

## CHAPTER TWO

### METHODOLOGY

#### Historic and Archaeological Reconnaissance Survey

##### Project Goals

The purpose of the cultural resources reconnaissance survey was to identify known historic and archaeological resources within the MBTA's Green Line Extension project Area of Potential Effect (APE). The survey was also designed to provide recommendations regarding the locations of potential sensitivity for archaeological resources and identified historic resources requiring additional intensive survey and/or significance evaluation.

The specific tasks involved in the reconnaissance survey were:

- to conduct a preliminary reconnaissance survey of all buildings, sites, structures, and objects 50 years old or older and of resources that are less than 50 years old, but which may possess exceptional significance;
- to review environmental and site file data to determine the presence of any known archaeological sites in the area, the extent of past ground disturbance, and the existence of any locations of potential archaeological sensitivity; and
- to make recommendations regarding the need for additional survey and evaluation work and the potential eligibility for listing in the National Register of those properties.

To achieve these goals, two strategies were employed: archival research and field survey of the APE.

##### Area of Potential Effect

The APE, in accordance with 36 CFR 800.16(d) is the area or areas within which an undertaking may directly, indirectly, or cumulatively cause changes in the character or use of historic properties (defined as resources listed or eligible for listing in the National Register), if any such properties exist. In addition to the actual site of the undertaking, the APE also includes other areas where the undertaking could cause changes in land use, traffic patterns, or other aspects that could affect historic properties. Different project factors may produce more than one APE for a given undertaking. Factors with potential to cause changes are noise, vibration, visual (setting), traffic, atmospheric, construction, indirect, and cumulative.

The Green Line Extension project has two APEs. The APE for historic resources is defined as an area extending approximately 125 feet or one assessor's lot on either side of the proposed Green Line Extension Medford and Union Square Branch routes, associated proposed station locations, and maintenance and/or interim train storage facilities. The APE extends out to encompass the boundaries of historic districts. Individual National Register listed or eligible properties outside the 125-foot area will not be affected. This area encompasses the direct APE, defined as the construction limits of the project, as well as the indirect APE.

The APE for archaeological resources is the direct APE where ground disturbances are planned for the construction of project elements. These elements include the active and inactive railroad ROW segments; new station locations, the new layover/maintenance facility, and any other ancillary work areas and landtakings identified as part of the alternatives refinement.

### **Archival Research**

Existing cultural resource inventories, reports, and collected information about previously documented archaeological and historic resources in the Green Line Extension project area were reviewed. These include the Inventory of the Historic and Archaeological Assets of the Commonwealth, and National Register files maintained by the MHC as well as the files of the Boston Landmarks Commission (BLC). Other archival materials, including local histories, historical maps and photographs, and census data were collected to establish a historical context for the towns encompassing the project area. Environmental, geotechnical, and utilities information was reviewed to establish environmental contexts and understand prior ground disturbance.

Specific sources reviewed as part of the archival research for the Green Line Extension project include:

#### ***State Inventory Forms and Regional/Town Reconnaissance Surveys***

The state site, building, district, structure, and object forms were retrieved from the MHC and reviewed to locate any recorded archaeological sites or historic properties in or close to the project. MHC inventories include resources listed or eligible for listing in the National Register. National Register of Historic Places nomination forms were also collected for resources located in or near the project area. The National Register Information System database (NRIS) was used to identify properties located in the vicinity of the project area. Other references consulted include the MHC's town reconnaissance reports for Cambridge (1980a), Medford (1981b), Charlestown (1980c), and Somerville (1980e). Regional reports from the MHC included *Historical and Archaeological Resources of the Boston Area* (1982a) and *Historical and Archaeological Resources of the Connecticut Valley* (1984).

#### ***Cultural Resource Management Reports***

Reports documenting cultural resource management (CRM) investigations conducted in the project vicinity were reviewed. These reports included: 1) *Cambridge: Survey of Architectural History in Cambridge: Cambridgeport* (Cambridge Historical Commission 1971); *Archaeological Investigations, NorthPoint Project Including the Lechmere Station Relocation Project Area of Potential Effect, Cambridge/Somerville/Boston, Massachusetts* (Cherau and Banister 2007); *Circumferential Transportation Improvements, Urban Ring Corridor: Phase 2, Archaeological Reconnaissance Survey and Supplemental Sensitivity Assessment of the Four Preliminary Build Alternatives, Boston, Brookline,*

*Cambridge, Chelsea, Everett, Medford, and Somerville, Massachusetts* (Cherau et al. 2008); *Archaeological Reconnaissance Survey, Cottage Farm CSO Storage Project, Cambridge, Massachusetts* (Deaton and Mair 2003); *Report on Excavations at Fort Washington, 1974–75* (Goodman 1975); *Archaeological Reconnaissance Survey, Kendall Station Electrical Interconnect, Cambridge, Massachusetts* (Mair 2001); *Phase I Archaeological Study for the Proposed Lechmere Reconstruction Project, Cambridge, Massachusetts* (Moir 1978); *Archaeological Investigations 10 St. James Avenue* (Mrozowski et al. 1999); and *Archaeological Investigations 25 Huntington Avenue* (Mrozowski et al. 2000); 2) **Medford:** *Reconnaissance Archaeological Survey, AGT J-2 Loop Gas Transmission Line Replacement, Medford and Somerville, Massachusetts* (Cherau 2007); *Intensive (Locational) Archaeological Survey, AGT Mystic River Replacement Anomaly, Medford, Massachusetts* (Waller 2001); 3) **Somerville:** *Middlesex Canal Heritage Corridor, Assessor’s Plan Map Book, June 8, 2007* (Middlesex Canal Commission 2005/07); *Middlesex Canal Archaeological Reconnaissance Survey, Massachusetts* (Russo and Kierstead 1999); *Historic and Commercial and Industrial Properties Survey, Somerville, Massachusetts* (Fitch & Hollister 1990); *Beyond the Neck: The Architecture and Development of Somerville, Massachusetts* (Zellie and Stott 1990).

### ***Histories and Maps***

Primary and secondary histories and historical maps and atlases were examined to assess changes in topography, land use, buildings, streetscapes, and the rail corridor within the project area. Town, county, state, and regional histories (CHC 1971; City of Somerville 2003; Cook 1976; Gookin 1972; Guzzi 1975; Maycock 1988; MDHCD 2003; Morrison 1923; Samuels and Kimball 1897; Seaburg and Seaburg 1980; Winthrop 1996; Zellie and Stott 1990) were consulted to locate possible sites within and close to the project area. Historical cartographic research was conducted using maps dating from 1700 to 1919 (Beers 1875; Bromley 1930; Draper 1852; Hales 1830; Hastings 1896, 1919; Mason 1849; Sparrell 1830; Tufts 1794; Walker 1889; Walling 1855). Sanborn fire insurance maps dating from 1888 to 1936 (Sanborn Map Company 1888a, 1888b, 1897, 1900a, 1900b, 1903, 1910, 1933-34, 1934, 1936) were also examined. Additional information regarding specific properties was retrieved from online census data (Census 1930), and the Tufts University digital library (Miller 1986; Tufts 2004).

PAL staff consulted historical materials relating specifically to the history of the Boston and Lowell, Fitchburg, and Boston & Maine railroads (Boston & Maine Railroad 1955; Harlow 1946; Karr 1989, 1995; Kennedy 1951,a, 1951b, 1962; Middleton 1991; Waters 1836). Historical photographic views of the rail corridor from the Prints Collection of the Boston Public Library were also used.

### ***Environmental Studies***

Bedrock and surficial geological studies provided information about the region’s physical structure and about geological resources near the project area (Billings 1976; Charles River Watershed Authority [CRWA] 2007; Clapp 1902; Fenneman 1938; Kaye 1976; Kaye and Barghoorn 1964; Mystic River Watershed Authority [MRWA] 2007; Power 1957; Rosen et al. 1993; Shimer 1918; Zen et al. 1983). The United States Department of Agriculture (USDA) Soil Conservation Service soil survey for Middlesex County (1986) was used for general information about soil types and surficial deposits within the project area and the general categories of flora and fauna that these soil types support. In addition, studies of past environmental settings of New England were consulted.

### *Geotechnical and Utilities Data*

All available underground utilities information and geotechnical data (e.g., soil boring logs and reconstructed soil profiles) were reviewed to assist in determining the depths and survival potential of cultural strata that could contain significant archaeological resources within railbed and roadbed ROWs. The utilities information was obtained from the EOT-MBTA project team. The soil borings and reconstructed soil profile information was obtained from the project's *Geotechnical Data Report* (Parsons Brinkerhoff 2006). The report was based on existing data obtained from available bridge design drawings and bridge geotechnical reports along with some earlier boring data on file with the Boston Society of Civil Engineers for the greater Boston area. The available soil borings information presented in the project's geotechnical data report is dated 1926 thru 2004. To date, no soil borings have been conducted specifically for the Green Line Project, including land-taking areas outside of the railbed and roadbed ROWs.

### **Field Survey**

A walkover/driveover reconnaissance field survey was conducted for the Green Line Extension project to identify historic resources and areas potentially sensitive for archaeological resources. The historic resources survey included an initial driveover along the project corridor to become familiar with the general character and number of historic resources within it. PAL's industrial historian walked the entire length of both of the existing rail ROWs, including proposed station locations. *This walkover was conducted under escort and with special access permit for live railroad lines.* Photos of and written notes about features along the rail corridors were taken. A walking survey of the APE corridor, including stations, outside of the ROW was conducted by a team of architectural historians. The survey included all buildings, structures, objects, areas, districts, streetscapes, parks, and urban landscapes that appeared to be at least 50 years old. MHC forms for previously recorded areas or properties were consulted on site and alterations to the properties were noted. Information about the resources including MHC number, date of construction, address, historic name/function, setting, condition, and historic designation and status was recorded in tabular format. Digital photographs were taken of all resources, streetscapes, and railroad/industrial landscapes. Viewshed photographs of the railroad were taken from select surveyed properties. All resources were recorded on an aerial map of the project area. Properties within the APE that were not historic were also marked on the map so that no properties were overlooked. The survey provided data about the full spectrum of historic resources along with a preliminary assessment of historically and architecturally significant buildings, sites, structures, objects, and areas/districts.

Field survey for archaeological sensitivity was conducted for off-ROW work areas including stations and land-takings to obtain existing conditions information about ground surface integrity, modern disturbances, and current environmental settings. Because of safety and permit requirements, the existing conditions information for ROW work areas was obtained from the digital photographs and field notes collected by PAL's team of architectural and industrial historians.

During the walkover survey and existing conditions data review, PAL staff looked for surface indications of archaeological sites. Although Native American sites in New England are most often found below the present ground surface, it is not unusual to find artifact scatters exposed through cultural or natural

processes, including road use, gravel pitting, construction activity, and erosion. Euro-American site types that might be visible include stone foundations, dams, stone walls, and trash deposits.

### **National Register Criteria for Evaluation**

The reconnaissance survey identifies properties that are listed or previously evaluated as eligible for listing in the State Register and National Register, and properties that are designated National Historic Landmarks (NHL), if any exist. In addition, the survey provides preliminary National Register eligibility recommendations and recommendations for further identification survey and for evaluation of the significance of cultural resources within the APE.

The National Register criteria (36 CFR 60) are the standards for evaluating the significance of resources as established by the NPS, Department of the Interior. The criteria are designed to guide the evaluation of potential entries for the National Register. The NHL eligibility criteria are similar to the National Register criteria, but apply to properties of national significance.

The National Register criteria state that, “the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

- A. that are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. that are associated with the lives of persons significant in our past; or
- C. that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose component may lack individual distinction; or
- D. that have yielded, or may be likely to yield information important in prehistory or history.

### **Archaeological Sensitivity Assessment**

Information collected during the archival research and the walkover survey/existing conditions review was used to develop a predictive model of potential site types and their cultural and temporal affiliation. The development of predictive models for locating archaeological resources has become an increasingly important aspect of CRM planning.

The predictive model considers various criteria to rank the potential for the Green Line Extension project area to contain archaeological sites. The criteria are proximity of recorded and documented sites, local land use history, environmental data, and existing conditions. The project area was stratified into zones of expected archaeological sensitivity to determine which areas would be tested.

### *Pre-Contact Period Archaeological Sensitivity*

Sets of key environmental variables used to predict the location of pre-contact sites have been compiled from research conducted by professional archaeologists. Those studies have demonstrated that certain environmental and topographical settings are strongly associated with the presence of Native American sites during the pre-contact period. The most productive studies have been of large areas with a variety of environmental settings that were field tested to determine the validity of the predictive model. For example, an analysis of several hundred sites in southeastern New England (Thorbahn et al. 1980) found that the highest concentration of pre-contact sites occurred within 300 meters (m) of low-ranking streams and large wetlands. The distribution of sites found along a 14-mile I-495 highway corridor in the same area confirmed this observation (Thorbahn 1982).

Other studies have found that pre-contact site locations are strongly associated with modern wetland densities (Mulholland 1984). Wetlands provide both a home and breeding habitat for a diverse set of animals, support foods and other vegetation. Pre-contact Native Americans sought the most productive wetlands, including those with a wide variety of resources and those with consistent and reliable resource availability (Hasenstab 1991; Nicholas 1991; Thorbahn 1982; Thorbahn et al. 1980).

Geologic data provide information about lithic resources and current and past environmental settings and climates. Bedrock geology helps to identify where pre-contact Native Americans obtained raw materials for stone tools and gives indications of how far from their origin lithic materials may have been transported or traded. The variety and amount of available natural resources are dependent on soil composition and drainage, which also play a significant role in determining wildlife habitats, and forest and plant communities.

Geomorphology assists in reconstructing the paleoenvironment of an area and is particularly useful for early Holocene (PaleoIndian and Early Archaic period) sites in areas that are different physically from 10,000 years ago (Simon 1991). Recent landscape changes such as drainage impoundments for highways and railroads, the creation of artificial wetlands to replace wetlands affected by construction, or wetlands drained for agricultural use, can make it difficult to assess an area's original configuration and current archaeological potential (Hasenstab 1991:57).

Beyond predicting where sites are located, archaeologists attempt to associate cultural and temporal groups with changes in the environmental settings of sites. Changes in the way pre-contact Native Americans used the landscape can be investigated through formal multivariates such as site location, intensity of land use, and specificity of land use (Nicholas 1991:76). However, distinguishing the difference between repeated short-term, roughly contemporaneous occupations and long-term settlements is difficult, and can make interpreting land use patterns and their evolution problematic (Nicholas 1991:86).

### *Contact Period Archaeological Sensitivity*

The contact period in New England is roughly from AD 1500 to 1650, and predates most of the permanent Euro-American settlements in the region. This period encompasses a time when Native and non-Native groups interacted with one another through trade, exploration of the coastal region, and sometimes

conflict. While contact period sites are usually associated with Native American activity during this period, they can also include sites utilized by Native and non-Native groups such as trading posts.

Native settlement patterns during the contact period are generally thought to follow Late Woodland traditions, but with an increased tendency toward the fortification of village settlements. Larger village settlements are frequently expected along coastal and riverine settings, often at confluences. Inland villages are known to occur near swamp systems, which were exploited both as resource areas and as places of refuge in the event of attack. Such sites would likely contain material remnants reflecting the dynamics of daily life, trade, and preparedness for defense.

The identification of contact period deposits is most frequently tied to the types of artifacts located within archaeological sites. Unfortunately, the majority of the archaeological data for this period in southern New England comes from the analysis of grave goods within identified Native American burial grounds, rather than from habitation sites and/or activity areas (Gibson 1980; Robinson et al. 1985; Simmons 1970). The available data suggest that sites dating to this period often contain traditionally pre-contact features and artifacts (e.g., storage pits, chipped-stone tools) as well as non-Native trade goods and objects (e.g., glass beads, iron kettles and hoes) (Bragdon 1999). The earliest contact period sites are often located at or near the coast and estuarine margin, since European visits to New England occurred via ship. Non-Native artifacts passed from the coastal region to the interior through trade and/or seasonal travel.

### *Post-Contact Period Archaeological Sensitivity*

The landscape of a project area is used to predict the types of post-contact period archaeological sites likely to be present. Major locational attributes differ according to site type. Domestic and agrarian sites (houses and farms) are characteristically located near water sources, arable lands and transportation networks. Industrial sites (e.g., mills, tanneries, forges, and blacksmith shops) established before the late nineteenth century are typically located close to waterpower sources and transportation networks. Commercial, public and institutional sites (e.g., stores, taverns, inns, schools, and churches) are usually situated near settlement concentrations with access to local and regional road systems (Ritchie et al. 1988).

Written and cartographic documents aid in determining post-contact period archaeological sensitivity. Historical maps are particularly useful for locating sites in a given area, determining a period of occupation, establishing the names of past owners, and providing indications of past use(s) of the property. Town histories often provide information, including previous functions, ownership, local socioeconomic conditions, and political development, that is used in the development of a historic context and assessing the relative significance of a post-contact period site.

The written historic record, however, tends to be biased toward the representation of Euro-American cultural practices and resources, particularly those of prominent individuals and families. Archival materials generally are less sensitive to the depiction of cultural resources and activities associated with socioeconomically or politically “marginalized” communities (MacGuire and Paynter 1991; Scott 1994). These communities may include, but are not limited to, Native Americans, African-Americans, and “middling” farming or working-class Euro-Americans.

Several archaeological studies conducted throughout New England have demonstrated the methodological pitfalls of relying exclusively on documentary or cartographic materials as a means to identify potential site locations associated with these types of communities. A large-scale archaeological study by King (1988) showed that in rural areas only 63 percent of the sites discovered were identifiable through documentary research. This suggests that approximately one-third of New England's rural Euro-American archaeological sites may not appear on historical maps or in town and regional histories.

More recent archaeological and ethnohistoric studies in the region have focused on the identification of other historically "invisible" communities, notably post-contact Native American communities. Several townwide surveys in southeastern Massachusetts have compiled archaeological and historical data about eighteenth- and nineteenth-century Native and African-American communities that are poorly represented or are altogether absent in written town histories (Herbster and Cox 2002; Herbster and Heitert 2004). In central Massachusetts, active and influential Native Americans have been identified through archival research despite the recorded "disappearance" of this group in the early eighteenth century (Doughton 1997, 1999). The cultural continuity of groups such as the Aquinnah Wampanoag is more thoroughly documented in archival sources, but until recently archaeologists focused their attention on pre-contact archaeological deposits. Current studies include predictive models for distinctly Native American post-contact sites, as well as interpretations of eighteenth- through twentieth-century archaeological sites (Cherau 2001; Herbster and Cherau 2002).

Other archaeological investigations have focused on worker housing and landscape organization within mixed-cultural mining communities in northern New England (Cherau et al. 2003); the social and spatial organization of a mixed racial community in western Connecticut (Feder 1994); and material culture and architectural patterns among nineteenth-century mixed African-American and Native American households in central Massachusetts (Baron et al. 1996).

Information about post-contact period land use within a project area can also be collected through written and oral histories passed through family members and descendant communities. These types of information sources can often fill in gaps in the documentary record and provide details that are not available through more conventional archival sources. While informants and other oral sources are subject to contradictory interpretations just like the documentary record, this type of information can also provide important data for the identification and interpretation of archaeological sites. However, the sole use of and reliance on the written and oral historical records during archival research can lead to an underestimation of the full range of post-contact period sites in any given region. Therefore, walkover surveys and subsurface testing, in conjunction with the critical evaluation of available documentary and cartographic resources, are required to locate and identify underdocumented historic sites.

### *Archaeological Sensitivity Ranking*

The Green Line Extension project area was ranked according to the potential for the presence of archaeological resources based on information collected during the archival research, geotechnical and utilities data review, and walkover/existing conditions review. Table 2-1 is a summary of the different factors used to develop the archaeological rankings for the project.



**Table 2-1. Archaeological Sensitivity Rankings Used for the Green Line Extension Project Area.**

FACTORS								RANKING
PRESENCE OF SITES		PROXIMITY TO FAVORABLE CULTURAL/ ENVIRONMENTAL CHARACTERISTICS			DEGREE OF DISTURBANCE			
Known	Unknown	< 150 m	150-500 m	> 500 m	None/ Minimal	Moderate	Extensive	Sensitivity
•		•			•			High
•		•				•		High
•		•					•	Low
•			•		•			High
•			•			•		High
•			•				•	Low
•				•	•			High
•				•		•		High
•				•			•	Low
	•	•			•			High
	•	•				•		High
	•	•					•	Low
	•		•		•			Moderate
	•		•			•		Moderate
	•		•				•	Low
	•			•	•			Moderate
	•			•		•		Low
	•			•			•	Low

**Historic and Archaeological Resources Assessment, Maintenance Facility Option L**

PAL staff reviewed information about the proposed alternative, including the *Green Line Extension Project, Additional Maintenance Facilities Analysis* (VHB 2009). PAL archaeologists and architectural historians reviewed MHC Inventory and National Register files, as well as historical maps, general histories, and current assessor’s data in order to compile information about known and potential cultural resources, particularly those classified as “historic properties,” and past land use in the area. The APEs for historic and archaeological resources were consistent with those used for the historic and archaeological reconnaissance survey.

**Historic Resources Intensive Survey**

**Project Goals**

The purpose of the Green Line Extension historic resources intensive survey was to conduct research and fieldwork, develop specific historic contexts for individual properties, complete MHC inventory forms, and evaluate the National Register eligibility of six historic resources within the Green Line Extension project APE that were recommended as potentially National Register eligible in the

reconnaissance survey, but which did not have existing MHC inventory forms (Adams et al. 2008). To achieve these goals, archival research, field survey, and evaluation analysis was completed for the six individual properties.

### **Archival Research**

In order to complete the intensive level survey, research in archival materials, including local histories, historical maps and photographs, and census data was performed to understand the historic context for the properties. Specific sources reviewed as part of the archival research included *Historic and Commercial and Industrial Properties Survey, Somerville, Massachusetts* (Fitch & Hollister 1990); *Beyond the Neck: The Architecture and Development of Somerville, Massachusetts* (Zellie & Stott 1990). Primary and secondary histories and historical maps and atlases were examined to understand the development of the area. Town, county, state, and regional histories (Cambridge Historical Commission [CHC] 1971; City of Somerville 2003; Cook 1976; Gookin 1972; Guzzi 1975; Maycock 1988; MDHCD 2003; Morrison 1923; Samuels and Kimball 1897; Seaburg and Seaburg 1980; Winthrop 1996) were also consulted. Historical cartographic research was conducted using maps dating from 1700 to 1919 (Beers 1875; Bromley 1930; Draper 1852; Hales 1830; Hastings 1896, 1919; Mason 1849; Sparrell 1830; Tufts 1794; Walker 1889; Walling 1855). Sanborn fire insurance maps dating from 1888 to 1936 (Sanborn Map Company 1888–1936) were also examined. Additional information regarding specific properties was retrieved from online census data (Census 1930), and the Tufts University digital library (Miller 1986; Tufts 2004). Various local archives were visited including the Massachusetts Archives located in Boston, Massachusetts, the archives at Tufts University, and the University of Massachusetts Boston Joseph P. Healey Library. Other research institutions visited include the Massachusetts State Library Special Collections and the Boston Public Library. The Safety Inspection records at the Massachusetts Archives in Boston, the Cambridge Inspectional Services, and the Medford Building Department were visited to review current and historical building plans and plan cards.

### **Field Survey**

PAL staff visited each of the six buildings identified for intensive survey in March 2010 to photograph and record their existing conditions. Photography was performed by an architectural historian using a Nikon D40 camera. Several views of each building and its surrounding area were taken, including any character-defining features. Current assessor's maps, acquired from the city assessor's online database, were used to verify the boundaries of each property and document views for the MHC building forms.

### **Consultation Evaluations**

The National Register evaluation status for several properties was adjusted during the course of Section 106 consultation with the MHC, Boston Landmarks Commission, CHC, Medford Historical Commission, and Somerville Historic Preservation Commission in October and November 2010. Revisions were based on information provided by consulting parties and on additional data collection and analyses completed by PAL at the direction of MassDOT. This information is incorporated into the presentation of survey results in Chapter 6 of this report.