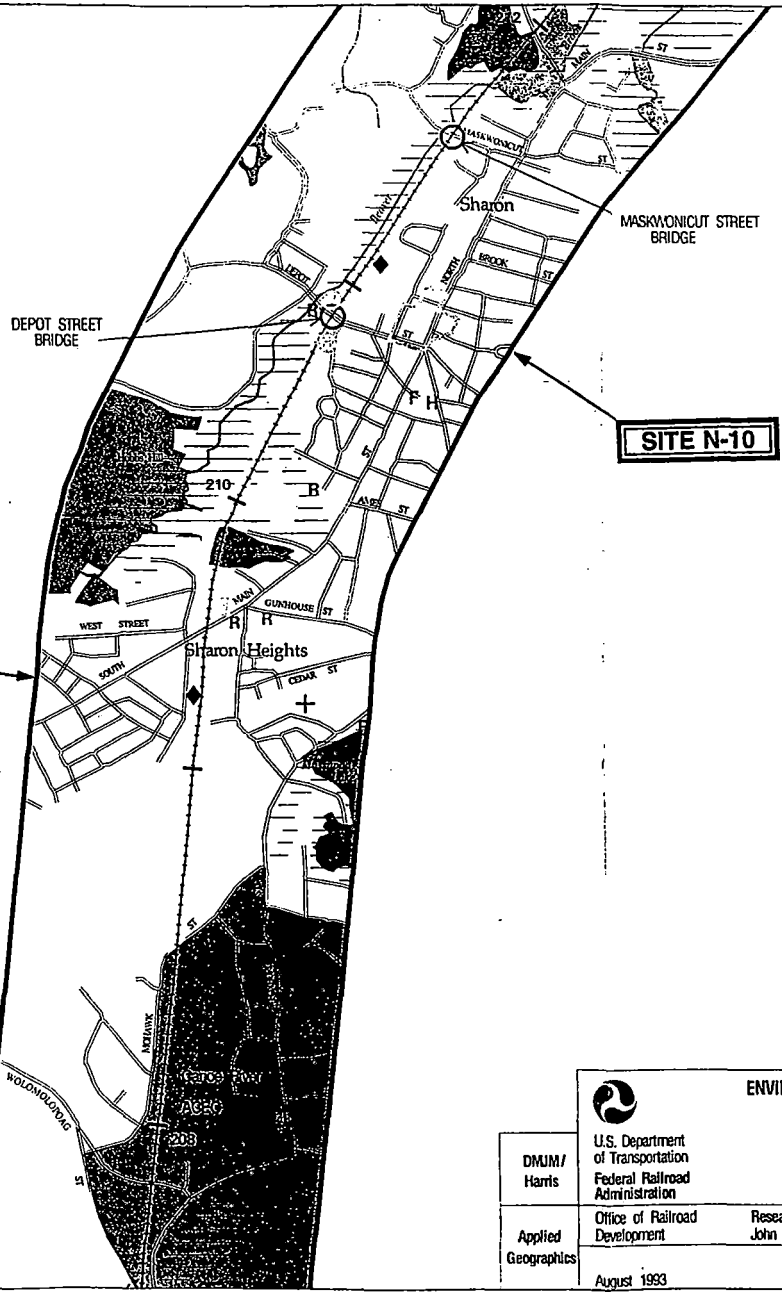
- Residential
- Water
- Commercial
- Wetlands
- Industrial
- Transportation & other
- Protected Open Space
- Forest, Vacant, Undeveloped
- Agriculture
- Recreation & Institutional

0 1/4 1/2 Mile

SCALE 1:24,000

SITE N-9, V-5





ENVIRONMENTAL IMPACT STATEMENT/REPORT

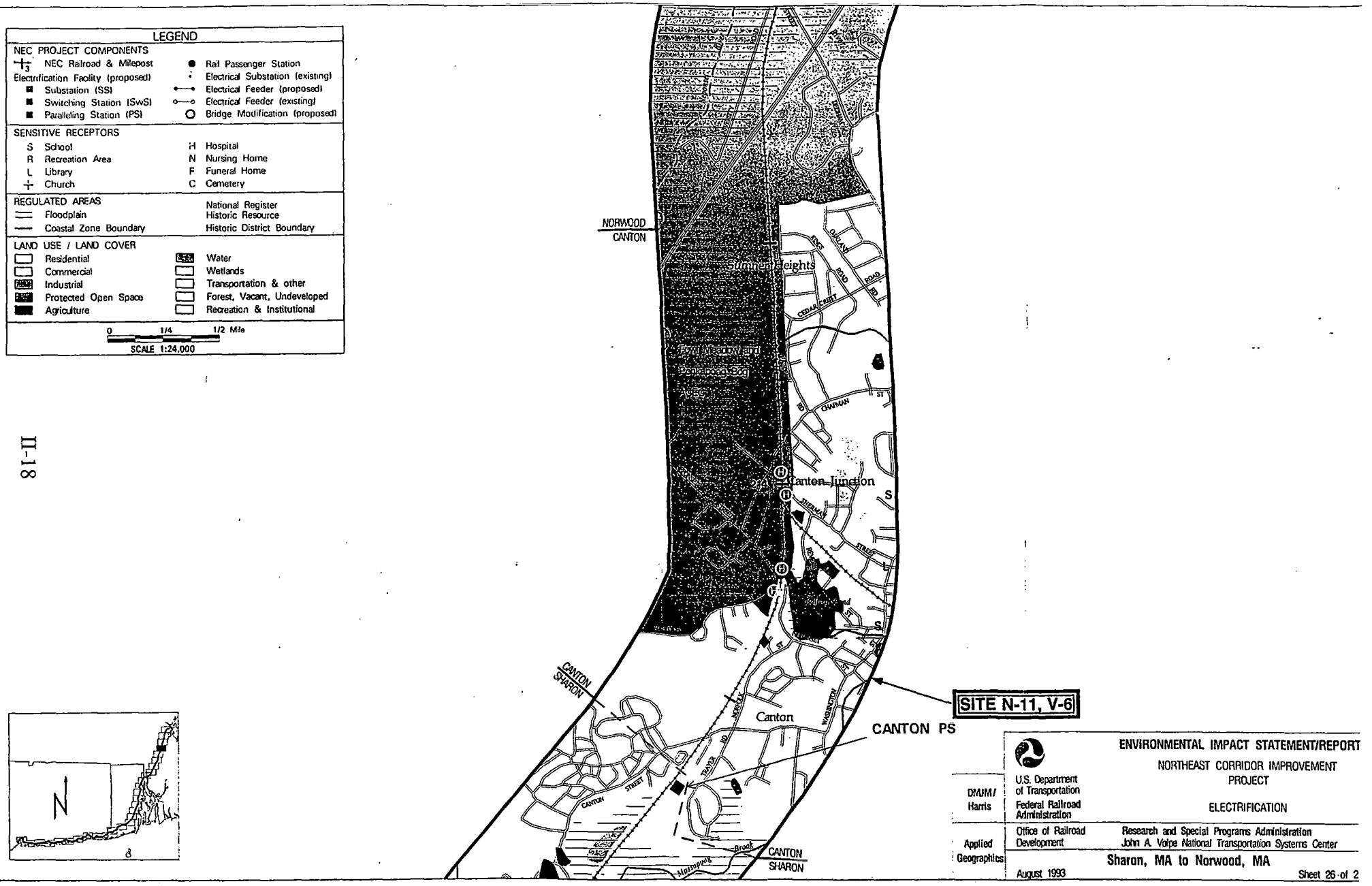
NORTHEAST CORRIDOR IMPROVEMENT PROJECT

ELECTRIFICATION

DMJM/ Harris	U.S. Department of Transportation Federal Railroad Administration	
Applied Geographics	Office of Railroad Development	Research and Special Programs Administration John A. Volpe National Transportation Systems Center

Sharon, MA

August 1993



II-18

ENVIRONMENTAL IMPACT STATEMENT/REPORT
NORTHEAST CORRIDOR IMPROVEMENT PROJECT
ELECTRIFICATION

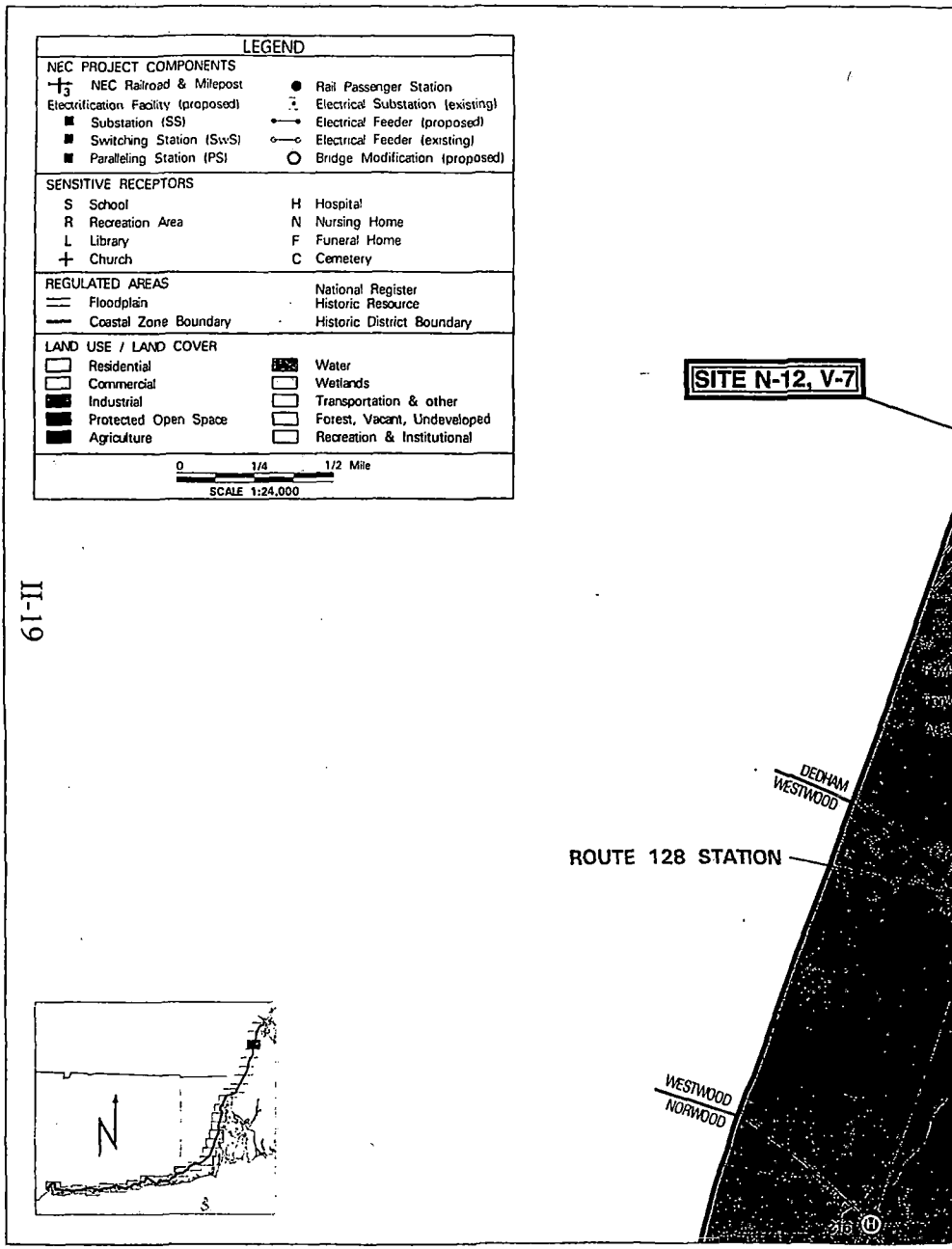
DMJM/ Harris
Applied Geographics

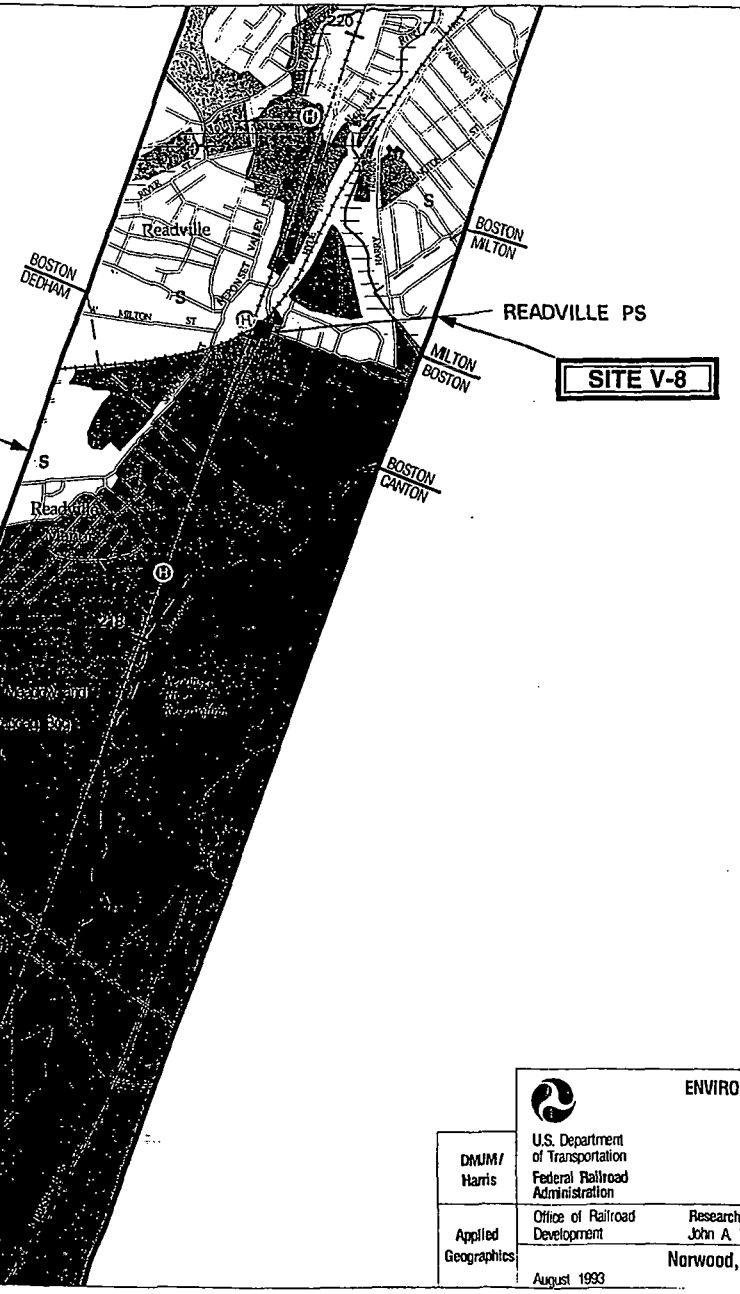
U.S. Department of Transportation
Federal Railroad Administration
Office of Railroad Development
Research and Special Programs Administration
John A. Volpe National Transportation Systems Center

Sharon, MA to Norwood, MA

August 1993

Sheet 26 of 2


LEGEND
NEC PROJECT COMPONENTS
NEC Railroad & Milepost
Rail Passenger Station
Electrification Facility (proposed)
Electrical Substation (existing)
Substation (SS)
Electrical Feeder (proposed)
Switching Station (SwS)
Electrical Feeder (existing)
Paralleling Station (PS)
Bridge Modification (proposed)
SENSITIVE RECEPTORS
S School
H Hospital
R Recreation Area
N Nursing Home
L Library
F Funeral Home
Church
C Cemetery
REGULATED AREAS
National Register Historic Resource
Floodplain
Coastal Zone Boundary
Historic District Boundary
LAND USE / LAND COVER
Residential
Water
Commercial
Wetlands
Industrial
Transportation & other
Protected Open Space
Forest, Vacant, Undeveloped
Agriculture
Recreation & Institutional
0 1/4 1/2 Mile
SCALE 1:24,000
SITE N-12, V-7
DEDHAM
WESTWOOD
ROUTE 128 STATION
WESTWOOD
NORWOOD
N



ENVIRONMENTAL IMPACT STATEMENT/REPORT

NORTHEAST CORRIDOR IMPROVEMENT PROJECT

ELECTRIFICATION

U.S. Department of Transportation
Federal Railroad Administration

DMJM/ Harris

Applied Geographics

Office of Railroad Development

Research and Special Programs Administration
John A. Volpe National Transportation Systems Center

Norwood, MA to Boston, MA

August 1993

LEGEND

NEC PROJECT COMPONENTS

- NEC Railroad & Milepost
- Rail Passenger Station
- *Electrification Facility (proposed)*
- *Electrical Substation (existing)*
- Substation (SS)
- Electrical Feeder (proposed)
- Switching Station (SwS)
- Electrical Feeder (existing)
- *Paralleling Station (PS)*
- Bridge Modification (proposed)

SENSITIVE RECEPTORS

- S School
- H Hospital
- R Recreation Area
- N Nursing Home
- L Library
- F Funeral Home
- Church
- C Cemetery

REGULATED AREAS

- National Register
- Floodplain
- Historic Resource
- Coastal Zone Boundary
- Historic District Boundary

LAND USE / LAND COVER

- Residential
- Water
- Commercial
- Wetlands
- Industrial
- Transportation & other
- Protected Open Space
- Forest, Vacant, Undeveloped
- Agriculture
- Recreation & Institutional

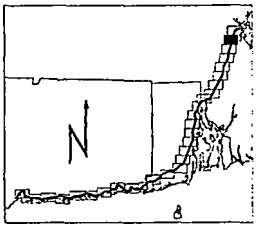
0 1/4 1/2 Mile

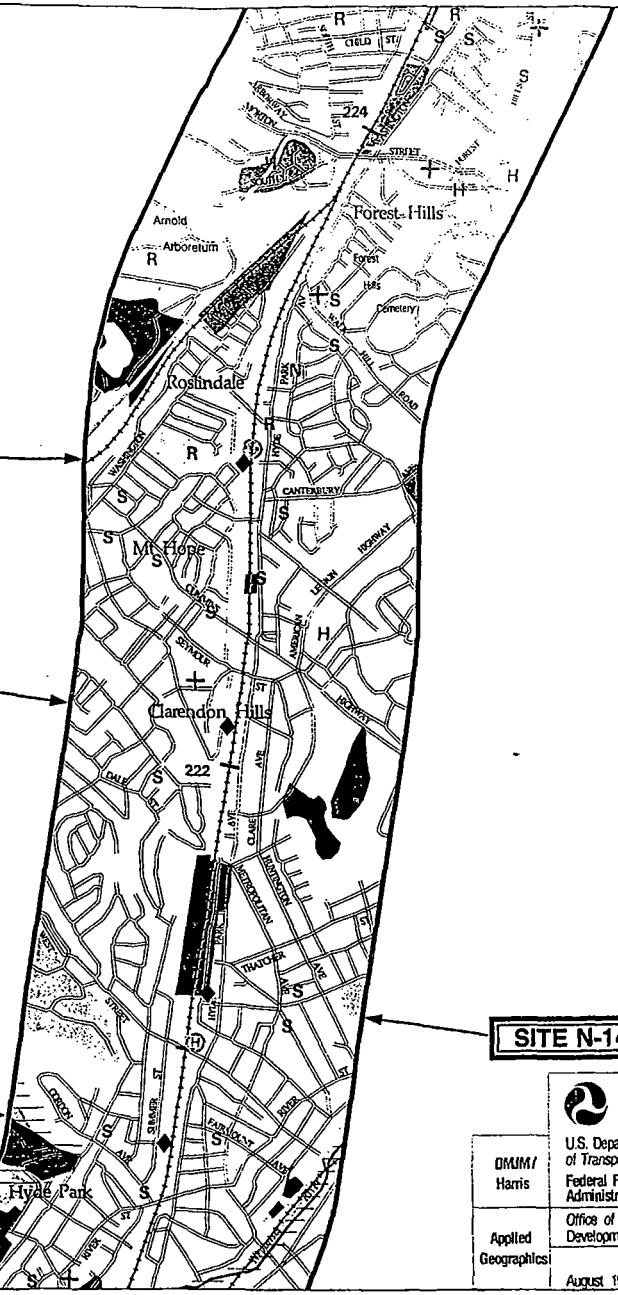
SCALE 1:24,000

SITE V-9

SITE N-15

SITE N-13





	U.S. Department of Transportation	ENVIRONMENTAL IMPACT STATEMENT/REPORT
		NORTHEAST CORRIDOR IMPROVEMENT PROJECT
OMJM/ Harris	Federal Railroad Administration	ELECTRIFICATION
Applied Geographics	Office of Railroad Development	Research and Special Programs Administration John A. Volpe National Transportation Systems Center
	August 1993	Boston, MA

LEGEND

NEC PROJECT COMPONENTS

- NEC Railroad & Milepost
- Rail Passenger Station
- Electrification Facility (proposed)
- Electrical Substation (existing)
- Substation (SS)
- Electrical Feeder (proposed)
- Switching Station (SwS)
- Electrical Feeder (existing)
- Paralleling Station (PS)
- Bridge Modification (proposed)

SENSITIVE RECEPTORS

- S School
- H Hospital
- R Recreation Area
- N Nursing Home
- L Library
- F Funeral Home
- + Church
- C Cemetery

REGULATED AREAS

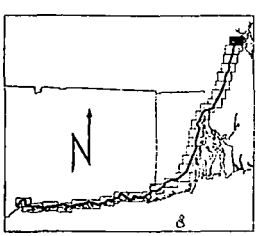
- Floodplain
- National Register Historic Resource
- Coastal Zone Boundary
- Historic District Boundary

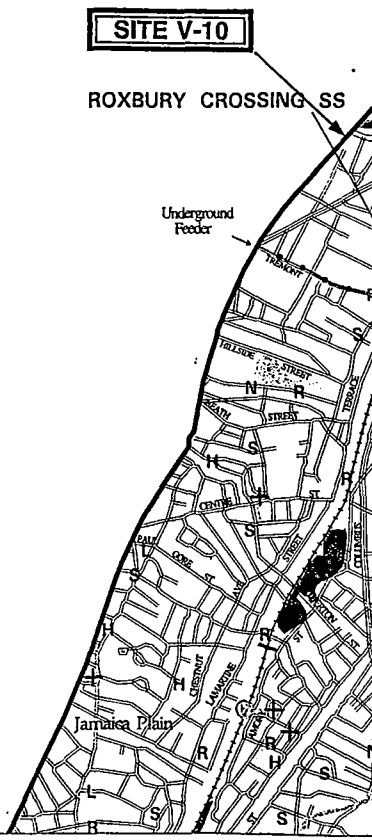
LAND USE / LAND COVER

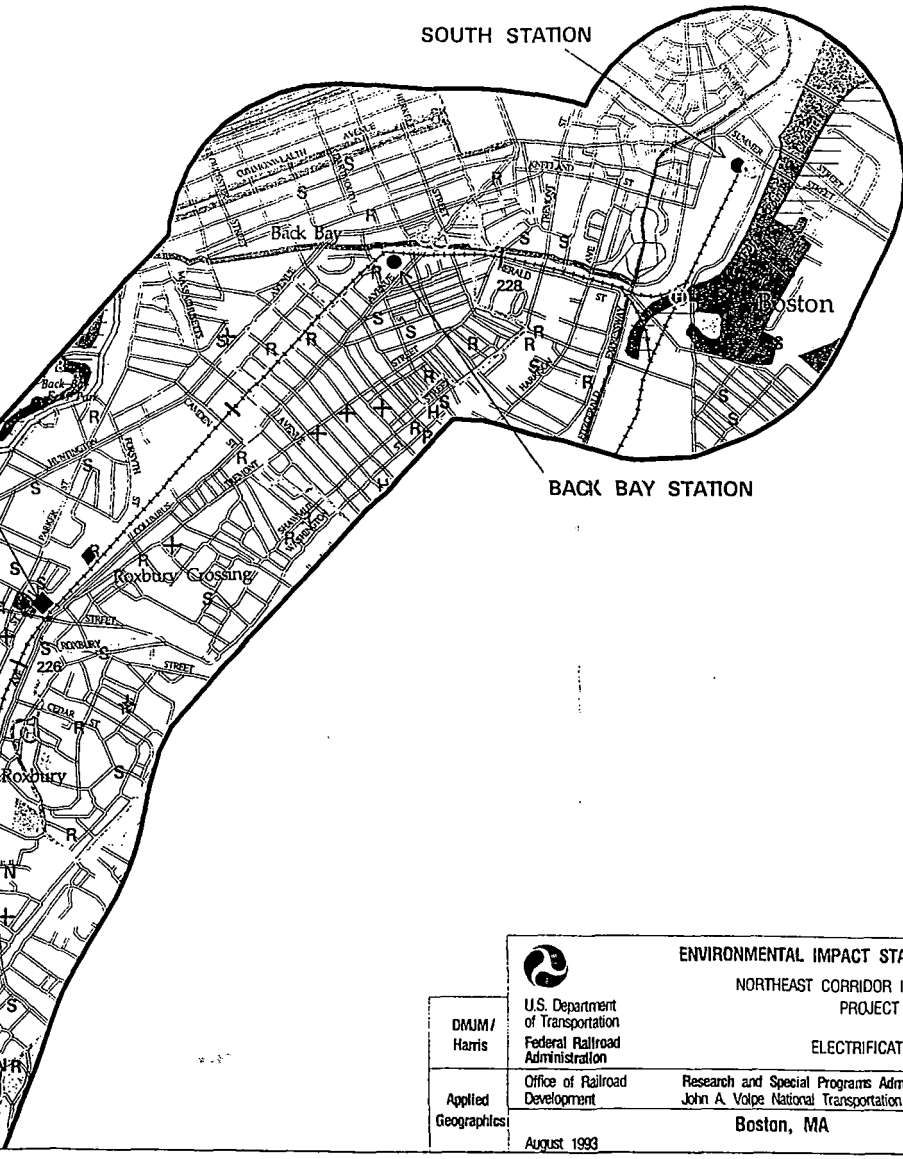
- Residential
- Water
- Commercial
- Wetlands
- Industrial
- Transportation & other
- Protected Open Space
- Forest, Vacant, Undeveloped
- Agriculture
- Recreation & Institutional

0 1/4 1/2 Mile

SCALE 1:24,000







	U.S. Department of Transportation Federal Railroad Administration	ENVIRONMENTAL IMPACT STATEMENT/REPORT NORTHEAST CORRIDOR IMPROVEMENT PROJECT ELECTRIFICATION
DMJM/ Harris		
Applied Geographics	Office of Railroad Development	Research and Special Programs Administration John A. Volpe National Transportation Systems Center
	August 1993	Boston, MA Sheet 29 of 29

2. Fencing

The MEPA Unit has asked for clarification with respect to the specific mitigation measures that pertain to potential impacts involving unauthorized persons on the right-of-way.

No measure to control trespassing on railroad property has been found to be completely effective, however that is not a reason not to try to mitigate these impacts. The measure with the greatest potential to mitigate these concerns is education as offered by the joint government and industry program *Operation Lifesaver.* Another measure frequently mentioned as a way to keep unauthorized persons off railroad property is fencing. Past experience shows that fencing is not necessarily effective in preventing a determined trespasser, but may serve a purpose in delineating the area of unacceptable entry to others.

To address the potential public safety impacts to unauthorized persons on the right-of-way, Amtrak will, in cooperation with *Operation Lifesaver* assist in the development of community and school educational programs, stressing the potential hazards associated with high speed trains and giving guidance on crossing the tracks at appropriate locations. At a minimum, this enhanced educational program will take place during period beginning six months prior to the start of electric operations and extending through the first anniversary of electric operations,

As with noise and vibration, control of access to the right-of-way in Massachusetts should be done in cooperation with the MBTA which owns the right-of-way and operates far more trains than Amtrak. The mitigation in the FEIS/R directs Amtrak to work with the MBTA to develop a comprehensive policy for fencing the NEC main line in Massachusetts. In the absence of an agreement between Amtrak and the MBTA, Amtrak will, prior to initiation of electric train operations, seek permission from the MBTA to install fences at the locations identified in the following table. Fencing the rail right-of-way is expected to cost approximately $15 per linear foot, based on six foot high chain link fence.

Table II-6. Massachusetts Fencing Locations

LOCATION	APPROXIMATE MILEPOST	APPROXIMATE LENGTH (ft.)
Knight Street, Hebronville, MA	193.7	900
Oak Street, Attleboro, MA	197.8	repair break
Morse/Summer Place, East Foxboro, MA	206.0	400
Manomet Street, Sharon, MA	208.2	440
Mohawk Street, Sharon, MA	208.5	880
Garden Street, Sharon, MA	209.5	1,265
TOTAL	----	3,885

3. Electromagnetic Field Monitoring

The NEC FEIS/R requires that Amtrak, in cooperation with FRA and in consultation with the interested state and local environmental, health and transportation agencies, establish a program to monitor electric and magnetic fields (EMF) at sensitive receptors adjacent to the catenary system and electric facilities developed as part of the Proposed Action.

The objective of the electromagnetic field monitoring program is to provide information on EMF: field intensity, frequency spectrum, origin and directionality for source characterization and other relevant parameters. This program would be designed to obtain a statistically significant data set of extremely low frequency (ELF) EMF in the vicinity of electric substations, feeders and overhead catenary system (OCS), that reflect the incremental environmental contribution due to rail traffic.

Should future research by the scientific community indicate a health- or safety-related need to reduce or mitigate EMF beyond those measures incorporated into the designing of the electrification project, FRA will be in a position to require appropriate modification to that design.

3.1 Monitoring Locations:

One site of each type shall be selected by FRA, in cooperation with Amtrak, MEPA and MBTA and other interested agencies at locations along shared right-of-way for electrified rail.

Category 1, Substation: Roxbury Crossing or alternate site, including substation within and at fenced perimeter, and points along one of two feeder lines from the power grid.

Category 2, Switching Station: Attleboro, MA

Category 3, Paralleling Station: Readville, Canton or East Foxboro.

Category 4, OCS: Monitor at accessible point at edge of right-of-way, along 60 Hz electrified portion of NEC.

Category 5, Tie Lines: Monitor EMF at the 115 kV tie lines needed to transfer power from the local utility to the substations.

3.2 Test Equipment and Protocol:

The program will use the protocol for tests and data analysis developed for FRA and used in its previous EMF measurements. (See as an example *Safety of High Speed Ground Transportation Systems -- Magnetic and Electric Field Testing of the Massachusetts Bay Transportation Authority (MBTA) Urban Transit Systems - Volumes I and II*, F. Dietrich et.al. - Electric Research and Management, Inc., for the Federal Railroad Administration Office of Research and Development, June 1993). This will ensure consistency and comparability to the existing EMF database for rail and transit electrotechnologies, facilities and locations. The FRA measurement

protocol previously used by Electric Research and Management, Inc. (ERM) using their trademarked MultiWave system, measured ELF/EMF over a broader frequency region (3 Hz- 3 KHz) than that afforded by the 60 Hz EMDEX Personal Exposure Monitors used for some of the EIS/R surveys, which filter off higher harmonics.

The measurements will be conducted for one continuous 48 hour weekday period at each location during each measurement year to permit characterization of EMF and source (load-or demand-based) variability over time. A 24-hour time interval will enable mapping of AC magnetic field intensity, directionality and polarization indicative of multiple sources and their individual characteristics, under typical commuter and regular traffic conditions. Replication of a typical weekday EMF data set is needed to ensure statistical confidence in EMF average and peak values. Background measurements (with no train drawing current from OCS and substation block) will also be taken for reference. Cumulatively, this monitoring program is estimated to cost $10,000 annually.

It is anticipated that background measurements will be taken one year prior to the start of electric operations. EMF monitoring would be conducted annually for the first five years and periodically thereafter to reflect significant changes (e.g. MBTA converting to electric operations) in operations along the NEC.

3.3 Data Analysis and Interpretation

The EMF data will be statistically averaged and tabulated to obtain average, maximum and minimum values, as well as standard deviations indicative of data variability due to power loading associated with trains moving through the block nearest the point of measurement. Spatial EMF mapping with distance from the electrical current sources, shall be correlated with information on power load (average and peak power), train schedule, and source geometry. EMF temporal and spectral (frequency) variability at any point shall be correlated to train schedule, train configuration and passenger loading, and to current drawn from the catenary and the substation providing power to the block.

These EMF signatures (levels, spectral band, and duration), as well as type of potential public and employee exposure (low level intermittent, occasional, or long term, voluntary or involuntary) shall be compared in understandable form to common and preexisting EMF exposures due to transmission and distribution lines, MBTA feeders and substations and light rail traffic, and to common home and workplace appliances.

The data collected in the EMF Monitoring Program and its analyses shall be made available to interested agencies and published periodically by the FRA and made available to the general public through the National Technical Information Service.

4. Draft Memorandum of Agreement Between Amtrak and MBTA Concerning Mitigation

MEMORANDUM OF AGREEMENT
BETWEEN
THE NATIONAL RAILROAD PASSENGER CORPORATION
AND THE
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

WHEREAS, the National Railroad Passenger Corporation (Amtrak) has proposed a program of improvements to reduce travel time on the Northeast Corridor, one component of which is the electrification of the rail line between Boston and New Haven; and

WHEREAS, the Massachusetts Bay Transportation Authority (MBTA) owns the segment of the Northeast Corridor rail line within the Commonwealth of Massachusetts and operates in excess of 100 commuter trains each weekday over this segment of the Northeast Corridor rail line; and

WHEREAS, Amtrak operates 20 daily trains over the Massachusetts-owned portioned of the Northeast Corridor, but plans to expand its service to 52 daily trains following the initiation of electrified rail service; and

WHEREAS, the Federal Railroad Administration (FRA) has completed a Final Environmental Impact Statement (FEIS) on the electrification of the rail line which identifies a number of potentially adverse impacts resulting from electrification of the rail line, including the generation of incremental noise and vibration from Amtrak's expanded train operations and the need for additional fencing at certain locations; and

WHEREAS, the FEIS also serves as a Final Environmental Impact Report (FEIR) in accordance with procedures for implementing the Massachusetts Environmental Policy Act; and

WHEREAS, the FEIS and FEIR direct Amtrak to coordinate with the MBTA certain activities to mitigate the incremental noise and vibration resulting from the operation of additional Amtrak trains and to reach agreement on the allocation of financial responsibility for the mitigation; and

WHEREAS, Amtrak is acquiring a new fleet of high-speed trainsets that will make up the majority of Amtrak trains operating on the Massachusetts-own segment of the Northeast Corridor and will be specifically designed to minimize the generation of noise and vibration; and

WHEREAS, the demand for MBTA commuter rail service is projected to grow significantly in the future and likely will result in the operation of additional trains on the Northeast Corridor, which may generate incremental noise and vibration;

NOW, THEREFORE, Amtrak and the MBTA agree by the Memorandum of Agreement that the mitigation included in the FEIS and FEIR be implemented in accordance with the following stipulations in order to take into account the effect of the electrification of the rail line in Massachusetts on noise, vibration and the need for fencing.

STIPULATIONS

A. Task Force Creation

1. Within three months of the issuance of a Northeast Corridor Improvement Project -- Electrification Record of Decision (ROD) or Certificate issued in accordance with the provisions of the Massachusetts Environmental Policy Act, whichever is issued earlier, a task force shall be created and charged with providing Amtrak and the MBTA input on alternatives for mitigating noise and vibration along the portion of the Northeast Corridor rail line located in the Commonwealth. Task force responsibilities shall be advisory in nature and shall include review of alternative mitigation systems and review of alternative locations for mitigation. The task force will also review the fencing policy, described below, jointly developed by the MBTA and Amtrak, as well as the noise and vibration monitoring plan, also described below and jointly developed by the MBTA and Amtrak.

2. The task force shall be chaired by the MBTA and shall consist of one representative each from Amtrak, the Executive Office of Transportation and Construction (EOTC) and the City of Boston, and one citizen each from the following communities: Forest Hill, Jamaica Plain, Hyde Park, Readville, and Dedham Manor. Selection of task force members shall follow the provision of notice in the Environmental Monitor. Said notice shall solicit public participation on the task force and in task force activities. Public meetings at several locations along the rail line to provide information on the need for mitigation and the procedure for its implementation shall proceed selection of task force members.

3. Within six months of its creation, the task force will review preliminary design options for installation of one or more prototype noise mitigation systems and review alternatives for locations to install the prototype systems.

4. Within nine months of its creation, the task force will review final design plans for installation of the prototype noise mitigation systems. The task force will also provide input on construction related issues, including the scheduling of work and impacts on local traffic and make recommendations regarding the extent and timing of public outreach.

5. Thereafter, the task force shall provide input and review of design documents, construction planning and a monitoring program to test the effectiveness of the prototype mitigation systems, as well as make recommendations on the extent and timing of public outreach. The task force would also review preliminary and final designs for noise mitigation systems on other segments of the rail line identified as requiring mitigation, as well as construction plans related to their installation.

6. The MBTA will provide administrative and other services necessary for full and effective performance of task force functions.

B. Scope of Mitigation

1. Within four months of the issuance of the ROD, Amtrak and the MBTA will develop, in consultation with the DEP, EOTC, and EOEA, a noise and vibration monitoring program to provide a base line of noise and vibration on the rail line and for use in monitoring the effectiveness of mitigation measures. Amtrak and the MBTA shall also agree on a plan for evaluating noise levels along the rail line and for identifying those locations that currently or are likely to exceed the thresholds for noise set forth in the FEIS. The evaluation will be undertaken and completed during the summer of 1995, with a final report on the results from the evaluation released by November 1, 1995.

2. Within six months of the issuance of the ROD, Amtrak and the MBTA shall develop one or more prototype noise mitigation systems for use at one or more locations along the rail line that have been identified as exceeding the thresholds for noise in the FEIS or in previous studies undertaken by Amtrak or the MBTA. Within two months thereafter, Amtrak and MBTA shall provide preliminary designs for the prototype noise mitigation system(s) to the task force for review.

2. Within nine months of the issuance of the ROD, Amtrak and the MBTA will complete a final design for the prototype noise mitigation systems and, following review by the task force and input as required above, will install the prototype systems along the rail line.

3. Within 18 months of the issuance of the ROD, Amtrak and the MBTA shall develop a proposal for installing noise mitigation systems at other locations along the rail line that exceed applicable noise standards as set forth in the FEIS and identify a preferred approach to mitigating noise at each location. Following input from the task force and public outreach regarding the proposal, Amtrak and the MBTA will implement a program to install the noise mitigation measures.

4. The MBTA will seek all necessary permits and approvals for the work.

5. Amtrak shall work with the FRA to identify measures in which to mitigate ground-borne vibration caused by train operations and shall work with the MBTA to determine whether any such measures could be applied to locations along the rail line identified in the FEIS as requiring mitigation for ground-borne vibration. Following initiation of electrified intercity service, Amtrak, in consultation with the MBTA, will identify locations where Amtrak-caused ground-borne vibration exceeds applicable thresholds established in the FEIS and shall develop a plan for mitigating the adverse impacts.

6. Within twelve months of the issuance of the ROD, Amtrak and the MBTA shall establish a fencing policy applicable to the Northeast Corridor rail line that, at a minimum, provides for the installation of fencing at locations identified in the FEIS, and establishes responsibility for the maintenance of existing fencing.

C. Financial Responsibility

1. Prototype Noise Mitigation Systems. Amtrak has available to it and shall fund the cost of developing and implementing the prototype noise mitigation system(s) identified in (B)(2)-(3) above, up to a total cost of $400,000.

2. Other Mitigation and Monitoring: Amtrak and the MBTA shall share equally the cost of (1) implementing a noise and vibration monitoring system; (2) designing and installing noise mitigation measures (other than the prototype noise mitigation systems to be funded by Amtrak) at locations the exceed the thresholds established in the FEIS; and (3) installing fencing required under the fencing policy. Amtrak shall be responsible for the cost of mitigating ground-borne vibration resulting from the operation of Amtrak trains that, following initiation of electrified intercity rail passenger service, exceed the thresholds set forth for ground-borne vibration in the FEIS.

3. Amtrak and the MBTA agree to make every effort to secure adequate funding to meet their financial obligations under this Memorandum of Agreement. In the event that funding is not adequate to fully implement the mitigation identified in the FEIS, Amtrak and the MBTA shall jointly provide notice to the FRA and MEPA, together with a plan for addressing the funding shortfall.

D. Dispute Resolution

Should any dispute arise between the parties concerning implementation of the measures provided for under this MOA, MBTA by its General Manager and Amtrak by its Vice President High-Speed Rail shall consult to resolve the dispute.

National Railroad Passenger Corporation

By:_____ Date:
George D. Warrington, CEO Northeast Corridor

Massachusetts Bay Transportation Authority:

By:_____ Date:
John J. Haley, General Manager MBTA

III. MEMORANDUM OF AGREEMENT BETWEEN AMTRAK AND MBTA CONCERNING RESPONSIBILITIES FOR IMPROVEMENTS AT THE ROUTE 128 STATION

MEMORANDUM OF AGREEMENT
BY AND BETWEEN THE FEDERAL RAILROAD ADMINISTRATION,
THE NATIONAL RAILROAD PASSENGER CORPORATION AND
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

WHEREAS, Congress has appropriated funds to the Federal Railroad Administration (FRA) for transfer to the National Railroad Passenger Corporation (AMTRAK) for the purpose of extending electric traction power to AMTRAK's Northeast Corridor (NEC) main line between New Haven, Connecticut and Boston, Massachusetts (The Electrification Project);

WHEREAS, the FRA has determined that the transfer of these funds would constitute a "major Federal action" as defined in the national Environmental Policy Act of 1969 and, therefore, has prepared a Final Environmental Impact Statement (FEIS);

WHEREAS, this FEIS will also serve as a Final Environmental Impact Report (FEIR) in accordance with procedures for implementing the Massachusetts Environmental Policy Act (MEPA);

WHEREAS, the Route 128 Railway Station in Massachusetts is owned by the MBTA and serves both AMTRAK intercity and Massachusetts Bay Transportation Authority (MBTA) commuter rail passengers;

WHEREAS, the FRA has determined that the Electrification Project will precipitate an increase in demand for parking by intercity rail passengers at Route 128 Station; and

WHEREAS, the MBTA is contemplating long range plans for changes at the Route 128 Station which may require additional MEPA submissions; and

WHEREAS, AMTRAK and the MBTA have participated in the preparation of this FEIR and have been invited to concur in this Memorandum of Agreement (MOA); and

NOW, THEREFORE, AMTRAK, and the MBTA agree by this MOA that the Electrification Project shall be implemented in accordance with the following stipulations in order to take into account the effect of such Project on the Route 128 Station and parking facilities.

STIPULATIONS

A. Task Force Creation

1. Within 3 months of the issuance of a Northeast Corridor Improvement Project - Electrification Record of Decisions or a Certificate issued in accordance with the provisions of the Massachusetts Environmental Policy Act (MEPA) pursuant to 310 CMR 11.00, whichever is earlier, a task force shall be created, charged with advising AMTRAK and the MBTA on alternative means of satisfying anticipated parking needs at the Route 128 Station. Task force responsibilities shall be advisory in nature, and shall include review of appropriate traffic and parking mitigation measures. Particular attention shall be given to ensuring provision of parking at the station adequate to meet anticipated demand.

2. The task force shall be chaired by the MBTA and shall consist of one representative each from AMTRAK, the Executive Office of Transportation and Construction (EOTC), the Massachusetts Highway Department (MHD), the Metropolitan District Commission (MDC), the Department of Environmental Management (DEM), the Joint Regional Transportation Commission (JRTC), the towns of Westwood, Dedham and Canton and 3 persons representing interested citizens. Selection of task force members shall follow the provision of notice in the Environmental Monitor. Said notice shall solicit public participation on the task force and in task force activities.

3. Within 6 months of its creation, the task force shall develop a Scope of Work covering items described in Section B(1) below, with time lines sufficient for the task force to satisfy its obligations as defined in Section A(1) above and Section B(1) and (4) below.

4. MBTA will provide administrative and other services necessary for full and effective performance of task force functions.

5. The task force will remain active for as long as necessary during the planning phase. If the MBTA initiates a project at Route 128 Station for which a MEPA submission is required, the task force shall remain in existence until a final certificate is received from the Secretary of the Executive Office of Environmental Affairs or a certificate stating no further review is required.

B. Facility and Parking Improvements

1. AMTRAK and the MBTA shall pay for and prepare necessary plans and analyses and construction improvements necessary to address Route 128 Station anticipated traffic, parking and environmental impacts. The task force shall have an opportunity to review and comment on any such plans or analyses. Each signatory to this MOA shall, at minimum, assume costs directly attributable to

the impacts for which each party is responsible. All other costs shall be paid as agreed to by the signatories to this MOA. For example, AMTRAK shall be responsible for all costs arising directly out of the Electrification Project. AMTRAK and the MBTA will work with appropriate agencies to determine implementation and funding measures.

2. Site improvement projects, including those pertaining to the provision of additional parking or traffic management, shall proceed in accordance with applicable law including, as appropriate, the provisions of the Massachusetts Environmental Policy Act (M.G.L., c. 30, 5. 61-62H). The MBTA shall be responsible for the preparation and filing of any required Environmental Notification Form.

3. The analysis prepared in accordance with MEPA provisions will examine projected growth in parking demand for AMTRAK and MBTA services.

4. The MBTA, in accordance with AMTRAK, will promptly after the execution of this MOA, develop a parking and traffic management plan for the Route 128 Station. Said plan will include information pertaining to parking space administration, parking log operations, and accompanying traffic management plans. The task force will have an opportunity to review and comment on such plan.

5. No traffic, parking, or other site improvements pertaining to the use or operations of Route 128 Station may proceed absent the prior approval of the MBTA.

6. A Route 128 Cost Sharing & Management Plan between AMTRAK and the MBTA will be the subject of a separate detailed agreement to be executed by December 31, 1995. In the event the parties are unable to agree on such Plan, the provisions of Section C shall apply.

C. Dispute Resolution

Should any dispute arise between the parties concerning the implementation of measures provided for under this MOA, MBTA by its General Manager and AMTRAK by its Vice President High Speed Rail shall consult to resolve the dispute.

NATIONAL RAILROAD PASSENGER CORPORATION (AMTRAK):

By: _____ Date: 10/21

George D. Warrington, CEO - Northeast Corridor

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY:

By: _____ Date: 10/19/94

John J. Haley, Jr., General Manager, MBTA

IV. PROPOSED PROJECT'S RELATIONSHIP TO GROUND WATER LEVELS IN THE SOUTHWEST CORRIDOR AREA (PROJECT MUD)

During the decade of the 1980s, the MBTA managed the construction of Southwest Corridor Project (SWCP) which involved reconstruction of the Northeast Corridor Route from a point east of Back Bay Station to a point west of Forest Hills (approximately 4.7 miles). This project involved placement of three high-speed railroad tracks in a depressed alignment to replace the previous ground-level and embankment line segment. For most of the length of this project, a "U" shape, reinforced concrete structure, supported by prestressed 100-foot-long concrete piles, was installed. This structural configuration is commonly called a boat section.

Concurrent with construction of the SWCP, FRA determined to improve the track structure between the east end of the SWCP and South Station as part of NECIP. This track segment improvement activity became known as Project MUD. For this segment, a membrane was placed upon the subbase, and then rock ballast and the track assembly installed over the membrane. Both the SWCP and Project MUD were designed so as to avoid adverse changes to the drainage patterns and the water table level within the two project areas.

Despite the drainage work constructed as part of Project MUD, changes in the water table in the Back Bay area apparently continue. It is unclear what is the cause of such changes. Concern has been expressed that activities to add additional clearance under bridges in the Project MUD area could adversely impact the groundwater levels in the vicinity.

Amtrak proposes to lower the three tracks at the Arlington/Tremont Streets overhead bridge (MP 228.13) and at the Albany/Broadway overhead bridge (MP 228. 51) within the Project MUD area to provide adequate clearance for the catenary. To accomplish this, Amtrak would remove a maximum of 5 inches of ballast in an area where the current depth of ballast under the ties ranges between 14 and 33 inches. The catenary would be hung either from bridges, from arms attached to existing concrete walls or from poles whose foundations are outside the membrane area. Amtrak's proposal for increasing clearances and installing the catenary in the Project MUD area would not affect, either positively or negatively, the drainage system in this area or groundwater levels.

Adjusting the depth of ballast section should not have any impact on the groundwater levels. A ballast section is designed to allow for maximum drainage, and groundwater levels do not regularly extend into the ballast section. Amtrak also would use construction techniques to avoid damaging the membrane. Amtrak does not plan to use the undercutters in this area; instead it would use front end loaders and similar construction equipment. (In a previous inspection of the membrane, all of the ballast was removed using the same procedures, with no damage to the membrane.)

The MEPA Unit posed the question in the Secretary's certificate of whether the Project MUD section is working properly. It is the opinion of FRA and Amtrak that the Project MUD membrane is functioning largely as designed. In 1990, the membrane was inspected and repaired, and the estimated leakage in this area and the resulting flow of groundwater being pumped out

of the Project MUD area (approximately 6 to 10 gallons per minute) is too small to account for the lowering of groundwater levels experienced in this area. This indicates that the water is flowing out elsewhere.

Notwithstanding FRA's and Amtrak's view that the Proposed Action will not affect Project MUD, FRA has expressed its willingness to work with the MBTA in the context of the Northeast Corridor Improvement Project to identify whether and how rail improvements may be affecting the water tables and in developing the appropriate response. A possible vehicle for such an effort would be for FRA and MBTA to jointly sponsor an independent investigation of this issue by engineering professionals experienced in groundwater hydrology and other relevant disciplines. FRA is presently awaiting a response from MBTA regarding our offer to cooperatively address this issue.

U.S. Department
of Transportation
**Federal Railroad
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

MAY - 9 1994

Mr. Michael T. Burns
Assistant General Manager
for Railroad Operations
Massachusetts Bay Transportation Authority
Ten Park Plaza
Boston, MA 02116-3974

Dear Mr. Burns:

Please refer to your March 9, 1994 letter concerning the membrane under the tracks in the project MUD area.

Amtrak spent two weekends in the spring of 1990 (May 20 and June 3) completely rebuilding the membrane interface with the Southwest Corridor to repair leaks. Members of your staff and their consultants visited the repair activities. My staff was present and photographed the repair activities in progress. These repairs have obviously corrected the great majority of the leakage problem, because the October 1, 1987 study (copy enclosed) showed over 45 gallons per minute (GPM) flowing at site 2 compared to your recent estimate of 6-10 GPM. This is a 78-87 percent reduction in flow.

We do not believe it is possible to totally eliminate all seepage from a membrane system with several thousand feet of glued joints. The dramatic reduction in the amount of water being pumped out of the membrane, however, since the Spring 1990 repairs, indicates to us that the water is flowing out elsewhere. One possibility, which we have pointed out to your staff, is that the 10-15 inches of crushed rock under the Southwest Corridor invert and behind the Southwest Corridor retaining wall allows essentially unrestrained movement of water along the Southwest Corridor to other drainage points west of the invert/membrane joint possibly contributing to the low ground water levels near the boat section.

We would be happy to work with the MBTA on further testing to uncover the source of the low water problem in the vicinity of the Southwest Corridor.

Sincerely,

James T. McQueen
Associate Administrator
for Railroad Development

Enclosure

cc: F. A. Vacca
G. DeVeccnis

Ground Water Infiltration
Project MUD/Southwest Corridor Interface

October 13, 1987

Prepared for
DeLeuw, Cather/Parsons

Prepared by
DeLeuw, Cather & Co.
1227 Burnside Avenue
East Hartford, CT 06108
203/528-9677

OWNERSHIP OF THIS DOCUMENT

AUTHORSHIP OF THIS DOCUMENT

This assessment was prepared by Robert S. De Santo, assisted by G. Blessing and S. Prusik.

Table of Content

Introduction

The status of ground water elevations at the interface between Contract 097-120 (i.e. The Southwest Corridor) and Project MUD has been reported to be as much as 2 feet below preconstruction levels. That finding was made according to a letter dated March 6, 1987 from N.J. Pappas, of Kaiser Engineers, Inc./Fay, Spofford & Thorndike, Inc., written to W.J. Quinlan of the MBTA. The critical concern about the potential for lowering this water table relates to detrimental effects such a drawdown would have on the buildings in the vicinity which are supported on timber piles. Those piles will rapidly deteriorate and rot if they are not submerged in ground water.

To prevent ground water lowering, the MUD Section Improvement uses a relief section with a membrane enclosure and underdrain which is designed to exclude ground water from the track drainage system. Therefore, seepage at the MUD/Southwest Corridor interface could only occur if the watertight seal between the Southwest Corridor invert slab and the MUD transition slab leaks. Ground water would thereby seep upward into the ballast and enter the track drainage. It would then appear in the manholes down gradient from the interface of the two projects beginning at Station 11+87.

In order to investigate the drainage characteristics of this drainage system a dye study was conducted as defined below.

Methods

In order to calculate the volume of water passing through the track drainage system between MUD Station 11+87 and 24+46, dye dilution was used. This technique is well established and involves the addition of a known amount of fluorescent dye at one point in the drainage system with subsequent sampling at a number of points downstream. Measuring the concentration of the dye at these points allows calculation of the volumes passing each sampling point (Cobb and Bailey, 1965).

The study was conducted on October 1, 1987, between 8:30 am and 12:30 pm. A known concentration of fluorescein dye was added at a known rate to the drainage system at Station 11+87 for one hour and ten minutes. This allowed saturation of the system. Once saturated, three replicant grab samples, each of four liquid ounces, were collected at each station using glass bottles which were then sealed with Parafilm. These samples were stored in the dark for transport to the laboratory. They were analyzed within 24 hours using a Sequoia-Turner Model 110 fluorometer.

Findings

The findings are illustrated on Figure 1. Site 1 was the injection point for the dye and samples were collected beginning one hour and ten minutes after the dye injection began. Collection of samples at Site 1 required the use of an extendable rod which allowed three feet of turbulent flow to mix the dye before the sample was taken. Samples were taken at Station 17+40, 14 minutes after they were taken at Station 11+87. Station 21+20 was sampled 12 minutes later; Station 23+30 was sampled six minutes later, and Station 24+46 was sampled 12 minutes later.

The observed flow at Station 11+87 was approximately one foot per second through a 12 inch diameter corrugated metal pipe with water 3.25 inches deep. It took approximately 20 minutes for the dye to reach Station 17+40.

The dimensions of the catch basins and manholes used, and the location of sample points in these structures, are illustrated on Figure 1.

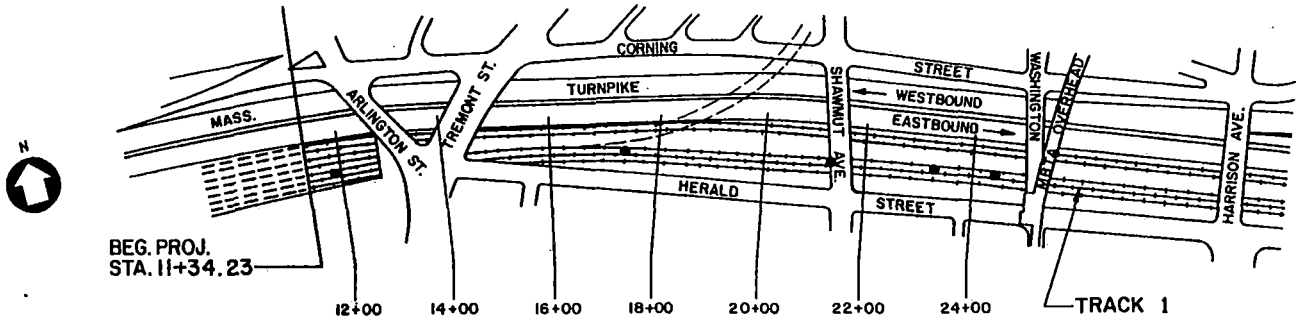
Conclusions

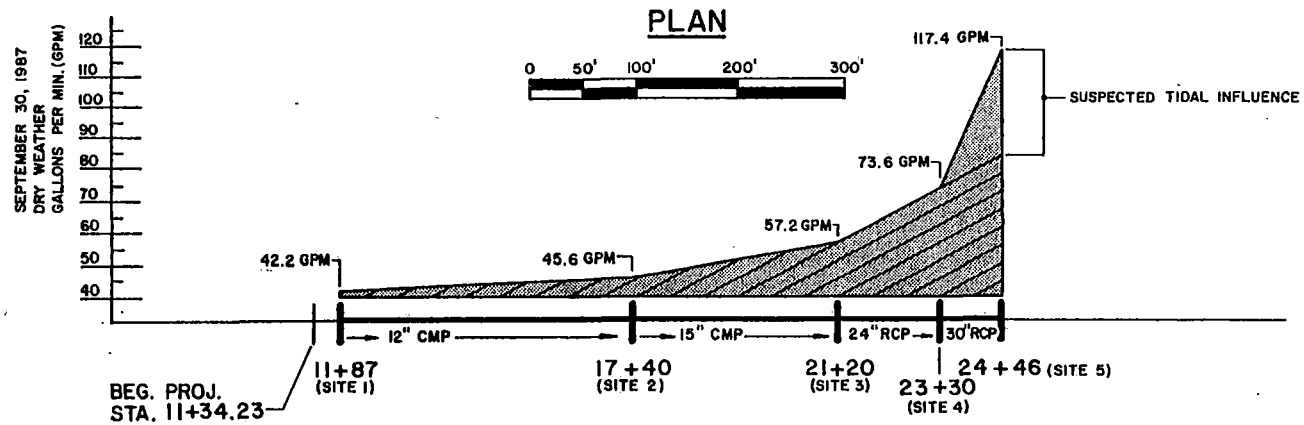
As indicated on Figure 1, the flow of ground water through the MUD drainage system at the interface with the Southwest Corridor trackage was calculated to be 42.2 gallons per minute. This number may be higher or lower that the true flow. Mixing of the dye within the first three feet of the corrugated pipe may not have been complete. If it was incomplete, the calculation of volume would not be correct. However, the mixing was certainly complete when the sample was taken at Station 17+40 (i.e. Site 2). There, the volume was calculated to be 45.6 gallons per minute. Therefore, it is assumed that the initial calculation at Station 11+87 of 42.2 gallons per minute was relatively accurate.

The flow observed at Site 5 was sluggish and may have been influenced by backwater dilution. Were this the case, the calculated volume there of 117.4 gallons per minute would be higher than is actually the case. The alternate shading of the graph on Figure 1 (between Station 23+30 and 24+46) represents a possible backwater influence which that segment of the drainage system may experience.

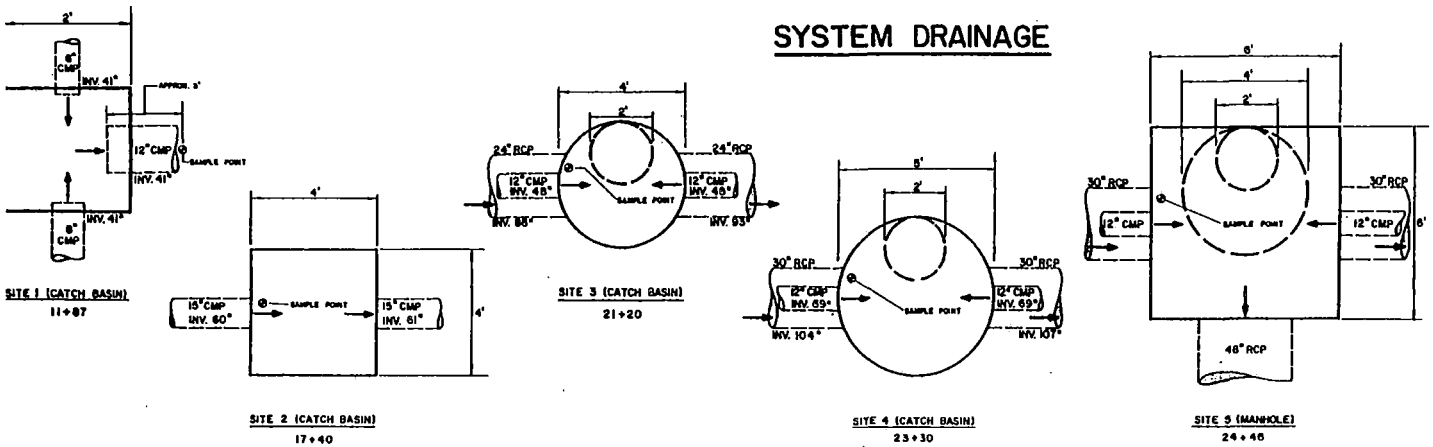
Bibliography

Cobb, E.D. and J.F. Bailey. 1965. Measurement of Discharge by Dye-dilution Methods. 27 pp. In Surface Water Techniques Series, Book 1, Chapter 14. United States Department of the Interior, Geological Survey, Washington, D.C.





SYSTEM DRAINAGE



NORTHEAST CORRIDOR IMPROVEMENT PROJECT

FIGURE 1
GROUNDWATER INFILTRATION
SEPTEMBER 30, 1987
SECTION IMPROVEMENT MUD

DeLEUW CATHER

DeLEUW, CATHER & COMPANY
Engineers and Planners

V. DRAFT SECTION 61 FINDINGS FOR REQUIRED STATE PERMITS

As required by Massachusetts General Law, Chapter 30, § 61 (see MEPA regulations 301 CMR 11.10 (3)), any agency which acts on a project (e.g. issues permits) for which an EIR has been prepared must determine the project's impact on the environment; make a finding describing such impact, if any; and make a finding that all feasible measures have been taken to avoid or minimize the impact. For a project which is subject to MEPA solely because of agency permits it requires, such determinations and findings are limited to the issues within the scope of the EIR.

In its review of the FEIS/R, the MEPA unit requested that FRA provide a draft Section 61 Finding for each state agency from which Amtrak is seeking permits or other formal approvals prior to construction. Notwithstanding that agencies are required to prepare their own Section 61 Findings, FRA has complied with this request in order to assist participating state agencies in carrying out their M.G.L. c. 30 § 61 obligations.

In conversations with MEPA, Amtrak, and Amtrak's design team, it was determined that four Massachusetts agencies may be involved in issuing permits or other approvals for the project. These are the Massachusetts Bay Transportation Authority, the Massachusetts Highway Department, the Massachusetts Turnpike Authority and the Massachusetts Historic Commission. Draft Section 61 Findings for actions associated with these agencies follow.

[DRAFT]

FINDING OF THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61

I. Project Description

The proposed project involves the electrification of the Northeast Corridor mainline located in the municipalities of Boston, Dedham, Westwood, Canton, Sharon, Foxboro, Mansfield, and Attleboro. Electrification would require the erection of catenary poles and wires along the entire corridor in addition to the construction of five electrification facilities to support the power traction system. One overhead bridge (Maskwonicut Street in the town of Sharon) would be raised. Catenary wires and solid bridge barriers would be attached to this and other bridges as part of the proposed project. Catenary poles and wires would remain within the existing right-of-way and facilities would utilize the edge of the right-of-way to the highest extent possible.

On August 10, 1992 the Federal Railroad Administration filed an Environmental Notification Form (ENF) with the Executive Office of Environmental Affairs (EOEA) with detailed Supplemental Information and was issued a Certificate September 9, 1992. On October 15, 1993 a Draft EIS/R was filed and on February 15, 1995 the Final EIS/R was submitted to the Secretary of Environmental Affairs.

II. Overall Project Impacts

The MBTA owns a number of structures along the Northeast Corridor which would be affected by the proposed project (see table below). Each affected overhead structure would require the construction of a barrier on each side of the bridge to protect the public from injury and the catenary system from damage. In addition, in some instances the catenary wires would be attached to the understructure where, if left unrestrained, electrified wires could come into contact with the bridge during locomotive passes. The MBTA is primarily concerned with the negative aesthetic impacts of the proposed bridge barriers as noted in the design drawings.

MBTA Bridges to be Affected

MILEPOST	BRIDGE	TOWN
228.42 *	Utility Pipe	Boston
228.28 *	Utility Bridge	Boston
228.27*	Shawmut Avenue	Boston

MILEPOST	BRIDGE	TOWN
227.87	Fort Point	Boston
227.50*	Back Bay Tunnel (East)	Boston
226.90*	Back Bay Tunnel (West)	Boston
226.81	Camden Street Footbridge	Boston
226.65	Footbridge	Boston
226.54 *	Access Ramp	Boston
226.48*	Ruggles station	Boston
226.45*	Ruggles Street Tunnel	Boston
226.30*	Prentiss Street Tunnel	Boston
226.00 *	Tremont Street	Boston
225.76*	Cedar Street	Boston
225.40*	Heath Street Tunnel	Boston
225.32*	Centre Street Tunnel	Boston
225.05 *	Atherton Street	Boston
224.90	Boylston Street	Boston
224.70*	Lawnsdale Terrace	Boston
224.43*	Green Street	Boston
224.38 *	Gordon Street	Boston
224.19*	Williams Street	Boston
224.17*	McBride Street	Boston
223.70*	Forest Hill Station	Boston
223.63*	Forest Hill Station	Boston
223.53*	Ukraine Way	Boston
223.46*	Cross Over Street	Boston

MILEPOST	BRIDGE	TOWN
221.85	Pedestrian Bridge	Boston
221.20 *	West Street	Boston
220.74*	River Street	Boston
220.18	Reservation Road	Boston
219.56	Milton Street	Boston
219.45	Readville Station Footbridge	Boston
219.41*	Franklin Branch	Boston
217.46	Route 128 Station Footbridge	Dedham

Notes: All structures would require protective barriers.
An "*" denotes a bridge requiring catenary wire attachments.

Mitigation

The FRA and Amtrak will closely coordinate with the MBTA to incorporate barriers which are more aesthetically appropriate.

Finding

For the reasons stated above, the MBTA hereby finds that, with implementation by the proponents of the mitigation measures described above, all practible means and measures will be taken to avoid or minimize adverse traffic and related impacts to the environment resulting from the Northeast Corridor Improvement Project - Electrification. Appropriate conditions will be included in the [bridge encroachment permits] to be issued by the MBTA to ensure implementation of the measures described herein.

_____ _____

Date General Manager [or other signatory]

[DRAFT]

FINDING OF THE MASSACHUSETTS HIGHWAY DEPARTMENT
PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61

I. Project Description

The proposed project involves the electrification of the Northeast Corridor mainline located in the municipalities of Boston, Dedham, Westwood, Canton, Sharon, Foxboro, Mansfield, and Attleboro. Electrification would require the erection of catenary poles and wires along the entire corridor in addition to the construction of five electrification facilities to support the power traction system. One overhead bridge (Maskwonicut Street in the town of Sharon) would be raised. Catenary wires and solid bridge barriers would be attached to other bridges as part of the proposed project. Catenary poles and wires would remain within the existing right-of-way and facilities would utilize edge the of the right-of-way to the highest extent possible.

On August 10, 1992 the Federal Railroad Administration filed an Environmental Notification Form (ENF) with the Executive Office of Environmental Affairs (EOEA) with detailed Supplemental Information and was issued a Certificate September 9, 1992. On October 15, 1993 a Draft EIS/R was filed and on February 15, 1995 the Final EIS/R was submitted to the Secretary of Environmental Affairs.

II. Overall Project Impacts

The MHD owns a number of structures along the Northeast Corridor which would be affected by the proposed project (see table below). Each affected overhead structure would require the construction of a barrier on each side of the bridge to protect the public from injury and the catenary system from damage. In addition, in some instances the catenary wires would be attached to the understructure where, if left unrestrained, electrified wires could come into contact with the bridge during locomotive passes. The MHD has technical, fiscal, and maintenance, and traffic concerns with respect to the solid barriers. These concerns include: how barriers and wires would be attached to their structures, who would perform and pay for maintenance, how to inspect and repair the barriers, that the overall roadway surface not be reduced, and that traffic flow during construction not be adversely impacted. MHD is also concerned with the issues of traffic and parking impacts at Route 128 Station which would result from increased ridership.

MHD Bridges to be Affected

MILEPOST	BRIDGE	TOWN
228.66	S.E. Expressway Ramp	Boston

MILEPOST	BRIDGE	TOWN
228.65	S.E. Expressway	Boston
228.51*	Albany & Broadway Streets	Boston
228.13*	Tremont / Arlington Street	Boston
227.76	Broadway	Boston
227.71*	Berkeley Street	Boston
227.64*	West Fourth Street	Boston
226.77*	Southampton Street	Boston
222.36	Canterbury Street	Boston
217.49*	Route 128 Northbound	Dedham
217.48*	Route 128 Southbound	Dedham
216.18	Dedham Road	Canton
215.79 *	I -95 Southbound	Canton
215.74*	I-95 Northbound	Canton
214.33	Chapman Street	Canton
214.22	Spaulding Street	Canton
212.95*	High Street	Canton
211.62*	Maskwonicut Street	Sharon
211.04 *	Depot Street	Sharon
209.95*	South Main Street	Sharon
207.92	Wolomolopoag Street	Sharon
203.00	Route 140	Mansfield
202.97	I-495 Northbound	Mansfield
202.95	I-495 Southbound	Mansfield
202.51*	School Street	Mansfield

MILEPOST	BRIDGE	TOWN
201.67*	Elm Street	Mansfield
200.49*	Gilbert Street	Mansfield
198.68*	Lindsey Street	Attleboro
198.01*	Holden Street	Attleboro
196.72*	Olive Street	Attleboro
196.36*	Thatcher Street / Route 152	Attleboro
195.23*	South Main Street / Route 152	Attleboro
194.83	Thurber Avenue / Route 152	Attleboro
193.89*	South Main Street / Route 152	Attleboro
193.30	Pond Street	Attleboro
192.47*	County Street	Attleboro
191.99*	Newport Avenue / US Route 1	Attleboro
191.13*	Washington Street	Attleboro

Notes: All structures would require protective barriers.
An "*" denotes a bridge requiring catenary wire attachments.

Mitigation

As noted in the Northeast Corridor Improvement Project - Electrification FEIS/R, the FRA and Amtrak will closely coordinate all bridge activities with the MHD to ensure all concerns are addressed. A separate Memorandum of Understanding between Amtrak and the MBTA (attached) sets forth an agreement whereas issues related to the Route 128 station will be addressed in a separate environmental process which will be undertaken by the MBTA with assistance from Amtrak. In addition, two master agreements currently being developed by the MHD and Amtrak will discuss the concerns of the MHD and provide means to address them.

Finding

For the reasons stated above, the MHD hereby finds that, with implementation by the proponents of the mitigation measures described above, all practible means and measures will be taken to avoid or minimize adverse traffic and related impacts to the environment resulting

from the Northeast Corridor Improvement Project - Electrification. Appropriate conditions will be included in the [bride encroachment permits] to be issued by the MHD to ensure implementation of the measures described herein. An access permit for conditions at Route 128 will not be required due to a separate environmental process to be under taken by the MBTA with assistance from Amtrak, as stipulated in the attached MOU.

_____ _____

Date Director [or other signatory]

[DRAFT]

FINDING OF THE MASSACHUSETTS TURNPIKE AUTHORITY
PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61

I. Project Description

The proposed project involves the electrification of the Northeast Corridor mainline located in the municipalities of Boston, Dedham, Westwood, Canton, Sharon, Foxboro, Mansfield, and Attleboro. Electrification would require the erection of catenary poles and wires along the entire corridor in addition to the construction of five electrification facilities to support the power traction system. One overhead bridge (Maskwonicut Street in the town of Sharon) would be raised. Catenary wires and solid bridge barriers would be attached to other bridges as part of the proposed project. Catenary poles and wires would remain within the existing right-of-way and facilities would utilize the edge of the right-of-way to the highest extent possible.

On August 10, 1992 the Federal Railroad Administration filed an Environmental Notification Form (ENF) with the Executive Office of Environmental Affairs (EOEA) with detailed Supplemental Information and was issued a Certificate September 9, 1992. On October 15, 1993 a Draft EIS/R was filed and on February 15 , 1995 the Final EIS/R was submitted to the Secretary of Environmental Affairs.

II. Overall Project Impacts

The MTA owns two structures along the Northeast Corridor which would be affected by the proposed project (see table below). Each affected overhead structure would require the construction of a barrier on each side of the bridge to protect the catenary system from damage and the public from injury. In addition, the catenary wires would be attached to the understructure where, if left unrestrained, electrified wires could come into contact with the bridge during locomotive passes. The MTA has minor concerns regarding these activities. It requests that attachments to their structures be bolted, not welded; computations would be required to assure that each bridge has the capacity to carry the loads to be added as a result of the catenary system; bridge barriers be placed either behind the existing bridge handrails or modified to include a continuous bridge rail; and verify whether a conflict would occur with Central Artery/Tunnel work on the Harrison Avenue bridges scheduled for 1996.

MTA Bridges to be Affected

MILEPOST	BRIDGE	TOWN
228.41*	Harrison Avenue	Boston
228.34*	Washington Street	Boston

Notes: All structures would require protective barriers.
An "*" denotes a bridge requiring understructure catenary wire attachments.

Mitigation

The FRA and Amtrak will closely coordinate all bridge activities with the MTA to ensure all concerns are addressed.

Finding

For the reasons stated above, the MTA hereby finds that, with implementation by the proponents of the mitigation measures described above, all practible means and measures will be taken to avoid or minimize adverse traffic and related impacts to the environment resulting from the Northeast Corridor Improvement Project - Electrification. Appropriate conditions will be included in the [bridge encroachment permits] to be issued by MTA to ensure implementation of the measures described herein.

_____ _____

Date Director [or other signatory]

[DRAFT]

FINDING OF THE MASSACHUSETTS HISTORICAL COMMISSION PURSUANT TO M.G.L. CHAPTER 30, SECTION 61

I. Project Description

The proposed project involves the electrification of the Northeast Corridor mainline located in the municipalities of Boston, Dedham, Westwood, Canton, Sharon, Foxboro, Mansfield, and Attleboro. Electrification would require the erection of catenary poles and wires along the entire corridor in addition to the construction of five electrification facilities to support the power traction system. One overhead bridge (Maskwonicut Street in the town of Sharon) would be raised. Catenary wires and solid bridge barriers would be attached to this and other bridges as part of the proposed project. Catenary poles and wires would remain within the existing right-of-way and facilities would utilize the edge of right-of-way to the highest extent possible.

On August 10, 1992 the Federal Railroad Administration filed an Environmental Notification Form (ENF) with the Executive Office of Environmental Affairs (EOEA) with detailed Supplemental Information and was issued a Certificate September 9, 1992. On October 15, 1993 a Draft EIS/R was filed and on February 15, 1995 the Final EIS/R was submitted to the Secretary of Environmental Affairs.

Overall Project Impacts

The MHC is concerned with the final location of the Roxbury Crossing substation, which has not been finalized. The substation could be located within a building that is individually listed in or eligible for listing in the National Register of Historic Places or is a contributing building within a listed or eligible district. If so, coordination with the MHC would be required. If the facility were located within the City of Boston, consultation with the Boston Landmarks Commission would be required.

Specific components of the power traction system could adversely affect the historic character of the Attleboro, Sharon, and Canton Junction train station properties. The spacing of the catenary poles and wires in these areas would be of concern to the MHC, and coordination with the MHC, including proper documentation of existing resources, should occur before these components are installed.

As noted above, one overhead bridge would be raised as part of this proposed project. This bridge, Maskwonicut Street Bridge in the town of Sharon, is considered Recommended Eligible for the National Register of Historic Places. Therefore, all construction activities at these locations should be coordinated with MHC and the State Historic Preservation Officer. Also, installation of catenary poles and wires on the Nation Register-listed Canton Viaduct should be properly documented, reviewed, and coordinated with the MHC and the State Historic Preservation Officer.

Mitigation

Attached to this Finding is a copy of the Memorandum of Agreement submitted to the Advisory Council on Historic Preservation pursuant to 36 CFR Section 800.6(a) submitted as part of the Final Environmental Impact Statement/Report for the proposed project. This document discusses the above issues and provides for mitigating the anticipated impacts.

Finding

For the reasons stated above, the MHC hereby finds that, with implementation by the proponents of the mitigation measures described above, all practible means and measures will be taken to avoid or minimize adverse traffic and related impacts to the environment resulting from the Northeast Corridor Improvement Project - Electrification. Appropriate conditions are included in the attached Memorandum of Understandings to ensure implementation of the measures described herein.

MEMORANDUM OF AGREEMENT
SUBMITTED TO THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
PURSUANT TO 36 CFR § 800.6(a)

WHEREAS, the Federal Railroad Administration (FRA) has determined that the **Northeast Corridor Improvement Project - Electrification: New Haven, Connecticut to Boston, Massachusetts** will have an effect upon properties in Massachusetts listed in or eligible for inclusion in the National Register of Historic Places (Appendix 1), and has consulted with the Massachusetts State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f); and

WHEREAS, the National Railroad Passenger Corporation (AMTRAK), the project proponent, and the Boston Landmarks Commission (BLC) participated in the Consultation and have been invited to concur in this Memorandum of Agreement;

NOW THEREFORE, the FRA, AMTRAK, the SHPO, and BLC agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

Roxbury Substation

1. The FRA and AMTRAK shall submit documentation to the SHPO and BLC showing the site and design of the Roxbury Substation. If the facility is located within a building that is individually listed in or eligible for listing in the National Register of Historic Places or is a contributing building within a listed or eligible district, the FRA and AMTRAK shall ensure that the construction of the facility is consistent with the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (1990) and shall submit the plans to the SHPO and BLC. The SHPO, on behalf of itself and the BLC, shall respond within 30 days of receipt of any such submission by indicating approval, requesting additional documentation, or requesting further consultation in order to arrive at an acceptable design pursuant to 36 CFR 800.5. Lack of response by the SHPO within 30 days shall indicate approval by the SHPO and BLC of the plans.

Effects of Catenary on Historic Resources

2. The FRA and AMTRAK shall ensure that the project is carried out in accordance with "Summary of Project: New Construction, Catenary Design, and Catenary Upright Spacing Adjacent to Historic Properties," prepared by Historic

Resource Consultants, Inc., and dated June 10, 1994. The FRA and AMTRAK shall consult with the SHPO to determine the kind of photographic recordation required for the following historic properties and shall cause such recordation to be completed. Unless otherwise agreed to by the SHPO, the FRA and AMTRAK shall ensure that all documentation is completed and accepted by the SHPO prior to installation of the catenary at these points:

Attleboro Stations
Sharon Station
Canton Junction Station

Bridge Modifications

3. Prior to any construction at the Maskwonicut Street bridge, FRA and AMTRAK shall submit the plans to the SHPO for its approval, including a description of any addition or replacement of fill, grading, and installation of guardrails in connection with the adjacent stone arch over Beaver Brook, as well as procedures for protecting the stone arch from damage during construction. The SHPO shall respond within 30 days of such submission by indicating approval, requesting additional documentation, or requesting further consultation in order to arrive at an acceptable design pursuant to 36 CFR 800.5. Lack of response by the SHPO within 30 days shall indicate its approval.

4. Prior to any construction affecting the Canton Viaduct, the FRA and AMTRAK shall submit plans for attaching the catenary on the viaduct to the SHPO for its approval. The SHPO shall respond within 30 days of such submission by indicating approval, requesting additional documentation, or requesting further consultation in order to arrive at an acceptable design. Lack of response by the SHPO within 30 days shall indicate its approval of the design.

5. Should a new protective barrier be necessary for the Mt. Hope Footbridge, the FRA and AMTRAK shall install a chain-link barrier similar to the one currently in place.

Archeological Resources

6. If any human remains and/or grave-associated artifacts are encountered, the FRA, AMTRAK and the SHPO shall consult to ensure appropriate treatment in accordance with the Policy Statement on Human Remains of the Advisory Council on History Preservation (the Council), as well as applicable Massachusetts laws (i.e., Massachusetts General Laws, Chapter 38, section 6B; Chapter 9, section 27C; Chapter 7, section 38A; and Public Law 101-601, the Native American Grave Protection and Repatriation Act of 1990).

Changes to Project and Unidentified Resources

7. Should any changes occur in the project's specifications that could have an effect on properties listed in or eligible for the National Register, including but not limited to modifications to historic bridges, catenary design, catenary installation on or adjacent to historic properties, and siting and design of electrification facilities on or adjacent to historic properties, FRA, AMTRAK, and the SHPO shall consult, prior to the implementation of such changes, to determine the effect of the changes on historic properties and to devise measures to mitigate any adverse effects in accordance with 36 CFR 800.5. The FRA shall notify the Council regarding any additional determinations of effect and mitigative measures agreed upon by the FRA, AMTRAK, and the SHPO.

8. The FRA believes the identification of properties of historic or archeological significance that was undertaken for this project is complete. Should any previously unidentified historic or archeological resources be discovered which may be affected by the project, the FRA and SHPO shall apply the National Register Criteria of Eligibility and consult pursuant to 36 CFR 800.4.

Amendment and Resolution of Disputes

9. Should the SHPO object within 30 days to any plans provided for review pursuant to this agreement, the FRA and AMTRAK shall consult with the SHPO to resolve the objection. If the FRA determines that the objection cannot be resolved, the FRA shall request the further comments of the Council pursuant to 36 CFR 800.6(b). Any comments provided in response to such a request will be taken into account by the FRA in accordance with 36 CFR 800.6(c)(2) with reference only to the subject of the dispute; FRA's responsibility to carry out all actions under this agreement that are not the subjects of the dispute remain unchanged.

Execution of this Memorandum of Agreement by the FRA and the SHPO, its subsequent acceptance by the Council, and implementation of its terms evidence that the FRA has afforded the Council an opportunity to comment on the **Northeast Corridor Improvement Project - Electrification: New Haven, Connecticut to**

Boston, Massachusetts and its effects on historic properties and that the FRA has taken into account the effects of the undertaking on historic properties.

FEDERAL RAILROAD ADMINISTRATION

By: _____ Date: 10/31/94

Donald M. Itzkoff Acting Administrator

MASSACHUSETTS STATE HISTORIC PRESERVATION OFFICER:

By: _____ Date: 10/24/94

Judith B. McDonough, State Historic Preservation Officer

NATIONAL PASSENGER RAILROAD CORPORATION:

By: _____ Date: 11/3/94

George D. Warrington, CEO - Northeast Corridor

BOSTON LANDMARKS COMMISSION:

By: _____ Date: 10/27/94

Ellen Lipsey, Executive Director

ACCEPTED for the Advisory Council on Historic Preservation:

By: _____ Date: _____

Robert Bush, Executive Director

VI. AMTRAK'S PROPOSED PUBLIC OUTREACH PROGRAM

National Railroad Passenger Corporation, 455 Boston Post Road, Box 11, Old Saybrook, CT 06475

BG

Amtrak®

January 27, 1995

Mr. William Gage
Massachusetts EOEA
MEPA Unit
100 Cambridge Street
Boston, MA 02202

Dear Mr. Gage:

The Certificate of the Secretary of Environmental Affairs on the Draft Environmental Impact Report for the Northeast Corridor Improvement Project Electrification requested from the proponent a public outreach program that would ensure public participation and input into issues impacting Massachusetts. Amtrak is pleased to submit its plan for public outreach, which will be implemented during the project.

The Final Environmental Impact Statement/Report (FEIS/R) identifies a number of potential adverse impacts on local residents. Amtrak has been directed to mitigate these impacts as a pre-condition of operating its trains under electric power. They relate to the location of the Boston-area electrical substation, which is required to provide electricity to the rail line; noise and vibration from train operations along the Boston Southwest Corridor; the desire of residents for additional fencing along the right-of-way; and construction related impacts resulting from installation of the electrification system and facilities.

As part of Amtrak's mitigation program, both the FRA and MEPA have directed Amtrak to develop a public outreach program to maximize public input in efforts to mitigate these potential impacts. Amtrak intends to hold numerous public meetings with respect to each area of mitigation, as well as to establish a number of task forces composed of local residents, property abutters, businesses and officials to provide detailed input into design and construction related issues. Notice for meetings will be as broadly disseminated as practicable, including through local newspapers, flyers, public announcements, and direct mailing to existing FEIS/R and local address lists. In addition, Amtrak will attempt to discuss key issues with local and neighborhood media prior to the holding of public meetings to maximize awareness of the meetings and issues to be discussed.

The MBTA, which owns the Massachusetts segment of the Northeast Corridor and operates the majority of trains on the rail line, necessarily will be an integral player in all of

Amtrak's activities relating to the project design and implementation.

The milestones included in the outreach program are based on Amtrak's current estimate for the timing of construction work. This is likely to change, but the public outreach associated with each phase of design and construction would not. The availability of Amtrak or MBTA funding for some of the work also could impact the milestones for design and construction work. However, Amtrak recognizes that it is required to implement the mitigation as a precondition for electric operations and is committed to undertaking the mitigation as proactively and broadly as possible.

Amtrak would appreciate any suggestions for improving its outreach plan. I can be reached at 203-395-3015.

Sincerely,

David J. Carol
Vice President
High-Speed Rail

cc: Mark Yachmetz, FRA
John Haley, MBTA

PUBLIC OUTREACH IN MASSACHUSETTS
NORTHEAST CORRIDOR IMPROVEMENT PROJECT ELECTRIFICATION
EOEA NUMBER 9134

Amtrak has been required to mitigate potential adverse impacts resulting from its proposal to electrify the Northeast Corridor between New Haven and Boston. In order to ensure maximum public input into the design and implementation of mitigation activities, both the Federal Railroad Administration (FRA) and MEPA have directed Amtrak to develop a public outreach program directed at issues specific to concerns in Massachusetts. Amtrak is committed to proactively seek public input and participation in implementing the project and views local residents and businesses as integral players in designing ways in which to mitigate any adverse impacts from the project.

It is important to recognize that Amtrak is being required to mitigate noise and vibration generated by <u>its</u> electrified high-speed train operations. Because Amtrak operates only a minority of trains on the rail line, Amtrak-only efforts will not fully mitigate all noise and vibration along the rail line. It is for this reason that Amtrak intends to enter into a Memorandum of Agreement with the MBTA, which owns the Massachusetts portion of the Northeast Corridor, regarding joint efforts to mitigate noise and vibration, as well as address fencing concerns. The MBTA would chair the task forces that are proposed below for coordinating local review of and input into the mitigation efforts.

The dates for various meetings and milestones set forth below represent Amtrak's current estimate, based on the schedule for implementing the project. These dates are likely to change, but the public outreach associated with each phase of design and construction would not. The availability of Amtrak or MBTA funding for some of the work also could impact the construction schedules. However, Amtrak recognizes that it is required to implement the mitigation as a precondition for electric operations and is committed to undertaking the mitigation as proactively and broadly as possible.

Notice for meetings will be as broadly disseminated as practicable, including through local newspapers, flyers, public announcements, and direct mailing to existing FEIS/R and local address lists. In addition, Amtrak will attempt to discuss key issues with local and neighborhood media prior to the holding of public meetings to maximize awareness of the meetings and issues to be discussed.

Public Outreach To Date

Public input into the environmental review of the electrification proposal already have been significant. To date, some 15 public meetings or hearings have been held in the Boston area by the FRA, MEPA and/or Amtrak relating to the project or to specific mitigation issues. Most have been held directly in the area most impacted by the project -- Roxbury, where Amtrak has proposed siting of an electrical substation; and in Boston Southwest Corridor communities, which have raised noise, vibration and fencing concerns. These meetings include:

November 6, 1991: FRA held two public scoping sessions in Cambridge to solicit public input on issues of concern regarding the project.

August 21, 1992: MEPA held a public scoping session in Boston to solicit public input on Massachusetts-specific issues, as required by state law.

December 2, 1992: FRA held an informational update meeting in Attleboro on the draft EIS/R.

December 7, 1992: FRA held an informational update meeting in Dedham on the draft EIS/R.

December 8, 1992: FRA held an informational update meeting in Jamaica Plain on the draft EIS/R.

February 11, 1993: Amtrak made a presentation to the Madison Park Housing Corporation Parcel 18 Task Force regarding the possible location of an electrical substation in Roxbury.

April 27, 1993: FRA held a public meeting in Jamaica Plain to provide an update on the drafting of the EIS/R and solicit additional input on local concerns.

November 16, 1993: FRA held two public hearings in Jamaica Plain to detail the draft EIS/R and explain the process for commenting on the draft.

January 12, 1994: MEPA held a public hearing in Roxbury to discuss the draft EIS/R, focusing on issues related to the location of the Boston-area substation.

January 13, 1994: MEPA held a second public hearing in Roxbury to discuss the draft EIS/R, focusing on issues related to the location of the Boston-area substation.

January 13, 1994: Amtrak held a meeting with the Roxbury Neighborhood Association to discuss the draft EIS/R and issues impact Roxbury, including location of the Boston-area substation.

Notice regarding each of the above public meetings was provided as required by federal and state law, as well as in local newspapers and through the FRA's growing mail list related to the project. In addition, special notice of the January 12-13, 1994, public meeting in Roxbury was sent to a local "neighborhood crime watch" mailing list of 500 addresses of individuals, business and organizations in the Roxbury/Mission Hill area.

In addition, several meetings have been held with local state Representatives and Senators, as well as with staffs from congressional offices. Local residents have attended a number of these meetings.

Separate from the EIS process, Amtrak was directed by Congress in 1992 to undertake an analysis of train-generated noise along the Southwest Corridor and to identify ways in which to mitigate that noise both before and after initiation of electric operations. Amtrak held two public hearings in Jamaica Plain and Hyde Park regarding the study -- a preliminary meeting in 1992 to solicit input from the public on the issue and to identify locations for noise measurements; and a second meeting in 1993 to provide information to the public regarding the results of the study. Copies of the study were provided to libraries in Jamaica Plain, Roslyndale and Hyde Park.

Future Public Outreach

Amtrak's public outreach program will focus on two separate issues: location of the Boston-area electrical substation; and noise/vibration and and EMF monitoring and mitigation and developing of a fencing policy along the Southwest Corridor. Two other issues will involve extensive public outreach as well -- construction of additional parking spaces at the Route 128 Station and renovation of the historic Canton Viaduct. While Amtrak will be sharing in the cost of these projects, both will be undertaken by the MBTA.

Electrical Substation Siting

The location of the Boston-area electrical substation has yet to be finalized. Amtrak had selected a location along the rail line in Roxbury, but both FRA and MEPA urged that other locations be considered through an alternatives analysis process. The FRA included an analysis in Appendix K of the FEIS/R of six

potential locations in the Boston area where substations could be built in close proximity both to the rail line and electrical feed lines from the utility. The six locations were reduced to Roxbury and Clarendon Hills on the basis of a preliminary analysis of the ability of each site to provide adequate power to supply the needs of electrified Amtrak and MBTA commuter service. Two sites in Roxbury -- one just north of Tremont Street near the Roxbury Crossing station and one in the Ditson Building -- are under consideration.

Amtrak expects to complete a detailed power supply study of the Clarendon Hills site by March 1 (Roxbury already has been studied and shown capable of providing a sufficient electrical supply). Assuming that the analysis demonstrates that Clarendon Hills remains a viable site, Amtrak will work with both communities to ensure adequate notice of the issues and to solicit input on the final site selection. Once the site has been selected, Amtrak intends to establish a task force to focus on both architectural and design issues and to focus on construction and implementation.

Amtrak proposes the following with respect to the substation siting:

- March 1: complete power study of Clarendon Hills to determine viability of location

- March 6: two public meetings (noon and evening) will be held in Roxbury to discuss with the community the two Roxbury sites and the Clarendon Hills site under consideration, the process for selecting the substation site, what its impact might be on the community if it is built in Roxbury, and the process Amtrak would use regarding local input in design and implementation.

- March 7: two public meetings (noon and evening) will be held in Clarendon Hills to discuss with the community the process for selecting the substation site, what its impact might be on the community if it is built in Clarendon Hills, and the process Amtrak would use regarding local input in design and implementation.

- April 15 (estimated): FRA will initiate site specific environmental reviews of the sites remaining under consideration.

- o April 3: Amtrak will identify its preferred site location and hold a public meeting at that location to explain its reasoning and identify the next steps in the process.

- o June 1 (estimated): Amtrak will establish a task force representing local residents and businesses for input on architectural design and technical issues. Amtrak will present its preliminary concepts for input.

- o September 1 (estimated): The task force will meet a second time to review 30 percent design documents for the substation.

- o December 1 (estimated): FRA completes its environmental review of the preferred site.

- o December 1 (estimated): Amtrak will present final design documents to the task force. A public meeting will follow to present the design and the results of the FRA environmental review to the public for comments.

- o February 1996 (estimated): Amtrak will establish a second task force to focus on construction and implementation issues. The task Force will review construction scheduling and efforts to minimize adverse noise and traffic impacts on the community. The task force will meet monthly or as often as its members request during the construction work.

- o December 1996 (estimated): The substation will be completed.

During the process, Amtrak will also seek input from appropriate city and state agencies to address historical, traffic and land use issues.

Southwest Corridor Issues

Noise, vibration, and fencing issues along the Southwest Corridor will require extensive public and community outreach to develop a local consensus on the most appropriate and acceptable means to implement mitigation. There are a multitude of ways in which to address these issues and different approaches may be necessary for site specific locations. Because noise barriers also act as fences, the issue of the need for additional fencing would be addressed by the various task forces at those locations where noise mitigation will not be required. It should be noted

that there is virtually no experience in this country in mitigating train-generated vibration along unenclosed rail lines. Amtrak intends to undertake research into this area with the Federal Railroad Administration in the near term. In addition, the new generation of trains that Amtrak is procuring will be specifically designed to generate less vibration. In the meantime, extensive monitoring of vibration in the Southwest Corridor will be included as part of the public outreach described below.

Amtrak and MBTA must undertake these types of mitigation jointly. MBTA owns the rail line and Amtrak cannot independently implement mitigation without the approval and, in some cases, financial support from the MBTA. Moreover, the timing for the MBTA's change to electric operations for its Northeast Corridor services is a critical factor in the type and height of mitigation used to reduce noise.

Amtrak will independently establish an EMF monitoring program, implementation of which will be reviewed by the task forces described below.

Subject to the revision and approval of the MBTA, Amtrak envisions the following public outreach program for Southwest Corridor issues:

- March 13: A public meeting will be held in Jamaica Plains to identify the various issues to be monitored and mitigated, discuss the process for developing a local consensus on approach, and identify the means for establishing one or more local task forces to provide community input into the study, design and construction processes.

- March 14: A public meeting will be held in the Hyde Park/Readville area to identify the various issues to be monitored and mitigated, discuss the process for developing a local consensus on approach, and identify the means for establishing one or more local task forces to provide community input into the study, design and construction processes.

- July 1 (three months from ROD): A task force will be established by Amtrak and the MBTA to provide input on alternatives for mitigating noise and vibration along the Massachusetts portion of the Northeast Corridor rail line. The task force will also review the fencing policy to be developed by Amtrak and the MBTA, as well as the noise and

vibration monitoring plan to be implemented by Amtrak and the MBTA, and the EMF monitoring plan to be implemented by Amtrak.

- o September 1 (five months from ROD): Amtrak and the the MBTA will establish a monitoring system at various locations along the Southwest Corridor to establish base line measurements for noise, vibration, and EMF.

- o October 1 (six months from ROD): The task force will review preliminary design options for installation of one or more prototype noise mitigation systems and review alternative locations for installing the prototype system(s).

- o December 1 (eight months from ROD): Design of the prototype mitigation measures will be completed and presented to the task force(s). A public meeting will be held at the location(s) for the prototype mitigation to present the designs to the public and outline an implementation plan. The task force will continue to meet as required to review plans for installing the prototype mitigation.

- o August 1, 1996 (estimated): The installation of the prototype mitigation will be completed. A public meeting will be held to review a testing and monitoring program and develop public input on the effectiveness of the mitigation.

- o October 1 (estimated): Public meetings will be held at various locations along the Southwest Corridor to discuss proposals for extending mitigation to all areas identified as requiring mitigation. Areas requiring additional fencing also will be identified.

- o February 1, 1997 (estimated): The task forces would review preliminary designs for the remainder of the mitigation measures. Public meetings would be held along the Southwest Corridor to solicit input on the preliminary designs. The task forces would meet regularly to provide input into the design process.

- o September 1, 1997 (estimated): Final designs for the mitigation would be presented to the task forces and to the public.

- o October 1, 1997-98 (estimated): The mitigation measures would be installed along the rail line. During construction, the task Force will review construction scheduling and efforts to minimize adverse noise and traffic impacts on the community. The task force will meet monthly or as often as its members request during the construction work.

- o October 1998 (estimated): A long-term monitoring program will be implemented to measure noise, vibration, and EMF at sensitive locations following initiation of electrified service by Amtrak.

During the process, Amtrak will also seek input from appropriate city and state agencies to address historical, traffic and land use issues.

Following the initiation of electrified Amtrak operations, Amtrak will continue to monitor noise, vibration and EMF as required by the FEIS/R and mitigate impacts that exceed the mandated thresholds. Wherever such mitigation is required, Amtrak will generally follow the public outreach approach described above to maximize public input and involvement into the implementation of mitigation.

4373: Final Environmental Impact Report Supplement: Northeast Corridor Improvement Project Electrification - New Haven, CT to Boston, MA

13-Electrification