

Figure 2.0-1
Site Plan
Existing Conditions

DATE: 01/25/09 3:37PM DRAWN BY: JMM/LSA
 PROJECT: 01/25/09 3:37PM DRAWN BY: JMM/LSA
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3.0 Purpose and Need

The purpose of this project is to renovate the station to comply with ADA requirements.

The platform level is located on the Lechmere Viaduct, a historic structure. There are two platforms, one for inbound service and one for outbound service. Both platforms have insufficient width over the viaduct to comply with the boarding and alighting requirements of passengers with disabilities. Each platform has a canopy for weather protection, benches, lighting, and signage. The overhead catenary system runs along the outbound platform and both platforms have a small starter's booth. In addition to the inadequate platform width, there are other conditions at the Science Park/West End Station which do not meet ADA requirements:

- Access to the elevated platform cannot be achieved by passengers with disabilities;
- Distance of platform above the top of rail (ATR) does not allow the Green Line low floor vehicles (LFV) proper space to deploy its ramp for the boarding and alighting of passengers with disabilities;
- No areas of refuge on the platforms;
- No visual announcement system; and
- No accessible handrails in the stairs from the mezzanine to the inbound and outbound platforms.

It also does not have a second means of egress from either platform to a point of safety, which is a requirement of NFPA 130, the egress code in effect.

4.0 Efforts to Identify Section 4(f) Properties

4.1 Parks and Recreation Lands

The Science Park/West Station is located within the Charles River Basin National Register Historic District, which includes the Charles River and both its banks in Boston and Cambridge, from the Charles River Dam to the Eliot Bridge. No significant wildlife or waterfowl refuges will be affected by the project. The parcel where the station is located is owned by the DCR and protected by Article 97 of the Massachusetts constitution. It will be necessary to permanently take 1,325 square feet of DCR land for the station's new elevators and lobbies. These impacts are considered a de minimus use of the parkland resource.

4.2 Historic and Archaeological Resources

A historic property, as defined in 36 CFR 800, the implementing regulations of the Advisory Council on Historic Preservation (ACHP), is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. The Department of Transportation Act of 1966 includes a requirement that the approval of a transportation project requiring the use of a historic sites can only occur under certain conditions. Historic sites as defined in Section 4(f) are historic properties listed or eligible for listing in the National Register. The identification and evaluation of cultural resources for the Science Park/West End Station project fulfills the need to establish knowledge of the historic properties that may be affected by the project.

4.2.1 Historic Resources

The Area of Potential Effect (APE) of a project, as defined in 36 CFR 800, is the geographic extent of project planning where possible effects to cultural resources may occur. The APE for historic above-ground resources for this project was defined as the Science Park/West End Station and the immediate surrounding area, where changes to the station have the potential for direct physical or indirect (such as visual) effect on significant historic resources. Following field analysis, the APE was defined as a circular

area with a radius extending approximately 600 feet from the center of the Science Park/West End Station.

The Science Park/West End Station is within a National Register Historic District, adjacent to an individual National Register-eligible property, and adjacent to properties that are included in the Inventory of the Historic Assets of the Commonwealth (Inventory), maintained by the Massachusetts Historical Commission (MHC). The Science Park/West End Station is recommended as eligible for individual listing on the National Register. The station may also be eligible as a contributing element to the Charles River Basin National Register Historic District if the period of significance (1893-1910) defined in 1978 were expanded to encompass the period from 1910 to 1958. In addition to the Charles River Basin Historic District and the Lechmere Viaduct, the APE for the project encompasses the Lock Houses and the Charles River Dam, which are contributing elements to the Charles River Basin Historic District. Four historic resources – the Stop Plank House, Storrow Drive, Storrow Embankment, and the Museum of Science – are more than 50 years old and have not been individually surveyed, but are within the bounds of the Charles River Basin Historic District, although they fall outside of the period of significance.

Charles River Basin National Register Historic District

The Charles River Basin is a major component of the metropolitan Boston park system, the first such system in the United States. Conceived in the nineteenth century, the Basin is an important landscape and recreational asset containing numerous structures representing a range of architectural styles and engineering accomplishments spanning more than 100 years. The 820-acre Charles River Basin Historic District incorporates parkways and landscaped areas on both banks for a distance of approximately six miles upstream, beginning at the Lechmere Viaduct. The National Register nomination that was completed in 1978 defined a period of significance from 1893 to 1910.

Contributing Resources

Three contributing historic resources within the Charles River Basin Historic District are located within the project APE. One of these properties was previously determined individually eligible for the National Register:

Lechmere Viaduct (a/k/a Street Railway Viaduct and East Cambridge Viaduct)

The Lechmere Viaduct, completed in 1910, carries the Massachusetts Bay Transportation Authority's (MBTA) Green Line between the Science Park/West End Station in Boston and Lechmere Station in Cambridge. The viaduct consists of three distinct attached elements: a short modified portion of steel elevated structure underneath the Science Park/West End Station in Boston, a reinforced concrete multiple arch and pier section crossing the Charles River adjacent to the Charles River Dam, and a riveted steel deck girder and column section extending west to Lechmere Station in Cambridge. The concrete section of the viaduct was designed by Robert S. Peabody of the noted and prolific Boston architectural firm of Peabody and Stearns. The structure was a product of the "City Beautiful" movement and was designed to provide an attractive eastern terminus for the Charles River Basin.

Both the concrete viaduct and the Science Park/West End Station portion of elevated structure are located within the Charles River Basin Historic District, and the viaduct is a contributing resource to the district. The concrete portion of the viaduct and its bascule trunnion drawbridge were determined individually eligible for National Register listing in 1985. The section under the Science Park/West End Station, which is the only remaining portion of the elevated structure in Boston proper, was not included in the determination of eligibility. The Cambridge portion of the elevated was recommended as eligible in 2004.

Charles River Dam (a/k/a Craigie Dam)

The Charles River Dam (1910) is a massive earth and granite block dam spanning the Charles River between Boston and Cambridge. The Charles River Dam was constructed by the Metropolitan District Commission (MDC) between 1905 and 1910 as a sanitary and public works endeavor to control the water level of the Charles River Basin and allow the river's development as a scenic and recreational resource. The dam carries the Monsignor O'Brien Highway across the top and contains inactive sluiceways, gates, and locks for both small and large boats. The portion of the Charles River Dam located within the APE contains the Charles River Dam Bridge (1961). Of the five structures located on the dam that are related to its historical operation, the Upper and Lower Lock Houses and the Stop Plank House are also within the APE. The majority of the land area on the dam is occupied by the Boston Museum of Science, which is discussed in its own section below Upper (Police Headquarters) and Lower Lock Houses

The Upper Lock House (Police Headquarters) and Lower Lock House (1910) are two-story Italianate-style structures abutting the east side of the large boat canal on the east end of the Charles River Dam. Both structures are built of yellow brick with complex hipped green shingle roofs, buff brick walls, and granite water tables and window sills. The lowest level of each tower houses a motorized lock gate leaf and pumping machinery to evacuate water from the lock.

The lock houses were designed by Guy Lowell along with other buildings and the historic landscape architecture of the Charles River Dam. Both buildings are contributing elements to the Charles River Basin Historic District (BLC 1978b).

Resources without Survey or Evaluation

The Science Park/West End Station and four other resources within the Charles River Basin Historic District boundaries are older than 50 years and have not been surveyed and/or evaluated. Their dates of construction fall outside the period of significance for the district as it is presently defined (1893-1910). However, if the period of significance for the district was reevaluated and extended to encompass properties 50 years of age and older, as is customary, then the station would be a contributing element of the district. In addition, the Science Park/West End Station is recommended as eligible for individual listing in the National Register.

James J. Storrow Memorial Embankment

The James J. Storrow Memorial Embankment (1931, altered 1951) is a linear greensward with multiple recreational facilities that extends along the shores of the Charles River Basin beginning at the intersection of Charles Street and the Monsignor O'Brien Highway on the edge of Leverett Circle. Landscape architect Arthur Shurcliff, formerly an apprentice in the Olmsted office, designed the park and oversaw its construction. The Storrow Memorial Embankment is included within the Charles River Basin Historic District nomination boundaries and is described in the nomination. However, its date of construction falls outside the period of significance (1893-1910).

Stop Plank House

The Stop Plank House is a buff brick structure with a hipped slate roof and a textured concrete water table constructed in 1938 for equipment maintaining the locks and sluiceways. The Stop Plank House is located within the Charles River Basin District nomination boundaries, but its date of construction falls outside the period of significance.

Boston Museum of Science and Hayden Planetarium

The Boston Museum of Science (1951 *et seq.*) is a highly visible complex of modern brick structures connected on an east-west axis across the Charles River Dam. The Museum of Science was founded by the Boston Society of Natural History. The East Wing, designed by Ames, Child and Graves, was completed in 1951. The new museum was distinguished as the first to encompass all branches of

scientific investigation under one roof and exemplifies the surging popular interest in the sciences after World War II. Subsequent large additions to the Museum were made from 1958 to 1980. The Science Park/West End Station was built in 1955 to meet the needs of the increasing crowds of visitors to the museum.

The Museum of Science is located within the Charles River Basin District nomination boundaries and is described in the Charles River Basin District nomination, but its date of construction falls outside the period of significance. However, if the period of significance for that nomination were expanded, then the Museum of Science might be eligible as a contributing element of the district. Only the 1987 Mugar Omni Theatre portion of the structure, built after the National Register District was listed, falls within the project APE.

James J. Storrow Memorial Drive

Storrow Drive (1951) is a four-lane parkway running through the Storrow Embankment via a combination of tunnels, ramps, and above-grade roads. A portion of Storrow Drive passes below the Science Park/West End Station in a reinforced concrete tunnel before emerging above ground south of Leverett Circle. The Massachusetts General Court passed legislation authorizing construction of Storrow Drive in 1948 and the road was completed in 1951. Storrow Drive is described in the 1978 Charles River Basin Historic District nomination, but is outside the period of significance (1893-1910). It has a MACRIS number, but no inventory form on file at MHC. This property has not been surveyed or evaluated.

Science Park/West End Station

The Science Park/West End Station (1955) is a multi-level steel frame structure built on, beside, and below the steel elevated railway at the east end of the Lechmere Viaduct. The station consists of four primary components: inbound and outbound station platforms on top of the viaduct at track level; inbound and outbound stair towers leading from the platform level to the mezzanine on the north and south sides of the Viaduct; a mezzanine situated below the viaduct but raised several feet off the ground; and three lower staircases leading from the mezzanine to grade level, one each on the north and south sides of the viaduct and one abandoned stairway under the concrete portion of the viaduct. The Science Park/West End Station was built on a modified portion of the Lechmere Viaduct by the MBTA at the request of the Boston Museum of Science, which desired more convenient rapid transit access for patrons visiting its new facility on the Charles River Dam. The Science Park/West End Station was constructed during a period of service expansion by the MBTA in the 1950s and appears to be representative of the organization's urban station construction. The station is individually eligible for inclusion in the National Register under Criteria A and C at the local level in the areas of entertainment/recreation, education, and transportation. The Science Park/West End Station was constructed after the Charles River Basin Historic District nomination period of significance; however, if the period of significance for the district were changed, then the station would be a contributing element of the district.

4.2.2 Archaeological Resources

An archaeological sensitivity assessment included a review of historic maps and land-making in Boston's West End, 30 percent project design plans, past/current utility maps, and geotechnical (e.g., soil borings) data.

Soil borings conducted to date in the immediate vicinity of the Science Park/West End Station, including at the proposed location of the north elevator, stairwell, and entrance, indicate the presence of multiple, relatively uniform fill deposits to depths between 14 and 19 feet below grade. The history of land-making for this former shoreline section of the West End of Boston indicates that the lower fill deposits likely date to the middle to latter part of the nineteenth century. The uppermost layers of fill are more likely related to the various twentieth century transportation-related construction. These fill deposits do not contain any meaningful archaeological context, and therefore are assigned a low sensitivity for potentially significant cultural deposits.

The fill is directly underlain by gray and black organic silt with traces of shell, peat fibers, and wood, presumably at or near the pre-nineteenth century river bottom/intertidal zone of the former estuary. The lower portions of these organic silts and underlying silty sand and clay strata (between 14 and 30 feet below grade) are considered archaeologically sensitive for pre-contact/contact period Native American cultural resources including fishweir remains. The soil strata between 14 and 19 and 30 feet in the below-grade project work areas are assigned high archaeological sensitivity. There may have been some soil disturbances at these depths from the 1954-1955 construction of the substructure pilings for the existing station structure, but overall the soils at these depths are considered to be intact.

This assessment determined that nineteenth and twentieth century fill deposits are present in the immediate project work area to depths that range from 14 to 19 feet below grade. These fill deposits lack any meaningful archaeological context, and are assigned a low archaeological sensitivity. Archaeologically sensitive strata, consisting of organic silt and peat deposits, are identified below the fill at depths that range from 14 to 19 to 30 feet below grade. These sensitive strata have the potential to contain significant Native American resources, including the remains of fishweir structures.

5.0 Affected Section 4(f) Properties

5.1 Parks and Recreation Lands

It will be necessary to permanently take 1,325 square feet of DCR land for the station's new elevators and lobbies.

5.2 Historic and Archaeological Resources

Impacts to the Lechmere Viaduct include:

- Widening of the a section of the historic north and south parapet with removal and replacement of historic balustrades;
- Addition of cantilevered platform extensions and safety panels/fences;
- New outbound platform canopy;
- New outbound mini-high ramp; and
- Modification of existing stairs in North and South Pier 3 for emergency egress.

Impacts to the Science Park/West End Station include:

- Construction of two external elevator towers, lobbies, and south elevator connecting bridge;
- New grade-level stairs,
- Mezzanine addition (with demolition of the original and now abandoned mezzanine stairs) and new east mezzanine wall;
- New station platforms, new platform walls, and platform extensions;
- New outbound mini-high ramp;
- New canopy deck; and
- Rehabilitation of the stairway enclosures.
- Reconstruct a portion of the exterior stairs from the mezzanine to platform.

6.0 Proposed Use of Section 4(f) Properties

6.1 Parks and Recreation Lands

The DCR land that will be permanently taken by the project (1,325 square feet) are necessary for construction of the new lobbies and elevators to meet ADA standards. This is considered a de minimus use of the parkland resource.

6.2 Historic and Archaeological Resources

Parapets and balustrades will be affected by the widening of the Lechmere Viaduct. New platform extensions, a platform canopy, a mini-high ramp, and emergency egress stair modifications will also impact the historic viaduct.

The construction of the elevators and lobbies, new ground-level stairs, mezzanine additions, new platforms, a new canopy and deck, a new mini-high ramp, and stairway rehabilitation will all impact the Science Park/West End Station.

7.0 Avoidance Alternatives

The MBTA and its design team undertook a detailed alternatives analysis for the Science Park/West End Station Accessibility Improvements Project. Four design alternatives were considered:

- Base Case - two door front/back elevator;
- Alternative 1 - two door adjacent elevator);
- Alternative 2 - ADA automatic fare collection (AFC) at grade; and
- Alternative 3 - ramp from grade to mezzanine.

The No Build Alternative was used as a baseline against which impacts of the build alternatives were measured; it reflects current conditions without any construction and does not meet the purpose and need. All of the build alternatives involve creating an additional point of entry to the platforms from proposed elevator towers and an extension of the existing station platforms approximately 90 feet west to the eastern edge of Pier 2 on the concrete portion of the viaduct. Until all trains can include all low floor vehicles, mini-high ramps will be located at the west end of the north platform and the east end of the south platform. The proposed typical platform plan will require the removal of portions of the inbound and outbound platform walls and the relocation of the concrete balustrade on the viaduct structure to accommodate wider platforms. Safety railings or fencing to suit code will require attachments to the viaduct balustrade. Descriptions of the four alternatives are outlined below.

7.1 Base Case (Two Door Front/Back Elevator)

The Base Case would locate two elevator towers approximately eight feet by eight feet on the north and south elevations of the station immediately adjacent to the existing ground level staircases, outside the station's current ground footprint. The paired entries would be on the north and south elevations of each elevator. Elevator towers would extend from ground level to platform level and have adjacent mechanical and circulation levels approximately eight feet square in plan, extending from ground level to mezzanine level. A new mechanical and electrical room approximately eight feet wide and 29 feet long would be added to the west elevation of the mezzanine and extend the full distance between the concrete piers of the Lechmere Viaduct. The mezzanine addition would require the removal of an original steel staircase currently leading from mezzanine to ground level.

7.2 Alternative 1 (Two Door Adjacent Elevator)

This alternative provides for two elevator towers near the same locations identified in the Base Case, but no adjoining mechanical rooms. A mezzanine level elevator platform would be located on the east side of the south elevator, outside the current station footprint. Entrances would be on both the north and east elevations of the north elevator, and the south and east elevations of the south elevator. Significant mezzanine level additions would be identical to those shown in the Base Case, but with fare collectors relocated within currently existing spaces to accommodate changed elevator locations.

7.3 Alternative 2 (ADA AFC at Grade)

Alternative 2 places elevator towers and mechanicals in the similar locations as the Base Case, but the north elevator tower and mechanical room would be pushed within the current mezzanine footprint, requiring structural modifications. Fare collection equipment for elevators would be placed in lobbies at grade level on the north elevation of the proposed north elevator tower and on the south elevation of the south elevator tower. Significant mezzanine level improvements would be identical to the Base Case and Alternative 1.

7.4 Alternative 3 (Ramp from Grade to Mezzanine)

Alternative 3 places multilevel dogleg ramps leading from ground level to the mezzanine level on the north and south elevations of the station. Elevators leading from the mezzanine level to the platform level would be located in the same positions as in Alternative 2, but without ground level elevator access, and would require similar structural modifications. Significant mezzanine level improvements would be identical to Alternative 2.

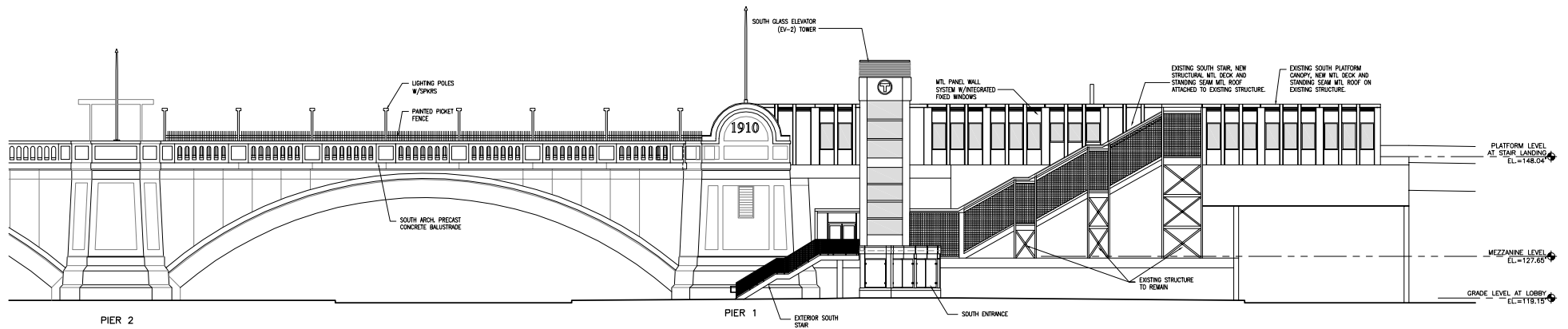
7.5 Evaluation and Preferred Alternative

All of the alternatives included in the first phases of analysis have similar degrees of impact on the 4(f) resources of the Lechmere Viaduct, the Science Park/West End Station, and DCR-owned land; none avoid impacts to 4(f) resources.

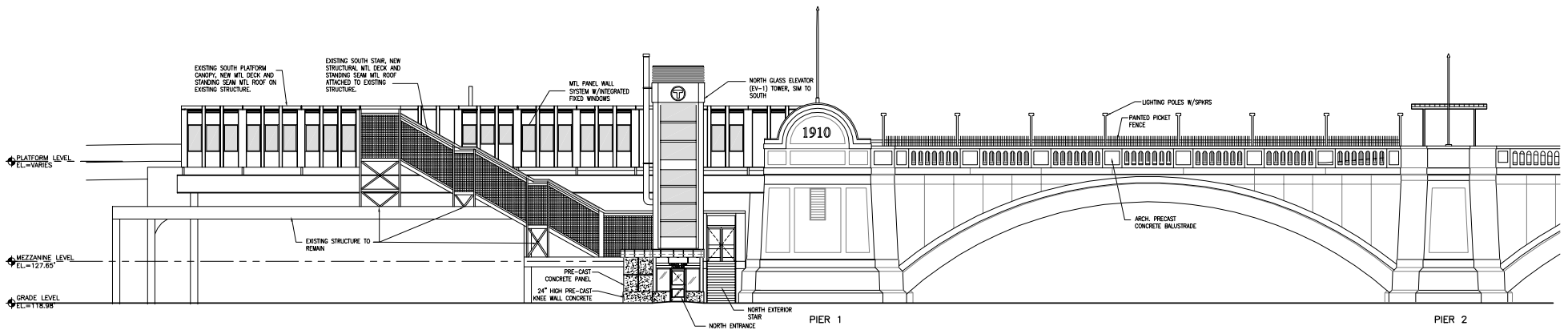
The criteria set used to evaluate the alternatives and determine which best met the overall project goals were:

- Quality of ADA circulation in terms of accessible route and queuing areas;
- Elevator cab layout in terms of number of doors and their location in the cab;
- Way-finding qualities in terms of visual continuity and logical space sequence;
- Sightlines and security within and outside the station;
- Impacts to existing MBTA spaces and to the existing structure;
- Elevator equipment room proximity to the elevator shaft; and
- Surface level impacts.

The ease of use, the visibility of the elevator to users, and the functionality of Alternative 2 contributed to its selection as the Preferred Alternative, with a modification to the design of the elevator to provide for a stop in the paid zone at the mezzanine level (see Figure 7.5-1).



1 SOUTH ELEVATION
SCALE: 3/32" = 1'-0"



2 NORTH ELEVATION
SCALE: 3/32" = 1'-0"



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