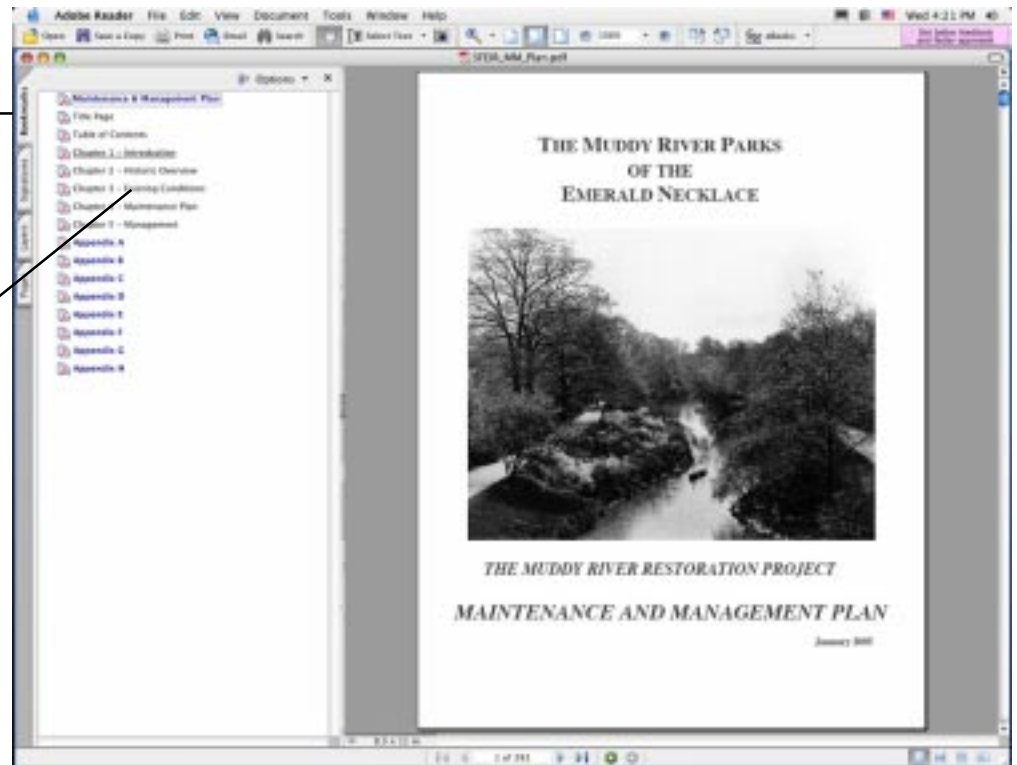


THE MUDDY RIVER RESTORATION PROJECT MAINTENANCE AND MANAGEMENT PLAN

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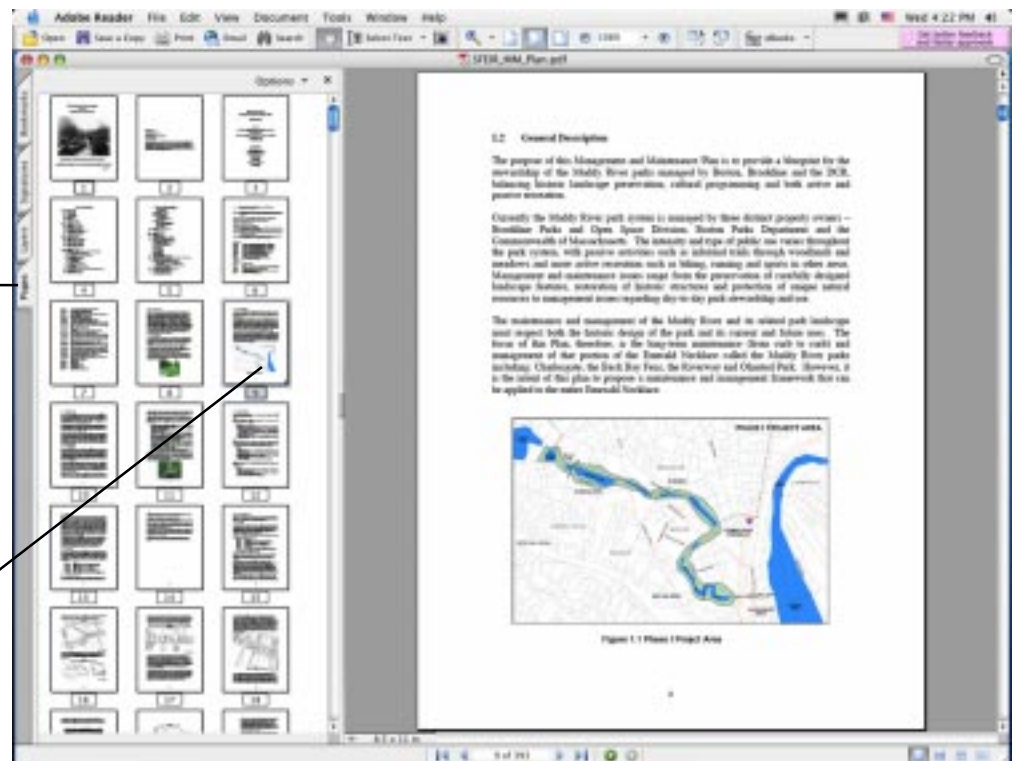


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THE MUDDY RIVER PARKS OF THE EMERALD NECKLACE



THE MUDDY RIVER RESTORATION PROJECT

MAINTENANCE AND MANAGEMENT PLAN

January 2005

City of Boston

Thomas M. Menino, Mayor

Town of Brookline

Robert Allen, Chair, Board of Selectmen

Acknowledgements

The Muddy River Management and Maintenance Plan has benefited from input of a variety of professionals and dedicated individuals. The City of Boston and the Town of Brookline would like to thank the following individuals, agencies and organizations for their contributions: Executive Office of Environmental Affairs, Division of Conservation and Recreation, the Muddy River Management and Maintenance Oversight Committee, the Muddy River Citizens Advisory Committee, and the Emerald Necklace Conservancy.

Muddy River Parks Management and Maintenance Plan

October 2004

Prepared by:

The City of Boston/ Boston Parks and Recreation Department
1010 Massachusetts Avenue
Boston, MA 02118

The Town of Brookline/ Brookline Parks and Open Space Division
333 Washington Street
Brookline, MA 02445

In conjunction with

ETM Associates, L.L.C.
Public Space Design and Management
73 Woodbridge Avenue
Highland Park, NJ 08904-3207

Pressley Associates
432 Columbia Street
Cambridge, MA

Camp, Dresser and McKee, Inc
One Cambridge Place
Cambridge, MA

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CHAPTER 1: INTRODUCTION

This Plan proposes a new and fully scoped maintenance program and management structure for the Phase I Muddy River Restoration Project [the “Project”]. As noted by the Secretary on page seven of the Draft Environmental Impact Report (DEIR) certificate, such a program and structure will prove critical for protecting the public’s investment in this historic property. The Management and Maintenance Plan for the Muddy River project is compatible and consistent with the requirements of the Secretary of Environmental Affairs in his Environmental Notification Form (ENF) Certificate, DEIR Certificate and Final Record of Decision (ROD). It also reflects the comments received from the numerous stakeholders and interested citizens on the DEIR (including the Emerald Necklace Citizens Advisory Committee) and Draft ROD. The Plan provides a higher level of maintenance that is both responsive to historic design intent and current use of the Muddy River parks system and outlines a new management structure that will ensure coordination and cooperation between project proponents as well as ensure a coordinated proponent response to oversight committees, agencies, park-related and greenspace organizations and the general public.

1.1 Vision Statement

The goal of this Management and Maintenance Plan is to implement a superior level of maintenance and an effective system of management for the Emerald Necklace’s Muddy River parks in order to ensure that the Muddy River Restoration Project meets its long-term goals and that the significant public investment in the project is adequately protected.

This plan will strengthen the ongoing coordination of Boston, Brookline, the Massachusetts Division of Conservation and Recreation (DCR), park staff, volunteers and park partners around management and maintenance of the park as well as the coordination of capital projects and the maintenance they require.

The success of the Muddy River restoration will depend upon the implementation of a long-term maintenance and management plan. As the landscape matures and further restoration projects are completed, the Plan will remain flexible and adapt to changing conditions and capital improvements.



Olmsted Park

1.2 General Description

The purpose of this Management and Maintenance Plan is to provide a blueprint for the stewardship of the Muddy River parks managed by Boston, Brookline and the DCR, balancing historic landscape preservation, cultural programming and both active and passive recreation.

Currently the Muddy River park system is managed by three distinct property owners – Brookline Parks and Open Space Division, Boston Parks Department and the Commonwealth of Massachusetts. The intensity and type of public use varies throughout the park system, with passive activities such as informal trails through woodlands and meadows and more active recreation such as biking, running and sports in other areas. Management and maintenance issues range from the preservation of carefully designed landscape features, restoration of historic structures and protection of unique natural resources to management issues regarding day-to-day park stewardship and use.

The maintenance and management of the Muddy River and its related park landscape must respect both the historic design of the park and its current and future uses. The focus of this Plan, therefore, is the long-term maintenance (from curb to curb) and management of that portion of the Emerald Necklace called the Muddy River parks including: Charlesgate, the Back Bay Fens, the Riverway and Olmsted Park. However, it is the intent of this plan to propose a maintenance and management framework that can be applied to the entire Emerald Necklace.

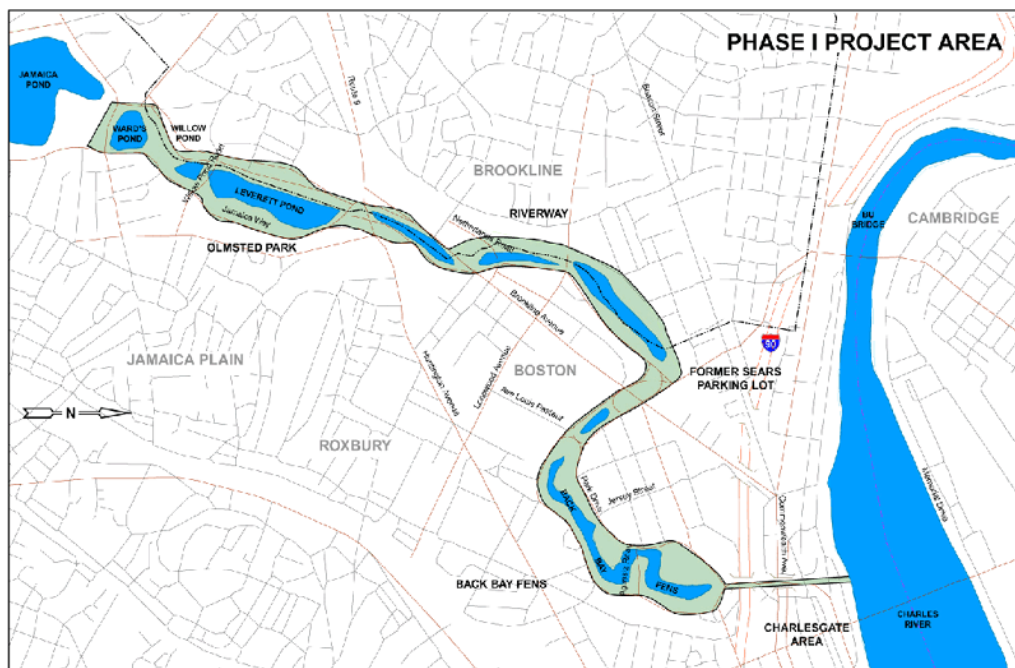


Figure 1.1 Phase I Project Area

1.3 Overview of Project

This report is a Management and Maintenance Plan for Charlesgate, the Back Bay Fens, the Riverway and Olmsted Park; four of the parks which have the Muddy River watercourse running through them and which are part of the six-park chain of the Emerald Necklace park system. It builds on the considerable inventory, analysis and recommendations that resulted from earlier works, most importantly, the recommendations of the Emerald Necklace Master Plan.

The most significant report, to date, for the park is the *Emerald Necklace Master Plan*, completed in 1989 and updated in 2001. Prepared by the Massachusetts Department of Environmental Management, now DCR, the Master Plan is the product of a decade of planning and extensive consultation with the many individuals and groups who have a special connection to the Emerald Necklace parks.

Currently, planning is underway to initiate one of the most ambitious and comprehensive historic landscape preservation projects in the nation. Through a partnership with the state, federal government and private sector, Boston, Brookline and the DCR will embark on a multi-million dollar effort to ensure the long-term preservation of the park system by providing flood control, improving water quality, enhancing habitat and restoring the historic landscape. The Muddy River Management and Maintenance Plan is designed as a tool to preserve, protect and enhance the capital improvements of the Muddy River Restoration Project Phase I.

1.4 The Olmsted Legacy

The Emerald Necklace Master Plan states that the park system still reflects much of Olmsted's original design from the Back Bay Fens, along the Muddy River to Leverett, Willow, Ward's and Jamaica Ponds and on to the Arnold Arboretum and Franklin Park. In the early 1970s, citizens from Boston and Brookline became alarmed at the level of park deterioration they observed in their communities. Their advocacy brought to the public's attention the plight of our urban open spaces, and the historic importance of the Emerald Necklace parks, a legacy that includes over 1,000 acres and about half of Boston's present park system.

While today the subtle plantings along the water's edge are gone, commuter traffic speeds along parkways designed for pleasure-driving carriages, and municipal maintenance forces are only a fraction of their former size, the Emerald Necklace is still an extraordinary and special place within the city – a succession of carefully orchestrated views of meadows, woodlands and watercourse which delight park visitors. The parks provide rich recreational opportunities, including jogging, fishing, picnicking, softball, gardening, and outdoor theater.

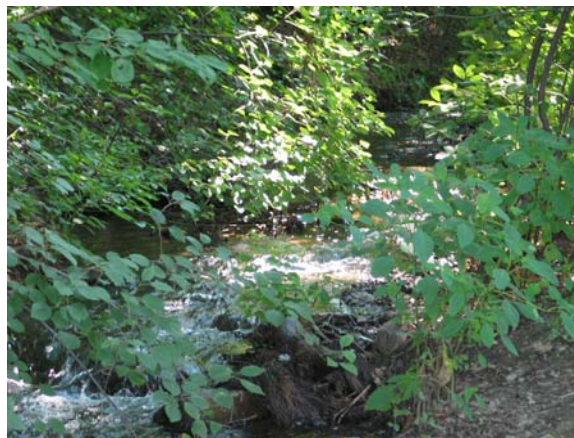
One hundred years ago, civic-minded leaders, supported by strong public sentiment, led a park movement that created the Emerald Necklace park system. They foresaw the need for passive green space and natural environmental features, such as stream valleys and

upland reservations, in their expanding urban areas. They implemented a massive public works engineering effort, while transforming the landscape into a recreational haven. Today's park advocates are driven by the same commitment to urban natural resources.

This Management and Maintenance Plan addresses the recommendations set forth in the *Emerald Necklace Master Plan* which were intended to reinforce Olmsted's original concept of a unified system of linked parks through the following actions. The goals of this Plan are to:

- Re-establish the visible continuity of the watercourse and restore the character of the original intent of a "chain of pleasant waters".
- Strengthen the linkages between the parks to recapture as much uninterrupted movement as possible through them.
- Reintegrate the parkways as a primary circulation element in and among the parks, as scenic pleasure routes.
- Reinforce unity, variety, and health of vegetation. Express "*distinctive*" landscapes of upland forests, "*alternating groves and meads*" of the middle section and the lowland landscapes of the Fens, which were once a marsh, but now, a landscape bordering a "*winding, meandering watercourse*".
- Enrich the wildlife supporting capacities of the park system.
- Accommodate the widest range of recreation needs for the broadest constituency of users that are not inconsistent with the Emerald Necklace's unique character as a passive, water related, linear park.
- Coordinate the energies of Boston, Brookline, the DCR, the institutions (both within the parks and abutting) and volunteer groups into a cooperative public/private restoration and preservation effort.
- Strongly support the improvement of water quality in the Muddy River as a concerted public/private effort. (*Emerald Necklace Master Plan, 2001*)

The Muddy River Restoration Project involves a wide range of physical improvements and management practices that will produce flood control, water quality improvements, habitat enhancement, landscape restoration, and stormwater best management practices. The Project constitutes the first phase in the long-term restoration of the entire Emerald Necklace park system in Boston and Brookline.



1.5 Goals and Objectives

The following is a summary of the goals and objectives for the Muddy River Parks Maintenance and Management Plan.

Goal #1

Promote the enhancement, protection and preservation of the historic and natural landscape of the Muddy River park system.

Objectives

1. Rehabilitate and maintain the historic landscape and extant historic features in an appropriate and sensitive manner.
2. Develop treatment recommendations that preserve and respect the historic and natural landscape features, circulation patterns, uses and structures that have been determined through research and documentation to be integral components of the Muddy River landscape.
3. Minimize alterations or additions that are not consistent with the historical integrity of the property while also recognizing contemporary needs and community priorities.

Goal #2

Provide a framework for ongoing management and maintenance of landscape features, uses and structures that will guide park managers, administrators and park partners who are responsible for or will be involved in the care of the Muddy River parks.

Objectives

1. Develop a maintenance plan for the vegetation and historic landscape of the Muddy River.
2. Provide guidelines for the use, rehabilitation and maintenance of the historic structures in the parks.
3. Prioritize projects for implementation by park partners.
4. Analyze existing staffing and provide recommendations to realize an increased maintenance standard.
5. Develop a budget that will support a higher standard of maintenance.

Goal #3

Promote the stewardship, use and awareness of the Muddy River parks as a unique historic landscape.

Objectives

1. Support ongoing efforts of volunteer and community groups in preserving the historic landscape of the parks.
2. Develop educational programs that reflect the significance and variety of resources within the Muddy River landscape.
3. Promote compatible recreational uses for the parks.

1.6 Methodology

The Maintenance and Management Plan submitted as part of the Muddy River FEIR was written as a requirement of the Massachusetts Environmental Protection Act [MEPA] permitting process for the Muddy River Restoration Project. ETM Associates, L.L.C. was hired to write the maintenance plan for the Muddy River parks of the Emerald Necklace Muddy River Restoration Project. ETM analyzed the current park maintenance responsibilities, classified the physical areas in the park system, measured the workload, evaluated performance and set a higher maintenance standard with the appropriate workforce based upon the landscape maintenance standards at the Arnold Arboretum. The Plan was developed by the custodians of the parks with assistance from Pressley Associates, Camp Dresser and McKee, Inc., ETM Associates, L.L.C., the MA Division of Conservation and Recreation, the Muddy River Management and Maintenance Oversight Committee and others. The Plan was further expanded to incorporate an appropriate historic preservation framework.

The Methodology used to develop the Muddy River Management and Maintenance Plan of the SFEIR follows the benchmarking standards developed by the National Recreation and Park Association, the Professional Grounds Management Society and the Secretary of the Interior's Standards for the Treatment of Historic Properties, which define the preservation approaches for historic properties and provide general guidance for acceptable treatment work. The methodology for specific maintenance analysis or management approaches is more fully described in the respective chapters.

1.7 Park Sectors

The Muddy River parks of the Emerald Necklace are addressed both as an entire system and as individual sectors. The Muddy River parks have been divided into 7 sectors for analysis, maintenance planning and implementation purposes – taking into account maintenance needs and the historic and physical characteristics of the areas. The analysis of the park in terms of park sectors allows for the careful consideration of the unique features, opportunities and constraints within each individual park. The 7 park sectors are as follows:

Sector I:	Charlesgate
Sector IIA:	Back Bay Fens North: Victory Gardens/Mother's Rest
Sector IIB:	Back Bay Fens Central: Rose Garden/Clemente Field
Sector IIC:	Back Bay Fens South and Sears Parking Lot
Sector III:	Riverway
Sector IVA:	Olmsted Park North: Leverett Pond/Daisy Pond
Sector IV B:	Olmsted Park South: Wards Pond/Willow Pond/Nickerson Hill

1.8 Previous Studies and Plans

The Plan includes several appendices that supplement information within the report. The Plan provides an updated maintenance and management strategy for the Muddy River

parks, building on the current management approach as well as considerable inventory, analysis and recommendations from previous plans and studies.

In addition, the following studies and plans have been used or referenced to aid in the management and maintenance plan for the Muddy River parks.

Maudslay State Park: Management and Maintenance Plan, Newbury Port, Massachusetts, Volume I, (Prepared for the Department of Environmental Management: Bureau of Project Planning, Design and Development), Pressley Associates, Inc. 432 Columbia Street, Cambridge, MA, April 2003

Maintenance Plan for the Emerald Necklace-Muddy River Parks, Muddy River Restoration Project, (prepared for the Boston Parks and Recreation Department, Town of Brookline Parks and Open Space Division and Metropolitan District Commission), ETM Associates, L.L.C., January 2003

The Emerald Necklace Parks, Master Plan, (prepared for the Commonwealth of Massachusetts), Pressley Associates, Inc. 432 Columbia Street, Cambridge MA, April 2001

CHAPTER 2: HISTORIC OVERVIEW

The Muddy River Parks are cultural and historic landscapes. As defined by the National Park Service, a cultural landscape is “a geographic area associated with an historic event, activity, or person or exhibiting other cultural or aesthetic values.

2.1 Introduction

With a cultural landscape such as the Muddy River parks it is important to document the property’s history before making recommendations for physical change in order to fully understand which features, materials and spaces contribute to its historic significance and thus ensure they are not inadvertently lost or damaged. The challenge is to preserve, rehabilitate, restore or replace character-defining features from the past, while simultaneously adapting the property for present day use.

The Muddy River parks of the Emerald Necklace have been divided into 7 sectors for analysis and planning purposes. These are:

Sector I:	Charlesgate
Sector IIA:	Back Bay Fens North: Victory Gardens/Mother’s Rest
Sector IIB:	Back Bay Fens Central: Rose Garden/Clemente Field
Sector IIC:	Back Bay Fens South and Sears Parking Lot
Sector III:	Riverway
Sector IVA:	Olmsted Park North: Leverett Pond/Daisy Pond
Sector IV B:	Olmsted Park South: Wards Pond/Willow Pond/Nickerson Hill

2.2 Historic Resources – Sector I – Charlesgate

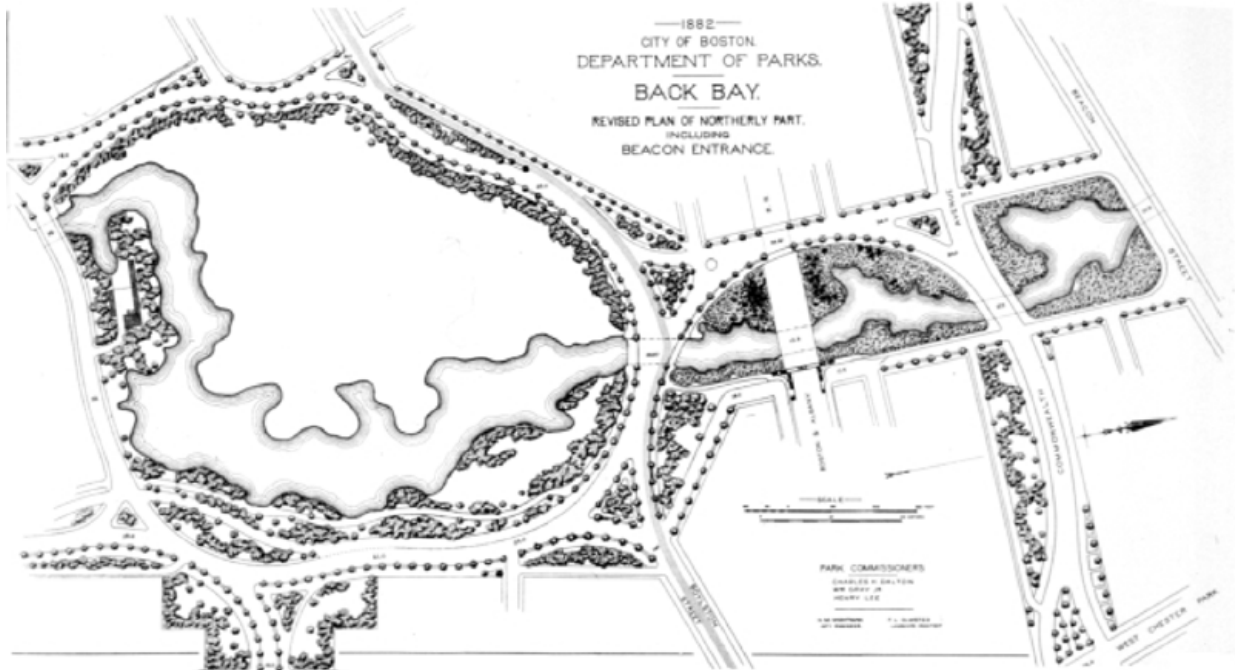
Historically, the Charlesgate area has a Primary Period of Significance of 1878-1895, which is the Frederick Law Olmsted design period for the area as documented by drawings from 1879 to 1896. Olmsted referred to this area as the "Beacon Street Entrance".

The 1879 "Proposed Improvement of Back Bay" plan shows Beacon Street, Commonwealth Avenue and the Boston and Albany Railroad Bridge crossing over the Muddy River. The railroad passes under a road (Charlesgate West) that connects Commonwealth Avenue to Boylston Street and Audubon Road (Park Drive) in an area that is referred to as Gaston Square. The Olmsted period drawings continue to show Commonwealth Avenue as a curving roadway with informal plantings, not as a formal, straight avenue. During this period the formal avenue with four rows of trees in the median and a single row of trees at both adjacent sidewalks starts at Charlesgate East and continues East.

The Fens, as the Back Bay was known, was a salt creek bordered by salt marshes that emptied into the tidally affected Charles River. Construction of the Charles River tidal gates began in 1881. They were ready for operation in 1882. The Muddy River Conduit

to the Charles was introduced in 1883. The "Back Bay Revised Plan of the Northerly Part including Beacon Entrance" illustrates the 1882 condition (see Figure 2.1).

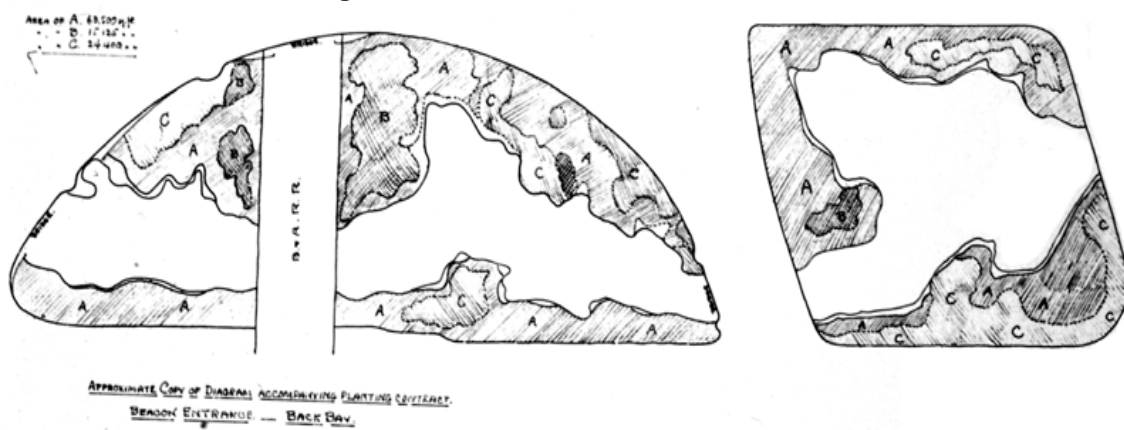
Figure 2.1
Back Bay Revised Plan of the Northerly Part including Beacon Entrance, 1884



Source: FLONHS

Planting design in this area is documented on the 1884 Planting Plan for the Beacon Street Entrance (FLONHS). A planting list compiled from several sources is provided by Cynthia Zaitzevsky in Frederick Law Olmsted and the Boston Park System, page 188 (see Figure 2.2).

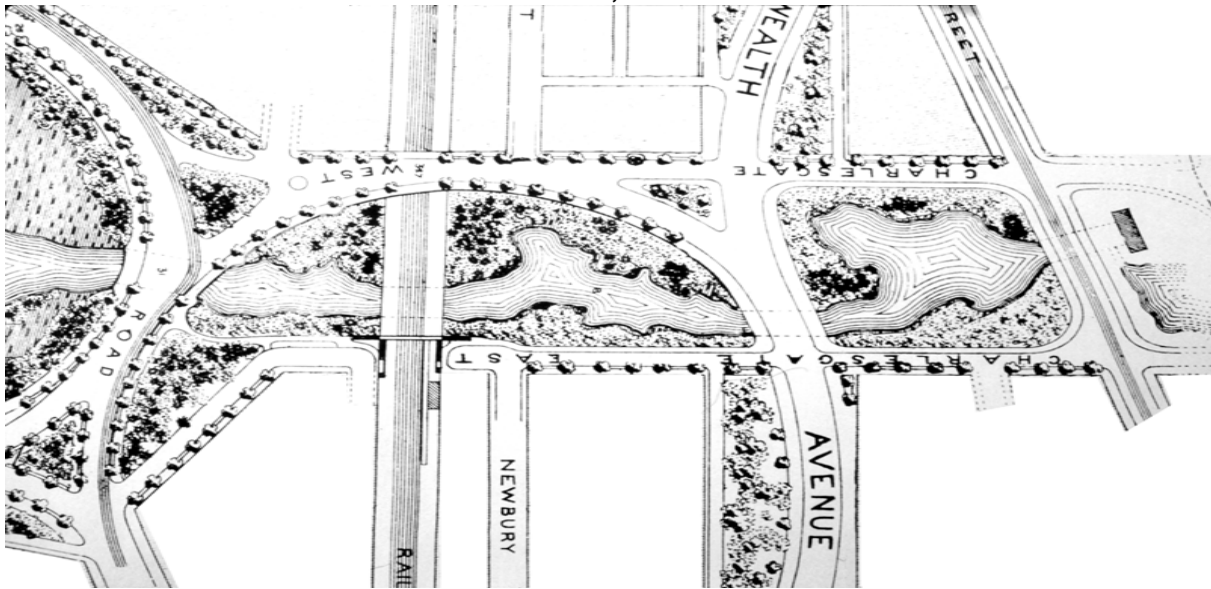
Figure 2.2
Planting Plan for the Beacon Street Entrance, 1884



Source: FLONHS

Even though the quantity of vegetation planted was extensive by 1885 and 1886, it was obvious that, with the exception of some upland vegetation, which survived, the majority of the plantings did not. A second planting that is undocumented, except for photographic evidence in 1896, seems to have been successful. The 1887 Lithograph of Olmsted's design, below, illustrates the conditions when the river was still tidal (see Figure 2.3).

Figure 2.3
Map of the Back Bay Fens, Commonwealth Avenue, Beacon Street and Audubon Road,
Dec. 3, 1887



Source: FLONHS

Grading for the area and the establishment of the shoreline are documented on two grading studies by John C. Olmsted and Warren Manning in 1882 FLONHS #923-52 and FLONHS #930-81. Photographic documentation for Charlesgate is limited for the Olmsted Period. The Secondary Period of Significance for the Charlesgate Area is 1910-1931. The Arthur A. Shurtleff design for the area is documented by a series of studies by Shurtleff from 1912 to 1931 that modify the Olmsted design for Commonwealth Avenue and part of the waterway. The proposals straightened the avenue from Charlesgate East to the Beacon Street intersection to the west and continued the rows of trees east of Charlesgate East (see Figure 2.4).

The documentation includes studies of the median width and MTA (MBTA) redesign of minor adjacent roads, and the construction of new bridging with balustrades in the formal classical style, completed by 1925. There also was a series of designs for a "Boat Haven" at the Charles River below the gates and studies of a proposed overpass connector from the Charles River Parkway (Storrow Drive) to Gaston Square at Boylston Street over the Muddy River. These elements were not completed. Drawings in 1928 and 1931 show informal and formal schemes for the never-completed connector overpass.

In 1919, the Metropolitan Park Commission and the Massachusetts Water and Sewer Commission were merged to form the Metropolitan District Commission (MDC), combining the Metropolitan Parks and Parkways' responsibilities with the function of water supply and sewerage for the state. The MDC prepared a series of studies from 1949 to 1957 that culminated in the 1963-64 construction of the current Bowker Overpass designed to connect James J. Storrow Memorial Drive (i.e., the Charlesgate Interchange) to Audubon Road (Park Drive). The MDC began this modification process with the taking of the Fens parklands from Beacon Street to the Charles River in 1950. The major overpass, as developed, impacts both light and water in this area and creates isolated areas that cannot be viewed from the adjoining streets. The homeless have occupied these isolated areas over time.



Figure 2.4
Charles River Basin Preliminary Plan

BPRD Arthur A. Shurtleff, 1931

In 1952, Chapter 354 of the General Acts authorized the Massachusetts Turnpike Authority to take lands for the Massachusetts Turnpike (I-90) Extension into downtown Boston. The taking was parallel with the railroad right of way at Charlesgate. Completed in 1962, the taking included the width of the Fens between the Railroad Bridge and Commonwealth Avenue. The Richardson Iron Railroad Bridge, constructed in 1880 was destroyed as part of this taking. The Commonwealth Avenue and Beacon Street Bridge were restored in the 1980's. The arches and historic balustrades were restored. On April

25, 1978, Commonwealth Avenue Mall, including Charlesgate, was designated a Landmark by the City of Boston, under Chapter 772 of the acts of 1975. Charlesgate is contained within the Back Bay Historic District of National Register of Historic Places.



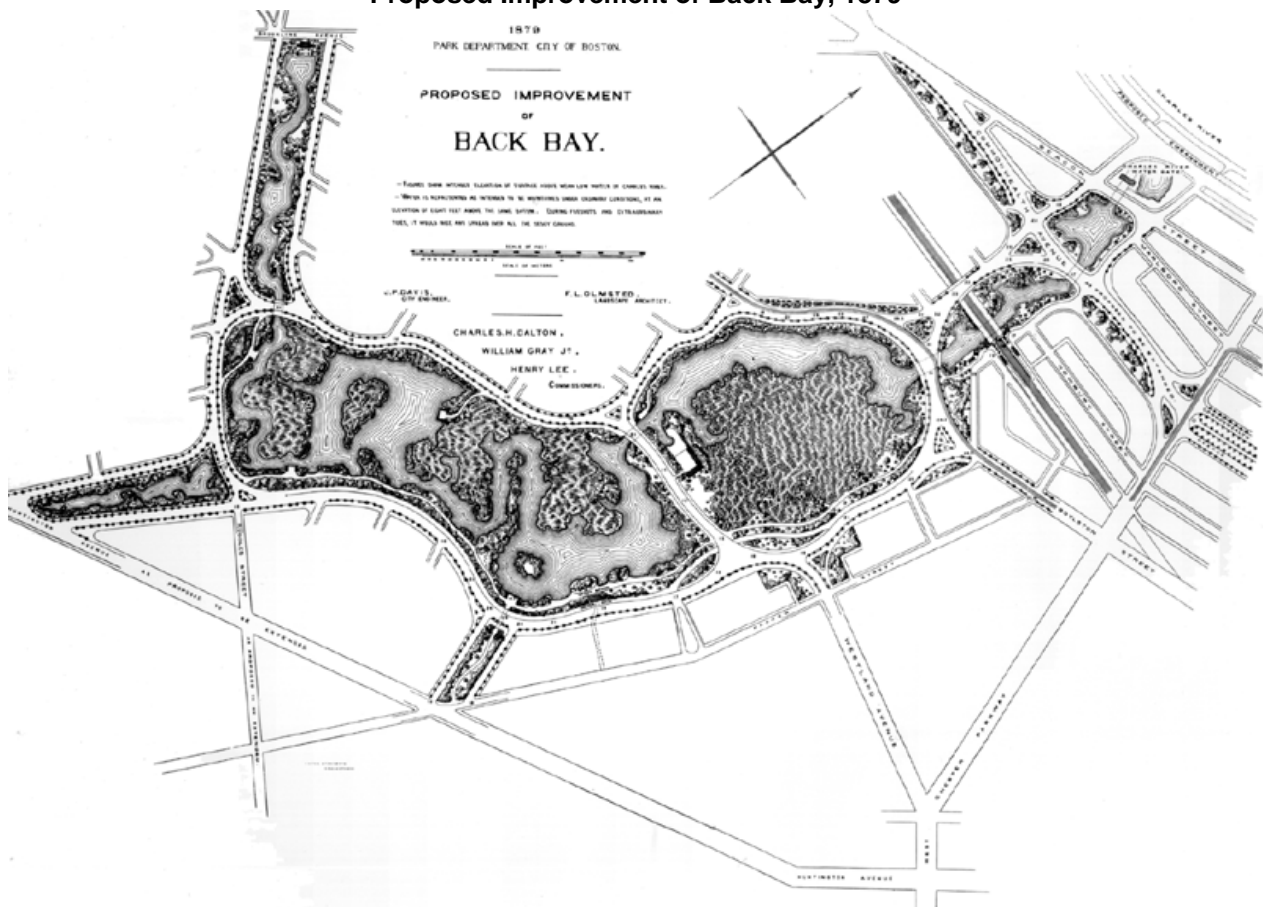
Figure 2.5
Charlesgate East and West, Arthur A. Shurtleff, 1930's
Source: BPL

2.3 Historic Resources – Sector IIA, IIB, IIC – Back Bay Fens

The Back Bay Fens has a Primary Period of Significance of 1878-1895, which is the time of Frederick Law Olmsted's design of the park in that area, and its construction. Plans and working drawings in the archives of the Olmsted National Historic Site (FLOHNS) document the development of the park by the Olmsted firm during this period. The most significant of these are the published plans, "Proposed Improvement of Back Bay" (1879), "Map of the Back Bay Fens, Commonwealth Avenue, Beacon Street and Audubon Road" (1887), and "Plan of Portion of Park System from Common to Franklin Park (1896). Numerous nautical charts and an 1878 survey in the archives of the Olmsted National Historic Site titled "Topographic Plan for Back Bay Fens showing Gravely Point" show that virtually all of the islands and peninsulas within the basins of the Fens were created by dredging according to Olmsted's plans. A survey of 1921 documents the Olmsted as-built design, as well as showing where filling of the Fens had occurred in the intervening period.

The 1879 design illustrates a winding stream flowing through a salt marsh. In fact, Olmsted's design intent was to create the feeling of a restored natural salt marsh, but he also introduced a wider variety of plant species than would have grown naturally in the area (see Figure 2.6).

Figure 2.6
Proposed Improvement of Back Bay, 1879



Source: FLONHS

As Olmsted explained in his "Paper on the Back Bay Problem and Its Solution" of 1886, he planned the naturalistic landscape of the public park in the Fens as an alternative to the traditional stone-lined holding basin with which similar problems of sewerage and storm-water control were solved elsewhere. (See the Papers of Frederick Law Olmsted, Supplementary Series, Volume 1, pp. 437-59.)

"The landscape created according to Olmsted's plans was that of a salt marsh of the region, although he used a wider variety of plants than would have grown naturally in the area. In addition to islands and peninsulas that rose up to four feet above the high tide level, Olmsted planned the landscape with extensive low islands planted with sedge that, in addition to their scenic purpose, were intended to prevent development of surf that would undercut the banks during times of high winds and heavy rain when the floodwaters of Stone Brook would be diverted into the Fens basin. The narrow, curving waterway, in addition to providing landscape interest,

provided no place where storm winds could build up heavy surf. Olmsted's plan also included a complex circulation system of drives, walks and bridle paths that would make the landscape accessible to a variety of users. While conceiving the recreational purpose of the area to be primarily the enjoyment of the salt-marsh scenery, Olmsted also provided for boating, including a circuit for large launches serving as public water buses. He also proposed that the park serve a scientific purpose, as a site for a collection of aquatic birds and fish.

Thus the Back Bay Fens was designed and constructed to serve a variety of recreational and educational purposes, while at the same time solving difficult and serious problems of sanitary engineering."

It was in fact a designed "naturalistic" landscape very different from the tidal flats that were the natural condition of the site when Olmsted began his work. The 1911 "Thirty-Sixth Annual Report, Board of Commissioners, Department of Parks Boston, Massachusetts" includes the following quote by Frederick Law Olmsted, Jr.

"The landscape design of the Fens was to create a salt creek bordered by salt marshes enclosed by high banks intended to be covered with wild flowers, low compact shrubs, vines and creepers, and scattering trees enough with the street trees to fairly well screen the future adjoining houses, but not enough to unduly shade out the ground cover. There are to be found many examples of this type of landscape where the little freshwater rivers of New England come to the sea level and mingle with keen delight by artists and lovers of natural scenery, but probably never before conceived of as a thing to be imitated in laying out a public park" (see Figure 2.7).



Figure 2.7
View of Back Bay as a Tidal Basin, 1890's

Source: Frances Loeb Library HGSD

Photographic documentation for this period, some documentation from planting plans for the northern basin, by W.L. Fischer, c. 1885, and plant lists exist. The plant lists principally include trees, although thick plantings of shrubs in both the northern and southern basin can be seen in both the photographic documentation and extensive marsh grasses. Plants that were believed to be salt-tolerant were selected.

Three bridges were included in the design; the Boylston Street and Agassiz Road Bridges for street traffic, and the Fens Bridge (at Avenue Louis Pasteur/Higginson Circle) for foot traffic. Olmsted also introduced a sewer interceptor and associated gatehouse to control stormwater runoff from Stony Brook into the Fens. The gatehouse and conduit were completed in 1882. In 1883 the Muddy River Conduit to the Charles River at Charlesgate was introduced. The 1887 lithograph of the Olmsted plan illustrates the park as completed by Olmsted (see Figure 2.8).

Figure 2.8
Map of the Back Bay Fens, Commonwealth Avenue, Beacon Street and Audubon Road, 1887



Source: FLONHS

In 1886 the Stony Brook flooded 63 acres of lower Roxbury causing extensive damage. As a result, by 1897 the New Stony Brook Conduit (The Commission's Channel) was constructed, bringing pollution into the Fens basin and resulting in offensive conditions. In 1889, the Fens was dredged to remove sludge deposits and foul odors. In 1903 The Commissioner's Channel was extended, a second Gatehouse was constructed and the 1882 Gatehouse was relocated.

The 1921 survey documents the grading and the shrub and tree massings from the Olmsted Period. It also shows the 1900 to 1920 gradual filling of the marshes under Commissioner John Pettigrew. In 1908, fill materials from subway excavations in Boston were dumped and graded in the Fens for ball fields. Pressure to provide spaces for organized active sports and for playgrounds and the need to find a place to dump excavation material resulted in further filling. This survey and other historical plans allow us to determine the line of the shore by the end of the Olmsted Period, as well as plant massings on the shoreline.

The Secondary Period of Significance is 1910-1933, during which Arthur A. Shurtleff redesigned much of the area. In addition to extensive filling of the basins, the water changed from salt to fresh, facilities for recreation were introduced into the landscape, along with ornamental gardening in the form of the James Michael Curley Rose Garden, and non-recreational functions such as the Fire Control Center.

Shurtleff, hired as a landscape consultant in 1910, prepared a Revised General Plan in 1921 in consultation with Olmsted Brothers. The plan illustrates a meandering fresh water river, which appears to be similar to Olmsted Senior's design for the Muddy River Improvement. The 1921 plan also illustrates the development of a rotary at Westland Avenue (see Figure 2.9).

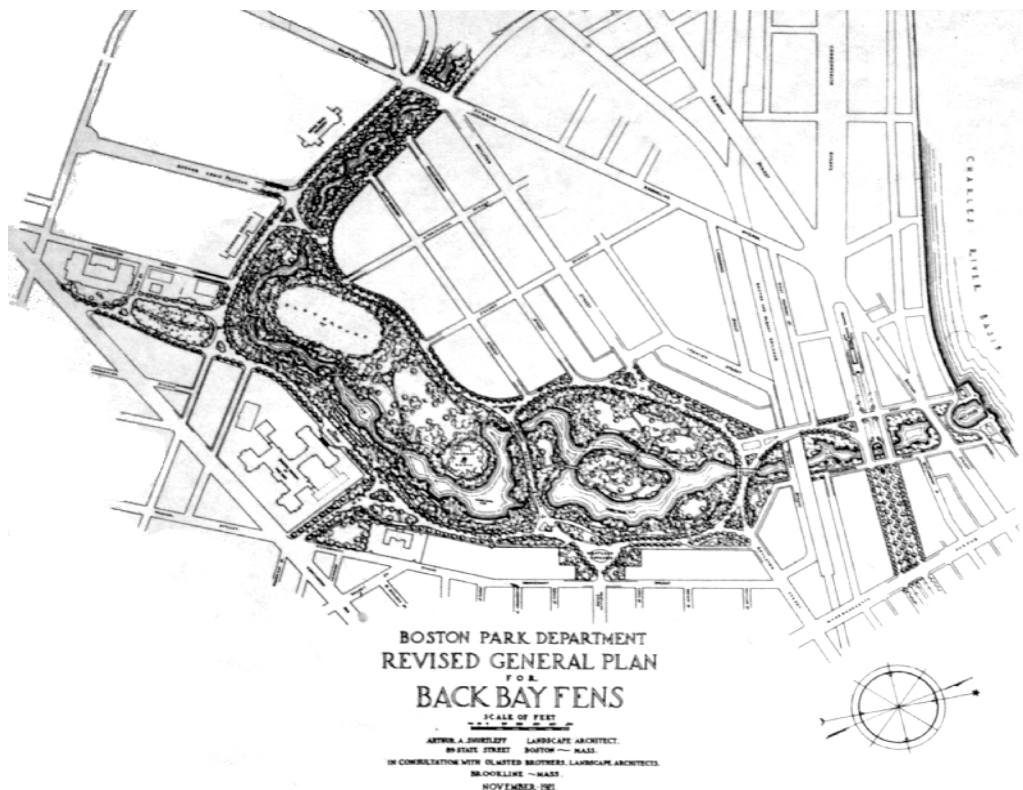


Figure 2.9
Revised General Plan for Back Bay Fens

Arthur A. Shurtleff, Nov. 1921
Source: FLONHS

From 1915 to 1922 a series of studies were conducted by Shurtleff for the Jersey Street Extension. A lagoon reflecting basin opposite the Museum of Arts Evans Wing was completed in 1927 and included two nearby wooden footbridges and a third wooden footbridge further to the south at Evansway (see Figure 2.10).

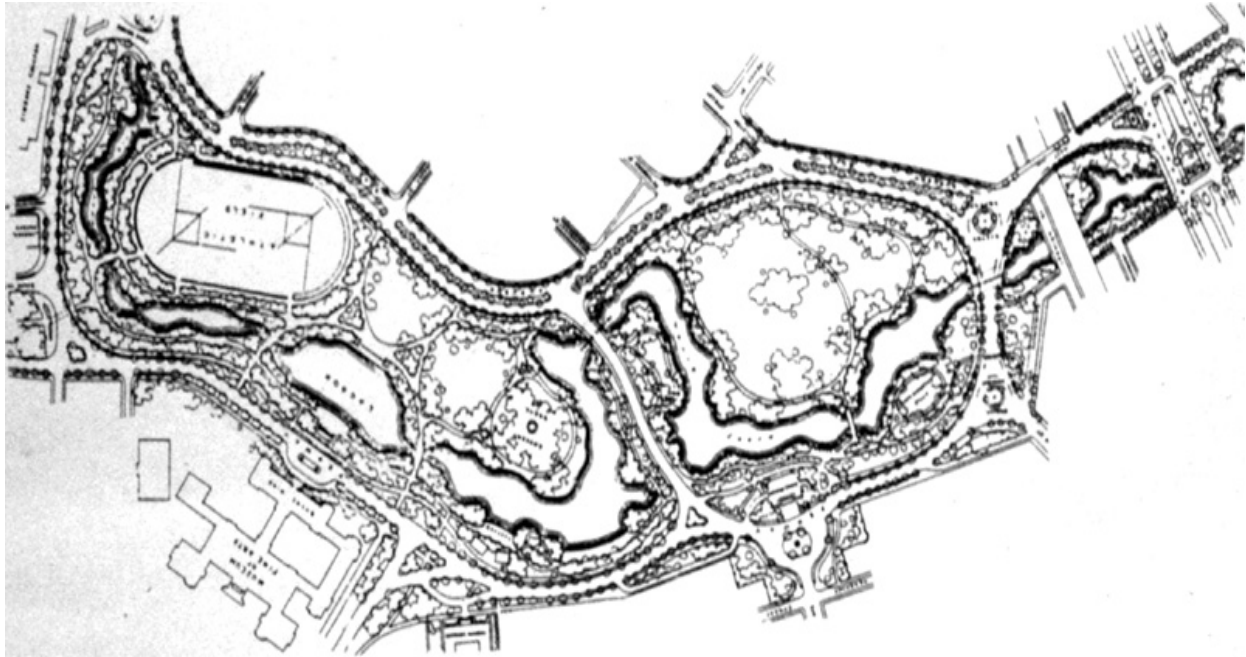


Figure 2.10
Revised General Plan for Back Bay Fens

Arthur A. Shurtleff, 1926
Source: FLONHS

In 1926, Shurtleff completed the Update to the Revised General Plan. The plan was followed by the intrusion of the Fire Control Center in 1927, the filling in the North Basin in 1927, the Field House and Stadium in 1929, modification of the lagoon in 1927 and again in 1930, and the Rose Garden by 1933.

Increased use of the parkways or pleasure drives of the park system as part of the commuter system for an expanding city resulted in the loss of parklands to accommodate wider roads. Audubon Road (Park Drive) and the Fenway Parkway were widened and straightened resulting in the loss of parkland during 1925-1926 (see Figure 2.11).

The Fens no longer had the appearance of a salt marsh; it had lost its distinctive landscape character and had become scenically part of the Muddy River with interspersed elements of ornamental gardening. In significant areas, active sports replaced the quieter and more landscape-oriented uses for which Olmsted had created his design.

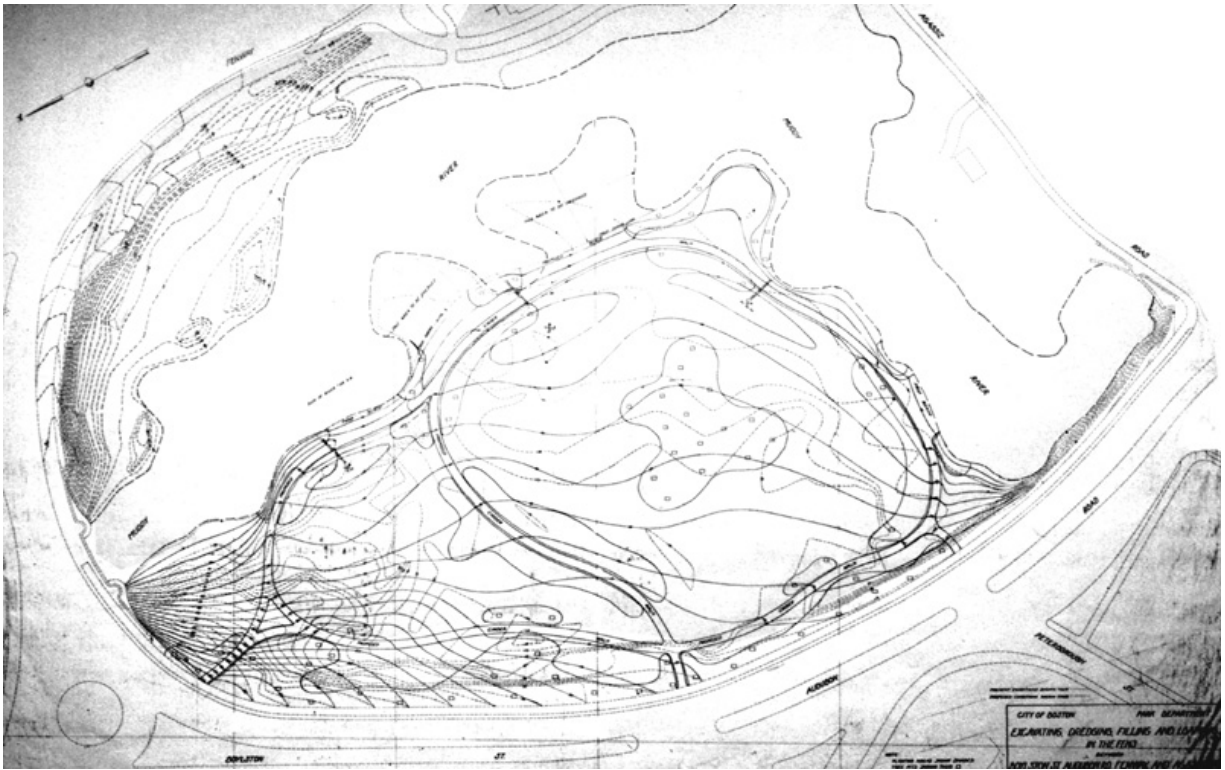


Figure 2.11
Excavating, Dredging, Filling and Loaming in the Fens
 Arthur A. Shurtleff, March 24, 1927
 Source: BPRD

Historical plans help to determine the line of the shore by the end of the Shurtleff Period, as well as plant massings on the shoreline. It is also possible to overlay the shoreline for the Primary and Secondary Periods of Significance and the existing condition to determine what area of shoreline is extant from each period. An aerial photo documents and confirms the filling of what is now the Victory Garden area and the shoreline prior to the invasion of *Phragmites* (see Figure 2.12).



Figure 2.12
Aerial Photo Overlooking the Victory Garden Area

Fairchild Aerial Survey Inc., 1926
Source: BPL Print Room

The Fens continued to change after the Shurtleff Period. The Victory Gardens were introduced into the North Basin fill area in 1940 and the World War II Memorial was added between the Agassiz Road Bridge and the Rose Garden. The area in the park set aside for war memorials was placed under the control of the White Fund, which during 1987-1990 restored the World War II Memorial and additional Memorials for the Korean and Vietnam Wars.

In 1956 the MDC took care and control of the Fenway, Park Drive (Audubon Road), Agassiz Road and Boylston Street as well as a twenty-five (25') foot taking of a right of way into the parkland. Between 1956 and 1982, parkland was taken for road widening, by-passes, turn-arounds and parking, while commuter traffic continually increased, isolating the Fens within a major roadway system. In 1958-1959 the taking of land above the Fens at Brookline Avenue for the Sears Roebuck Company cut into the Fens for a turn-around, demolished the gatehouse and headwalls at Brookline Avenue and filled the Muddy River. Additional filling of the Muddy River occurred at the Fens Bridge and the headwall of the bridge was filled in the process for a new road configuration that was never completed. Historical plans provide information on shoreline location as well as plant massing along the shoreline prior to the filling. The basketball courts were added between the stadium and Rose Garden in the 1970's.

In 1971 The Back Bay Fens was placed on the National Register of Historic Places along with all of Olmsted's Emerald Necklace Parks and on November 1, 1983, the Fens was designated a Landmark by the City of Boston.

Projects completed in the Back Bay Fens since the adoption of the Emerald Necklace Master Plan are documented in the Emerald Necklace Master Plan.

2.4 Historic Resources – Sector III – Riverway

The Riverway area has a Primary Period of Significance of 1880-1895, which is the Frederick Law Olmsted design period for the area between Brookline Avenue at the Fens to Route 9 in Brookline.

In 1880 Olmsted completed a plan titled "Suggestion for the Improvement of Muddy River, which was published in the Sixth Annual Report of the Boston Park Commissioners and in the Annual Report of the Brookline Park Commissioners. The suggested improvement included a diagrammatic plan for the proposed park prior to the 1881 design plan. Frederick Law Olmsted sets forth his intent:

"Except where the valley is now narrowest, it would be reduced in width by artificial banks, so that the river with its shores would everywhere have a general character, resembling that which is now near Longwood Bridge, only that its water would be kept at a nearly uniform level, and guarded from defilement by intercepting sewers and otherwise. The Brookline margin would be the broadened base of the present railroad embankment, bearing a woody thicket. The opposite on Boston bank would have an elevation above the water of ten feet, rising where the natural bank is used to twenty feet. Upon this will be laid out a public way ninety feet wide in continuation of that now forming along the Back Bay Basin, divided like that into foot, carriage, and saddle courses, and designed to serve as a public promenade along the river bank, as well as a trunk line giving an element of continuity to the street system of the neighborhood"

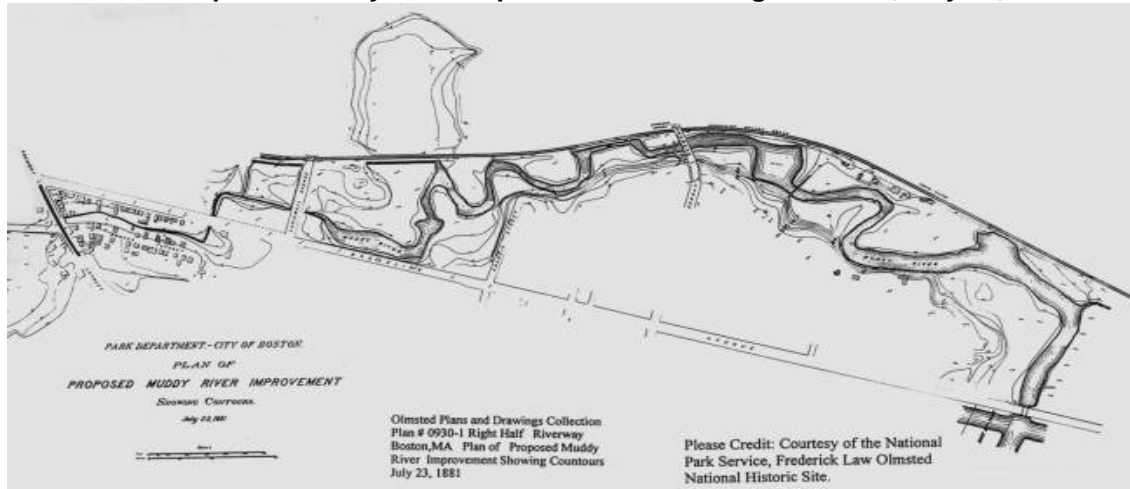
John Charles Olmsted discussed the issue of a manmade landscape in a 1904 report:

"Practically everything seen in this picture, which is typical of many portions of the Riverway, was artificially created in accordance with plans of the designers. Only the larger trees, in the distance and on the left, existed at the time, substantially as they now appear. The various ...were designed in collaboration with different architects. This beautiful and popular water park represents the transformation of what was once an ugly, neglected, and unsanitary stream."

A July 23, 1881 survey titled "Plan of Proposed Muddy River Improvement Showing Contours," prepared by Boston City Engineer Henry M. Wrightman, documented the site prior to the commencement of Olmsted's work. The Riverway site was in fact part of the

estuary of the Muddy River and contained salt marsh grasses and salt-water resistant shrubs. It was impacted by runoff water, a public health problem, and was a generally derelict area. The creation of the park required a change to the boundary between Boston and Brookline transferring the new boundary principally down the center of the river (see Figure 2.13).

Figure 2.13
Plan of Proposed Muddy River Improvements Showing Contours, July 23, 1881



Source: FLONHS

The 1892 lithograph titled "Plan of the Parkway between Muddy River Gate House and Jamaica Park", and the 1896 "Plan of Portion of Park System from Common to Franklin Park" document the park during the Olmsted Period. In addition, a series of plans dating 1890 to 1893 provide detailed proposed grading, historic shoreline, plant massings with viewsheds, plant lists, and planting plans for the Olmsted design.

The 1892 design plan illustrates a winding fresh-water stream described by Olmsted as *"fresh water course bordered by passages of rushy meadow and varied slopes from the adjoining upland; trees in groups diversified by thickets and open glades"* (see Figure 2.14).

Figure 2.14
Plan of the Parkway Between Muddy River Gate House and Jamaica Park, 1892



Source: FLONHS

Olmsted's design intent was to create a landscape with the character of a New England fresh water stream. The entire streamway was re-graded and replanted to produce a

landscape that, while appearing natural, was the product of careful design, engineering, and construction. Both the Olmsted firm's plans and historic photographs show how completely the site was transformed in the process.

Although the basis of Olmsted's plantings was the trees, shrubs, and ground cover of the region, he supplemented them with non-native plants in order to enrich the landscape effect and produce a more powerful experience. The dominant figure on the Brookline Park Commission was Charles S. Sargent, with whom Olmsted had collaborated in planning the Arnold Arboretum. Sargent objected to Olmsted's proposal to use non-native plants, as well as plants that Sargent considered too floral and ornamental. Accordingly, Sargent removed a number of plants from Olmsted's list in the spring of 1892, some of which were restored. The Olmsted firm's less detailed planting plans and lists for the Boston side of the Muddy River reflect their desire to use a wider range of plant materials than Sargent would permit on the Brookline side, while retaining an overall unity of landscape character between the two sides of the river (see Figure 2.15).



Figure 2.15
Riverway Under Construction, 1892

Source: FLONHS

Extensive photographic documentation exists for the park, starting with construction photographs in 1891 and 1892 and continuing up to 28 years after its completion. These photos illustrate how the shoreline of the river was constructed and how the plantings and original bank treatments, either planted or grass beaches, progressed down to the edge of emergent vegetation (see Figure 2.16).



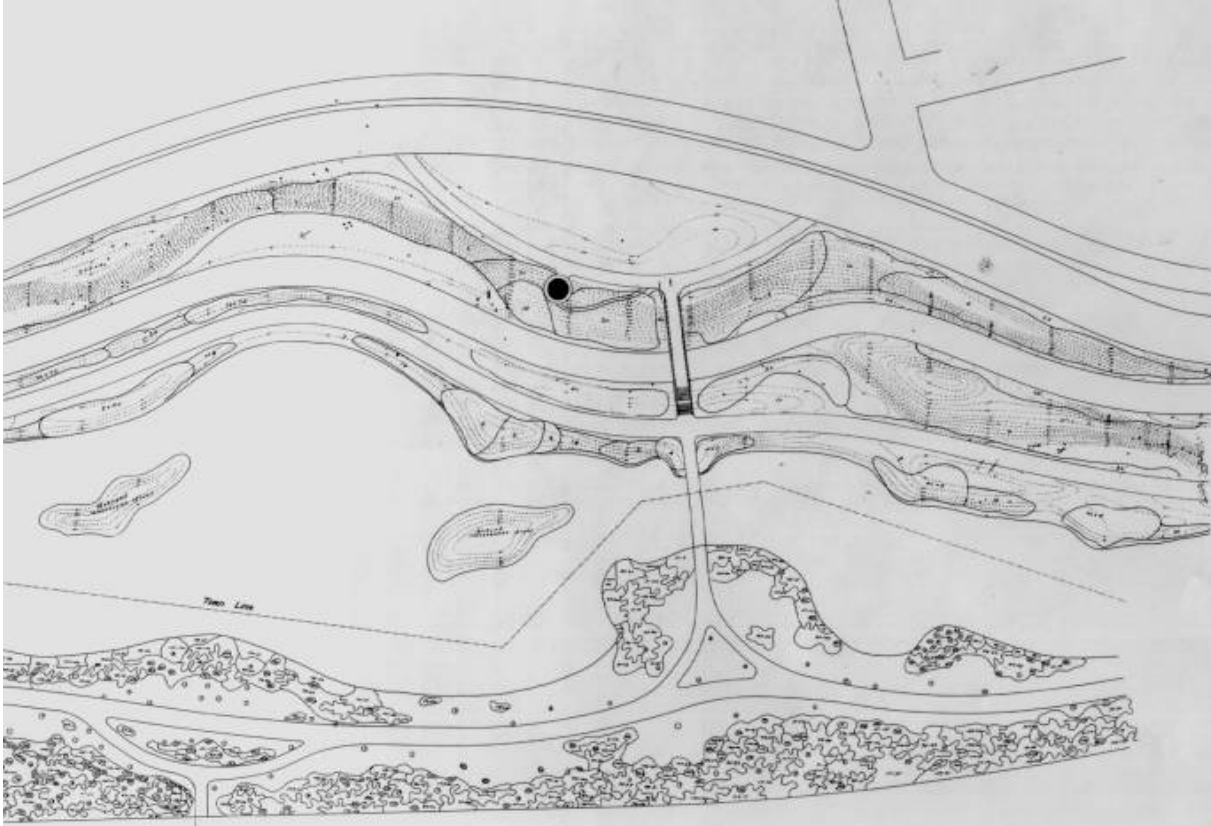
Figure 2.16
View Upstream from Longwood Bridge, 1920 (28 years after construction)
 Source: FLONHS

Complete grading plans that delineate the grading and layout of the original shoreline have been examined. Overlaying the shoreline for the Primary Period of Significance with existing conditions aids in determining what area of shoreline is extant from that period. Extensive drawings exist which document the planting that occurred over the grading plan areas, including massing and viewshed diagrams, planting plans, and the above mentioned plant lists. Drawings of the Brookline side show detailed plant placement, while the documentation of the Boston side illustrates massings with general lists of species to be planted. No other park designed by the Olmsted firm during Olmsted's career and with his active participation has nearly as detailed a record of planting intent. Planting plans for the Muddy River Restoration project from the Olmsted Archives are provided in Appendix D.

The planting plans and plant list for the entire Boston side of the Muddy River and Olmsted Park have been identified and brought together for the first time during the present project. They indicate plant materials not used on the Brookline side that were supplements to those lists. They also indicate the particular conditions of soil, sun and shade under which different groups were to be used. The Boston-side plans are less detailed than those for Brookline, since Olmsted and his firm usually preferred to make many planting decisions in the field as the process continued. William L. Fisher

supervised the planting on the Boston side for the Olmsted firm. He preferred to locate plants in the field rather than do detailed planting plans (see Figure 2.17).

Figure 2.17
Riverway, Topographic Plan for Planting Study, 1893



Source: FLONHS

2.4.1 Historic Resources - Back Bay Yard

Olmsted designed the Back Bay Yard as a scenic picturesque park, with activities that were compatible with enjoying the scenery. As with the Back Bay Fens, Olmsted constructed a circular system along the Muddy River as a part of transformation of the site to serve the purpose of a public park. The path systems and the separation of carriage, horse, and foot traffic were the major features that allowed three categories of users to enjoy scenery without causing physical danger or interfering with the experience of the landscape of each. Olmsted also intended to have the river accessible to canoes. Photographic records show a canoe landing at a gatehouse near Brookline Avenue. The design included nine bridges that interfaced with the river and either provided viewing points or were features of picturesque views. Several of the bridges and culverts were built under a cooperative arrangement between the city and town. The bridges included:

- ♦ the Audubon Bridal Bridge, which provided for foot, street traffic and horseback riding;
- ♦ the Carlton Street Bridge over the railroad tracks provided for foot traffic;

- ♦ the Chapel Station Bridge, a footbridge over the river;
- ♦ the Bridal Path Bridge, a combined footbridge with an equestrian underpass for the bridal path;
- ♦ the Longwood Bridge, accommodating street traffic and including a stair connection from the Brookline side to the park below;
- ♦ the Bellevue Street (Netherlands Road) Bridge for street traffic;
- ♦ two footbridges in the island area between Netherlands Road and Brookline Avenue; and
- ♦ the Bridge at Brookline Avenue in Brookline for vehicles that also serves as a culvert.

Olmsted also introduced three structures to the design: a round stone shelter above the Bridal Path Bridge, an Administration Building near the Audubon Bridge for Boston, and a Gatehouse at Brookline Avenue in Boston to divert Muddy River overflow to the Charles River. The gatehouse and associated conduit were completed in 1883.



Figure 2.18
Riverway Footbridge near Brookline Avenue at Netherlands Road, 1920

Source: FLONHS

There is no Secondary Period of Significance since there has been no major designer involved in the Riverway since Frederick Law Olmsted's involvement, although the Olmsted Firm did some consulting afterwards. In 1897 John A. Pettigrew was hired as Park Superintendent for the Boston side, following which the contract with the Olmsted Firm was not renewed.

Cynthia Zaitzevsky, in her book, Frederick Law Olmsted and the Boston Park System, states that between 1895 and 1930, the Riverway escaped the massive redesigns of the Back Bay Fens and the removal of original design elements that occurred in the upper part of Olmsted Park to the south. Although modifications occurred, they were generally limited to alterations in plantings. The Riverway, unlike the Fens and Olmsted Park, was not suited to active recreation and organized sports due to its narrowness and terrain, and thus was insulated from these intrusions.

The parkways were not insulated from such intrusions. In the 1930s parkland takings began when the Tremont Street (Route 9) overpass was constructed, impacting the southern end of the Muddy River and its connection to Olmsted Park. From 1934-1949, proposals to construct a rotary at the intersection of Audubon Road (Park Drive) and the northern end of the Riverway were initiated. From 1951-1955 proposals for a by-pass road at the Riverway and Audubon Road were considered. Between 1953 and 1959 parkland was taken for road widening, right-hand turn only lanes, exit and entry ramps, and parking.

During this time commuter traffic continually increased, isolating the Riverway park within a major roadway system. This resulted in the gatehouse, Audubon Bridal Bridge and headwalls at Brookline Avenue being demolished. The Muddy River was filled and culverted, and the parkways around the park were widened and reconfigured. In 1958-1959 the taking of land above the Fens at Brookline Avenue resulted in relocation of the boat launch and filling to construct the Sears Roebuck Company parking lot.

These actions severed the Riverway park from the Fens, negatively impacting pedestrian movement, the equestrian ride, and the canoeing activity in the Riverway park. The equestrian system was impacted so dramatically by the roadway widening and right hand turn only lanes at Longwood Bridge and Brookline Avenue that it was virtually eliminated.

In 1956 the MDC assumed care and control of the Riverway parkway, including a twenty-five (25') foot taking of a right of way into the parkland. Although originally built as a sanitary improvement, the Riverway waterway and park has, overtime, been impacted by the associated drainage and sewerage systems. In addition, the banks are undermined and plantings that originally stabilized the banks, including wetland bank, upland, and canopy plantings are non existent, having been replaced by volunteer tree and shrub growth and extensive invasive herbaceous species. Cynthia Zaitzevsky noted in her report, Riverway Historic Landscape Report, January 1987, that on October 6, 1962, floodwater was discharged through the MBTA tunnels via the new Fenway Park opening and that between 1963 and 1964 two flood control projects were undertaken by the MDC. The projects included dredging the Muddy River from the southerly end of Leverett Pond to Park Drive and installing new culverts as well as constructing a new dike system. In 1971 the Riverway was placed on the National Register of Historic Places under the National Preservation Act of 1966, along with all of Olmsted's Emerald Necklace Parks and Parkway. On October 24, 1989, The Riverway was designated a landmark by the City of Boston, under Chapter 772 of the Acts of 1975.

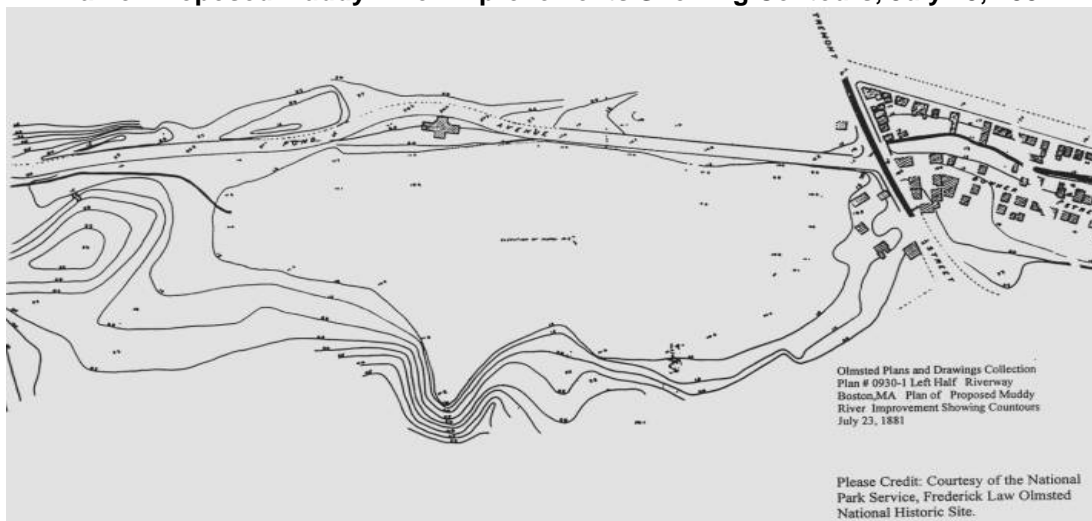
2.5 Historic Resources – Sector IVA, IVB – Olmsted Park

The Leverett Pond area has a Primary Period of Significance, (1880-1895), which is the Frederick Law Olmsted design period for the area between Tremont Street (Route 9) in Brookline and Willow Pond Road. In 1880 Olmsted completed the plan for a "Suggestion for the Improvement of Muddy River", which is published in the Sixth Annual Report of the Boston Park Commissioners and in the Annual Report of the Brookline Park Commissioners. The suggested improvement included a diagrammatic plan for the proposed park prior to the 1881 design plan. Frederick Law Olmsted set forth his intent:

"Upper Valley of Muddy River -- A chain of picturesque fresh-water ponds, alternating with attractive natural groves and meads. From Tremont Street, south to Jamaica Pond, the waters widen out into pools and ponds, connected by a rapid brook, and, besides the scenery a more varied Parkway, the road on the Boston side has been named Jamaica-way, thus indirectly, by change of name, recognizing the change of landscape character. The public way on the Brookline side is named Brookline Road, the use of the word 'road' being appropriate to its rural character." (Note: Tremont Street now Huntington Avenue)

A July 23, 1881 survey titled "Plan of Proposed Muddy River Improvement Showing Contours," prepared by Boston City Engineer Henry M. Wrightman, documents the site prior to the implementation of Olmsted's plan. The Leverett Pond site was an existing fresh-water pond that was modified by Olmsted's design. The creation of the park required change to the boundary between Boston and Brookline (see Figure 2-19).

Figure 2.19
Plan of Proposed Muddy River Improvements Showing Contours, July 23, 1881



Source: FLONHS

The following decade involved the preparation of several planning efforts including:

- The 1881 "General Plan for the Sanitary Improvement of Muddy River and for Completing a Continuous Promenade between Boston Common and Jamaica Pond";
- The 1889 "Outline of Revised Plan for The Parkway and Sanitary Improvement of Muddy River showing the proposed change in the Town boundary and the relationship of the proposed pleasure ground to the neighboring streets and to the suggested revisions to the railroad arrangements between Chapel and Longwood Stations";
- The 1890 plan published in the Fifteenth Annual Report of the Boston Park Commissioners and the Annual Report of the Brookline Park Commissioners,
- The 1892 lithograph titled "Plan of the Parkway between Muddy River Gate House and Jamaica Park", which increased the site acreage to accommodate a meadow, now Daisy Field; and
- The 1896 "Plan of Portion of Park System from Common to Franklin Park" documents the park during the Olmsted Period.

A series of plans dated between 1890 and 1893 provide detailed proposed grading, historic shoreline, plant massings with viewsheds, plant lists, and planting plans for the Olmsted design (see Figure 2.20).

Figure 2.20
Plan of the Parkway Between Muddy River Gatehouse and Jamaica Park, 1892



Source: FLONHS

There is limited photographic documentation for the pond. Photographs illustrate how the shoreline of the pond was constructed and the plantings and the original bank treatments; be they planted or turf covered banks coming down to the edge of emergent vegetation. The Olmsted plans and photographs also show the "Olmsted beaches", which were widened paths that allowed access to the water edge and were made of the same material as the path (see Figure 2-21). In Olmsted's period these were gravel paths. The elevation of the water in Leverett Pond is about three feet lower than the elevation shown on Olmsted's grading plans. This has resulted overtime in the change from the banks of the original beaches to turf covered banks that extend to the waters edge, since the banks today are too steep to negotiate and stabilize as gravel material. The pond on the Brookline side has a gabion treatment to stabilize the edge, which has resulted in herbaceous plants and shrub and tree seedlings invading the edge, some of which are invasive species. The Boston side has a natural shoreline edge.



Figure 2.21
View Over Leverett Pond from Allerton Street Overlook, c. 1900

Source: Brookline Public Library

Complete grading plans exist that delineate the grading and layout of the original shoreline as designed and constructed by Olmsted and his firm in the early 1890's. Overlaying the plans for the shoreline created during the Primary Period of Significance with surveys showing the existing conditions demonstrates the shoreline that are extant from that period. Also available are extensive drawings documenting the planting done in Olmsted's time. These include plans showing the intended massing of plant materials and the site direction of dozens of vistas through and over vegetation, providing views up, down and across the river. For Brookline's side there are also detailed plant placement

plans supplemented by extensive planting lists that identify individual trees and plants or groups of plants to be placed in precisely indicated areas. No other park designed by the Olmsted firm during Olmsted's career and with his active participation has nearly as detailed a record of involvement by John C. Olmsted, who carried on the firm's work in the Boston parks after Olmsted's retirement in 1885, and by Warren Manning, the firm's chief plantsman, who had a notable landscape design career of his own beginning in the late 1890's.

Olmsted designed the park as a scenic picturesque park, with activities that were compatible with enjoying the scenery. As with the Back Bay Fens and the Riverway, Olmsted constructed a circulation system around Leverett Pond as a part of his transformation of the site to serve the purposes of a public park. The path systems and the separation of carriage, equestrian and foot traffic were major features that allowed the three categories of users to enjoy the picturesque pond landscape, without causing physical danger or interfering with the experience of the landscape of each. Olmsted also intended to have the pond accessible to canoes. A canoe landing with boathouses was studied for Leverett Pond and a temporary landing was built in 1895, probably at the southern end.

The Cumberland Avenue Bridge was built at the southern end of the pond to cross over the brook feeding into the pond. A second bridge was constructed at the northeast edge to form the cove that today is called the Cove Bridge. Both bridges were stone masonry bridges and allowed for movement through a constantly changing "passage of scenery". It should be noted that as the water level in the pond went down, the cove created by Olmsted was no longer feasible and it was filled. The bridge still remains today (see Figure 2.22).



Figure 2.22
View of Leverett Pond Cove Bridge, c. 1900
Source: Frances Loeb Library HASD

There is no Secondary Period of Significance since there has been no major designer involved in Olmsted Park since Frederick Law Olmsted's involvement. In 1897, John A. Pettigrew was hired as Park Superintendent for the Boston side. The contract with the Olmsted Firm was not renewed. In 1898 the first dredging in Leverett Pond at the mouth of the Village Brook storm sewer occurred.

In the 1940's the Boston Park Department placed a baseball diamond in the meadow east of Leverett Pond. Today this meadow is called Daisy Field. A second baseball diamond followed, as did associated lighting. In 1956 the Metropolitan District Commission assumed care and control of the Jamaica-way, Perkins Street, Chestnut Street and Willow Pond Road as well as a twenty-five (25') foot taking of a right of way into the parkland. Pond Avenue, which is dated to the 1881 survey, is the only road surrounding the park that is not under MDC control.

In 1971 Olmsted Park was placed on the National Register of Historic Places under the National Preservation Act of 1966, along with all of Olmsted's Emerald Necklace Parks and Parkways. In October 24, 1989 Olmsted Park was designated a landmark by the City of Boston under Chapter 772 of the Acts of 1975.

Projects completed in Olmsted Park since the adoption of the Emerald Necklace Master Plan are documented in the Master Plan.

2.6 Historic Resources – Sector IVB - Willow Pond

The Willow Pond Area has a Primary Period of Significance of 1880-1895, which is the Frederick Law Olmsted design period for the area. In 1880 Olmsted completed a plan titled "Suggestion for the Improvement of Muddy River", which is published in the Sixth Annual Report of the Boston Park Commissioners and in the Annual Report of the Brookline Park Commissioners. The suggested improvement included a diagrammatic plan for the proposed park prior to the 1881 design plan. Frederick Law Olmsted set forth his intent:

"Upper Valley of Muddy River -- A chain of picturesque fresh-water ponds, alternating with attractive natural groves and meads. From Tremont Street, southwardly to Jamaica Pond, the waters widen out into pools and ponds, connected by a rapid brook, and, besides the scenery a more varied Parkway, the road on the Boston side has been named Jamaica-way, thus indirectly, by change of name, recognizing the change of landscape character. The public way on the Brookline side is named Brookline Road, the use of the word 'road' being appropriate to its rural character."

A July 23, 1881 survey titled "Plan of Proposed Muddy River Improvement Showing Contours," prepared by Boston City Engineer Henry M. Wrightman, documents the site prior to the start of Olmsted's work. The Willow Pond site was a small pond with a small brook feeding it and a small brook out-letting to Leverett Pond (see Figure 2.23).

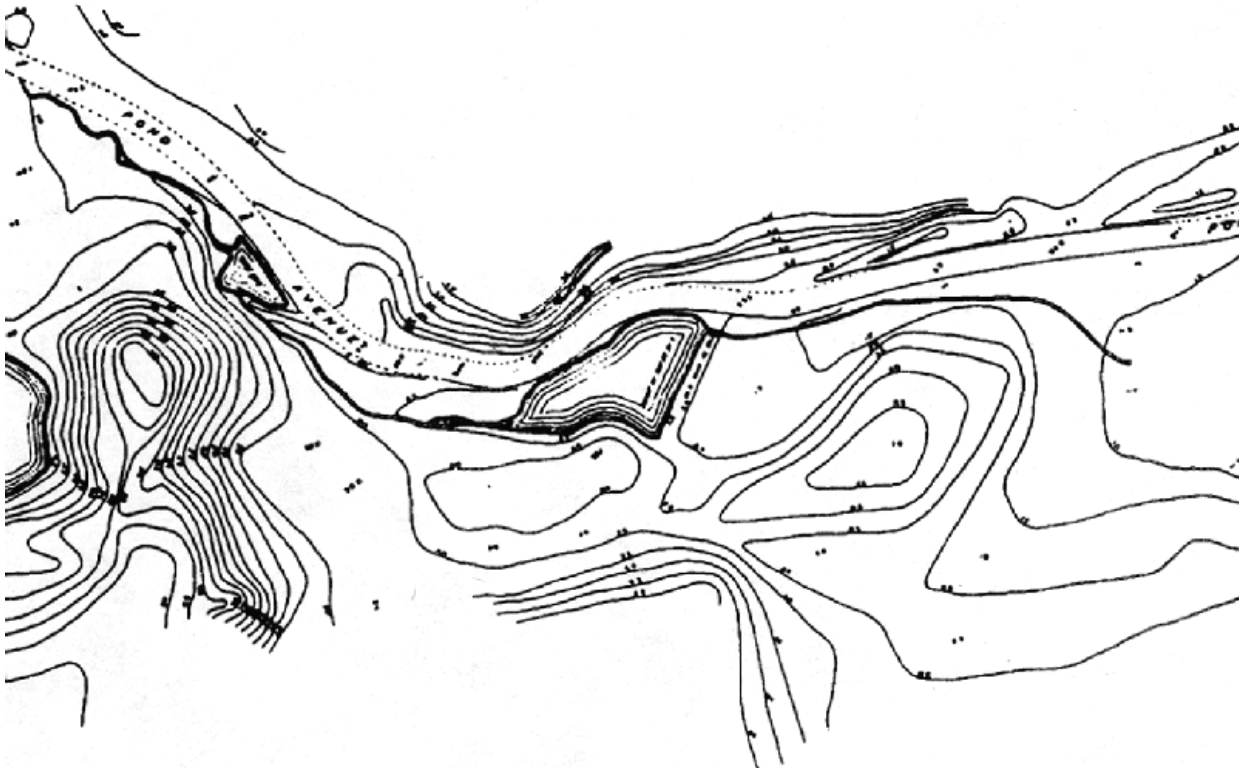


Figure 2.23
Plan of Proposed Muddy River Improvements Showing Contours 1881

Source: FLOHNS

Several sources of information document the park during the Olmsted period including:

- 1) The 1881 "General Plan for The Sanitary Improvement of Muddy River and for Completing a Continuous Promenade between Boston Common and Jamaica Pond";
- 2) The 1889 "Outline of Revised Plan for The Parkway and Sanitary Improvement of Muddy River showing the proposed change in the Town boundary and the relationship of the proposed pleasure ground to the neighboring streets and to the lately suggested revisions to the railroad arrangements between Chapel and Longwood Stations;
- 3) "The 1889 Revised plan for the upper part of the Muddy River (Olmsted Park), increases the site acreage to accommodate the natural history pools);
- 4) The 1890 plan published in the Fifteenth Annual Report of the Boston Park Commissioners and the Annual Report of the Brookline Park Commissioners;
- 5) The 1892 lithograph titled "Plan of the Parkway between Muddy River Gate House and Jamaica Park (see Figure 2-24), and 6) the 1896 "Plan of Portion of Park System from Common to Franklin Park document the park during the Olmsted Period.

Figure 2.24
Plan of the Parkway Between Muddy River Gatehouse and Jamaica Park, 1892



Source: FLONHS

In addition, a series of plans dating 1890 to 1893 provides detailed proposed grading, historic shoreline, plant massings with viewsheds, plant lists, and planting plans for the Olmsted design.

There is limited photographic documentation for the pond. Photographs illustrate the construction of the pond shoreline, the plantings and original bank treatments; be they planted or grass beaches coming down to the edge of emergent vegetation (see Figure 2.25).



Figure 2.25
View of Willow Pond Toward Willow Pond
Road Culvert Bridge, 1900

Source: FLOHNS

Complete grading plans delineating the grading and shape of the shoreline as designed and constructed by Olmsted are available. By overlaying the plans of the shoreline created during the Primary Period of Significance with surveys showing the existing conditions today, it can be determined which shoreline areas are extant from that period. Extensive drawings documenting the planting that was done in Olmsted's circulation system around Willow Pond as part of his transformation of the site to serve the purposes of a public park are also available. The path systems and the separation of carriage and foot traffic were the major feature that allowed the passive user to view the picturesque pond landscape and the carriage drive or parkway to view its green edge, without causing physical danger or interfering with the experience of the landscape of each. Riverdale Parkway, west of Willow Pond was designed and constructed by Olmsted as a park drive within the park, but it had become a commuter route with parked cars at its edge and was impacting the use of the park. The 1990 Master Plan discontinued the parkway

converting it into a pedestrian and bicycle path, which was completed between 1998 and 2000.

A granite footbridge was built at the southern end of the pond to cross over the Babbling Brook feeding into the pond. Willow Pond Bridge, a bridge/culvert, was constructed at the north edge as the water left the pond. Both bridges provided viewing points or were features set in Olmsted's picturesque views. Two small stone culvert bridges were constructed in the history pool area and a bridge/culvert and waterfall entered the east side of Willow Pond below the history pools.

There is no Secondary Period of Significance since there has been no major designer involved in Olmsted Park since Frederick Law Olmsted's involvement. In 1897 John A. Pettigrew was hired, as Park Superintendent for the Boston side and the contract with the Olmsted Firm was not renewed. A decision was made under Pettigrew to fill two of the Natural History pools at Spring Pond above Willow Pond (1898), since the Society could not raise funds. Pettigrew also began "rearranging" the plantations, adding broadleaf evergreens.

State legislation in 1962 and 1963 directed the MDC to take by eminent domain or otherwise, land in Jamaica Plain and elsewhere for skating rinks. In 1964 the City of Boston conveyed to the MDC a parcel of land east of Willow Pond to construct a skating rink. By 1965 the Sergeant Peter Kelly Rink was constructed. In 1997 the rink was removed.

Further takings as well as modifications to the parkway and road systems were planned by the MDC starting in 1967, when a one-way system of parkways was recommended around Olmsted Park and Jamaica Pond. This involved a taking by eminent domain by the MDC of Riverdale Parkway. Brookline fought this in the courts up to the state Supreme Court and won, so the parkways were not widened or made one-way and the parkway remained under town ownership.

In 1971 Olmsted Park was placed on the National Register of Historic Places along with all of Olmsted's Emerald Necklace Parks. In 1982 Brookline installed a gabion system on the west shore of the pond. In 1983, Olmsted Park was designated a landmark by the City of Boston.

2.7 Historic Resources – Sector IVB – Ward's Pond

The Ward's Pond Area has a Primary Period of Significance, 1880 to 1895, which is the Frederick Law Olmsted design period for the area. In 1880, Olmsted completed a plan for a "Suggestion for the Improvement of Muddy River", which was published in the Sixth Annual Report of the Boston Park Commissioners and in the Annual Report of the Brookline Park Commissioners. The suggested improvement included a diagrammatic plan for the proposed park prior to the 1881 design plan. Frederick Law Olmsted set forth his intent:

"Upper Valley of Muddy River -- A chain of picturesque fresh-water ponds, alternating with attractive natural groves and meads. From Tremont Street, southerly to Jamaica Pond, the waters widen out into pools and ponds, connected by a rapid brook. The road on the Boston side has been named Jamaica-way, thus, by change of name, recognizing the change of landscape character. The public way on the Brookline side is named Brookline Road, the use of the word 'road' being appropriate to its rural character."

A July 23, 1881 survey titled "Plan of Proposed Muddy River Improvement Showing Contours," prepared by Boston City Engineer Henry M. Wrightman, documented the site prior to the start of Olmsted's work. The Wards Pond site was an existing pond (see Figure 2.26).

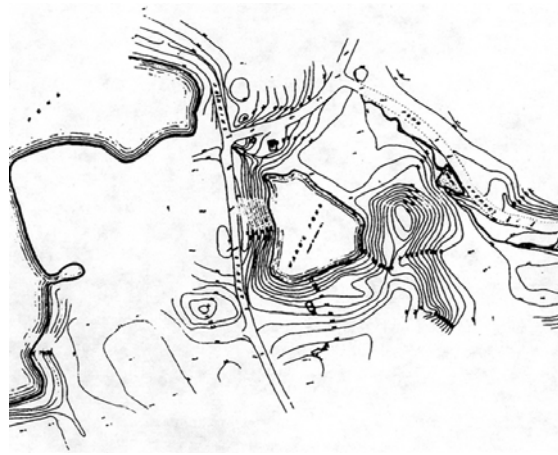


Figure 2.26
Plan for Proposed Muddy River Improvements Showing Contours, 1881
Source: FLONHS

The following resources document the park during the Olmsted Period:

- 1) The 1881 "General Plan for The Sanitary Improvement of Muddy River and for Completing a Continuous Promenade between Boston Common and Jamaica Pond";
- 2) The 1889 "Outline of Revised Plan for The Parkway and Sanitary Improvement of Muddy River showing the proposed change in the Town boundary and the relationship of the proposed pleasure ground to the neighboring streets and to the lately suggested revisions to the railroad arrangements between Chapel and Longwood Stations";
- 3) The 1890 plan published in the Fifteenth Annual Report of the Boston Park Commissioners and the Annual Report of the Brookline Park Commissioners;
- 4) The 1892 lithograph titled "Plan of the Parkway between Muddy River Gate House and Jamaica Park; and
- 5) The 1896 "Plan of Portion of Park System from Common to Franklin Park document the park during the Olmsted Period.

In addition, a series of plans dating from 1890 to 1893 provide detailed proposed grading, historic shoreline, plant massings with viewsheds, plant lists, and planting plans for the Olmsted design (see Figure 2.27).

Figure 2.27
Plan of the Parkway Between Muddy River Gate House and Jamaica Park, 1892



Source: FLONHS

Extensive photographic documentation for the pond exists particularly in the early 1900's. These photographs illustrate the shoreline of the pond, the plantings, and original bank treatments, either planted or grass beaches coming down to the edge of emergent vegetation (see Figure 2.28).



Figure 2.28
View of Wards Pond Looking Towards Perkins Street, 1904

Source: FLONHS

Complete grading plans exist that delineate the grading and shape of the original shoreline as designed and constructed by Olmsted and his firm in the early 1890's. The plans can be overlayed to the shoreline created during the Primary Period of Significance with surveys showing the existing conditions today, and so determine what areas of shoreline are extant from that period. Also available are extensive drawings documenting the planting that was done in Olmsted's time. These include plans showing the intended massing of plant materials and the site direction of dozens of vistas through and over vegetation, providing views across the pond. Planting plans supplemented by extensive planting lists identify individual trees and plants or groups of plants to be placed in precisely indicated areas. No other park designed by the Olmsted firm during Olmsted's career and with his active participation has nearly as detailed a record of involvement by John C. Olmsted, who carried on the firm's work in the Boston parks after Olmsted's retirement in 1885, and by Warren Manning, the firm's chief plantsman, who had a notable landscape design career of his own beginning in the late 1890's (see Figure 2.29).

Figure 2.29
Grading Plan at Ward's Pond, 1900



Source: FLONHS

The planting plans and plant list for the entire Boston side of Olmsted Park have been identified and brought together for the first time during the present project. They indicate plant materials not used on the Brookline side that were to supplement those lists. They also indicate the particular conditions of soil and sunshade under which different groups of plants were to be used. The Ward's Pond plans are plant massings, since Olmsted and his firm usually preferred to make planting decisions in the field.

Olmsted designed the park as a picturesque park with activities that were compatible with enjoying the scenery. As with the Back Bay Fens and the Riverway, Olmsted constructed a circulation system around Ward's Pond. The path systems and the separation of carriage and foot traffic were the major feature that allowed the passive user to view the picturesque pond landscape and the carriage drive or parkway to view its green edge without causing physical danger or interfering with the experience of the landscape of each. The path system around the pond was complete in 1895, except for the northern side.

Two boulder/culvert bridges were constructed at the north and south ends of the pond. Both bridges provided viewing points or were features set in Olmsted's picturesque views. The area of the history pools west of the pond had two boulder/culvert bridges, which were demolished along with the history pools by John A. Pettigrew in 1897. A granite footbridge spans the babbling brook at the Ward's Pond exit.

There is no Secondary Period of Significance since there has been no major designer involved in Olmsted Park since Frederick Law Olmsted's involvement, although the Olmsted Firm did some consulting afterwards. In 1897 John A. Pettigrew was hired, as Park Superintendent for the Boston side and the contract with the Olmsted Firm was not renewed. The decision was made by Pettigrew to fill two of the Natural History pools at Spring Pond (1898), since the Society could not raise funds. By 1899, additional pools were filled, and the boulder bridges were demolished at Wards Pond. Pettigrew also began "rearranging" the plantations, adding broadleaf evergreens with particularly dense plantings on the east and south banks of Wards Pond (see Figure 2.30).



Figure 2.30

Wards Pond from Near Jamaicaaway Looking North Towards Chestnut Street, c. 1900

Source: FLONHS

In 1971 Olmsted Park was placed on the National Register of Historic Places under the National Preservation Act of 1966 along with all of Olmsted's Emerald Necklace Parks. On October 24, 1989, Olmsted Park was designated a landmark by the City of Boston under Chapter 772 of the acts of 1975.

CHAPTER 3: EXISTING CONDITIONS

Before management and maintenance recommendations can be made, a thorough inventory of the existing conditions and park operations must be documented. The following narrative documents these components of the park, as they existed in 2001. This chapter contains descriptions of the landscape elements, unique resources and existing park uses in each of the parks included in the Muddy River Restoration Project Phase I. The analysis of existing conditions is organized by park: Charlesgate, Back Bay Fens, Riverway, Leverett Pond, Willow Pond, and Ward's Pond, and by maintenance sector: Sector I – Charlesgate, Sector II A - Back Bay Fens North: Victory Garden's/Mother's Rest; Sector II B – Back Bay Fens Central: Rose Garden/Clemente Field; Sector II C – Back Bay Fens and Sears Parking Lot; Sector III – Riverway; Sector IV A – Olmsted Park North: Leverett Pond/Daisy Pond; Sector IV B – Olmsted Park South: Ward's Pond/Willow Pond/Nickerson Hill.

3.1 Introduction

The Muddy River watershed is located within the City of Boston and the Town of Brookline, Massachusetts. A small part of the watershed is located in Newton.

The Muddy River Project area is contained within the historic park system that is known as the Emerald Necklace. The Emerald Necklace consists of a series of six parks that was planned by Frederick Law Olmsted to extend from the Boston Public Garden and along Commonwealth Avenue, encompassing the Muddy River through the Arnold Arboretum and Franklin Park to the South Boston beaches, and culminating at Castle Island. The link from Franklin Park through Dorchester was never constructed. A circa 1897 plan (see Figure 3.1) depicts the layout of the present-day Emerald Necklace and encompasses the following park areas: Charlesgate, Back Bay Fens, Riverway, Olmsted Park (Leverett Pond, Willow Pond, Ward's Pond, Jamaica Pond), the Arnold Arboretum and Franklin Park.

Figure 3.1
Historic Emerald Necklace Plan



Source: FLONHS

The Emerald Necklace and its adjacent parkways are listed on the National Register of Historic Places and located near several other districts, individual structures, and institutions that are also listed on the National Register in addition to being designated as landmarks by the Boston Landmarks Commission.

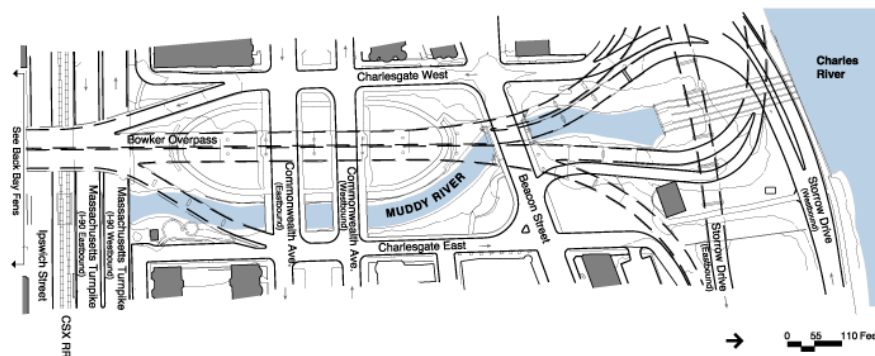
3.2 Existing Conditions - Charlesgate Area (Sector I)

The Charlesgate area of the Muddy River includes the parkland that extends linearly from Ipswich Street to the Charles River (Figure 3.2). The Charlesgate area contains several main roadways including the elevated Bowker interchange, Commonwealth Avenue, Beacon Street, Boylston Street and several local streets with connections to Storrow Drive. The Massachusetts Turnpike and the CSX railroad (Boston and Albany line) also bridge the Muddy River.

The land use in the Charlesgate area is both commercial and residential with a substantial number of student apartments. Kenmore Square and Fenway Park (the Boston Red Sox) are nearby, as are a number of colleges and universities (Boston University, Berkeley College of Music). The Massachusetts Bay Transportation Authority (MBTA) provides mass-transit via bus, subway and rail service.

The Charlesgate area is the furthest downstream segment of the Muddy River before it flows through large conduits under Storrow Drive and into the Charles River. The Muddy River channel in this area consists entirely of rock and concrete construction with no wetland vegetation present. Scattered stands of Japanese knotweed have been observed in this area. The surrounding landscape of the river is either grass or bare ground with some trees and shrubs.

Figure 3.2 Charlesgate Area



The Charlesgate area is a maintained urban park with extensive lawns, some mature trees, and few shrubs. *Phragmites australis* (phragmites) does not grow in this area.

The inventory, documentation, and analysis of vegetation in the Charlesgate area were completed in August of 2000. The area includes the watercourse from the Charles River to the Boylston Street Bridge (Richardson Bridge). The scope of work included

documentation of trees, shrubs, vines, and lawn areas including notation of areas with bare lawn and erosion (Table 3.1).

Table 3.1 Inventory and Analysis of Existing Vegetation – Charlesgate

Category	Unit	Total	Good	Fair	Poor	Dead
Trees:						
Canopy tree	each	233	69	152	12	7
Flowering tree	each	27	8	18	1	0
Evergreen tree	each	45	26	19	0	0
Heritage tree ¹	each	12	9	2	1	0
Total Trees:		317	112	191	14	7
Shrubs:						
	(Estimated)					
Restored planting	square footage	0				
Shrub massing	square footage	1,890				
Total Shrubs:		1,890				
Invasive Plant Colonies:						
	(Estimated)					
Phragmites	square footage	13,539				
Other Invasives (e.g. Knotweed)	square footage	9,415				
Total Invasive Plant Colonies:		22,954				
Woodland:						
	(Estimated)					
	square footage	0				

¹Note: A heritage tree is a canopy tree with a 32" or greater caliper. If it is listed as a heritage tree, it will not be listed as a canopy tree.

In accordance with the Commonwealth of Massachusetts Department of Environmental Management standards, trees that are 32" inches in caliper and over are considered to be heritage trees. All trees have their species and caliper size identified and the condition of the heritage trees is rated as good, fair or poor as are all other trees on the site. The diameter of the circle for tree canopy is in relation to its caliper size.

The wildlife resources of the Charlesgate area include avian and non-avian species. The Charlesgate area does not contain wetland vegetation or any natural environmental amenities. Therefore, the Project's Wildlife Habitat Evaluation and Vegetation Assessment did not extend to this area.

Passive recreation in the Charlesgate area is limited to a series of poorly lit seating areas. There is no active recreation in this location. Current use of this area is limited due to two factors: the lack of a pedestrian path parallel to the river and to the domination and shading of the space by the Bowker Overpass.

Historic Structures

The one historic structure at Charlesgate is the gatehouse at the Fens outlet to the Charles River. It is beneath the 1960s Storrow Drive/Charlesgate (Bowker) Interchange. Smaller than the Stony Brook Gatehouses, it is more elaborate and monumental. Like the two gatehouses upstream, its equipment is not fully operable. Debris, including floating sludge and grease, is periodically removed by the MDC.

3.3 Existing Conditions - Back Bay Fens (Sectors IIA, IIB and IIC)

The Back Bay Fens consists of linear parkland that extends southerly (upstream) along the Muddy River from Boylston Street at the Richardson Bridge, to the Riverway/Park Drive area, in front of the new Landmark Center (formerly the Sears Building). The Back Bay Fens contains a number of intersecting roadways and is paralleled by the DCR-maintained Park Drive and the Fenway (Parkway). The Back Bay Fens contains the following maintenance sectors: Sector II A – Back Bay Fens North: Victory Gardens/Mother’s Rest, Sector II B – Back Bay Fens Central: Rose Garden/Clemente Field and Sector II C – Back Bay Fens South and Sears Parking Lot.

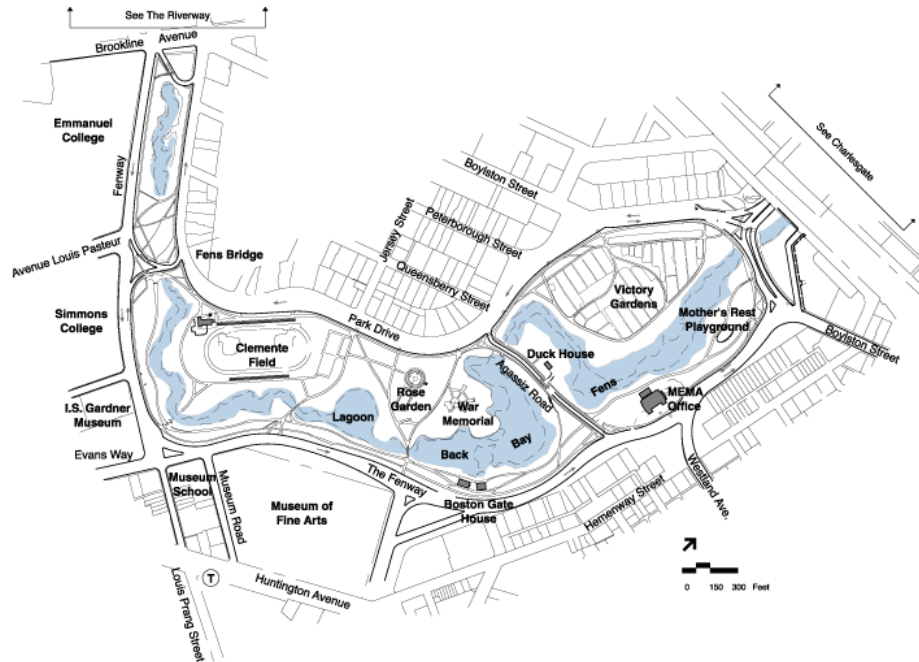
The Back Bay Fens contains lawn areas, numerous mature shade trees and smaller trees, and shrubs. Many paved and unpaved paths transect the park. The shoreline of the Muddy River along both sides of the Back Bay Fens is earthen, although it is heavily overgrown by extremely dense stands of giant reed grass (*Phragmites australis*) which grow along much of the bank and well out into the waterway, severely restricting its flood flow capacity. This is particularly true in the area of the Back Bay Fens GateHouse, Agassiz Road and the Victory Gardens. While some of the bank is in good condition, other parts of the bank are eroded and/or undercut.

There are abundant cultural and institutional resources, and adjacent to the Back Bay Fens. These include: the Victory Gardens, Mother’s Rest playground, the Boston Emergency Management Agency field office (a former fire station), the Duck House, War Memorial, Rose Garden, and Clemente Field. The Back Bay Fens also contains apartments and longer-term residences, the Museum of Fine Arts, the Museum School, the Gardner Museum, Northeastern University, Wentworth Institute, Berkley College of Music, MIT, Boston Conservatory of Music, Forsyth Dental School, Harvard Medical School, Emerson College, Emmanuel College, and Wheelock College.

The Back Bay Fens contains two sections of river where the original channel has been culverted and filled over. These areas are located under the former Sears parking lot adjacent to the recently opened Landmark Center and abutting roadways, and upstream of the Fens Bridge at Avenue de Louis Pasteur. As the Muddy River flows through the two 6-foot diameter culverts under the former Sears parking lot, it passes through a diversion chamber for the Muddy River Conduit. This conduit, which is located under part of Brookline Avenue, takes higher stormwater flows directly to the Charles River. There is a low flow weir in the Muddy River Conduit, which allows low flow water to continue into the Back Bay Fens. The Back Bay Fens contains a number of small, individual stormwater outfalls from Park Drive and the Fenway. Larger noteworthy outfalls include

the overflow from the Stony Brook Conduit at Boston Gatehouse No. 1 and the Emmanuel College Drain overflow.

Figure 3.3 Back Bay Fens



The Back Bay Fens (Figure 3.3) is a maintained urban park with extensive lawns, mature trees, and some shrubs. Monotypic stands of *Phragmites australis* dominate much of the shoreline of the Fens. The plant grows to heights of 18-20 feet. The *Phragmites australis* extends considerably into the waterway, severely constricting the flow of water and storage capacity. The following sections include information on the existing woodlands, horticultural resources and aquatic and wildlife resources and wetlands along the Back Bay Fens section of the Muddy River.

The inventory, documentation, and analysis of vegetation in the Back Bay Fens Area were completed in August of 2000. The area includes the watercourse from the Boylston Street Bridge (Richardson Bridge) to the Riverway at Sears Parking Lot. The scope of work includes trees, shrubs, vines, and lawn areas including notation of areas of bare lawn and areas of erosion (Table 3.2).

Table 3.2 Inventory and Analysis of Existing Vegetation – Back Bay Fens

Category	Unit	Total	Good	Fair	Poor	Dead
Trees:						
Canopy tree	each	1,223	251	802	165	5
Flowering tree	each	180	17	134	25	4
Evergreen tree	each	12	1	11	0	0
Heritage tree	each	88	21	56	11	0
Total Trees:		1,503	290	1,003	201	9
Shrubs:						
	(Estimated)					
Restored planting	square footage	0				
Shrub massing	square footage	26,666				
Total Shrubs:		26,666				
Invasive Plant Colonies:						
	(Estimated)					
Phragmites	square footage	358,382				
Other Invasives (e.g. Knotweed)	square footage	26,536				
Total Invasive Plant Colonies:		384,918				
Woodland:						
	(Estimated)					
	square footage	0				

¹Note: A heritage tree is a canopy tree with a 32" or greater caliper. If it is listed as a heritage tree, it will not be listed as a canopy tree.

In The Back Bay Fens, there are both organized and informal sports areas. An athletic field that includes a track and field area with bleacher seating was constructed in 1929. In addition, a baseball diamond is now within the track area. Basketball and volleyball courts, added later, are located in an adjacent area. Less organized active recreation areas include paths for activities such as walking, running, and biking and open lawn for informal catch and Frisbee throwing. The Victory Gardens, one of the few gardens established during World War II to still be in active use, provide gardening activity for those who can secure the use of a plot.

There is also passive recreation in the Fens area with numerous benches along the paths, areas of open lawn for informal seating, a rose garden and war memorial area for sitting and viewing. The historical Victory Gardens also provide viewing opportunities.

Historic Structures

The following are referenced in the Emerald Necklace Master Plan as existing historic structures in the Back Bay Fens.

- ♦ Boylston Street Bridge
- ♦ Agassiz Bridge

- Fen Bridge
- Stony Brook Gatehouse
- Fens Gatehouse
- Agassiz Road Shelter (Duck House)
- Clemente Field House
- Boston Fire Alarm Headquarters
- World War II Memorial, Vietnam Memorial, Korean Memorial

The Back Bay Fens has the greatest number of buildings in the Emerald Necklace system. It also boasts three of the most significant original bridges: Boylston Street, Agassiz and Fen. It contains the original Stony Brook Gatehouses, the Fens Gatehouse at Charlesgate, and a number of memorials and monuments.

Although it carries heavy traffic, Boylston Street Bridge has always been well maintained. Only minor repointing and graffiti removal is needed at this time. Agassiz Bridge was restored to eradicate minor cracks, replace capstones and accomplish minor repointing and graffiti removal. The north viewing bay was severely damaged by a car in 1988. Full restoration of the bridge, including understory plantings, was completed in 1988. The south headwall of the Fen Bridge is intact, but many places need mortar fills and the removal of vegetation and graffiti.

Located below the Museum of Fine Arts are two small pedestrian bridges built in 1978. These need minor repainting, pointing and placement paving.

The Agassiz Road Shelter (the Duck House) has been severely fire damaged and some of the roof has caved in. Roberto Clemente Field House has been extensively vandalized and defaced.

The Boston Fire Alarm Headquarters is a massive building with historic masonry walls. With the exclusion of some surface staining these walls are apparently sound. The building's exterior terraces and walls are in poor condition. The Mother's Rest Shelter requires minor upkeep and repainting.

All the memorials and monuments except for the World War II Memorial were in fairly good condition. Most needed minor cleaning and graffiti removal. The World War II Memorial, a major feature, had been vandalized: plaques were missing, stone retaining walls and pavements settled, base pedestals were damaged and seats were in need of repair or replacement. The rehabilitation of the World War II Memorial and the construction of the Korean and Vietnam Memorials was completed in 1990 through a project funded by the Boston White Fund. In contrast, the nearby Rose Garden fountain and monuments have been continually well maintained.

The Stony Brook Gatehouses (Nos. 1 & 2) have granite masonry walls in good condition. These original engineering structures allowed Stony Brook to discharge into the Lower Fens (then a coastal marsh) and enter the tidal Charles River. Gatehouse Number 1 was built in 1905 by H.H. Richardson's successor firm. The design replicated the smaller

1882 Richardson Gatehouse, which was moved to a new foundation over the Stony Brook Conduit in 1905.

Most of the structures in the Fens, both old and new, require extensive repair and rehabilitation. Work on recently vacant buildings, such as the Agassiz Road Shelter and Clemente Field House, as well as work required to repair the drainage control functions at the gatehouses, will require major capital expenditures.

3.4 Existing Conditions - The Riverway (Sector III)

The historic boundary of the Riverway section of the Emerald Necklace was located at Brookline Avenue, before the segment between the Back Bay Yard and Brookline Avenue was filled for construction of the Sears Parking Lot. The Riverway currently begins at the twin 6-foot culverts at Park Drive and the Riverway roadway itself. There are also numerous cultural and institutional resources along the Riverway. These include the members of the Medical Academic and Scientific Community Organization, Inc. (MASCO), Wheelock College, the Winsor School, Simmons College, and numerous apartment and condominium units.

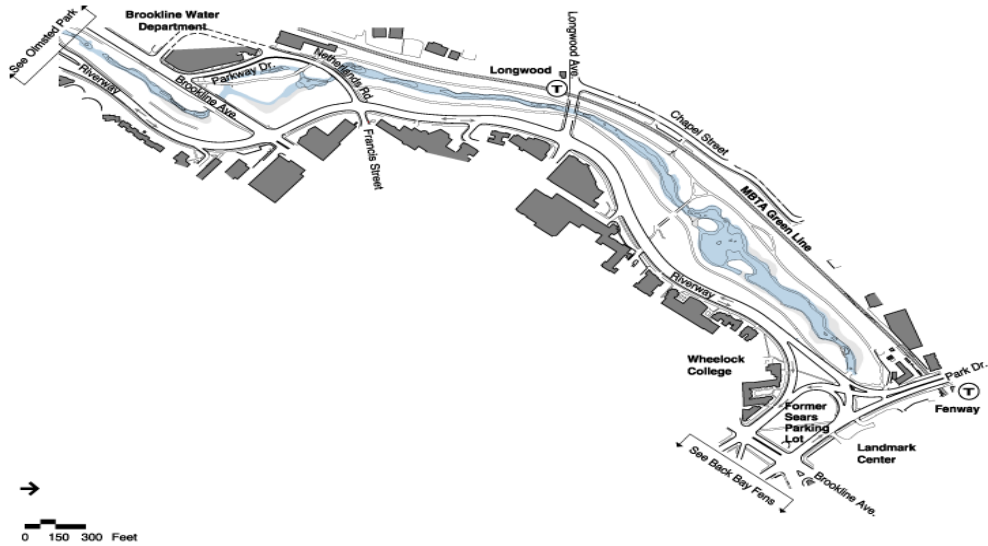
The Muddy River flows north from Leverett Pond into the Riverway. The Riverway comprises a linear park along both sides of the Muddy River. It consists of a maintained grassy parkland with paved and unpaved paths, a mixture of mature Olmsted-planted trees and younger volunteer trees, and some shrubs (Figure 3.4).

The DCR-maintained Riverway parkway runs parallel along the River's east side (Boston) with the MBTA Green Line tracks running along the west side (Brookline) until Netherlands Road where local Brookline streets are encountered. The Riverway (watercourse) is bordered on both sides with linear grassed parkland, and numerous paralleling and intersecting roadways. With the exception of a rip-rapped channel immediately downstream of the Route 9 bridge and the area under Longwood Avenue Bridge, the shoreline of the Muddy River along both sides of the Riverway consists of naturalized terrain designed by Olmsted. Considerable lengths of the bank have no vegetation and need stabilization as they are either eroding and/or being undercut by stormwater runoff and river flow.

The Riverway contains three islands along its length, all designed by Olmsted. The only accessible island is located between Brookline Avenue and Netherlands Road, where formal stairs and bridges provide pedestrian access to the maintained island park. The other two islands are not maintained nor are they accessible. Dense growth of *Phragmites* is present along The Riverway. It has blocked the flow channel at the Island Area and has severely narrowed the flow channel at several other locations, particularly immediately upstream of the two six-foot culverts at the Back Bay Yard.

The Riverway contains a number of stormwater outfalls. Those that are most noteworthy include the Huntington Avenue Drain, which discharges on the Boston side of the Muddy River; and the Tannery Brook and Longwood Avenue Drains, both of which are located in Brookline.

Figure 3.4 The Riverway



The environment surrounding The Riverway consists of a maintained urban park with mature trees, grass and some shrubs. *Phragmites* and Japanese knotweed are dominant in a number of locations and the habitat diversity along the Riverway is not as desirable as it is in Olmsted Park. The following sections include information on the existing woodlands, horticultural, aquatic, wildlife resources, and wetlands along the Riverway section of the Muddy River.

The inventory, documentation and analysis of vegetation in the Riverway area were completed in August of 2000. The area includes the watercourse from the Riverway parkway at Sears Park to Route 9 (Tremont Street). The scope of work included trees, shrubs, vines, and lawn areas including notation of areas of bare lawn and erosion.

Historic Structures

The following are referenced in the Emerald Necklace Master Plan as existing historic structures in the Riverway

- ♦ Huntington Avenue Overpass
- ♦ Back Bay Maintenance Yard
- ♦ Carlton Street Footbridge
- ♦ Longwood Bridge and associated staircase
- ♦ Chapel Street Bridge and Shelter
- ♦ Netherlands Road and Brookline Ave bridges

The Riverway contains a rich assemblage of original bridges, stairs and one of only two surviving park shelters (the Duck House in the Fens being the other). In addition, the

Huntington Avenue Overpass, the Back Bay Maintenance Yard and two major drainage structures post-date the park's inception.

The iron Carlton Street Bridge, currently closed to the public due to deferred maintenance, is in need of extensive rehabilitation. The other bridges are in better condition. They are: the Longwood Bridge (and its associated staircase on the Brookline side), the Chapel Street Bridges with its arches over the watercourse and bridal path (with integral stairs and a shelter building), the bridges at Netherlands Road, Brookline Avenue, the ramps to Route 9, and two pedestrian bridges to the island area.

Four structures, the Longwood and Netherlands Road bridges, the Brookline Avenue Bridge and the ramps to the Huntington Avenue Overpass, carry heavy traffic and are in good condition. The pedestrian portion of the Brookline Avenue Bridge has had stones removed. The most ornate bridge in the park system, the Chapel Street Bridge, appears basically sound, but it needs repair, resetting of stone, and resurfacing for both of its arches. Its associated round shelter overlook requires replacement of its spirally designed roof, some stone resetting, and the reconstruction of its interior floor decking. The Huntington Avenue (Route 9) Overpass has been maintained fairly well.

3.5 Existing Conditions – Leverett Pond (Sector IV A)

The land use around Leverett pond includes the U.S. Veterans Administration Hospital, the New England Home for Little Wanderers, the Museum of Native Americans, and numerous apartment and condominium units. Leverett Pond is in maintenance Sector IV A – Olmsted Park North: Leverett Pond/Daisy Pond.

The inventory, documentation, and analysis of vegetation in the Leverett Pond area were completed in August of 2000 (Table 3.3). The area includes the watercourse from Route 9 to Willow Pond Road. The scope of work includes trees, shrubs, vines, and lawn areas including notation of areas of bare lawn and erosion. The environment surrounding Leverett Pond approximates a maintained urban park more than an unattended urban woodland. Therefore, the biological resources reflect this setting.

Table 3.3 Inventory and Analysis of Existing Vegetation – Leverett Pond

Category	Unit	Total	Good	Fair	Poor	Dead
Trees:						
Canopy tree	each	685	180	406	89	10
Flowering tree	each	62	3	52	7	0
Evergreen tree	each	1	1	0	0	0
Heritage tree ¹	each	57	12	31	14	0
Total Trees:		805	196	489	110	10
Shrubs:						
	(Estimated)					
Restored planting	square footage	15,142				
Shrub mowing	square footage	8,451				
Total Shrubs:		23,593				
Invasive Plant Colonies:						
	(Estimated)					
Phragmites	square footage	0				
Other Invasives (e.g. Knotweed)	(Estimated)	95,820				
Total Invasive Plant Colonies:		95,820				
Woodland:						
	(Estimated)					
	square footage	287,775				

¹Note: A heritage tree is a canopy tree with a 32" or greater caliper. If it is listed as a heritage tree, it will not be listed as a canopy tree.

Plan documentation is contained in the Appendices in the form of annotated Existing Conditions Plans.

Leverett Pond is a linearly shaped pond located at the northern end of Olmsted Park, which is highly impacted by passive recreators. The Pond area is bounded on the western side by the Riverway, on the east by the Jamaica Way, on the north by Route 9 and on the south by Willow Pond Road. Leverett Pond is a warm water pond due to the temperature of water from Willow Pond, natural heating, and its inherent shallow depth. The water in Leverett Pond appears turbid as a result of algae growth and suspended sediments.

The Pond is approximately seven acres in size with a maximum depth of approximately six feet. The pond is fed via discharge from Willow Pond. The outlet from Willow Pond consists of a 15' reinforced concrete culvert under Huntington Ave to the Muddy River. There are approximately 0.181 acres of wetlands around the pond. The Village Brook Drain discharges storm water from the surrounding area into Leverett Pond. Stormwater discharge from this drain has caused a great amount of siltation in the pond that has resulted in the formation of sand bars. In addition, there are eight storm drains which also discharge into the pond. Overland flow from the worn path systems around the pond and Daisy Field (ball field) also contribute to the pond's siltation.

The areas around the pond are vegetated by manicured lawn of various grasses with a mature tree canopy. In the majority of areas, the manicured lawn extends to the pond's shoreline. Active planting of shrubs in past years along the western side of the pond has replaced lawn cover. The tree canopy is comprised of sugar maple (*Acer saccharum*), pin oak (*Quercus palustris*), sweet gum (*Liquidambar styraciflua*), black cherry (*Prunus serotina*), black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), and box elder (*Acer negundo*). Shrubs consist of purple loosestrife, sweet pepperbush (*Clethra alnifolia*) and arrowwood (*Viburnum dentatum*).

Due to the narrowness of the wetlands around the pond, flood storage or sediment retention is minimal. Passive recreation activities have degraded much of the surrounding native vegetation. As a result, invasive species such as purple loosestrife dominate. Principal wetland functions for Leverett Pond include fish habitat and recreation.

The vegetated islands located on the western side of the pond provide good wildlife habitat. Vegetation on the islands consist of river birch (*Betula nigra*), balsam poplar (*Populus balsamifera*), paper birch (*Betula papyrifera*), white ash (*Fraxinus americana*), and tupelo (*Nyssa sylvatica*). The narrow channels between the shoreline of the pond and the islands lend to the diversity of habitats available in Leverett Pond for aquatic species. Furthermore, the islands provide excellent habitat for reptiles, amphibians and avian species. This variety of habitat diversity directly leads to species diversity, which was evidenced by the assortment of aquatic species found in Leverett Pond. Intraspecies comparison amongst the species was observed. The preferred habitat for aquatic species within Leverett Pond is hard-bottomed areas adjacent to steep banks.

The land use on both sides of Leverett Pond is residential, with two exceptions on the eastern side of the Jamaica way. At the northern corner of Leverett Pond, there is commercial land use with a gas station to the east of the Jamaica way. Further south, there is institutional land use with Sherrill House and The Home for Little Wanderers, after which the land use again becomes residential.

Olmsted designed the park as a scenic picturesque park, with activities that were compatible with enjoying the scenery. The pedestrian circulation system around Leverett Pond is extant, except for the portion of the footpath on the Boston side at the southern end. The equestrian path along the Jamaica way has been converted into a bikeway, but its location is extant. On the Brookline side Riverdale Parkway has been converted into a bikeway and limited parking has been added in a structured parking lot on the southern end to accommodate park users, but the footpath is extant from the Olmsted period. Canoeing activities are no longer permitted. The current footpaths and bikeways are used for walking, biking, and running. There are also beaches for sitting and viewing.

The active recreation in the Leverett Pond area consists of two lighted baseball diamonds in Boston's Daisy Field. A structured parking lot at Willow Pond Road accommodates park users of the athletic fields.

Historic Structures

The following are referenced in the Emerald Necklace Master Plan as existing historic structures in Olmsted Park (Sector IV A).

- Cumberland Ave bridge

The granite stone bridges are generally in fair to good condition, except for the puddingstone footbridge at Willow Pond on the Boston side, which was well hidden by overgrown vegetation. The other bridges need minor masonry repair, graffiti and iron stain removal (Cumberland Avenue) and resetting and repointing of stones (Inlet Bridge). Recent mortaring efforts appear inconsistent with historic joints in size, shape and color. The retaining wall along the Jamaica way requires substantial repointing and resetting and extensive clearing of undergrowth.

3.6 Existing Conditions - Willow Pond (Sector IV B)

Willow Pond is also situated in the Olmsted Park portion of the Emerald Necklace. The pond is in maintenance Sector IV B – Olmsted Park South: Ward's Pond/Willow Pond/Nickerson Hill. Steep slopes surround the pond on its eastern, southern and western sides. Olmsted modified the then existing pond by constructing an outlet control at the northern end and removing sediments. The land that is immediately adjacent to Willow Pond consists of vegetated woodlands and grassy parklands with both paved and unpaved paths. Beyond the woodlands to the east is the Jamaica way; to the west is Pond Avenue, which separates the residential areas from Willow Pond. The land use beyond the bordering roadways around Willow Pond is residential.

The Chestnut Street Drain (179 acres) discharges to Willow Pond adjacent to the inlet from Ward's Pond. The Chestnut Street drain has been, and continues to be, a large contributor of sediment to Willow Pond. The three-spine stickleback (*Gasterosteus aculeatus*) inhabits Spring Pond, which is a tributary pond to Willow Pond located to the southeast. The Massachusetts Natural Heritage Program classifies the three-spine stickleback as a rare species. The three-spine stickleback was also found to inhabit a small inlet area in Willow Pond where the water is cool and clean.

The following information on the biological environment includes the existing woodlands, horticultural resources and aquatic and wildlife resources and wetlands. The inventory, documentation and analysis of vegetation in the Willow Pond area were completed in August of 2000 (Table 3.4). The area includes the watercourse from Willow Pond Road to the pedestrian bridge at Ward's Pond. The scope of work includes trees, shrubs, vines, and lawn areas including notation of areas of bare lawn and areas of erosion.

Table 3.4 Inventory and Analysis of Existing Vegetation – Willow Pond

Category	Unit	Total	Good	Fair	Poor	Dead
Trees:						
Canopy tree	each	119	27	79	10	3
Flowering tree	each	7	1	5	0	1
Evergreen tree	each	1	0	1	0	0
Heritage tree ¹	each	3	0	1	2	0
Total Trees:		130	28	86	12	4
Shrubs:						
	(Estimated)					
Restored planting	square footage	1,369				
Shrub massing	square footage	13,764				
Total Shrubs:		15,133				
Invasive Plant Colonies:						
	(Estimated)					
Phragmites	square footage	0				
Other Invasives (e.g. Knotwe	(Estimated)	29,336				
Total Invasive Plant Colonies:		29,336				
Woodland:						
	(Estimated)					
	square footage	223,385				

¹Note: A heritage tree is a canopy tree with a 32" or greater caliper. If it is listed as a heritage tree, it will not be listed as a canopy tree.

Plan documentation is contained in the Appendices in the form of annotated Existing Conditions Plans.

Notwithstanding the present condition of Willow Pond, the aquatic and wildlife resources that are present around Willow Pond are varied in nature, reflecting the diversity and good quality of the surrounding terrestrial and aquatic habitat. These areas include the adjacent woodlands, the inlet stream from Ward's Pond, and the only remaining Olmsted natural history pool, known as Spring Pond.

Willow Pond is fed by water from Ward's Pond, the adjacent Spring Pond, and groundwater seepage. The water in Willow Pond is warm due to the water temperature of Ward's Pond as well as from natural heating and its inherent shallow depth. On the contrary, Spring Pond is well shaded and quite cool and clear year-round, as it is almost totally fed by groundwater discharge. The water in Willow Pond is generally more turbid as a result of algae growth and suspended sediments. A Wildlife Habitat Evaluation and Vegetation Assessment of Willow Pond is contained in Appendix D.

Information on fish resources in Willow Pond was determined through sampling that was conducted as part of the Wildlife Habitat Evaluation and Vegetation Assessment (see

Appendix D). Other data sources were not found. The three-spine stickleback, *Gasterosteus aculeatus*, was found in Spring Pond, and in the small pool immediately below the dam that separates Spring into Willow Pond (Figure 3-5).

The Massachusetts Natural Heritage Program was consulted and while Endangered, Threatened Rare species are not reported to inhabit Willow Pond itself, the three-spine stickleback — [*Gasterosteus aculeatus*] (see Figure 3.5) was reported to be present in the only remaining Olmsted natural history pool (Spring Pond). The presence of the three-spine stickleback was confirmed through use of the electro-shocking sampling technique. The three-spine stickleback was also found to inhabit a small pool in Willow Pond that is immediately below the dam that separates Spring Pond from Willow Pond.



Figure 3.5
Three-Spine Stickleback

Willow Pond is approximately one acre in size. The maximum depth of the pond is approximately ten feet. The pond is fed by water from Ward's Pond via the Babbling Brook and Spring Pond which is one of the original history pools, the Chestnut Street Drain, and groundwater discharge. The outlet to Willow Pond includes a 48" conduit located under Willow Pond Road, which discharges into Leverett Pond. There are approximately 0.82 acres of wetlands around the pond. Wetland types consist of a small amount of emergent vegetation at the outfall of Babbling Brook and a fringe of scrub/shrub throughout. Principal wetland functions and values consist of fish and shellfish habitat, passive recreation, and endangered species habitat.

The majority of the pond's wetlands are classified as scrub/shrub. Shrubs in the area consist of red osier dogwood (*Cornus stolonifera*), sweet pepperbush (*Clethra alnifolia*), American bittersweet (*Celastrus scandens*), weeping willow (*Salix babylonica*), barberry (*Myrica pensylvanica*), and virginia rose (*Rosa virginiana*). A significant stand of emergent vegetation exists at the outfall from Babbling Brook. The emergent vegetation is confined to two small island areas comprised of broadleaf arrowhead (*Sagittaria latifolia*), pickerelweed (*Pontederia cordata*), barnyard grass (*Enhinocloa crusgalli*), jewelweed (*Impatiens capensis*), purple loosesrife (*Lythrum salicaria*), rushes and mannagrass (*glyceria candensisI*). The western side of Willow Pond consists of manicured lawn with a shrub fringe, while the eastern side is forested.

The Chestnut Street Drain discharges storm water from the surrounding area (approximately 129 acres) into Willow Pond. The drain has deposited a significant amount of sediment in the pond resulting in the formation of a sandbar. Silt-laden overland flow from the path systems around the pond also contributes to the siltation. It is evident that the water quality of Willow Pond is not as desirable as that of Ward's Pond.

Due to the narrowness of the wetlands surrounding the pond, flood storage capacity and/or sediment retention is considerably hindered. Hydric soils are present in the wetland and are able to retain some flood water.

Animal species observed in Willow Pond include a variety of avians, insects, amphibians, and freshwater fishes. The diverse vegetative community supports a strong diversity of wildlife habitat. In addition, a state listed endangered species, the threespine stickleback (*Gasterosteus aculeatus Linnaeus*), was observed in a portion of Willow Pond adjacent to the outlet from Spring Pond.

Land use immediately adjacent to Willow Pond is vegetated woodlands and grassy parklands with both paved and unpaved paths. Beyond the woodlands to the east is the Jamaica way and to the west is Pond Avenue. Both separate residential areas from Willow Pond.

Olmsted designed the park as a scenic picturesque park, with activities that were compatible with the enjoyment of the scenery. The pedestrian circulation system around Willow Pond is extant, except for a portion of the footpath on the Boston side at the southern end. On the Brookline side Riverdale Parkway has been converted into a bikeway and footpath. The current footpaths are used for walking. There are also benches for sitting and viewing on the Brookline side, but none are located on the Boston side.

The Metropolitan District Commission Kelly Rink constructed in 1965 at the junction of Willow Pond Road and The Jamaica way to the east of Ward's Pond was removed in 1997.

Historic Structures

The following are referenced in the Emerald Necklace Master Plan as existing historic structures in Olmsted Park (Sector IV B).

- Ward's Pond footbridge
- Willow Pond footbridge

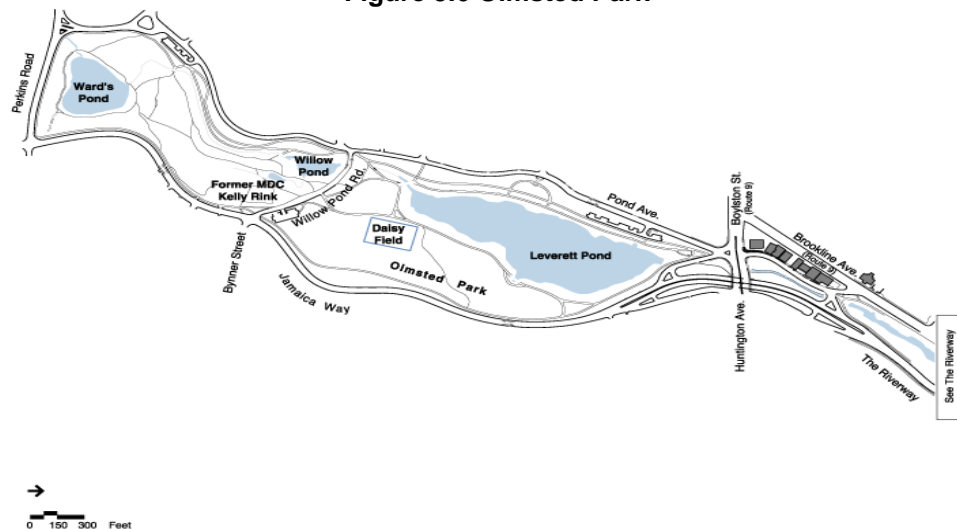
The granite stone bridges are generally in fair to good condition, except for the puddingstone footbridge at Ward's Pond on the Brookline side, which was well hidden by overgrown vegetation. The other bridges need minor masonry repair, graffiti and iron stain removal (Ward's and Willow Pond bridges) and resetting and repointing of stones (Inlet Bridge). Recent mortaring efforts appear inconsistent with historic joints in size, shape and color. The Willow Pond and Ward's Pond footbridges were restored in 1983-

84 through a grant from the George B. Henderson Foundation, to the Massachusetts Association for Olmsted Parks.

3.7 Existing Conditions – Ward’s Pond (Sector IV B)

Steep slopes surround Ward’s Pond on its eastern, southern, and western sides. While Ward’s Pond appears to be a kettle hole pond, its shoreline was modified by Olmsted. The land immediately adjacent to Ward’s Pond entails vegetated woodlands with unpaved paths. A wooden boardwalk has been constructed by the BPRD along the southern edge of the Pond to protect the wetlands and to facilitate access and use of the parkland. Beyond the woodlands to the south is Perkins Street, to the east is the Jamaica Way, and to the west is Pond Avenue, which separates the residential areas from Ward’s Pond. The surrounding land use is residential. The pond is in maintenance Sector IV B – Olmsted Park South: Ward’s Pond/Willow Pond/Nickerson Hill (Figure 3.6).

Figure 3.6 Olmsted Park



Source: VHB, Inc.

The resources discussed in this section include upland woodlands, horticultural resources, the aquatic and wildlife resources and wetlands.

The inventory, documentation and analysis of vegetation in the Ward’s Pond Area were completed in August of 2000. The area includes the watercourse from the pedestrian bridge at Ward’s Pond to Perkins Street. The scope of work includes trees, shrubs, vines, and lawn areas including notation of areas of bare lawn and areas of erosion (Table 3.5).

Table 3.5 Inventory and Analysis of Existing Vegetation – Ward’s Pond

Category	Unit	Total	Good	Fair	Poor	Dead
Trees:						
Canopy tree	each	136	7	114	15	0
Flowering tree	each	2	1	1	0	0
Evergreen tree	each	0	0	0	0	0
Heritage tree ¹	each	24	1	17	6	0
Total Trees:		162	9	132	21	0
Shrubs:						
	(Estimated)					
Restored planting	square footage	0				
Shrub massing	square footage	861				
Total Shrubs:		861				
Invasive Plant Colonies:						
	(Estimated)					
Phragmites	square footage	0				
Other Invasives (e.g.Knotweed	square footage	21,535				
Total Invasive Plant Colonies:		21,535				
Woodland:						
	(Estimated)					
	square footage	199,247				

¹Note: A heritage tree is a canopy tree with a 32" or greater caliper. If it is listed as a heritage tree, it will not be listed as a canopy tree.

The aquatic and wildlife resources present at Ward’s Pond are of a diverse nature and reflect the diversity and good quality of the surrounding habitat as well as the aquatic habitat. Because groundwater seepage as well as direct flow feed to Ward’s Pond from Jamaica Pond, the water is clear, well oxygenated, and provides for a healthy aquatic habitat. The water is warm, however, due to the temperature of water from Jamaica Pond.

Ward’s Pond is located at the southern-most section of the project area. This portion of the Emerald Necklace is least impacted by pedestrians and has minimal urban development; thus it remains the most natural environment within the Muddy River system. Steep banks that lead to Jamaica Way bound the Pond on the southern and eastern perimeter and the Riverway (roadways).

Ward’s Pond is approximately three acres in size. The maximum depth of the pond is approximately five feet. The pond is fed by three water sources: a 4' x 3' brick culvert from Jamaica pond, an 8" overflow pipe from Jamaica Pond, and groundwater seepage. There are approximately 0.65 acres of wetlands around the pond. Wetland types consist of emergent in some areas and scrub/shrub throughout.

The sound water quality of Ward’s Pond supports a diverse and healthy wetland population. No manicured lawns and little erosion of the banks exist at Ward’s Pond.

Most of the pond's wetlands are classified as scrub/shrub. Shrubs in the area consist of glossy buckthorn (*Rhamnus frangula*), weeping willow (*Salix babylonica*), river birch (*Betula nigra*), gray birch (*Betula populifolia*), paper birch (*Betula papyrifera*), and arrow wood (*Viburnum dentatum*). The herbaceous layer of plants consist of jewelweed (*Impatiens capensis*), sensitive fern (*onoclea sensibilis*), and purple loosestrife (*Lythrum salicaria*). In many places there are healthy emergent vegetated wetlands extending into the water. Such species include narrow-leaved cattail (*Typha angustifolia*), swamp loosestrife (*Lysimachia terrestris*), and lily pads. The principal wetland function/values for this wetland system are wildlife habitat, recreation, and product export. The wetlands do function to retain sediments and toxicants and remove nutrients. However, due to the relative narrowness of the wetlands, this is not a principal system.

The southwest portion of the pond receives a large amount of groundwater via seepage from the hillside. The groundwater is filtered through the emergent/shrub wetland and eventually discharges into the pond.

Due to the narrowness of the wetlands around the pond, flood storage capacity is very low. Hydric soils are present around the wetland and are able to retain some floodwater. There are no storm drains or drainage swale outfalls leading to the wetlands or the pond. However, overland flow may occur. The wetlands do filter some sediments and restrain toxicants from entering Ward's Pond.

Wildlife species observed in Ward's Pond include a variety of freshwater fishes, insects, amphibians, and avian species. The vegetative community supports a strong diversity of wildlife habitat. The clear water quality of Ward's Pond indicates that sediment retention may occur in the wetland. These wetlands are of high importance because of the potential sources of sedimentation upgradient of the pond (i.e. The Riverway and Jamaicaway).

Ward's Pond is bordered by residential land use on the east and west and the park to the north and south. Ward's Pond is principally a passive area, but has unorganized active recreation with woodland trails for walking and running. Currently there are no benches around the pond.

Historic Structures

The following are referenced in the Emerald Necklace Master Plan as existing historic structures in Olmsted Park (Sector IV B).

- ♦ Ward's Pond footbridge
- ♦ Willow Pond footbridge

The granite stone bridges are generally in fair to good condition, except for the puddingstone footbridge at Ward's Pond on the Brookline side, which was well hidden by overgrown vegetation.

CHAPTER 4: MAINTENANCE PLAN

4.1 Introduction

Current maintenance personnel for the Muddy River parks consist of a combination of Boston Parks staff, Brookline Parks staff, and staff from the DCR, Division of Urban Parks. In recent years, and particularly since Proposition 2 ½, park departments in Massachusetts have suffered from increasing demands and decreased resources. This has resulted in degraded park systems due to insufficient levels of maintenance and/or deferred maintenance. The most significant issue facing the respective Parks agencies undertaking the Muddy River Restoration Project is the level of maintenance required to retain the character-defining features of the historic Emerald Necklace landscape, particularly related to vegetation management, visitor use and impacts, and the care of bridges, roads and structures.

One objective of the Muddy River Management and Maintenance Plan is to identify the gap between the current level of maintenance and the level that will be required once the Muddy River Restoration project is complete. The Plan was created to incorporate maintenance and management operations into the framework of the parks' historic design. Developing appropriate maintenance standards includes analysis of performance, management, staffing levels, training, funding, large and small engine equipment as well as an understanding of the historic landscape design intent.

As the result of interviews with city, town and state park staff, site observation, and benchmarking standards developed by the National Recreation and Park Association and the Professional Grounds Management Society, it is estimated that 34,679 Net Productive Time (NPT) hours will be needed annually to bring the Muddy River park maintenance to a higher level. NPT and associated maintenance tasks are discussed in this chapter.

This Plan recommends specific maintenance practices and guidelines for the Muddy River park system. The budget and staffing figures are all based upon ETM's analysis using FY 04 and FY 04 data. This section begins with park-wide maintenance recommendations that are pertinent to the park system as a whole and continues with specific maintenance activities for landscape types within each park sector.

4.2 Methodology for Establishing the Muddy River Maintenance Standards

Through a series of meetings, interviews with staff and senior management, and research it was determined that the exceptional landscape maintenance at the Arnold Arboretum was an appropriate standard of maintenance for the Muddy River parks of the Emerald Necklace. The Arnold Arboretum has approximately 232 acres requiring regular maintenance and is broken down as follows:

- 120 acres of mowed lawn of which approximately 50% is mowed only 2-3 times annually
- 5 acres of water

- 90 acres of naturalized vegetation including woodlands, wetlands and meadows
- 3 acres of greenhouse and nursery
- 14 acres of gardens

The analysis of time needed to achieve the maintenance standard of the Arnold Arboretum considered the cost per square foot as the baseline and then considered maintenance standards and work activities based upon the Muddy River park landscape design.

4.2.1 Setting a Higher Maintenance Standard

Using the Arboretum as the park maintenance standard, a square foot cost for maintenance was developed as a reference point for evaluating maintenance costs for the Muddy River parks of the Emerald Necklace (noting also that there are many differences and variables that exist between the two sites).

The Arboretum square foot maintenance cost is \$0.07/ square foot as determined by the annual operating budget, percent salaries and total square feet:

- The annual operating budget for landscape maintenance excluding the greenhouse, nursery and water is \$962,000.
- In most parks, approximately 65-75% of the annual operating budget is salaries. Using 70%, approximately \$674,000 is spent annually at the Arboretum on salaries.
- Total Square Feet equals total acres with the exception of water multiplied by the amount of square feet in an acre. $224 \text{ acres} \times 43,560 \text{ sq. ft/acre} = 9,757,440 \text{ total square feet}$.

Thus, the annual cost for salaries divided by the total square feet = cost per square foot. $\$674,000 \text{ divided by } 9,757,440 = \$0.07/\text{sq. ft.}$

Based upon contemporary use and the historic design of the park, a higher square foot cost of \$0.10/sq. ft. is assessed for the Muddy River parks of the Emerald Necklace. As a point of reference, the estimated cost for maintenance of Prospect Park in New York City is \$0.12/sq. ft. \$0.10/sq. ft was determined by ETM to be a reasonable estimate for the Emerald Necklace due to the design of the park, location and use.

The Arboretum has 12 full-time staff, 1 Apprentice (0.75 FTE) and 10 summer interns (seasonal) performing park maintenance. The Arboretum has 1 FTE devoted to delittering and emptying the 25 trash cans spread throughout the Arboretum.

Key factors for higher maintenance standards at the Arboretum are:

- Dedicated park staff
- Skilled staff
- Stable full-time staff with knowledge and commitment to maintenance of the Arboretum

- Combination of staff who are equipment operators, horticulturalists and 3 certified climbing arborists. (2/3 of ALL of the full time grounds maintenance staff have MA Certified Arborist credentials).

It should be noted that the Arboretum is, strictly, not a public park. While open to the public, the Arboretum is first and foremost a research facility and many management decisions are made from a curatorial perspective. The Muddy River parks of the Emerald Necklace, on the other hand, are well-used public spaces. Management and policy decisions are made in this context.

A large portion of both the Muddy River parks of the Emerald Necklace (23%) and the Muddy River Restoration Project (54%) is water. Calculating maintenance of the water is complicated as it includes not only park-related costs but also costs included in Best Management Practices that may be shared by the different entities on a watershed ownership basis. For the purposes of calculating estimated maintenance hours and costs for this report, water (with the exception of litter and debris removal) is not included and will be investigated separately in Chapter 7 (Stormwater Management/Pollution Control) of the SFEIR and by the ACOE in their maintenance plan. The maintenance recommendations for this plan address only the landscape portion of the Muddy River parks.

$$\$0.10 \times 6,186,000 \text{ sq. ft. (142 acres} \times 43,560 \text{ sq. ft./acre)} = \$618,600$$

Assume an average salary cost of \$30,000/employee;

$$\frac{\$618,600}{\$30,000/\text{FTE}} = 20.7 \text{ Total FTE's}$$

This square foot cost is a starting point for estimating future maintenance costs.

4.2.2 Classification

A good classification system lends itself to work measurement and the application of work standards; it supports management decision-making at all levels (i.e., in deploying personnel and equipment), and is based on understanding the nature of park maintenance work.

Three critical variables condition the analysis of park maintenance work: 1) the nature of the task, 2) skill levels of those performing the task, and 3) the physical setting. For example, cleaning a paved surface is different from cleaning a densely wooded one, both in type of equipment used and in the time it takes per acre.

Maintenance tasks for the Muddy River parks have been classified into five areas as indicated below. Based upon this classification, specific landscape types and the level of maintenance required based upon the specific landscape design of the Muddy River parks, have been identified.

- ♦ General Maintenance – Work having to do with the appearance of the park and sanitary conditions, including litter pick-up and collection of trash from receptacles.
- ♦ Horticultural Care - Work having to do with the care of shrubs, perennials, small trees, turf and woodlands.
- ♦ Repair and Preservation – Work having to do with the proper functioning and safety of park equipment and facilities, preventative maintenance, historic structure preservation and repair. Examples include: repair of park lighting, bench painting and repair, park structure maintenance, and graffiti removal.
- ♦ Operations/Special Events – Work related to the use of park facilities and equipment. This work is often seasonal or special event related, such as setting and removing barricades.
- ♦ Water Body Management – Work related to maintaining the proper health of park water bodies including monitoring, cleaning, edge repair, and removal of invasive vegetation.

4.2.3 Relationship between Usage and Maintenance

Park users not only greatly increase the time required to repair and maintain a park's physical setting, but also create daily litter of all types. Cleaning up after visitors is the most time-consuming park task. Services to special park users, such as special events and organized recreational groups, also add a considerable amount of work, especially during the peak summer season.

In general, the greater the number of users in and around parks, the greater the amount of maintenance work that needs to be done. How long people stay and what they do when they get there is also important. Five busy vandals can create more work than 1,000 people strolling through a park.

Maintenance also impacts use. If parks are dirty, benches are broken, and ball fields are not playable or open, people will not enjoy the parks as much, and eventually they may stop usage. If parks are well maintained, the number of visitors will increase.

Given the interdependence between maintenance and use, the goal of this Plan is to ensure that the parks “keep up”. Maintenance recommendations are determined in order to ensure that an increase in park users is mirrored by an increase in the quality and quantity of park maintenance.

4.3 Measuring Workload

In a complex maintenance environment such as the Muddy River Parks, many different kinds of work measures need to be considered: amount of work; quality of work; frequency; speed (amount of work per unit of time); and time to complete. The different

work measures are inter-related – one can usually complete a task more quickly by compromising on the quality of work.

External or uncontrolled variables affect workload and complicate work measurement: the impact of use (the number of users and their behavior, i.e., vandalism, special events); the intensity of use (i.e., heavy use during large special events); the culture or style of the workplace; the physical conditions (i.e., terrain and weather); and the difficulty of the task itself and skill level possessed by the staff.

Deferred maintenance, capital projects in process, and future capital projects all have an impact on workload. In the Muddy River parks of the Emerald Necklace, the primary variables are the park's physical variations, the culture or style of the workplace and future capital projects. The Plan recommendations take into consideration all of these factors.

4.3.1 Measuring Current Work

The process of measuring current maintenance work involved interviews, observations, and information provided by Boston, Brookline and the Commonwealth of Massachusetts. The following is an outline of the methods used:

- Interviews were conducted with senior managers and field staff of all three entities to elicit information on current staffing and operations
- Review of existing organizational charts, budgets and work schedules
- Site walks and park tours
- Interviews with members of the Citizens Advisory Committee
- Interviews with the Emerald Necklace Conservancy

In order to measure current productive time the following are considered:

Total Time

- The base unit for measuring potential productive work is the number of hours a person works during one year. The total number of hours is the maximum someone can work, deducting weekends.

Off-the-Top Deductions

- Total time represents only a starting point in calculating the productive time of the work force. Workers are entitled to a certain number of holidays and vacation days, excused absences, emergency absences and time for breaks.

Lost Time

- Lost time includes sick leave, leave without pay, workers compensation, and Family with Medical Leave Act. No worker is constantly productive, nor is any organization perfectly efficient.

Non-Productive Time

- Non-productive time is spent away from work including travel time, trips to the dump, change and wash up, and waiting time for vehicles or equipment.

Lost Time Due To Inclement Weather

- In times of inclement weather (rain and snow), less outside maintenance work can be completed.

4.3.2 Current Maintenance Practices

Current maintenance standards vary throughout the Muddy River parks of the Emerald Necklace. A site walk on August 4th, 2001 revealed discrepancies in maintenance standards and practices. Many areas differed in:

- Maintenance – degree thereof
- Mowing standards and practices – degree thereof
- Erosion – extent thereof
- Bench treatments
- Trash containers
- Path edges – maintenance
- Lawn – maintenance, renovation and usage
- Tree maintenance – degree thereof
- Walkway materials – consistency
- Plant maintenance – due to the type of materials selected or neglect
- Graffiti – degree thereof on walls and trash receptacles

The inability to maintain newly improved areas is a serious cause for concern, reflecting that existing resources can do little more than keep up with basic park maintenance. Additional maintenance resources will be needed to meet and sustain the workload from newly completed capital projects, particularly the Muddy River Restoration Project.

While a cursory inspection indicates that existing park maintenance is basically acceptable, a closer look shows that many areas have deteriorated: overall turf standards need improvement, extensive tree care is needed, horticultural care is lacking and there is little or no existing woodland management or water body maintenance efforts. In other words, only basic park maintenance, cleaning, mowing, and some limited tree work, is currently being done. The lack of uniform standards and practices exhibits the fact that multiple entities share maintenance responsibilities.

It should be noted that new plantings near Leverett Pond in Brookline highlighted a serious current and future maintenance problem. The particular variety of rose, Memorial Rose, selected for the planting areas has serious maintenance implications. The Memorial rose is a very aggressive grower and quickly spreads beyond the boundaries of the planting area. In addition, access by maintenance staff is very difficult due to the dense spreading nature of the plant and its small thorns. The inability of the maintenance staff to “wade” into these planting beds to weed and remove litter results in insufficient maintenance. In this particular instance, it is not insufficient staffing but rather the

species of the plant material itself which makes maintenance very difficult, if not impossible. Plant material should be selected not only for its historic and environmental appropriateness, but also the ability of staff to maintain it.

Given the current staffing levels, it is understood that little more than basic maintenance can be done.

4.3.3 Existing Staffing

Calculations for existing full time equivalents were developed to reflect the actual percentage of time maintenance staff spent in the Muddy River parks of the Emerald Necklace.

- Boston Parks and Recreation: A crew of 4 spends approximately 80% of its time in the Muddy River parks of the Emerald Necklace which equates to 3.2 FTEs, while the Parkman horticulture crew of 3 spends about 40% of its time or 1.2 FTEs. Boston maintenance staff is augmented by 1.1 FTE of supervisory support provided by the Director of Historic Parks (50%), a Historic Park Landscape Architect (20%), and the Parkman Funds contract Project Manager (40%).
- Brookline Parks and Open Space: Two zone maintenance crews of 4 persons each spend 15% of their time in the Muddy River parks of the Emerald Necklace or 1.15 FTE, while Forestry spends .1 FTE. Brookline maintenance staff is augmented by .6 FTE supervisory support provided by an Arborist (5%), Operations Manager (10%) and Landscape Architect (5%).
- DCR: A DCR maintenance crew of 4 persons from the Charles District spends approximately 25% of its time in the Muddy River parks, which equates to 1.0 FTE. DCR maintenance staff is supplemented with supervisory staff equal to .1 FTE.

The estimated current staffing in the Muddy River parks of the Emerald Necklace by maintenance field staff and supervisors is shown in Table 4.1.

Table 4.1 Current Full Time Equivalent Staff Project Area

<i>Organization</i>	<i>Work Force</i>	<i>Managers/ Supervisors (FTE)*</i>	<i>Workers (FTE)*</i>
Boston	M & O	.3	3.2
	Horticulture	.4	1.2
	Forestry	.1	.3
	Trades	.2	1.2
Brookline	M & O	.5	.75
	Horticulture	.25	.4
	Forestry	.25	.1

	Trades	.1	.25
DCR	M&O	.1	1
Total	10.6	2.2	8.4
*FTE = Full Time Equivalent M&O Maintenance & Operations from ETM Associates, L.L.C.			

4.3.4 Net Productive Time

The total time or potential productive work hours per year for the Muddy River Parks is 260 days per year, times 8 hours a day, times a staff of 10.6 (FTE), for a total of **22,048 hours**. After all the deductions are subtracted (520) from the total time available (TTA), 2080, the net productive time (NPT) per worker is approximately 1,560 hours per year (2080 – 520 hrs). The estimated net productive time for existing park maintenance is:

10.6 F.T.E. x 1,560 hrs/year, which equals 16,536 net productive hours/year for maintenance work in the Muddy River parks of the Emerald Necklace.

4.3.5 Supplementary Available Hours

There are also other private partners or contractors that contribute to the maintenance of the Muddy River parks including:

- Tree and Landscape Maintenance Contract Work
- Correction Department Workers
- Boston Youth Fund (seasonal)
- Parkman Contract Work
- City Year and Volunteers – currently minimal
- “Park Partners”

Based on staff interviews, it is estimated that the total supplementary work hours for the Muddy River parks of the Emerald Necklace is 2,000 – 3,000 annually.



Parks staff removing Japanese Knotweed

4.4 Proposed Staffing

The Muddy River parks suffer from an insufficient number of staff members to manage and maintain the park. In addition to hiring additional laborers or services, the park needs professionals skilled in the management and maintenance of historic landscapes, structures, horticulture and water resources.

4.4.1 Setting Higher Maintenance Standards

The Muddy River Restoration Project will increase the gap between available and needed maintenance hours. While under construction, the areas affected by capital projects are usually closed off to the public for the duration of the project, which slightly reduces the total maintenance workload. When completed and reopened, the renovated Muddy River parks will add to the existing park maintenance load.

When the Muddy River Restoration Project is completed, there will be an increase of 24.5 acres of newly restored landscape including 15 acres of lawn, 8.15 acres of planted areas and 215 new trees requiring regular maintenance, after the two-year maintenance guarantee period expires. Table 4.2 depicts the increased planting from the Muddy River Restoration Project. One of the planting requirements recommended by the Citizens Advisory Committee (CAC) is that the Contractor(s) be required to maintain all plant materials for two years after acceptance of the work. The specifications for the two-year maintenance period associated with Charlesgate are included in Appendix B. It is recommended that the Charlesgate specifications be adapted to meet the requirements of the newly landscaped areas in the park based upon the final landscape design. However, based upon recent experience at Charlesgate, it may be more advantageous to hire a skilled landscape maintenance contractor to perform the work.

Maintenance for the new plant material during the two-year maintenance period includes:

- Watering
- Fertilization
- Weeding
- Mulching
- Disease and Pest Control
- Plant Replacement
- Control of Invasives

Table 4.2 Increased Planting from Muddy River Restoration Project

<i>Project</i>	<i>Trees</i>	<i>Low Shrubs (sq.ft.)</i>	<i>Medium Shrubs (sq.ft.)</i>	<i>High Shrubs (sq.ft.)</i>	<i>Lawn Areas (sq.ft.)</i>	<i>Wetland Plants (sq.ft.)</i>	<i>Perennial (sq.ft.)</i>
Wards Pond	1	2,425	2,875	1,750	8,350	2,360	1,625
Willow Pond	7	20,175	4,900	13,660	23,720	1,650	4,700
Leverett Pond	24	21,088	7,835	1,468	112,615	3,860	

Riverway	57	51,308	51,955	34,345	110,480	18,090	
Sears Parking Lot	28	7,700	3,050	5,400	25,200	1,260	
Back Bay Fens	98	24,635	59,515	34,450	389,100	32,330	
Total Trees	215						
Total (square feet)		127,331	130,130	91,073	669,465	59,550	6,325
Total (acres) 24.5		3	3	2	15	1.3	0.15

From ETM Associates, L.L.C.

The contractor would be responsible for **only** those areas within the contract area. It is likely that other landscape areas located outside and/or adjacent to the contracted area will need mowing, horticulture care, delittering and emptying of trash receptacles, etc. during the two-year maintenance period.

Once the two-year maintenance period ends, Boston, Brookline and the DCR will resume maintenance within their respective jurisdictions. The proposed construction schedule for the Muddy River Restoration Project extends from 2004 thru 2011. The two-year maintenance period will follow completed capital construction. Increased agency maintenance responsibilities will be phased, with the greatest maintenance impact occurring between years 2008-2010. The DCR will be responsible for the Charlesgate project area in early 2005; Boston will assume increased maintenance responsibilities beginning in early 2008 and Brookline in early 2010.

It is estimated that a total of 18,688 NPT hours will be needed annually just to maintain the newly restored Muddy River Restoration Project areas. Table 4.3 summarizes the additional hours of maintenance required.

Table 4.3 Summary of Additional Hours for Each Entity

	<i>Hours at Current Standards</i>	<i>Additional Hours Needed</i>	<i>Hours at Higher Standards</i>	<i>Muddy River Restoration Project Impact</i>
General Maintenance	8,387	9,713	18,100	8,783
Boston	5,368	6,216	11,584	5,621
Brookline	1,426	1,651	3,077	1,493
DCR	1,594	1,846	3,439	1,669
Horticultural Care	3,155	8,888	12,043	6,998
Boston	2,019	5,689	7,708	4,479
Brookline	821	1,226	2,047	1,190
DCR	315	1,973	2,288	1,329

Repair/Preservation	1,562	1,449	3,011	1,035
Boston	1,200	727	1,927	662
Brookline	362	150	512	176
DCR	0	572	512	197
Operations/Special Events		1,525	1,525	656
Boston		976	976	420
Brookline		259	259	112
DCR		290	290	124
Totals are for field staff and do not include supervisory or management staff From ETM Associates, L.L.C.				

4.4.2 Gap Analysis

The estimated amount of maintenance time required by the Muddy River parks of the Emerald Necklace is 34,679 hours annually, as shown in Table 4.4. The gap between needed NPT hours and total NPT hours available is estimated to be 21,575 hours, which equals 13.8 FTE's as calculated by NPT.

Table 4.4 Hours Needed to Maintain the Project Area Parks

	<i>Hours of Current Standards</i>	<i>Muddy River Restoration Project Impact**</i>	<i>Total Hours of Higher Standards</i>	<i>Additional Hours</i>
General Maintenance	8,387	8,400	18,100	9,713
Horticultural Care	3,155	7,470	12,043	8,888
Repair/Preservation	1,562	1,868	3,011	1,449
Operations/Special Events		950	1,525	1,525
Totals*	13,104	18,688	34,679	21,575
* Totals are for field staff, and do not include supervisor or management staff. ** Included in Hours at Higher Standards From ETM Associates, L.L.C.				

The total number of additional hours needed by each party in order to achieve the higher maintenance standards for their portion of the project area is:

Boston	13,600 hours = 8.7 FTE's
Brookline	3,300 hours = 2.1 FTE's
DCR	4,700 hours = 3.0 FTE's

The challenge is to develop strategies that will close as much of the gap as possible through:

- Better management
- Increased staff productivity
- Use of outside contractors
- Reducing non-productive time
- Increased staff

Again, once the two-year maintenance period ends, Boston, Brookline and the DCR will resume maintenance within their respective jurisdictions. The proponents will work with the contractors to transition maintenance activities to the respective property owners. The proposed construction schedule for the Muddy River Restoration Project extends from 2004 through 2011. The two-year maintenance period will follow completed capital construction. Increased agency maintenance responsibilities will be phased, with the greatest maintenance impact occurring between years 2008-2010. The DCR will be responsible for the Charlesgate project area in early 2005; Boston will assume increased maintenance responsibilities beginning in early 2008 and Brookline in early 2010. The increase in relative FTE's with a phased schedule based upon the current construction and maintenance contract is provided in Table 4.5

Table 4.5 Maintenance Increases Following Project Construction

<i>Property Owner</i>	<i>Hours at Current Standards</i>	<i>Hours at Increased Standards</i>	<i>Increase in Maintenance Hours Per Year</i>					
			<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
DCR: Current FTE 1.1 Percentage of Additional Hours or FTEs sequenced with Park Construction Phased Increase in Hours (Current hours plus percent increase of total hours at higher standard at \$32.00/Hr) Phased Increase in FTE's (Current FTE plus percent increase of total FTE at higher standard) **Please note that DCR numbers go to the curb only (25' into park) and do not include the parkways.	1909 Hrs \$47,725	6529 Hrs \$163,225	30% 1959 \$87,275 2.00	40% 2612 \$93,925 2.3	50% 3265 \$105,475 2.6	60% 3917 \$117,025 2.9	80% 5223 \$140,125 3.5	100% 6529 \$163,225 4.1
Boston: Current FTE 6.9 Percentage of Additional Hours or FTEs sequenced with Park Construction Phased Increase in Hours (Current hours plus percent increase of total hours at higher standard at \$32.00/Hr) Phased Increase in FTE's (Current FTE plus percent increase of total FTE at higher standard)	8587 Hrs \$274,784	22195 Hr \$710,240				60% 13317 \$536,057 12.12	80% 17756 \$623,148 13.86	100% 22195 \$710,240 15.6
Brookline: Current FTE 2.6 Percentage of Additional Hours or FTEs sequenced with Park Construction Phased Increase in Hours (Current hours plus percent increase of total hours at higher standard at \$32.00/Hr) Phased Increased in FTE's (Current FTE plus percent increase of total FTE at higher standard)	2609 Hrs \$83,488	5895 Hrs \$188,640					60% 3537 \$146,579 3.86	100% 5895 \$188,640 4.7

The next section identifies specific maintenance performance standards and activities per park area that will be performed within each jurisdiction.

4.5 Classification of Park Sectors within the Emerald Necklace-Muddy River Parks

The Muddy River parks of the Emerald Necklace has been divided into 7 sectors for analysis, planning and implementation purposes. Maintenance needs and the characteristics of the physical areas have been taken into account. These are:

Sector I:	Charlesgate
Sector IIA:	Back Bay Fens North: Victory Gardens/Mother's Rest
Sector IIB:	Back Bay Fens Central: Rose Garden/Clemente Field
Sector IIC:	Back Bay Fens South and Sears Parking Lot
Sector III:	Riverway
Sector IVA:	Olmsted Park North: Leverett Pond/Daisy Pond
Sector IV B:	Olmsted Park South: Wards Pond/Willow Pond/Nickerson Hill

The physical areas within each Sector of the Muddy River parks are further subdivided into landscape types.

4.6 Landscape Types

The Muddy River parks of the Emerald Necklace consist of different landscape types requiring different maintenance needs based upon the historic design intent:

- ♦ **Parkland** (turf, meadow and athletic fields) – park areas characterized by grassland covered by a tree canopy. This is the predominant landscape type found in the Muddy River parks of the Emerald Necklace and requires intensive maintenance. Grass needs to be mowed and maintained on a regular schedule, litter picked up, and trees pruned and maintained. Higher standards of turf care, reseeding, fertilizing, aeration, and soil testing are needed to ensure a high quality turf. This plan identifies three levels of turf maintenance and separately addresses maintenance for meadow grass and athletic fields.
- ♦ **Planting Areas** (shrubs and perennials) – these areas are characterized by plantings of ornamental shrubs and perennials. Understanding the character of these plantings will be important to performing proper maintenance practices. Some plantings will need regular pruning or trimming (hedges) while others will be allowed to grow with limited pruning to reach their desired height and character. This plan identifies three levels of planting areas and one level of garden maintenance.
- ♦ **Woodlands** – natural areas characterized by the Ward's Pond area with less intense usage. These areas should be managed as woodlands requiring low levels

of maintenance. However staff with specialized skills, particularly in urban forestry or woodland management is needed. This plan identifies two levels of woodland maintenance.

- ♦ **Embankment Plantings** – plantings along the water edge will need regular maintenance including removal of invasive plant species. As a mature landscape with considerable use, the Muddy River parks of the Emerald Necklace suffer from numerous erosion problems. Controlling erosion and run-off helps prevent long-term degradation of the waterways. It also significantly improves the appearance of the parks. This plan identifies three levels of embankment planting maintenance.
- ♦ **Water** – the Muddy River as well as the lakes and small streams will need monitoring, cleaning and removal of invasive vegetation. Specialized skills are needed to monitor and maintain water quality throughout the Muddy River parks of the Emerald Necklace. This plan identifies two levels of watercourse maintenance.
- ♦ **Site Furnishings** – this includes benches, trash cans, and signs needing regular maintenance. Park furniture, such as benches, trashcans, catch basins, soft surface paths— which are easy to overlook and make a second priority—need regular maintenance. This plan identifies one level of maintenance for site furnishings, three levels of maintenance for trash removal, two levels of maintenance for paved surfaces, and two levels of maintenance for graffiti removal.
- ♦ **Structures & Bridges** – owners of the Muddy River Parks should evaluate the significance of historic buildings and guide preservation efforts accordingly. All structures and bridges within the Muddy River Parks should be managed and maintained with the goal of preserving the historic authenticity and structural integrity of the buildings. This plan identifies three levels of maintenance for structures.

4.7 Measurable Performance Standards

The maintenance activities as described under each landscape type have been analyzed using the Arnold Arboretum of Harvard University as the standard for excellent maintenance. For each individual activity a work description has been formulated, these descriptions take the form of performance standards detailing how each activity should be performed and to what end result. Maintenance for each landscape type is classified as Level I, Level II or Level III depending on the intensity and frequency of maintenance activities. Landscape types with Level I maintenance are maintained at a high level of care or intensity, while landscape types classified as Level III receive less frequent maintenance and are kept in a more natural state. Table 4.4 summarizes the landscape type, level and performance standard.

Table 4.6 Measurable Performance Standards

Landscape Type	Level	Performance Standard
Turf	I	Mowed to height of 3 inches every 5-7 working days.
Turf	II	Mowed to height of 4 inches every 7-12 working days.
Turf	III	Mowed to height of 4.5 inches every 14-18 working days.
Meadows	I	Meadow grass no higher than 2 feet.
Meadows	II	Meadow grass no higher than 2.5 feet.
Athletic Fields	I	Mowed to height of 2.5 to 3 inches with zero infield depressions.
Planting Areas	I	Less than 10% weeds and 5% deadwood in bed.
Planting Areas	II	Less than 10% weeds and 10% deadwood in bed.
Planting Areas	III	Less than 10% invasives.
Gardens	I	Less than 5% weeds.
Woodlands	I	Less than 5% invasives and less than 5% deadwood.
Woodlands	II	Less than 10% invasives and less than 10% deadwood.
Embankment Plantings	I	Less than 5% trash, less than 5% exposed soil, 90% planting density and less than 5% weeds and/or invasives.
Embankment Plantings	II	Less than 5% trash, less than 5% exposed soil, 90% planting density and less than 10% weeds and/or invasives.
Watercourse	I	Less than 2% trash.
Watercourse	II	Less than 5% trash.
Trash Removal	I	Zero overflowing cans.
Trash Removal	II	Zero overflowing cans.
Trash Removal	III	Zero overflowing cans.
Paved Surfaces	I	Less than 2% in degraded condition.
Paved Surfaces	II	Less than 5% in degraded condition.
Park Furniture	I	Inspected weekly and routine repairs are done within 3-5 working days.
Graffiti Removal	I	Graffiti removed within 24 hours.
Graffiti Removal	II	Graffiti removed within 48 hours.
Structures	I	Less than 5% in degraded condition

4.8 Proposed Maintenance Practices

The Muddy River Maintenance Plan contains information on the work method, the daily productivity, the resources required and the time of year for each operation. Full details of the maintenance operations, schedule, and resource requirements for each activity are contained in the Maintenance Calendar in **Appendix A**. The table also shows the landscape type or feature to which the activity is applied.

4.8.1 Parkland: Turf, Meadow and Athletic Fields

Goal: Restoration of turf areas through improved soil health and the establishment of a low-input, sustainable and ecologically sound turf-care program that includes regular maintenance and the definition of differential cutting areas.

The soil in the landscape is the most important natural resource in the park. A healthy soil sustains all plant life, including trees, shrubs and especially the turf. A large part of the parks have grass as a ground cover. Generally less tree cover over grass results in more light and moisture, requiring more frequent mowing in order to maintain a specified length of grass. The required length of grass will depend on the desired use of the space and the actual climatic conditions experienced. Sports turf areas, which sustain heavy levels of use, require a much higher level of maintenance than do more passive park areas. Equally, in periods of drought, grass will be cut higher and less frequently to reduce stress. The size of the area is probably the most important factor influencing maintenance. Large areas, free from obstructions can accommodate large, efficient grass cutting machinery. Small areas with mowing obstructions such as lights, signs, benches, litter bins and trees must be mown by smaller, slower equipment.

4.8.1.1 General Guidelines for Turf Care:

No maintenance operation affects the appearance of a park more dramatically than mowing. Mowing is the heart of turf care. A well-groomed patch of weeds can present a pleasing appearance while poorly groomed turf of the finest available grass will look poor. Without mowing, most turf grasses will grow to heights of 2 to 3 feet. Limiting turf to 2" to 2 ½" (for athletic fields) puts tremendous stress on the plant and increases the level of necessary inputs, especially irrigation. Turf that is cut higher (3-4") is better able to withstand the pressures of foot traffic, equipment traffic and drought. Proper mowing practices and equipment minimize this stress. Grass clippings are to be left on all turf areas including athletic fields. This practice will decrease fertilizer requirements, increase the health of the turf's root system, and eliminate the need for disposal or composting of grass clippings.



Turf areas in Olmsted Park.

Select soil tests need to be done on an annual basis. Without the information from a soil test, all management decisions regarding the soil result in guesswork. Soil tests should be conducted in early spring (March). Soil pH for turf should be between 6.0-6.5. Base saturation for potassium (K) should be 2-4%; magnesium (Mg) should be approximately 14%; and calcium (Ca) should be 60-70%.

Turf Level I is the highest maintenance grass (with the exception of the athletic fields) in the park system. The high maintenance areas are either large turf areas such as the Fens or small areas that are usually long and thin and are found around water edges or along the Riverway. The intention in this category is to achieve well-maintained grass that is often dotted with trees.

- **Maintenance Standard - Turf Level I: Mowed to height of 3” every 5-7 working days.**

Annually, the turf is evaluated for restoration, aeration, overseeding, disease and fertilizer treatment. Select soil tests are performed annually and mineral soil amendments (Limestone, potassium fertilizer, etc.) are applied if necessary. Before lime applications are made, the soil should be aerated. Nitrogen application of 1#/1000 square feet should be made as necessary in the spring (late April). Because of the proximity of the parks to surface waters, no phosphorous fertilizers are to be applied. Phosphorous-containing fertilizers contribute to eutrophication of water and the growth of aquatic weeds. Turf restoration (overseeding), if necessary, should be carried out with a slicer-seeder during the months of late August through September. If turf is restored, a snow fence is erected to protect the grass. The performance standard is set at less than 2% trash visible with a 0% trash tolerance goal.

Turf Level II is a lower maintenance grass that typically occurs in combination with trees. Without trees it occurs in areas outside of parkland that are viewed but not often walked over or sat upon.

- **Maintenance Standard - Turf Level II: Mowed to height of 4” every 7-12 working days.**

The soil is tested and fertilized as required and some weeds and bare spots are acceptable, but routinely corrected. Less than 5% trash with 0% trash tolerance goal.

Turf Level III is the lowest maintenance grass other than the meadow. Typically, it is not very visible from the paths and parkways. It may be in very dense shade and therefore grow at a slower rate.

- **Maintenance Standard - Turf Level III: Mowed to height of 4.5” every 14-18 working days.**

This turf requires no fertilizer, no irrigation, occasional repair, some weeds are tolerated, and it can be allowed to wear out and grow through rest cycles. Less than 5% trash with 0% trash tolerance goal.

4.8.1.2 Meadows

Meadows with annual and perennial flowering species provide a naturalistic contrast to the other grass areas of the park system.

Meadow Level I encompasses the areas within the park that are designed to have higher grasses, but that are adjacent to heavily trafficked areas or parkways.

- **Maintenance Standard - Meadow Level I: Meadow grass no higher than 2 feet.**

Trash removed weekly; less than 2% trash cover with a 0% trash tolerance goal. Meadow mowed four times per year.

Meadow Level II is adjacent to woodlands and refers to areas that are allowed to grow in a more natural meadow environment to provide wildlife habitat.

- **Maintenance Standard - Meadow Level II: Meadow grass not higher than 2½ feet.**

Trash removed based on inspection, meadow mowed twice per year. Meadow grass shall be cut once in June following spring flowers or early spring to encourage summer flowers. A final cut will be made in the fall to remove past vegetation.

4.8.1.3 Athletic Fields

Athletic fields require a high level of daily maintenance to provide safe playable field surfaces. There is only one maintenance standard for the athletic turf within the Muddy River parks. It is important that athletic fields do not become a visual intrusion on the historic element of the park.

- **Maintenance Standard - Athletic Turf Level I: Mowed to a height of 2 ½ to 3” with zero infield depressions.**

Trash removed daily, infield dragged once/week from April – August, backstops and seating in good repair, fields relined as necessary, turf mowed weekly, irrigated regularly. For more detailed information on field maintenance and management, refer to the Boston Park and Recreation Athletic Field Maintenance Plan.

4.8.2 Planting Areas - Shrub Care

Goal: Rejuvenation of shrub areas and the establishment of regular maintenance appropriate to the species.



Shrub bed in Olmsted Park.

Shrubs and groundcovers provide numerous functions and are a vital part of the park landscape. When properly selected and maintained, they serve as focal points, accents, help control circulation, and provide an aesthetic appearance, complimenting and enhancing the surrounding park landscape. The annual maintenance program for new and established plants depends on the type of plant material and the skill levels of the personnel responsible for the work. Shearing of shrubs is to be discouraged except in the most formal areas such as the rose garden and the war memorial. Shrubs should be pruned with the plant's natural form in mind; plants are not to be sheared into little balls dotting the landscape.

Planting Areas Level I includes formal hedges and shrub beds. These features surround formal spaces within the park such as the rose garden and the war memorial. They have a manicured formal appearance usually reflecting the nature of the space they surround. The shrub species will be kept pruned on a regular basis and in general the maintenance will be of a high level.

- **Maintenance Standard - Planting Areas Level I: Less than 10% weeds and 5% deadwood in bed.**

Shrub beds and small trees are edged and mulched each spring. Shrub beds are maintained and weeded monthly. Shrub beds and small trees are watered as required. Trash removal completed 3 times per week.

Planting Areas Level II includes informal hedges and shrub beds. Typically hedges and shrubs of this type will surround the Victory Gardens and the Riverway Maintenance area. They have a more bushy irregular appearance in keeping with their surroundings and a much lower level of maintenance. These hedges look reasonable if kept untrimmed.

- **Maintenance Standard - Planting Area Level II: Less than 10% weeds and 10% deadwood in bed.**

Shrub beds and small trees are edged and mulched each spring. Shrub beds are maintained and weeded every other month. Shrub beds and small trees are watered as required. Trash removal is completed once per week.

Planting Areas Level III typically abut woodland areas and are more naturalistic areas that serve to provide a visual screen or buffer between intensively used areas and wildlife habitat. Use is typically low level and informal. The shrubs are allowed to achieve their natural form. The shrubs will rarely be pruned and species will be chosen that will flourish in the particular site and light conditions and will grow to the desired height without any pruning or shaping.

- **Maintenance Standard - Planting Area Level III: Less than 10% invasives.**

Shrub beds and small trees are edged and mulched biannually. Shrub beds are maintained and weeded two times per year. Trash removal completed once per month.

4.8.3 Gardens

Gardens Level I refers to the only rose garden in the park located in the Fens. The skills required to undertake this work are of a specialized nature and are probably best allocated to one or two individuals and trained volunteers who are assigned to the area.

- **Maintenance Standard - Gardens Level I: Less than 5% weeds.**

Gardens are maintained on an annual basis at a high level of horticultural care; weeding, irrigation, fertilizing, disease control, disbudding done weekly.

4.8.4 Woodland Management

Goal: Removal of trees that are hazardous, in significant decline, or inappropriate (including exotic invasive species) to the landscape design and intent. Implementation of a regular tree maintenance program that will preserve the health and structural integrity of park trees. All woodland areas and trees will be inspected seasonally and treated according to the integrated pest management requirements.



Pathways and Turf in Olmsted Park.

More than any other landscape element, trees provide the most prominent visual component in the landscape. Tree preservation and management involves the protection of the canopy, trunk and roots.

Trees in public parks are subject to intensive visitor use. Over time this use can have severe impacts. Ongoing public use includes the following:

- Compaction and lack of soil fertility begins to change the soil both physically and chemically.
- Rainwater begins to runoff (causing soil erosion) rather than percolating down through the soil and to the plants' roots.
- Groundcover materials such as turf are lost or damaged.
- Exotic invasives begin to seed in the woodlands (such as Ailanthus, Rhamnus, Phellodendron, Norway Maple, Malus, Euonymus, Berberis, Celastrus, Ampelopsis) and the character of the woodland begins to deteriorate. Native invasives such as Black Cherry and Black Locust also seed and should be removed.
- Native shrubs and native understory trees are lost.
- Older native trees cannot compete for nutrients and water and begin to decline – tops die back.
- Areas become so impacted that users begin to seek other locations.

Park managers must be vigilant to spot these trends early and initiate corrective practices such as liming, fertilization, corrective pruning and keeping walking paths well mulched with composted wood chips. The removal of exotic invasives is an intensive recurring task. Smaller plants can be handpulled. However, the most effective strategy for eradication is cutting and spraying the freshly cut stump with a small quantity of tricopyr. Brush should be chipped and blown into the forest if possible, or in turf areas. Wood chips should be composted in another location.

Age diversity in the canopy layer is a long-term goal. Ideally the trees should be of all ages with every stage present from newly established plants to past maturity.

Woodland Level I areas are characterized by rough grass and shrubs under trees on gently rolling topography. It is a pleasant open area for sitting in, picnicking or walking through. The nature of the topography is critical as the grass must be capable of being mown 3-4 times annually. Walking paths through the long grass can be cut shorter and more often. The actual frequency of mowing depends on the density of the tree canopy and park setting.

- **Maintenance Standard - Woodland Level I: Less than 5% invasives and less than 5% deadwood.**

Trees are inspected and pruned as necessary for health and safety biannually, and thinned out every five years. Trash is collected weekly. Woodland areas are planted 2 years after thinning to enrich natural regeneration. Stumps are removed following tree removals to improve appearance and assist maintenance.

Woodland Level II areas are natural areas and serve to provide a visual screen or buffer to more intensively used areas and habitat for wildlife. Use is typically low and informal. They require a low level of maintenance, but a high level of skill for management and implementation of work. The objective in the forest areas is to sustain a continuous tree cover with the area being regenerated naturally. Both the canopy and understory will be managed on a 10-year cycle. Natural regeneration may, on occasion, be enriched by planting if the desired species do not regenerate naturally.

- **Maintenance Standard – Woodland Level II: Less than 10% invasives and less than 10% deadwood.**

Trees are safety pruned every five years; hazard trees are removed as required. Trash pickup as required.

4.8.5 Wetlands Management

Goal: To inspect, maintain and replant bordering vegetated wetlands along the Muddy River on an annual basis.



Leverett Pond

Water is a central feature of the Muddy River parks of the Emerald Necklace. Given the importance of water, it is essential that it be kept in good condition, both in the treatment of the edges and in the quality of the water. The water bodies in the Muddy River parks of the Emerald Necklace require ongoing maintenance along the embankments and in the water.

Routine maintenance tasks will include:

- Trash removal
- Removal of water-borne vegetation such as duckweed, etc.
- Removal of invasive vegetation
- Regular water sampling to monitor water quality

Wetland or embankment plantings have been separated into three levels of maintenance depending upon plant selection, historic landscape design and relationship to pathways. All of the embankment maintenance recommendations include the removal of invasive species such as phragmites, Japanese knotweed and buckthorn. Level I is more rigorous whereas Level III is the least rigorous requiring less frequent, yet still skilled maintenance.

4.8.5.1 Embankment Plantings

- **Maintenance Standard - Embankment Planting Level I: Less than 5% trash, 90% planting density, less than 5% exposed soil and less than 5% weeds and/or invasives.**

Plantings are maintained by properly trained personnel monthly. Invasive species are removed on a monthly basis. Replacement plants are installed seasonally.

- **Maintenance Standard - Embankment Planting Level II: Less than 5% trash, 90% planting density, less than 5% exposed soil, and less than 10% weeds and/or invasives.**

Plantings are maintained by properly trained personnel four times per year. Invasive species are removed on a quarterly basis. Replacement plants are installed seasonally.

- **Maintenance Standard - Embankment Planting Level III: Less than 5% trash, 90% planting density, less than 5% exposed soil, and less than 15% weeds and/or invasives.**

Plantings are maintained by properly trained personnel two times per year. Invasive species are removed on an annual basis.

4.8.5.2 Watercourse (10' zone from embankment edge into water)

Goal: The watercourse is an important visual and flood control element of the Muddy River parks. It is essential that it be kept in good condition, both in the treatment of the edges and in the quality of the water.



The Riverway

Watercourse Level I is intended to keep the watercourse free from obstructions, trash and water-borne vegetation such as duckweed.

- **Maintenance Standard - Watercourse Level I: Less than 2% trash.**

Trash removed from watercourse weekly. The goal is less than 2% trash.

Watercourse Level II refers to areas of the river that are more difficult to access and have less of an impact on the visual and functional elements of the park.

- **Maintenance Standard - Watercourse Level II: Less than 5% trash.**

Trash removed from watercourse on a quarterly basis. The goal is less than 5% trash.

4.8.6 Trash Removal

Goal: The park system should be clean and free from trash and litter. Trash receptacles should not be overflowing and litter should be kept to a minimum.



Trash Removal Level I through III have to do with the appearance of the park and sanitary conditions, including litter pick-up and collection of trash from receptacles. Trash Removal Level I is specified for high use areas that generate a significant amount of trash. Trash Removal Level III corresponds to areas that have demonstrated over time the need for less frequent removal of trash.

Maintenance Standard – Trash Removal Level I: Zero overflowing cans.

Minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing/day.

- **Maintenance Standard - Trash Removal Level II: Zero overflowing cans.**

Minimum of once a day, 5 days/week. Use may dictate more frequent cleaning.

- **Maintenance Standard - Trash Removal Level III: Zero overflowing cans.**

Minimum servicing 2 to 3 times/week. Litter barrels should be emptied up to 3 times per week from April through October and weekly during the winter.

4.8.7 Repair and Preservation

The following categories relate to work having to do with the proper functioning and safety of park equipment and facilities, preventative maintenance and repair, such as repair of park lighting, bench repair, park structure maintenance and graffiti removal.

4.8.7.1 Parking Lots and Pathways:



- **Maintenance Standard - Paved Surfaces Level I: Less than 2% in degraded condition.**

Sweeping, cleaning and washing of surfaces done weekly so there is no accumulation of sand, dirt or leaves accumulated.

- **Maintenance Standard - Paved Surfaces Level II: Less than 5% degraded condition.**

Should be cleaned when there is a noticeable accumulation of debris.

- **Maintenance Standard - Path Maintenance: Less than 5% degraded condition.**

Repair stone dust and asphalt paths, including minor repairs, grading and potholing as necessary.

4.8.7.2 Park Furniture Maintenance

Maintenance of park site furnishings includes:

- Bench maintenance – repair, replacement, painting
- Trash cans – emptying, replacement
- Light poles – replace bulbs, painting, realigning
- Drinking Fountains – cleaning, repair, turn on & off
- Graffiti Removal

Regular maintenance of the park's site furnishings is an important task, which is often overlooked or only done on an emergency basis. Keeping park furnishings in good repair makes for a more inviting and usable park.

A uniform set of park furnishings should be developed for the Muddy River parks of the Emerald Necklace including trash cans, benches, lighting standards and drinking fountains. Olmsted designed the park as a whole. Standardized furnishing will reinforce the historic character of the park while adding visual continuity to the park. In addition, maintenance is easier if there are one or two bench styles instead of five or six. Repairs are more likely to be done with “available materials” or not done at all when too many options exist. As much as possible, maintenance practices of park furnishings should be standardized throughout the Muddy River parks of the Emerald Necklace. This will reinforce the sense of one park both visually and managerially.



- **Maintenance Standard – Park Furniture Level I:** Are inspected weekly and routine repairs are done within 3-5 working days.

4.8.7.3 Graffiti Removal

Maintenance standards for Graffiti removal are followed unless they involve a historic structure that requires historic preservation notice or authorization.

- ♦ **Maintenance Standard - Graffiti Removal Level I: Graffiti removed within 24 hours.**
- ♦ **Maintenance Standard - Graffiti Removal Level II: Graffiti removed within 48 hours.**



4.8.7.4 Structures

All buildings and structures within the Emerald Necklace Muddy River parks will be managed and maintained with the goal of preserving the historic authenticity and structural integrity of the buildings. In addition, all buildings and structures will be inspected and their condition will be recorded annually. New work necessary because of changes in use should meet the state building code. However, historic buildings should not be altered solely to make them compliant with the state building code as this could have an adverse affect on the resources. Code related work that may be necessary when historic buildings are converted to a new [public] use should also respect the historic character and meet the Secretary’s Standards for Rehabilitation. Alterations for accessibility should be carefully designed to respect both the historic landscape and structures. Work required to stabilize the structures, prevent vandalism and insect or animal damage should be considered a high priority and implemented immediately.

- ♦ **Maintenance Standard – Structures Level I:** Historic structures require very specialized maintenance and sensitive treatments. All historic structures are assumed to be Level I, however the particular problem or situation may necessitate a specific response. Small, routine in-house repairs are done within 3-5 working days. Contracted repairs are assessed within 3-5 working days. Annual maintenance is done yearly and Preservation maintenance is done cyclically according to the Secretary of the Interior’s Standards.

Historic preservation to structures shall be completed in accordance with the Secretary of the Interior’s standards for the Treatment of Historic Properties, 1995: “The intent of the Standards is to assist the long-term preservation of a structures significance through the preservation of historic materials and features. The Standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and

interior of the buildings. They also encompass related landscape features and the building's site and environment, as well as attached, adjacent, or related new construction. To be certified for Federal tax purposes, a rehabilitation project must be determined by the Secretary to be consistent with the historic character of the structure(s), and where applicable, the district in which it is located.”

Standards for Preservation

1. A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.
2. The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color, and texture.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

The Emerald Necklace Master Plan lists the following structures as part of the Muddy River parks:

Olmsted Park

Kelly Rink (removed)
Cumberland Ave bridge
Ward's Pond footbridge
Willow Pond footbridge

Riverway

- Huntington Avenue Overpass
- Back Bay Maintenance Yard
- Carlton Street Footbridge
- Longwood Bridge and associated staircase
- Chapel Street Bridge and Shelter
- Netherlands Road and Brookline Ave bridges

Back Bay Fens

- Boylston Street Bridge
- Agassiz Bridge
- Fen Bridge
- Stony Brook Gatehouse
- Fens Gatehouse
- Agassiz Road Shelter (Duck House)
- Clemente Field House
- Boston Fire Alarm Headquarters
- World War II Memorial, Vietnam Memorial, Korean Memorial

These structures are discussed further in the existing conditions chapter.

4.9 Equipment

An equipment acquisition and replacement schedule is available in each jurisdiction and will support the increase in staffing and equipment for maintenance. Equipment will be replaced as it wears out and new more effective equipment becomes available.

4.10 Maintenance and Monitoring Schedule

As indicated in the tasks above, the Muddy River parks require a great number of diverse tasks to care for this unique landscape. A maintenance calendar and monitoring checklist (see Appendix A) was created that lists all tasks that need to be completed in each park sector per month. This chart will also be used to monitor the success of each organization in achieving these standards.

Following the Muddy River Restoration project there will be an increased level of maintenance for the newly restored landscape to preserve and protect both the public investment and the legacy of this historic park.

4.11 ETM Maintenance Maps

(See Attached PDF)

4.11 ETM Maintenance Maps

List of Maps




1. **Agency Areas of Responsibility**
2. **Contract Limit Lines**
3. **ETM Sectors**

Levels of Maintenance by Task and Sector Maps

4. **Sector I Hort** – Charlesgate: Planting Areas, Embankment Plantings, Gardens, Watercourse
5. **Sector I Turf** - Charlesgate: Turf, Woodlands, Athletic Fields, Playgrounds
6. **Sector IIA Hort** – Back Bay Fens North: Victory Gardens/ Mother’ Rest: Planting Areas, Embankment Plantings, Gardens, Watercourse
7. **Sector IIA Turf** – Back Bay Fens North: Victory Gardens/ Mother’ Rest: Turf, Woodlands, Athletic Fields, Playgrounds
8. **Sector IIB Hort** – Back Bay Fens Central: Rose Garden/Clemente Field: Planting Areas, Embankment Plantings, Gardens, Watercourse
9. **Sector IIB Turf** – Back Bay Fens Central: Rose Garden/Clemente Field: Turf, Woodlands, Athletic Fields, Playgrounds
10. **Sector IIC Hort** – Back Bay Fens South and Sears Parking Lot: Planting Areas, Embankment Plantings, Gardens, Watercourse
11. **Sector IIC Turf** - Back Bay Fens South and Sears Parking Lot: Turf, Woodlands, Athletic Fields, Playgrounds
12. **Sector III Hort** – Riverway: Planting Areas, Embankment Plantings, Gardens, Watercourse
13. **Sector III Turf** – Riverway: Turf, Woodlands, Athletic Fields, Playgrounds
14. **Sector IVA Hort** – Olmsted Park North: Leverett Pond/Daisy Pond: Planting Areas, Embankment Plantings, Gardens, Watercourse
15. **Sector IVA Turf** - Olmsted Park North: Leverett Pond/Daisy Pond: Turf, Woodlands, Athletic Fields, Playgrounds
16. **Sector IVB Hort** – Olmsted Park South: Wards Pond/Willow Pond/Nicholson Hill: Planting Areas, Embankment Plantings, Gardens, Watercourse

17. **Sector IVB Turf** – Olmsted Park South: Wards Pond/Willow Pond/Nicholson Hill: Turf, Woodlands, Athletic Fields, Playgrounds

ETM ASSOCIATES, L.L.C.
73 WOODBRIDGE AVENUE
HIGHLAND PARK, NJ 08904
TEL: 732 572 6626
FAX: 732 572 7161
EMAIL: ETMASSOC.LLC@VERIZON.NET

-  BOSTON PARKS
 BODY OF WATER
 METROPOLITAN DISTRICT COMMISSION
 MASSACHUSETTS HIGHWAY DEPARTMENT

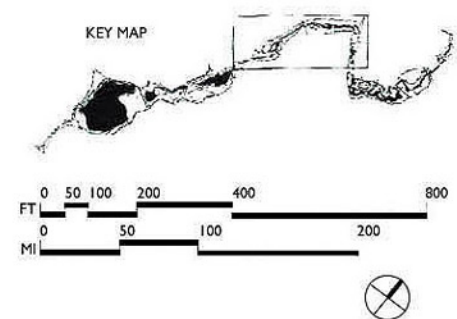


THE EMERALD NECKLACE - MUDDY RIVER PARKS

AGENCY AREAS OF RESPONSIBILITY

ETM ASSOCIATES, L.L.C.
73 WOODBRIDGE AVENUE
HIGHLAND PARK, NJ 08904
TEL: 732 572 6626
FAX: 732 572 7161
EMAIL: ETMASSOC.LLC@VERIZON.NET

- BOSTON PARKS
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- MASSACHUSETTS HIGHWAY DEPARTMENT
- BROOKLINE
- BOSTON/BROOKLINE TOWN LINE



THE EMERALD NECKLACE - MUDDY RIVER PARKS
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ETM ASSOCIATES, L.L.C.
73 WOODBRIDGE AVENUE
HIGHLAND PARK, NJ 08904
TEL: 732 572 6626
FAX: 732 572 7161
EMAIL: ETMASSOC.LLC@VERIZON.NET

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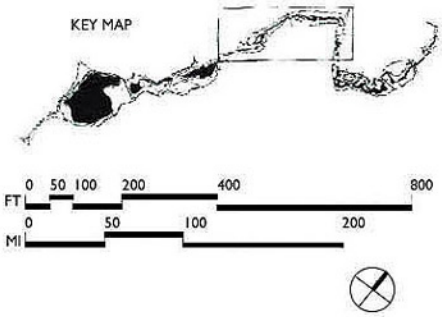
- BOSTON PARKS
- BODY OF WATER
- METROPOLITAN DISTRICT COMMISSION
- MASSACHUSETTS HIGHWAY DEPARTMENT
- EMERALD NECKLACE-MUDDY RIVER PARKS
- MUDDY RIVER CONTRACT LINE



THE EMERALD NECKLACE - MUDDY RIVER PARKS
MUDDY RIVER RESTORATION PROJECT CONTRACT LIMIT LINE

ETM ASSOCIATES, L.L.C.
73 WOODBRIDGE AVENUE
HIGHLAND PARK, NJ 08904
TEL: 732 572 6626
FAX: 732 572 7161
EMAIL: ETMASSOC.LLC@VERIZON.NET

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MUDDY RIVER PARKS
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THE EMERALD NECKLACE - MUDDY RIVER PARKS
MUDDY RIVER RESTORATION PROJECT CONTRACT LIMIT LINE

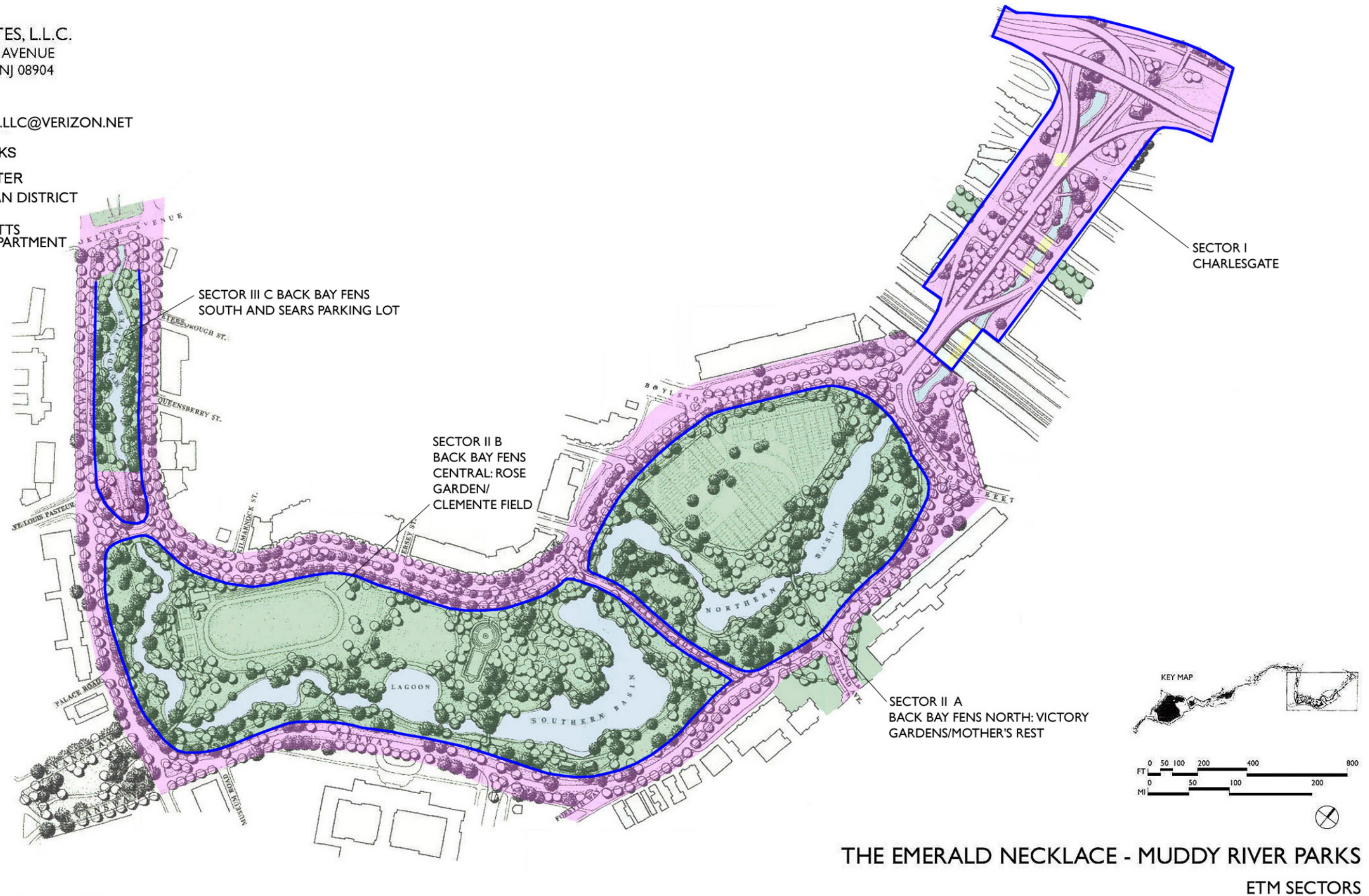
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- MUDDY RIVER CONTRACT LINE



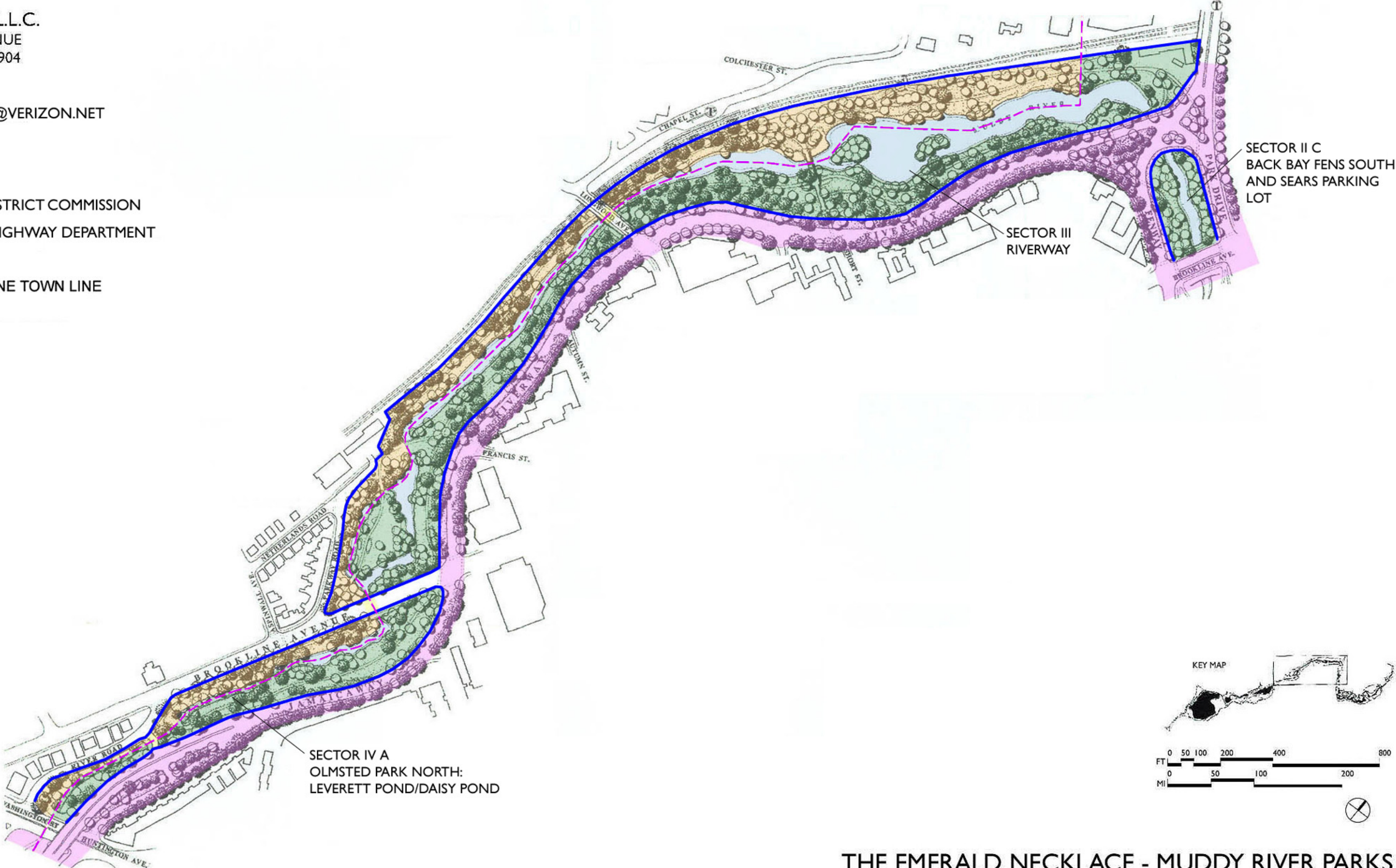
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MUDDY RIVER RESTORATION PROJECT CONTRACT LIMIT LINE

- BOSTON PARKS
- BODY OF WATER
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- ETM SECTORS



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73 WOODBRIDGE AVENUE
HIGHLAND PARK, NJ 08904
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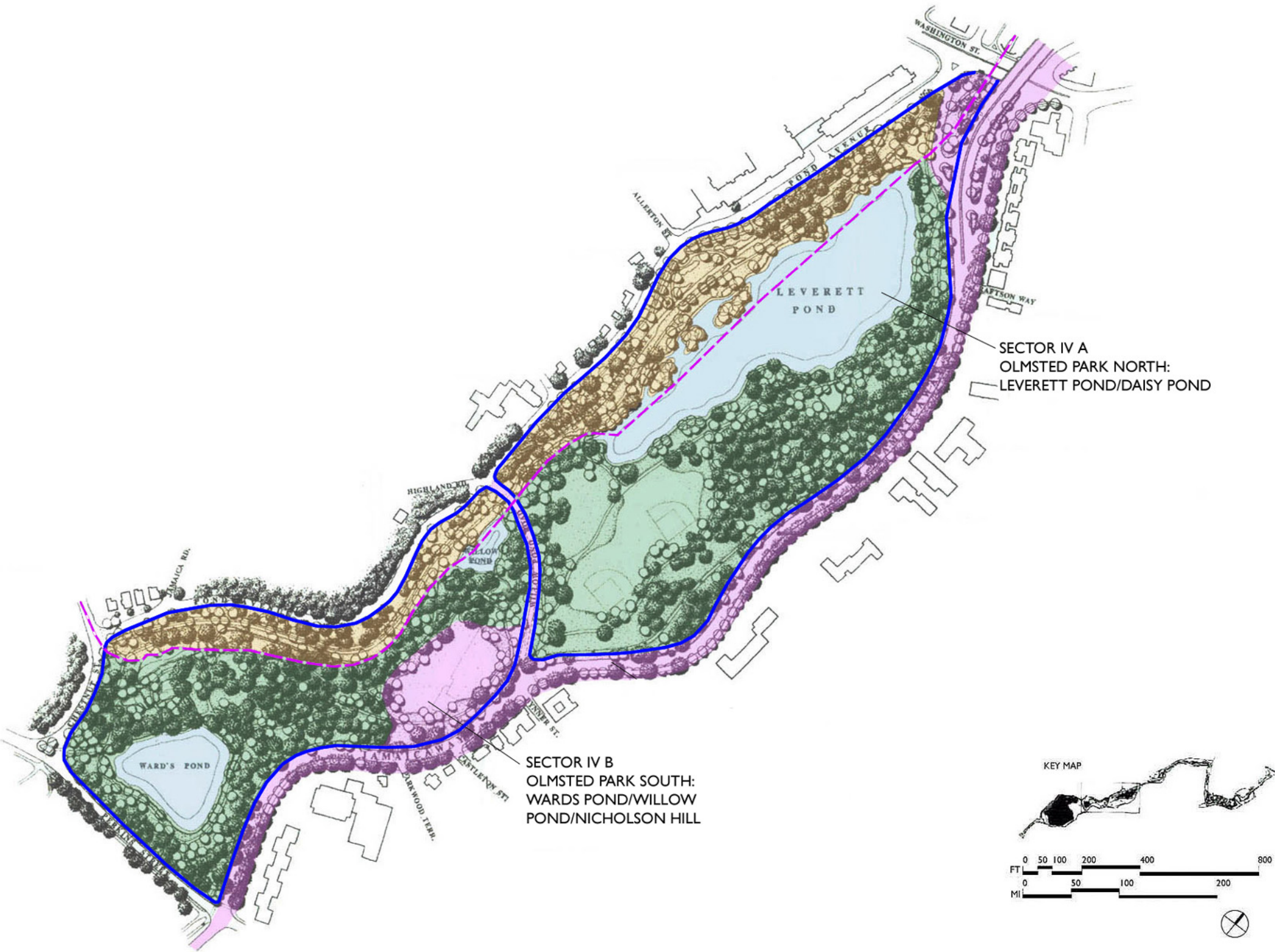
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73 WOODBRIDGE AVENUE
HIGHLAND PARK, NJ 08904
TEL: 732 572 6626
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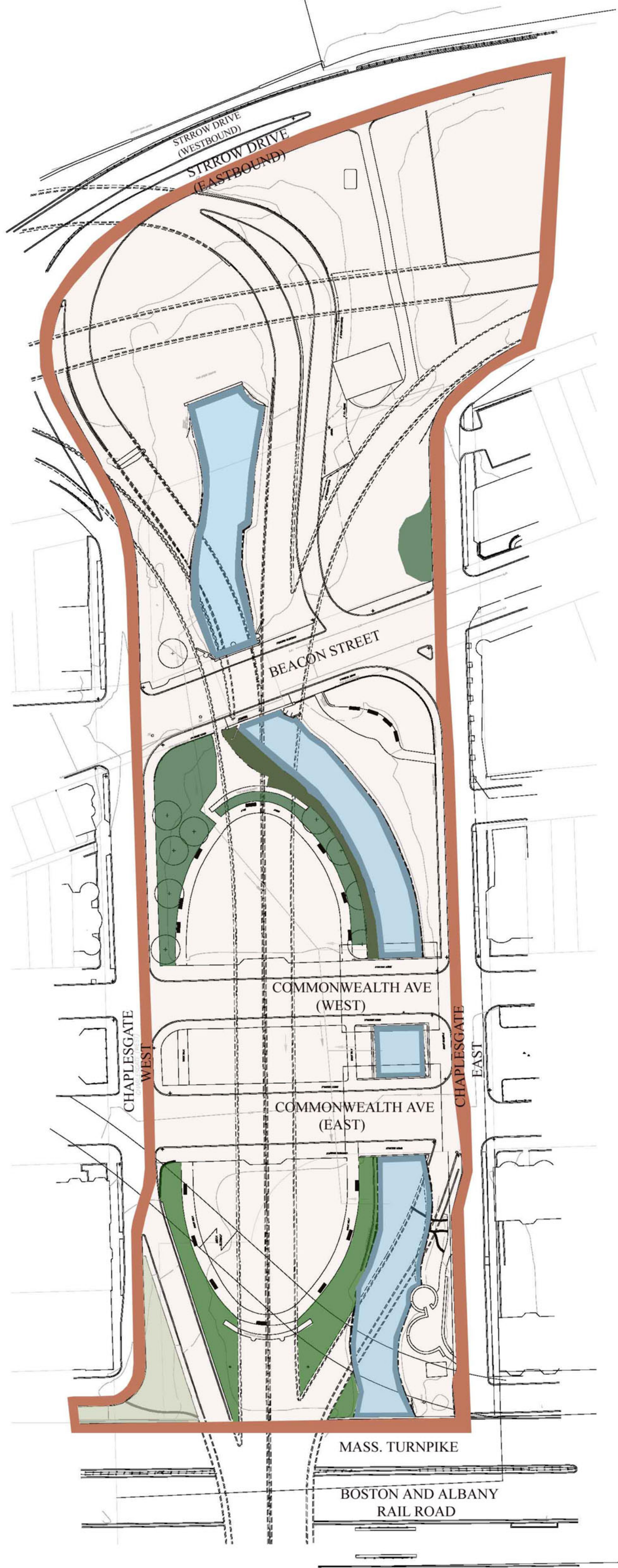


THE EMERALD NECKLACE - MUDDY RIVER PARKS
ETM SECTORS

Emerald Necklace - Muddy River Parks

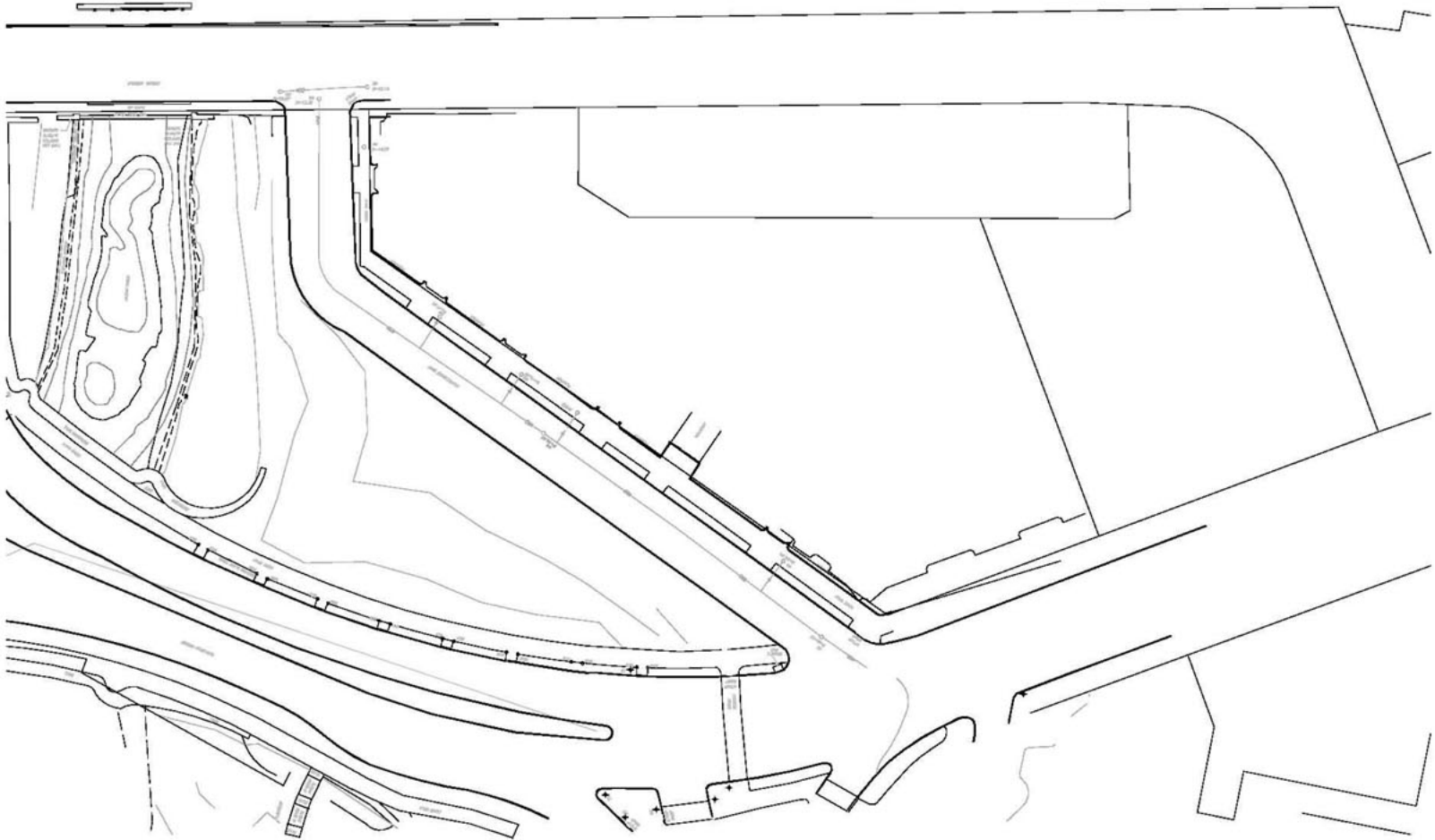
Levels of Maintenance by Task and Sector

Sector: I



Legend:

- Planting Areas - Level 1
- Embankment Plantings - Level 1
- Gardens - Level 1
- Watercourse - Level 1



Emerald Necklace - Muddy River Parks

Levels of Maintenance by Task and Sector

Sector: I



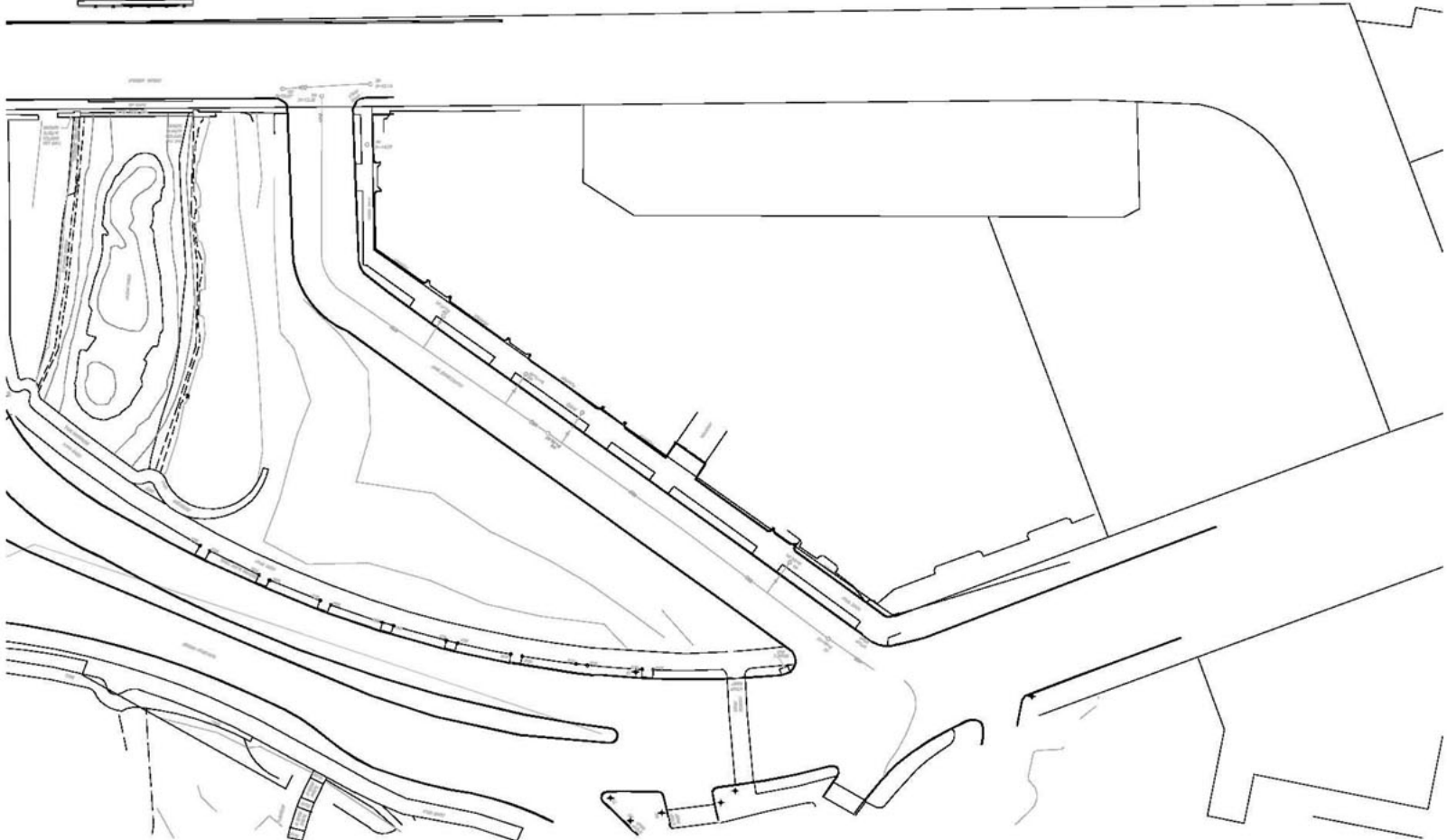
Legend:

Turf:

- Level - 1
- Level - 2
- Level - 3

Woodlands:

- Level - 1
- Level - 2
- Athletic Fields
- Playgrounds



Emerald Necklace - Muddy River Parks

Levels of Maintenance by Task and Sector

Sector: IIA

Legend:

- Planting Areas - Level 1
- Embankment Plantings - Level 1
- Gardens - Level 1
- Watercourse - Level 1



Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: IIA

Legend:

- Turf:
- Level - 1
 - Level - 2
 - Level - 3
- Woodlands:
- Level - 1
 - Level - 2
 - Athletic Fields
 - Playgrounds



Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: IIB

Legend:

- Planting Areas - Level 1
- Embankment Plantings - Level 1
- Gardens - Level 1
- Watercourse - Level 1



Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: IIB

Legend:

Turf:

- Level - 1
- Level - 2
- Level - 3

Woodlands:

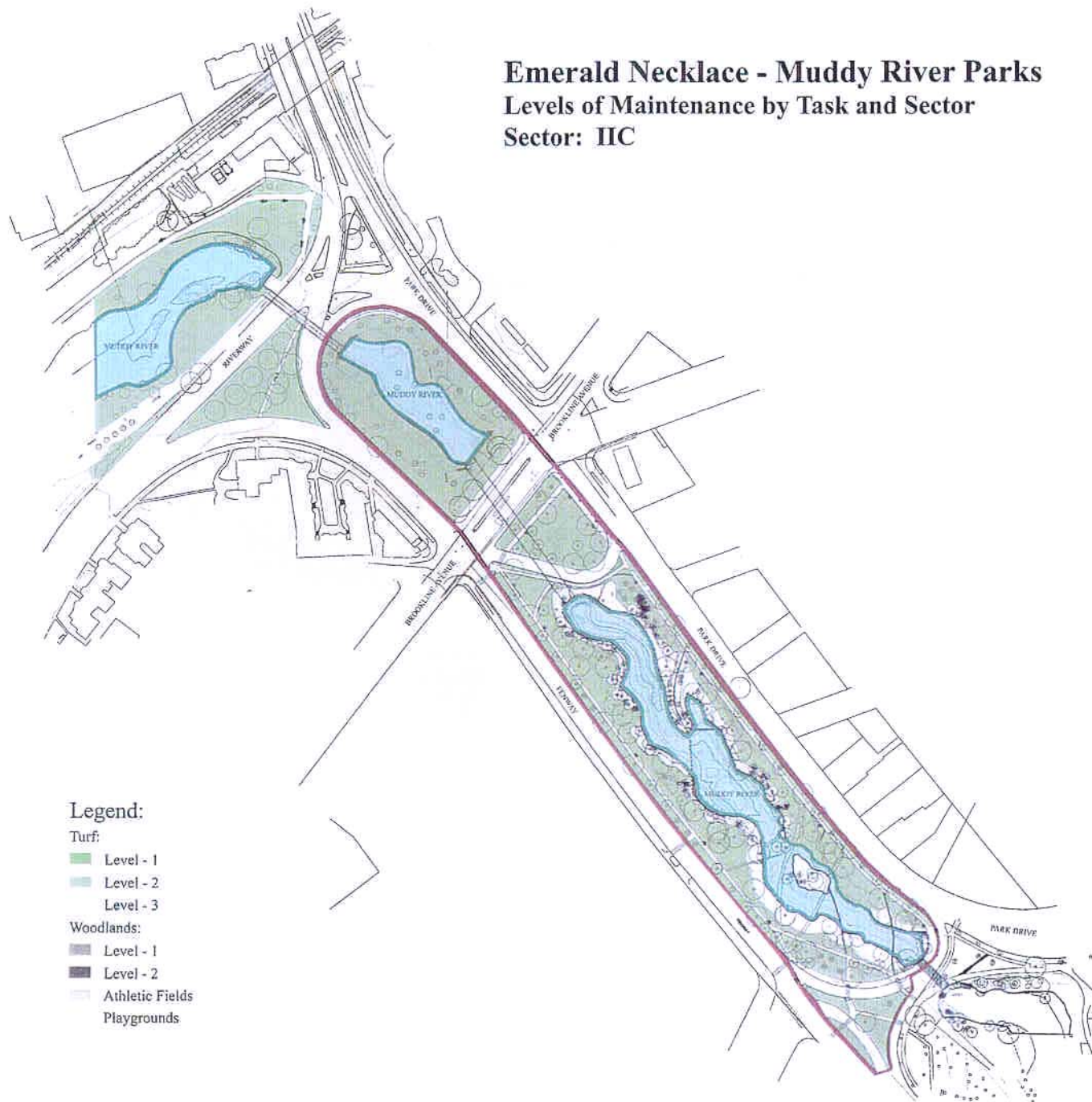
- Level - 1
- Level - 2
- Athletic Fields
- Playgrounds



Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: IIC



Emerald Necklace - Muddy River Parks **Levels of Maintenance by Task and Sector** **Sector: IIC**



Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: III / Riverway

Legend:

- Planting Areas - Level 1
- Embankment Plantings - Level 1
- Gardens - Level 1
- Watercourse - Level 1



Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: III / Riverway

Legend:

- Turf:
- Level - 1
 - Level - 2
 - Level - 3
- Woodlands:
- Level - 1
 - Level - 2
 - Athletic Fields
 - Playgrounds



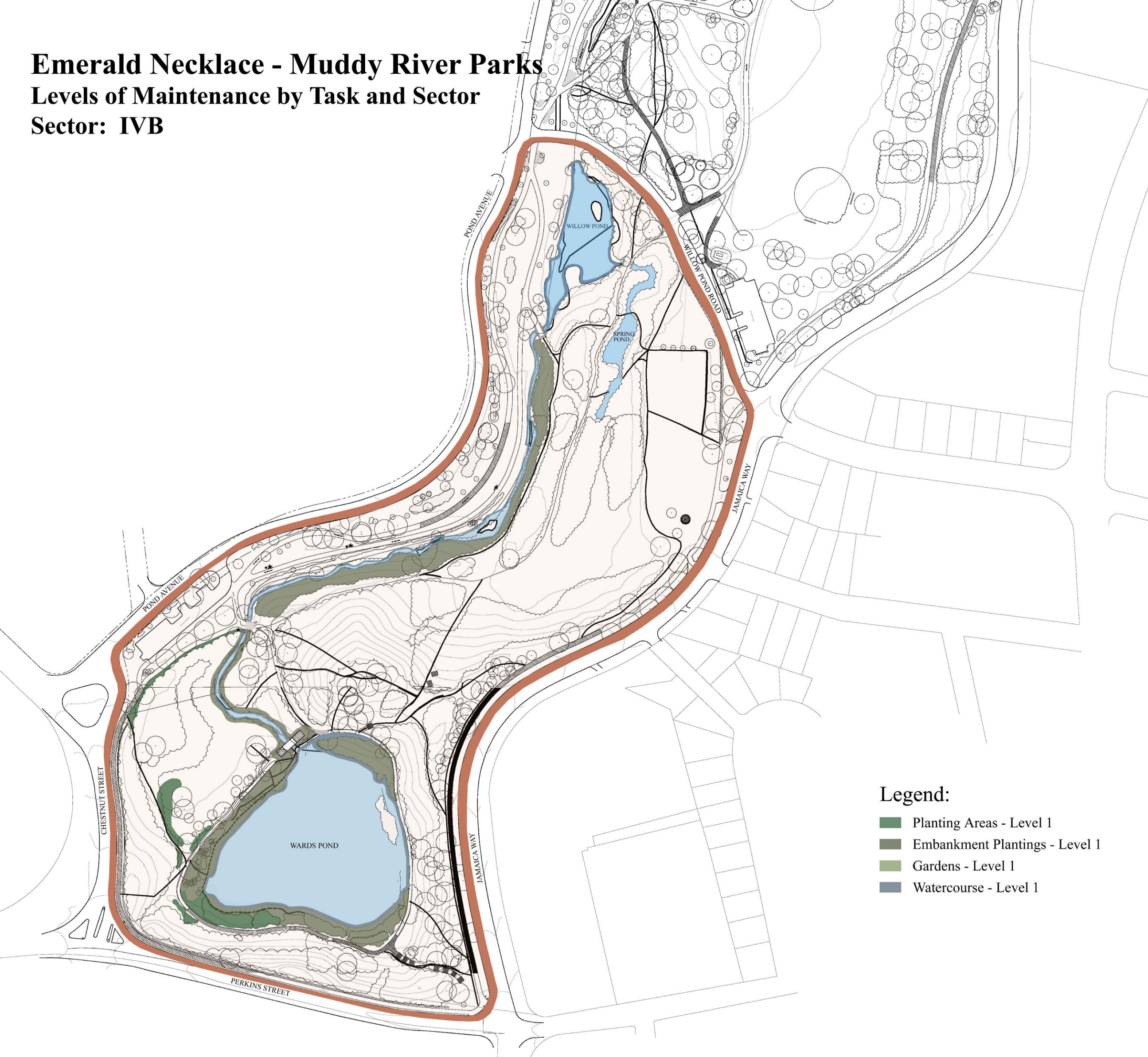
Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: IVA



Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: IVA



Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: IVB



Legend:

- Planting Areas - Level 1
- Embankment Plantings - Level 1
- Gardens - Level 1
- Watercourse - Level 1

Emerald Necklace - Muddy River Parks
Levels of Maintenance by Task and Sector
Sector: IVB



CHAPTER 5: MANAGEMENT

5.1 Introduction

The objectives and recommendations contained in this chapter are based on the history of the Emerald Necklace Muddy River parks along with the inventory, documentation and analysis of existing conditions, and information gathered from meetings and interviews with park staff, friends of the park and other organizations. This chapter outlines the proposed management structure, in the form of a Muddy River Cabinet, and sets forth management objectives and recommendations that will ensure the successful implementation of this Management and Maintenance Plan.

5.2 Management Objectives

The management objectives described below are structured as follows: objectives for the park as a whole and specific recommendations related to sectors of the Emerald Necklace Muddy River parks.

5.2.1 Park System Management Objectives

In order for the Management and Maintenance Plan for the Muddy River parks to be successful, the owners and managers of the parks must embrace management objectives that recognize the importance of the park as a cultural landscape. In order to accomplish this goal, the following management objectives were established during the Emerald Necklace master planning process:

- Foster greater appreciation of the Emerald Necklace Muddy River parks as a cultural landscape: Significant cultural landscapes demand higher levels of understanding, public awareness and sympathetic treatment than other recreational grounds.
- Respect the value of the natural environment of the parks: Every effort should be made to enhance the natural resources of the parks through a sound management and maintenance program and programming for the open space that respects the environment.
- Foster a new generation of park managers: Historic and cultural properties require a management structure and maintenance staff with specific skills related to preservation maintenance, cultural resource management, horticulture and other related areas. The appointment of Park Administrators and “Horticultural” crews in New York City’s Central Park, Prospect Park and Riverside Drive Park, as well as fields of preservation maintenance and horticulture in the National Park Service, are evidence of emerging trends. More demands are imposed on park administrators to address contemporary needs in historically sensitive ways: for example, to evaluate original planting plans and plant lists in the light of authenticity, public safety, maintenance and cost.
- Strengthen and coordinate management: The success of this plan depends on ongoing coordination of the owners of the Emerald Necklace Muddy River parks, park staff, volunteers and park partners around management and maintenance of the parks as well as the

coordination of capital projects and the maintenance they require. The need for strong cross-jurisdictional communication among management partners, as well as a sound management and maintenance program that will ensure a seamless appearance for the Emerald Necklace Muddy River parks cannot be overemphasized.

- ♦ Institutionalize public/private partnerships: State and municipal government must continue to be responsible for certain park services and improvements. However, as the economic climate of the 1990s and 2000s has shown, the private sector should continue to be encouraged to play an expanded role. This role, however, needs to be clearly defined and directed in ways that benefit the cultural landscape and enhance overall conditions.
- ♦ Be aware of outside impacts on the parks: Parks are subject to external events and are inseparable from the cities, towns or neighborhoods of which they are a part. The Muddy River parks are no exception, and have been continuously affected by events outside, as well as inside their boundaries. These changes can threaten the future of the parks or compromise resources. Park managers should recognize the external threats and pursue strenuous efforts to control them.
- ♦ Establish emphasis of the park as a cultural landscape: The Emerald Necklace Muddy River park system is a special place because of its rich and unique history. The addition of unobtrusive, on-site interpretive signs or other appropriate interpretive methods would help share the park's history with its visitors. Park staff who are familiar with cultural landscape maintenance, particularly horticulturalists, would also help to communicate the importance of the parks as a historic resource and contribute greatly to the long-term preservation of the parks' character-defining vegetation. Management and development of the parks should strive to preserve the known and potentially significant historic features and significant natural resources for future generations. These features should be considered individually and for their contribution to the overall character of the landscape.
- ♦ Respond to contemporary uses: One of the most difficult tasks facing the caretakers of historic parks is to provide access for present and future generations of users, while maintaining the integrity of the historic property. New uses should be considered in relation to the Emerald Necklace's historic integrity and should be accommodated in ways that do not compromise the historic design intent or adversely affect extant resources. Recreational uses should be consistent and sympathetic to the historic character of the property. The siting of new facilities should be carefully scrutinized and generally be discouraged. Mass, scale, form, materials and visual impacts should be carefully considered so that the original design intent, historic character, and integrity of the landscape are not compromised. Park management should strive to offer potential new uses for historic buildings, rather than to encourage new construction.
- ♦ Event programming and control: Several events are held within the Muddy River parks throughout the year. These events bring additional people to the parks, but if not controlled can result in major impacts and also increased maintenance for the park staff. Management, maintenance, and the enforcement of rules and regulations are important to make these events successful for both the public and the park.

- Provide access for all: Special efforts must provide for the young, disabled and elderly. It is crucial that the parks be accessible to all those individuals who wish to visit and engage in appropriate park activities. Physical changes necessary to accommodate disabled visitors should be carefully designed so that they are compatible with the historic character of the property.
- Limit vehicular impacts: Public parks, in general, are subject to assaults from the automobile and other modes of transportation. Any future planning should emphasize limits and restriction to automobiles in the parks, as well as minimizing changes to the parks' edges to accommodate additional parking. The current parking areas in the parks are compatible with their use.
- Expand park programming: A key to the future use, interest and support of the Emerald Necklace Muddy River parks is the expansion of park programs – information, exhibits, tours, events, public relations, and education. Programming reinforces existing constituencies and establishes new ones, but should not accomplish this at the expense of the environment or the historic integrity of the site. Park programming can also reinforce capital outlays, security, park use, advocacy and stewardship. Along with expansions in programming is the need to establish guidelines for use and enforcement of park-related rules.
- Expand horticultural capabilities: The Emerald Necklace Muddy River parks have a unique and significant designed landscape with a large collection of specimen shrubs and trees as well as naturalistic plants requiring subtlety of treatment. These features contribute to both the historic significance and character of the park. They should be monitored, managed and maintained with the necessary technical skills needed to treat individual plant species correctly, as well as to preserve the character of individual features. Without skilled horticultural and arboricultural care, the parks risk the inadvertent loss of significant features, and the gradual decline of historic integrity.

5.2.2 Park Landscape Management Objectives

The management objectives for the park landscape include:

- Preserve, protect and rehabilitate as necessary areas within the park that are unique ecological resources.
- Preserve, protect and rehabilitate the extant features from the appropriate period of significance, while allowing for present day users. Various features within the greater park landscape, such as extant vegetation, buildings and structures and the carriage roads are part of the historic Muddy River landscape and should be retained, preserved and maintained as a character-defining feature.
- Preserve, protect and rehabilitate the extant features from the period of significance, while allowing for intensive use in specific areas: Selected areas within the park, such as the athletic fields and recreation areas, should be maintained in a manner that is in keeping with their intensive use by the community and park visitors.

5.3 Management Issues and Recommendations

There are many recommendations for the Muddy River parks that are not specific to a particular sector of the park system, but are applicable for the parks as a whole. These management recommendations are intended to ensure regulatory compliance throughout the project. The recommendations should also ensure the practice of cultural resource management. Good cultural resource management includes the following considerations:

- 1) Planning for both capital project and normal maintenance take into consideration impacts on cultural resources;
- 2) Consultation with appropriate review bodies, such as the Brookline Preservation Commission, Boston Landmarks Commission or the Massachusetts Historic Commission; and
- 3) In the case of federally funded or regulated projects, compliance with Section 106 of the National Historic Preservation Act must be met.

The recommendations are as follows:

5.3.1 Buildings and Structures

The Emerald Necklace parks were embellished with many special buildings and bridges, most of which survive today. Several buildings, such as the gatehouses at Park Drive and Brookline Avenue, the Fens and Charlesgate had engineering functions. Some bridges, such as Boylston Street, Longwood and Brookline Avenue were imposing structures, while others, such as the pedestrian bridges in the Riverway and Olmsted Park, were intimate in scale, similar to the viewing shelters and overlooks. Overtime, some of these structures have been allowed to deteriorate, even to the point where they are no longer safe to use. This plan seeks to establish work procedures that institutionalize cyclical preservation as opposed to reconstruction or rehabilitation due to neglect.

Park managers should evaluate the significance of historic buildings and guide preservation efforts accordingly. All buildings within the Muddy River parks should be managed and maintained with the goal of preserving the historic authenticity and structural integrity of the buildings. In addition, all buildings and structures in the Muddy River parks should be inspected and their condition recorded annually. New work necessary because of changes in use should meet the state building code. However, historic buildings should not be altered solely to make them compliant with the state building code as this could have an adverse affect on the resources. Code related work that may be necessary when historic buildings are converted to a new use should also respect the historic character and meet the Secretary's Standards for Rehabilitation. All historic buildings not in use should be mothballed properly.

5.3.2 Heritage and Specimen Tree Inventory

The Emerald Necklace illustrates Olmsted's design ideas at the height of his professional career. Master Plan and restoration projects must be faithful to these ideas while recognizing current needs and resources. An accurate inventory of trees and plant material is critical to guiding

decisions for historically appropriate replacement species as some of this material becomes overly mature.

A Heritage and Specimen Tree Inventory has been completed for the Brookline portion of the Riverway. An inventory with maintenance recommendations should be developed and fully implemented for the rest of the Emerald Necklace Muddy River parks. The former MA DEM's Division of Forests and Parks, through its Bureau of Forestry, provided technical assistance and training to municipalities for the identification, evaluation and protection of heritage trees. The newly formed MA Division of Conservation and Recreation should be consulted to see if the agency is available to assist in the identification and management of trees in the Emerald Necklace in two ways:

- Development of an inventory form for heritage and specimen trees for the Muddy River parks
- Training of park staff and volunteers in the identification, documentation and assessment of heritage and specimen trees

The final product of the Heritage Tree Inventory should comprise a complete documentation of heritage and specimen trees in the parks and along the parkways, including their condition, location and a prioritized list of recommended treatment actions. Treatment of the trees could range from pruning and cabling work to removal and replacement in kind and should be incorporated into maintenance planning for the parks. The park system needs a systematic forestry management program with a mission to increase forest health and ecological diversity.

In addition to heritage trees, a complete inventory of historic character-defining vegetation, particularly specimen shrub collections would provide critical information to enhance management and maintenance. It would aid in determining maintenance needs, and in solutions related to long-term replacement.

5.3.3 Interpretation and Signage

The Muddy River parks need signs to guide today's traffic and activities. This signage must be compatible with the landscape, structures and furnishings. Research has revealed historic prototypes compatible with these park settings. Signage in other urban historic parks has been evaluated. Proper attention to message and design will allow necessary signs to enhance rather than detract from the parks' natural quality.

The Emerald Necklace Muddy River parks have always been recognized for their immense interpretive and educational potential, with opportunities for visitors to enjoy the historic and natural landscape. However, a comprehensive interpretive program has not been developed, and the sensitive landscape has presented a challenge in creating a system of wayside panels, signage or other interpretive features. Because of this, interpretive features are very limited.

Signage along the trails and landscape of the Emerald Necklace Muddy River parks falls into two categories: Wayfinding signage and Interpretive signage.

Interpretive: A full interpretive plan for the historic landscape of the Muddy River parks should be developed. In general, signage within the parks should be designed to be unobtrusive and compatible with the park landscape. In this historic area the quantity of signs should be limited to prevent visual clutter. Interpretive signage at other locations should be consistent with the overall interpretive strategy for the parks.

Wayfinding: Wayfinding signage is designed to guide park visitors through the parks. The existing wayfinding system includes signage indicating pedestrian and bike paths, and parking areas. Wayfinding signage should be clear and readily identifiable.

5.3.4 Program and Events Calendar

A key to the future use, interest and support of the Emerald Necklace is the expansion of park programs – information, exhibits, events, tours, public relations and education. Programming is also the key to rehabilitating currently unused buildings. Park programming reinforces capital outlays, security, park use, advocacy and stewardship.

Many public events and programs are held in the Emerald Necklace Muddy River parks each year, particularly in the warmer months. Programs and more specifically events should be reviewed for their impacts to the parks. In order to accommodate the work needed to host these events, park staff should develop a method for tracking the schedule and tasks for these activities. This could be done through an internal calendar of events and programs, that indicates the necessary preparation time for the events, including set up and break down, and the number of persons needed to staff the events. Post event maintenance should also be included.

The continuation of the Park Ranger program is essential to build strategic partnerships between the police, rangers, parks staff and the public. Both the perception and the actuality of greater security are important to all park users. Park Rangers provide a friendly and informative uniformed presence and also foster a greater public understanding of the historic and environmental value of the Emerald Necklace parks. A complete program of information, exhibitions, tours, public relations and educational programs is to be developed as the Master Plan improvements are carried out.

5.3.5 Wetlands

All ponds, rivers streams, land under water, bordering vegetated wetlands and floodplains within the Muddy River parks are subject to the Massachusetts Wetlands Protection Act. Appropriate permits must be sought from either the Boston or Brookline Conservation Commission for activities that may alter the resource areas.

Continuing management and monitoring of all the parks' wetlands is ecologically important. With the exception of maintenance, any work that occurs within the wetland areas of the Muddy River parks will need to seek the regulatory authority of the Wetlands Protection Act and the Massachusetts Endangered Species Act (MESA). Management of the wetlands, especially in the ecological restoration efforts, requires local Conservation Commission permits, and an official filing with the regional Department of Environmental Protection office.

5.3.6 Roads and Trails

The Emerald Necklace Master Plan illustrates that there is no common standard of paving materials, no vocabulary of furnishings, and no policy governing the alignment of walks or the placement of lights, benches, trash receptacles, drinking fountains, or signs throughout the park. The various paving surfaces and furnishings in the parks represent a patchwork of intermittent, unrelated efforts to arrest the decline of the Muddy River parks and their related parkways. Park paths have been neglected, particularly in Olmsted Park and the Riverway. This lack of coordination is evidence of the larger problem of fragmented management and absence of a consistent overall maintenance approach.

Several primary and secondary carriage roads and footpaths exist within the Emerald Necklace Muddy River parks. These roads should be treated according to the park system-wide recommendations above, which propose a comprehensive maintenance, management and rehabilitation program for pathways and roads. A thorough mapping and investigation of the trail system in the Emerald Necklace Muddy River parks should be undertaken. First, the location of the trails should be more accurately mapped. A more accurate mapping of the trails would be beneficial to both the park managers and visitors.

Secondly, during the inventory process an assessment of trail condition and hierarchy could be performed to determine which trails are in need of erosion control measures. All trails that need erosion control measures should be treated. Finally, it is recommended that the parks take a more active control over the use of particular trails.

Brookline has installed paved pathways with rolled aggregate in lieu of the historically designed gravel or stone dust paths. This decision was made to avoid the impact of erosion from the paths into water bodies and to facilitate maintenance of the park.

5.3.7 Circulation

There are numerous interruptions between the parks in the Emerald Necklace system, particularly at the Route 9 and Bowker Interchanges. At Olmsted Park, access to Ward's Pond from Perkins Street is restricted to the east side. At the Riverway, access to the park from the east sides of Longwood Bridge is inadequate, and the decorative iron Carlton Street Bridge (over the MBTA tracks) is closed. Park continuity, circulation and access were an essential part of the historic parks' success.

The existing visitor parking lots, two at Pond Avenue, one at Daisy Field and one at Clemente Field, should remain the only parking lots for visitors to the parks. Any consideration of additional visitor parking, even for event overflow parking, should undergo a thorough study and investigation related to impacts to the historic landscape, visual impacts and safety/traffic.

5.3.8 Park Furnishings

Many recent repairs to park features have been undertaken in materials that are easy to vandalize or susceptible to early deterioration under current use conditions. All materials considered for

use in the parks should be evaluated for their long-term durability and ease of maintenance. Usually these considerations will result in materials that are consistent with the originals: stone curbs are better than concrete, cast iron is better than anodized aluminum for light standards. The hardest woods that can be acquired without negatively affecting the earth's rain forests should be used for benches and shelters. Metal and/or wood are the materials of choice for signage.

Throughout the Muddy River parks, curbs, stairs, walks and fences need repair or replacement. Many of the smaller park "destinations" (such as shelters and overlooks) which gave meaning and pleasure to movement through the park are missing.

Most park furnishings have also suffered over time. Older walk lights have not been maintained, particularly in the more remote sections. They have been replaced by newer models that are in various conditions. Floodlights have appeared at Daisy Field in Olmsted Park and at Clemente Field in the Fens. Historic benches are almost totally absent; concrete and wooden benches, as well as the "Emerald Necklace" design have been introduced. Many of these are in need of repair. Circulation and furnishings were an essential part of the historic parks' success and they are critical for the greatest enjoyment of today's users.

5.3.9 Goose Control

Invasive wildlife can have a negative impact on plant material, park appearance and user enjoyment. The Canada Goose has become problematic throughout the eastern United States and is having a negative impact on the Muddy River parks. Each spring Boston and Brookline make an effort to reduce the number of geese infesting our parks and detention ponds. The Canada Goose is protected by state and federal laws, which protect all species of migratory birds. Both Boston and Brookline hold a federal Egg and Nest Depredation Permit, which allow the parks agencies to affect a maximum of 30-50 goose nests. Each nest usually contains between 6 and 12 eggs. Many other land management agencies throughout the region are also involved with egg and nest depredation.

Signage stating that feeding of waterfowl permitted is not permitted and educational campaigns for the public are critical. In addition, significant changes are also being made in landscape design to reduce goose populations. This regional approach to population control is an appropriate start for dealing with problem goose populations, but assistance on a state or federal level may ultimately be necessary to effectively control the Canada Goose population.

5.3.10 Recreation

There is a need to improve recreational opportunities for walking, cycling, jogging, boating, picnicking, theatre, free-play in open areas, softball, sledding, sitting, watching, nature study, contemplation, and other forms of scenic enjoyment in the Muddy River parks.

While the parks were originally intended for a variety of activities, opportunities for many historic pleasures have disappeared. While many activities currently take place, conditions for multiple uses could be made better by separating competing uses, providing a fully functional circulation system and rehabilitating the key structures.

5.3.10 Pest Management

An integrated pest management program for the Muddy River parks is not a "no pesticides ever" program. It utilizes integrated pest management techniques that emphasize physical, biological and cultural pest controls, alternatives to pesticides and least toxic pesticides. The use of pesticides is suggested as a last resort and only when necessary. All areas of the Muddy River parks, including the Victory Gardens, should utilize integrated pest management.

There are more than one million insect species, but less than one percent of those are considered pests. The other 99 percent play a crucial role in our food chain and many are indispensable. Flying insects such as bees and butterflies pollinate fruits and vegetables. Burrowing insects aerate soil and assist in the decomposition of organic material by returning nutrients to the soil. Insects also serve an important role as a food source for birds, fish, other animals and some plants.

IPM utilizes regular monitoring to determine if and when treatments are needed. It employs physical, mechanical, cultural, biological and educational tactics to keep pest numbers low enough to prevent damage and annoyance through least toxic and economical methods of pest management. IPM utilizes information on the pest and environmental conditions as well as the best available pest management methods.

Unlike most commercial pesticide applications, IPM treatments are not made on a schedule. Treatments are made only if monitoring indicates that pests will cause an unacceptable amount of economic, medical or aesthetic damage. Treatments are timed to be made when they will be most destructive to the pest and least disruptive to natural pest control methods.

5.4 Management Recommendations for Maintenance

The level and consistency of maintenance in the Emerald Necklace Muddy River parks must be determined, planned and funded. The most important issues that could arise in the future include:

- Sufficient maintenance funds: The owners of the parks should establish an operational budget that includes sufficient maintenance and ensures funding continuity in the future. Historically, many public parks have not received adequate maintenance funding. Often, when funding seems in place, subsequent budget cuts necessitate reductions in maintenance efforts. Typically, government appropriations and grants are available for specific capital improvements, but not for operating costs such as maintenance. For this reason, public agencies must work hard to establish and protect an appropriate maintenance budget.
- Protection of funds to hire and train staff and to maintain equipment: The owners of the parks should establish positions and a budget necessary to hire and train both skilled and sensitive horticulturalists and professional arborists needed to maintain the historic landscape, as well as additional maintenance staff to care for the parks, including seasonal workers. This recommendation should become a priority for the park. In addition, funds should be available to maintain and upgrade equipment.

- Protection of the historic integrity of the Emerald Necklace Muddy River parks: The level and quality of maintenance has a great effect on the condition and integrity of the park landscape. Inadequate or inappropriate maintenance, for example, can result in the loss of the character-defining features, design intent, and diminished integrity. Loss of integrity can, in turn, result in the loss of historic significance. The maintenance program must recognize the historic significance of the parks and should be tailored to preserve the landscape and its components.
- Planning and Design of Capital Improvements: Capital improvements within the Emerald Necklace Muddy River parks need to be designed with long-term preservation and maintenance in mind. Some special focal areas such as Allerton Overlook may benefit from irrigation.
- Update the maintenance and management plan: The maintenance and management program should be reviewed and updated on a regular basis, in order to incorporate new information and experience in maintenance gained over time related to the ongoing process of parks restoration. In addition, new technical advances, methodologies, and equipment should also be incorporated into the parks management. We recommend that the program be reviewed and revised as necessary, but at least every five years.

5.5 Recommended Studies and Plans to Follow the Management and Maintenance Plan

Upon the adoption of this Management and Maintenance Plan, the parks' owners should pursue additional plans that build on the findings and recommendations in this document.

Recommendations for additional work include:

- Habitat plan
- Interpretive plan
- Signage plan
- Invasive Species Task Force plan
- Plant Inventory, including Heritage Tree Inventory
- Long-term preservation and use plan for buildings and structures

5.6 Management Structure and Coordination

Upon completion of the Phase I Muddy River Project, nearly \$100 million will have been spent from federal, state, local and private sources on the Emerald Necklace's waterparks and related landscapes. In order to ensure that this level of investment is protected and preserved, a management structure for the project area and adjacent parks must be in place.

The Muddy River project area is a portion of the Emerald Necklace, the core of Boston, Brookline and the Commonwealth's historic park system consisting of a series of linear parks of nearly 1,000 acres. The Muddy River project area runs from Wards Pond down through Charlesgate at the Charles River and form the border between Boston and Brookline. The City of Boston, through the Boston Park and Recreation Department, is responsible for maintaining 117 acres of parkland within and adjacent to the project area.

The Town of Brookline, through the Park and Open Space Division, is responsible for maintaining 32 acres of parkland within and adjacent to the project area. The Commonwealth of Massachusetts owns the Charlesgate section of the Back Bay Fens and is responsible for the care, custody and control of the parkways and parkland located 25 feet in from the curb, an area totaling approximately 35 acres within the project area. The total Muddy River project area and adjacent parklands is 184 acres or 18 percent of the entire Emerald Necklace.

There is no single organization that manages the Muddy River park system with the result that Boston, Brookline and the Commonwealth of Massachusetts have developed, over time, differences with regard to: management objectives, maintenance standards, maintenance resources, capital improvement projects, work methods, priorities and technical solutions. In practice these manifest themselves as different user activities, path surfacing, landscape treatment, maintenance priorities and use of voluntary labor.

The Muddy River Maintenance and Management Plan identifies areas that are in need of a higher level of care that is coordinated, consistent and seamless. Park users should be able to enjoy the parks without distraction, moving freely and with pleasure from city to town, path to bridge, woodland to overlook, experiencing the very diversity of spaces Olmsted envisioned. One way to foster that change is to create a new management structure for the park system in conjunction with an increased commitment to management, maintenance and restoration.

In order to correct the unbalanced maintenance of the Muddy River parks, the project partners are proposing the creation of a Muddy River Project Management Cabinet [The Cabinet]. The proposed Management Cabinet addresses the lack of a single authority with overall responsibility for the management and maintenance of the Muddy River parks. The Cabinet Management Structure holds each of the property owners accountable for maintenance and management responsibilities within their jurisdiction, however, it provides a framework for management oversight, public input, partner cooperation, and a forum to review, plan and improve park maintenance. The proposed Muddy River Project Management Cabinet includes: the Boston Parks Department, Brookline Parks and Open Space Division, the Massachusetts Division of Recreation and Conservation, the Emerald Necklace Conservancy, and the Muddy River Maintenance and Management Oversight Committee.

5.6.1 Muddy River Project Management Cabinet

The Muddy River Project Management Cabinet [The Cabinet] will facilitate uniform maintenance and management of the entire Muddy River park system. The project partners have completed a draft Memorandum of Agreement [MOA] that will define the roles and responsibilities of each partner and park maintenance commitments. A Committee comprised of Boston, Brookline, the State, the ENC and the MMOC have worked collaboratively to identify issues to be included in the MOA, a draft of which is included in Appendix E. The Cabinet members providing public funds will also be signatories to a Memorandum of Understanding (MOU) describing the estimate funding to be provided by the parties.

This structure has been selected because it is consistent with MEPA's direction to protect the public investment in the project and consistent with the proponents' responsibilities for

management of municipally owned resources. The agencies responsible for park maintenance want to provide a seamless approach to maintenance not only within the Muddy River parks but also through the city and town's parks as a whole. Retaining authority over the park areas in any management structure allows this to happen. However, in order to protect the massive public investment in this project, the city, town, and state have agreed to work cooperatively and to integrate a Management Cabinet dedicated to protecting Olmsted's Emerald Necklace parks into on-going management.

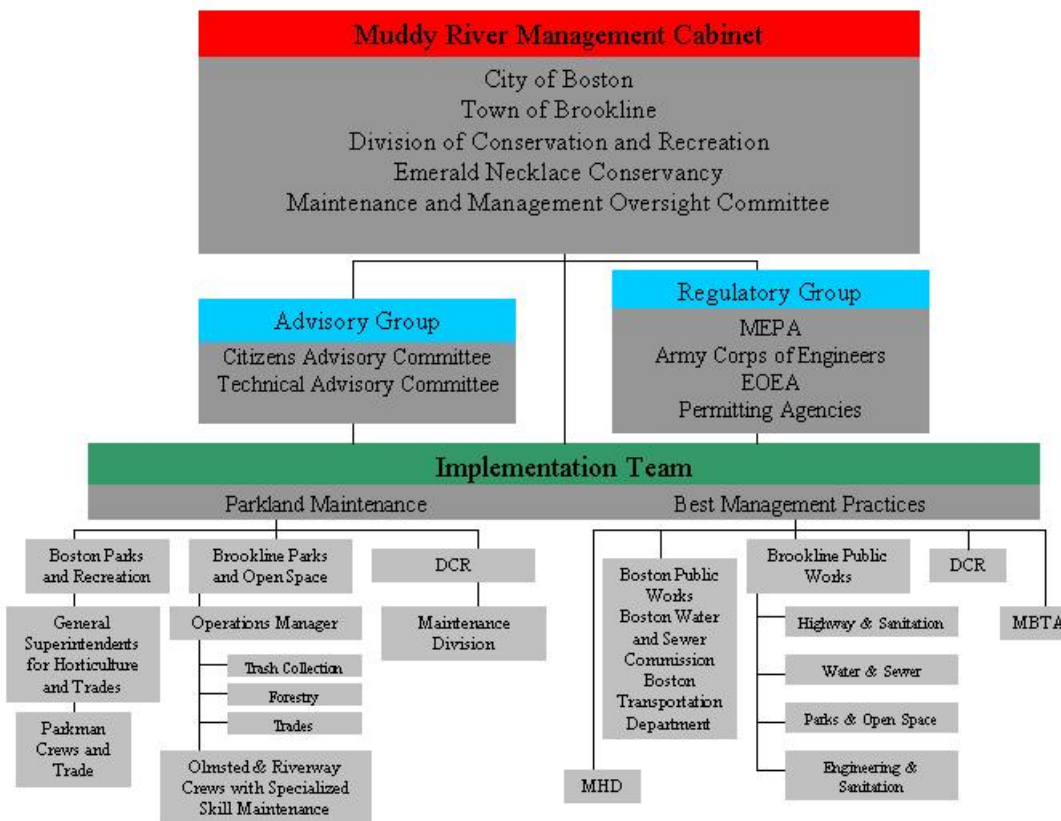
The Management Cabinet is designed to ensure that the goals of the Muddy River project are met through cooperative management, accountability and appropriate responsibility for long-term maintenance activities. The Management Cabinet will:

- Ensure unified quality performance standards for restoration and maintenance;
- Ensure seamless care of the parks system;
- Ensure effective completion of the Muddy River Restoration project;
- Protect and upkeep the significant public investment in the Emerald Necklace park system;
- Develop a workforce with the specialized expertise necessary to meet the unified quality standards to care for the historic and natural landscapes;
- Provide a safe, comfortable and positive environment for the public throughout the system for all seasons;
- Ensure sufficient and consistent public funding streams;
- Help to leverage significant private resources in support of the park system.

In the Cabinet a senior representative of each entity (Boston, Brookline and DCR) with parkland responsibilities would meet with the ENC and the MMOC to set policy and goals for work inside the project area, parkland (park maintenance) and for work outside the parkland (principally BMPs). These representatives would be Commissioner/Director/Chair level at each entity and have the ability to commit resources or influence the commitment of resources to the management and maintenance effort. Consistent with MEPA's Final Record of Decision, Boston, Brookline, and DCR will continue to manage the resources under their control, with the flexibility they need to make day-to-day decisions and implement long-term management and operational policies.

An Implementation Team consisting of the staff within the City, Town and DCR would support the Management Cabinet. The Implementation Team would be those actually conducting the maintenance and management of parkland and waterway resources.

Figure 5.1 Muddy River Management Cabinet



5.6.2 Roles and Responsibilities of the Cabinet Members

Roles and responsibilities will be based upon MOA, a draft of which is included in Appendix E.

5.6.3 Implementation

5.6.3.1 Implementation Team – Parkland Maintenance

Parkland maintenance falls under the responsibility of the Boston Parks Department, Brookline Parks and Open Space Division and the DCR. These agencies provide dedicated work crews for specific areas to ensure continuity in carrying out maintenance activities.

The Boston Parks Department's property maintenance division is under the direct oversight and management of the General Superintendents for Horticulture and Trades. Under the Superintendents' direction are the regional park crew, horticultural crew and crew foremen for the Muddy River area, to be supplemented by additional workers having specialized skills in woodlands and wetlands maintenance.

Brookline Parks and Open Space property maintenance is under the direct oversight and management of the Operations Manager. Under the Operations Manager are maintenance crews -

including general landscape maintenance, forestry, trades, and litter removal crews - dedicated to the Olmsted and Riverway area.

DCR property is under the overall management of the Deputy Commissioner of Operations who supervises maintenance crews and crew foremen for the Muddy River area.

Collectively, the Boston Parks General Superintendent, Brookline Operations Manager, and DCR Deputy Commissioner of Operations represent the maintenance managers and Implementation Team for each entity under the Muddy River Project Cabinet. They would also meet to work on implementing the goals and policies set out by the partnership. Horticulturists, arborists and crew maintenance supervisors will work with maintenance managers to advise on setting policy and meeting goals.

5.6.3.2 Implementation Team - Best Management Practices

Improvements outside the parkland areas are principally BMPs that will be owned or conducted by several parties such as the Boston Public Works Department, BWSC, DCR, the Town of Brookline and the Brookline Department of Public Works, the Massachusetts Turnpike Authority (MTA), and the Massachusetts Highway Department (MHD). The goal for outside parkland work is that signatories to the MOA will meet their maintenance and implementation commitments and work to coordinate their activities through the Management Cabinet. As new BMPs come online, the management group and each entity will reach a consensus to establish maintenance procedures and the entity will report results so the Cabinet can complete the Annual Update Report for MEPA.

5.6.4 Meetings and Review Sessions

A regular schedule of the Muddy River Project Cabinet meetings between the ENC, the MMOC, Boston, Brookline and the DCR will be developed. The schedule of the meetings and reviews would be the subject of the MOA and generally include:

- Planning and policy meetings several times a year with staff at the Commissioner/Director/Chair level from the Cabinet. These would review on-going parks maintenance, progress to date and establish goals, programs and priorities for succeeding years.
- Prepare and review the Annual Update Report for MEPA and reporting to the CAC and TAC.
- Coordination meetings between Operations Managers, General Superintendents and Deputy Commissioner of Operations to coordinate maintenance activities and standards between park maintenance sections.
- Establishment of any public meetings, public information and other activities to update the general public on the progress of the Muddy River Restoration Project, Emerald Necklace parks maintenance and the like.
- Budget review to meet commitments

5.7 Guidelines for Maintenance and Monitoring Procedures

The importance of monitoring of natural and cultural resources in the Emerald Necklace Muddy River parks cannot be overemphasized. In a popular park system like the Emerald Necklace, an ongoing program to monitor resources allows park staff to proactively manage the parks and to adapt or revise maintenance practices before resources suffer from too much use or deteriorate beyond repair. Park owners should develop a monitoring program to regularly assess the condition of park resources, including critical character-defining features associated with the historic landscape as well as natural resources, such as important habitats, wildlife and wetlands.

Ideally, a field inspection/monitoring program for the park landscape would accomplish two goals. First, it would provide a method for regularly assessing the condition and health of the park's features, to determine when/if intervention is required in advance of drastic measures such as replacement. Without a regular monitoring system in place, it is difficult to track changes from year to year. The following parameters are recommended for field inspections:

- Monitor conditions during the appropriate time and frequency throughout the year(s);
- Monitor changes in health due to decay, pests, diseases, environmental or cultural problems, including vandalism or inappropriate maintenance practices;
- Identify external threats such as visitor use, construction, air quality etc.;
- Diagnose conditions in the field when possible, or note that further diagnosis is needed;
- Describe what level or threshold of damage is acceptable and when action is necessary; and
- Describe the work required to treat the condition, or know where to get more information.

In some instances, specialists may be required to assess particular field conditions. This may be true for some features such as wetlands, and to identify the presence and effects of specific diseases and pests. In addition to regular monitoring, the park would benefit from some specific assessments, such as after unplanned storms or drought. The form of the field inspection could be written notes, photographs, annotated plans, specimen samples, drawings or correspondence. Regardless, electronic records should be retained as part of the maintenance documentation for the parks. Suggested fields for the inspection include:

- Inspected by and date;
- List the feature name and field identification number (if developed);
- Identify the type of feature and criteria for inspection (i.e. What to look for);
- Describe the inspection results;
- Provide comments related to condition, size, stabilization and/or repair work needed;
- Identify if further diagnosis is needed;
- Describe physical work needed (note critical work when needed); and
- Note if the feature is threatened or deteriorating.

Second, a record-keeping system could be used to track work accomplished or major changes in condition. This includes changes in the health, form or condition of the feature, as well as major work performed such as removal, replacement, propagation, or any other activities. At a

minimum, maintenance staff should retain receipts, notes, or other documentation related to maintenance activities so a long-term record exists related to overall site management. This serves an invaluable tool to ensure both consistent and appropriate maintenance practices, particularly when staff changes occur.

5.8 Guidelines for Training and Volunteers

Volunteers play a major role in the maintenance of urban parks. They lead nature walks, supervise playgrounds, participate in park-wide clean-ups, adopt flower plots and help with miscellaneous chores in park offices through out the country. The benefits resulting from successful volunteer programs in parks have ranged from encouraging community “ownership” and increasing the use of parks to identifying and nurturing future community leaders and park donors.

In the Emerald Necklace, volunteers can be used to help with tasks such as controlling invasive species, repainting benches and light posts, graffiti removal, weeding and general parks clean up. Volunteers can be managed through organizations such as the Charles River Conservancy, who has a Volunteer Stewardship Program or the Emerald Necklace Conservancy, who runs a “Volunteers for the Necklace” Program. Volunteers can contact these conservancies directly to get involved in volunteering.

Volunteering provides opportunities for park users to learn more about the natural environment of their parks. Volunteers see their overall purpose as protecting and preserving nature, restoring part of natural landscape to its original condition, and helping nature survive the invasion of weeds and human interference. Managers of volunteer programs need to carefully consider the size of an initial project, and build a program that addresses ecological needs and considers providing demonstration sites for public observations.

Effective programs are built around good planning, background research, community involvement, student participation, training, and long term monitoring. Restoration leaders need to provide clear directions and specific tasks to keep everyone actively engaged. Volunteers need to know they are an essential part of the solution. By providing training to volunteers, they go away with a better understanding of the project, the long-term goals, and how their efforts are incorporated into the long-range plans for a restoration program. People who volunteer are proud to share their experience with others in the community.

5.9 Role of Regulatory Agencies and Committees

All the members of the Cabinet are represented on the MMOC. The proponents and ENC sit on the Technical Advisory Committee. The ENC also has a seat on the Citizens’ Advisory Committee. Each of these committees has a distinct role, and each will inform how the partners make day-to-day decisions and implement long-term management and operational policies.

For the purposes of inclusion and cooperation, the Regulatory Agencies will be addressed as a Regulatory Group. The Group will consist of the Executive Office of Environmental Affairs (EOEA), the Massachusetts Environmental Policy Act (MEPA) Unit within EOEA, the

Department of Environmental Protection (DEP), Massachusetts Historical Commission (MHC) and other permitting agencies such as the City of Boston and Town of Brookline Conservation Commissions and historical commissions. The active participants of the regulatory group may vary by construction contract depending on the permits and approvals applicable to each construction contract. The federal, state, and local regulatory agencies are expected to carry out their responsibilities within each one's current management and administrative framework under their own regulations, policies, and procedures. The regulatory group is responsible for ensuring compliance with applicable regulatory programs including the MEPA process, required permitting, and fulfillment of Section 61 Findings.

In addition, three committees were created during the regulatory process: the Citizens Advisory Committee, the Technical Advisory Committee and the Muddy River Maintenance and Management Oversight Committee.

5.9.1 Citizens Advisory Committee

The CAC, whose members represent a diverse range of backgrounds, experience, and affiliation, provides public input on the full range of environmental issues both to the proponents, as they prepare MEPA submittals, and to the EOE, as it reviews the submissions. The CAC was established by EOE to serve as advisors to the Secretary on the project. Following the submittal of the FEIR, the CAC will receive annual updates from the project proponents regarding the status of the Muddy River improvements. Beyond the annual updates, the CAC can remain active and informed by holding four seats on the MMOC, which will last through the duration of the project plus five years.

5.9.2 Technical Advisory Committee

The TAC is comprised of members having considerable technical knowledge in all areas of importance to the project, principally federal, state and local agencies with regulatory authority. The TAC is the forum for addressing detailed technical issues on project permitting, design, and implementation. The TAC would provide technical support to the Management Cabinet and Project Implementation Team.

5.9.3 Muddy River Maintenance and Management Oversight Committee

The Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC) is an independent oversight body, established by the Secretary of the Executive Office of Environmental Affairs, for the Muddy River Restoration Project.

In order to ensure full protection of the significant public investment in the Project, and to serve as an innovative collaborative model for similar cross-jurisdictional projects, the MMOC: a) provides ongoing independent evaluation of the Project, including management and maintenance; b) facilitates close coordination and cooperation among Project partners; and c) serves as the formal vehicle for public participation in all aspects of the Project, including its long-term management.

The roles and responsibilities of the MMOC are:

- To ensure outstanding stewardship of the resource by serving as a vital, independent and outspoken ‘watchdog.’
- To participate in the development and ongoing evaluation of performance standards for construction, BMPs and maintenance.
- To identify benchmarks to evaluate Project progress.
- To provide independent review of the Project, including the Participants’ conformance to Project Goals.
- To monitor and evaluate compliance with the provisions of federal, state, and local permits and approvals (including section 61 findings).
- To monitor and evaluate compliance with the MOA, the MOU, and other multi-party contractual obligations to be developed, and with the 1999 MOA and 1999 MOU so long as they remain in effect.
- To promote close coordination of activities among the Project Participants and other relevant public agencies, and where necessary participate effectively in dispute resolution.
- To promote representation of a broad public constituency on the MMOC.
- To provide a conduit for public access to the Project.

5.10 Former Agreements and Partnerships

The Secretary’s Certificate encourages the proponents to amend the 1999 MOU to include the DCR (formerly MDC) as part of the management of the project and to be included in the maintenance of the project area.

There are actually two agreements concerning the Muddy River project that have been executed. A Memorandum of Agreement (MOA) was signed June 8, 1999 between the City of Boston and the Town of Brookline that detailed the financial and management terms for conducting work on the Muddy River project. (See Appendix E.) The Agreement identified the responsibilities for Boston and Brookline in contracting for services and sharing information on the project. There was no specific definition of the level of funding required by either party or source of other funds.

The second agreement was the November 1999 Memorandum of Understanding (MOU) containing the responsibilities for funding and administering the Muddy River Restoration Project. In summary, the MOU identified the City of Boston through its Parks Department as the project manager of Phase I of the project including Charlesgate. The City would receive and disburse funds for the project in cooperation with other participating agencies. The MOU indicated that about \$7.1 million was necessary to complete the planning, design and permitting of Phase 1 of the Project and the planning, design, permitting and construction of Charlesgate. A specific breakdown of the sources of funding was included. The proponents agreed to accept responsibility for costs of maintaining and managing the project including implementation of BMPs once Phase I is complete.

**Appendix A: MAINTENANCE CALENDAR & MONITORING CHECKLIST
FOR THE MUDDY RIVER PARKS OF THE EMERALD NECKLACE MUDDY
RIVER RESTORATION PROJECT**

Maintenance Calendar and Monitoring Checklist

JANUARY - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Playgrounds Level I	<ul style="list-style-type: none"> ▪ Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. ▪ Remove trash daily from playground area ▪ Snow removal as necessary 	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	

Maintenance Calendar and Monitoring Checklist

JANUARY - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Athletic Fields Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
		▪ Maintain signs indicating that playing fields are closed for the season.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
Back Bay Fens South and Sears Parking Lot	Circulation	▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Embankment Plantings Level I	▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary	
	Watercourse Level I	▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
Riverway	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
	Circulation	▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed	

Maintenance Calendar and Monitoring Checklist

JANUARY - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Woodlands Level I	▪ Pick up litter and trash weekly	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed	
	Woodlands Level I	▪ Pick up litter and trash weekly	
	Athletic Fields Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. ▪ Maintain signs indicating that playing fields are closed for the season.	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

JANUARY - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Woodlands Level I	▪ Pick up litter and trash weekly	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

FEBRUARY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
Back Bay Fens Central: Rose Garden/ Clemente Field	Playgrounds Level I	<ul style="list-style-type: none"> ▪ Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. ▪ Remove trash daily from playground area ▪ Snow removal as necessary 	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	

Maintenance Calendar and Monitoring Checklist

FEBRUARY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Turf Level I	<ul style="list-style-type: none"> ▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. ▪ Maintain signs indicating that playing fields are closed for the season. 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Shovel and remove snow as needed 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens South and Sears Parking Lot	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Shovel and remove snow as needed 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Riverway	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Inspect and prune out dead, broken or diseased branches. ▪ Prune to improve or maintain structural form and stability. ▪ Control invasive vines competing with trees and shrubs. ▪ Pick up litter and trash weekly 	

Maintenance Calendar and Monitoring Checklist

FEBRUARY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed	
	Woodlands Level I	▪ Inspect and prune out dead, broken or diseased branches. ▪ Prune to improve or maintain structural form and stability. ▪ Control invasive vines competing with trees and shrubs. ▪ Pick up litter and trash weekly	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Athletic Fields Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. ▪ Maintain signs indicating that playing fields are closed for the season.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

FEBRUARY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Inspect and prune out dead, broken or diseased branches. ▪ Prune to improve or maintain structural form and stability. ▪ Control invasive vines competing with trees and shrubs. ▪ Pick up litter and trash weekly 	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

MARCH - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Turf Level I	Remove matted leaf and debris from lawns and open space areas.	
	Embankment Plantings Level I	Pruning as needed	
	Watercourse Level I	The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Shovel and remove snow as needed	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Structures Level I	<ul style="list-style-type: none"> Monitor structures for storm damage Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Turf Level I	Remove matted leaf and debris from lawns and open space areas.	
	Turf Level II	Remove matted leaf and debris from lawns and open space areas.	
	Embankment Plantings Level I	Pruning as needed	
	Watercourse Level I	The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Shovel and remove snow as needed	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. Remove trash daily from playground area Snow removal as necessary 	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> Monitor structures for storm damage Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

MARCH - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Turf Level I	Remove matted leaf and debris from lawns and open space areas.	
	Turf Level II	Remove matted leaf and debris from lawns and open space areas.	
	Athletic Fields Level I	Remove matted leaf and debris from lawns and open space areas.	
	Planting Areas Level I	<ul style="list-style-type: none"> Conduct an inspection of shrubs. Inspect for broken limbs and branches from storm damage. Inspect shrubs for insect and disease problems. The spring inspection will assist in scheduling pruning and pest control. Remove dead or damaged shrubs from plant beds. Note all locations for future replacements. Leave wood mulch and other winter protection systems in place until the weather is above 45-50 degrees. Clean plant beds of all debris and top dress areas with pine bark mulch. Trash removal completed three times per week 	
	Gardens Level I	<ul style="list-style-type: none"> Conduct an inspection of shrubs. Inspect for broken limbs and branches from storm damage. Inspect shrubs for insect and disease problems. The spring inspection will assist in scheduling pruning and pest control. Remove dead or damaged shrubs from plant beds. Note all locations for future replacements. Clean plant beds of all debris and top dress areas with pine bark mulch. Leave wood mulch and other winter protection systems in place until the weather is above 45-50 degrees. 	
	Embankment Plantings Level I	Pruning as needed	
	Watercourse Level I	The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Shovel and remove snow as needed	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> Monitor structures for storm damage Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

MARCH - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens South and Sears Parking Lot	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Turf Level I	<ul style="list-style-type: none"> Remove matted leaf and debris from lawns and open space areas. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Pruning as needed 	
	Watercourse Level I	<ul style="list-style-type: none"> The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Shovel and remove snow as needed 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Monitor structures for storm damage Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Riverway	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Woodlands Level I	<ul style="list-style-type: none"> Conduct an inspection of trees with the arborist. Inspect for broken limbs and branches from storm damage. Inspect shrubs for insect and disease problems. The spring inspection will assist in scheduling pruning and pest control. Start scheduled dormant pruning program in order to improve and maintain the trees structural form and stability prior to bud break. Dormant pruning should be completed by mid-March. Inspect trees for insects, apply dormany oil if approved and applicable for insects observed. Start scheduled trees and stump removal. Leave wood mulch and other winter protection systems in place until the weather is above 45-50 degrees. Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> Remove matted leaf and debris from lawns and open space areas. 	
	Turf Level II	<ul style="list-style-type: none"> Remove matted leaf and debris from lawns and open space areas. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Conduct an inspection of shrubs. Inspect for broken limbs and branches from storm damage. Inspect shrubs for insect and disease problems. The spring inspection will assist in scheduling pruning and pest control. Remove dead or damaged shrubs from plant beds. Note all locations for future replacements. 	

Maintenance Calendar and Monitoring Checklist

MARCH - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Planting Areas Level I	▪ Leave wood mulch and other winter protection systems in place until the weather is above 45-50 degrees.	
		▪ Clean plant beds of all debris and top dress areas with pine bark mulch.	
		▪ Trash removal completed three times per week	
	Embankment Plantings Level I	▪ Pruning as needed	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	▪ Monitor structures for storm damage	
		▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
	Woodlands Level I	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
		▪ Shovel and remove snow as needed	
		▪ Conduct an inspection of trees with the arborist. Inspect for broken limbs and branches from storm damage. Inspect shrubs for insect and disease problems. The spring inspection will assist in scheduling pruning and pest control.	
		▪ Start scheduled dormant pruning program in order to improve and maintain the trees structural form and stability prior to bud break. Dormant pruning should be completed by mid-March.	
		▪ Inspect trees for insects, apply dormany oil if approved and applicable for insects observed.	
		▪ Start scheduled trees and stump removal.	
	Turf Level I	▪ Leave wood mulch and other winter protection systems in place until the weather is above 45-50 degrees.	
		▪ Pick up litter and trash weekly	
	Turf Level II	▪ Remove matted leaf and debris from lawns and open space areas.	
	Athletic Fields Level I	▪ Remove matted leaf and debris from lawns and open space areas.	
	Planting Areas Level I	▪ Remove matted leaf and debris from lawns and open space areas.	
		▪ Conduct an inspection of shrubs. Inspect for broken limbs and branches from storm damage. Inspect shrubs for insect and disease problems. The spring inspection will assist in scheduling pruning and pest control.	
		▪ Remove dead or damaged shrubs from plant beds. Note all locations for future replacements.	

Maintenance Calendar and Monitoring Checklist

MARCH - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Planting Areas Level I	▪ Leave wood mulch and other winter protection systems in place until the weather is above 45-50 degrees.	
		▪ Clean plant beds of all debris and top dress areas with pine bark mulch.	
		▪ Trash removal completed three times per week	
	Embankment Plantings Level I	▪ Pruning as needed	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Circulation	▪ Monitor structures for storm damage	
		▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
	Woodlands Level I	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
		▪ Shovel and remove snow as needed	
		▪ Conduct an inspection of trees with the arborist. Inspect for broken limbs and branches from storm damage. Inspect shrubs for insect and disease problems. The spring inspection will assist in scheduling pruning and pest control.	
		▪ Start scheduled dormant pruning program in order to improve and maintain the trees structural form and stability prior to bud break. Dormant pruning should be completed by mid-March.	
		▪ Inspect trees for insects, apply dormany oil if approved and applicable for insects observed.	
		▪ Start scheduled trees and stump removal.	
		▪ Leave wood mulch and other winter protection systems in place until the weather is above 45-50 degrees.	
		▪ Pick up litter and trash weekly	
	Turf Level I	▪ Remove matted leaf and debris from lawns and open space areas.	
	Turf Level II	▪ Remove matted leaf and debris from lawns and open space areas.	
	Planting Areas Level I	▪ Conduct an inspection of shrubs. Inspect for broken limbs and branches from storm damage. Inspect shrubs for insect and disease problems. The spring inspection will assist in scheduling pruning and pest control.	
		▪ Remove dead or damaged shrubs from plant beds. Note all locations for future replacements.	

Maintenance Calendar and Monitoring Checklist

MARCH - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Planting Areas Level I	▪ Leave wood mulch and other winter protection systems in place until the weather is above 45-50 degrees.	
		▪ Clean plant beds of all debris and top dress areas with pine bark mulch.	
		▪ Trash removal completed three times per week	
	Embankment Plantings Level I	▪ Pruning as needed	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage	
		▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

APRIL - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Plantings are maintained by properly trained personnel. Mulching and pruning as needed. Invasives removed on a monthly basis. Install replacement plants as necessary. 	
	Watercourse Level I	<ul style="list-style-type: none"> The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Should be cleaned when there is a noticeable accumulation of debris. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Turf Level II	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Turf Level III	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Plantings are maintained by properly trained personnel. Mulching and pruning as needed. Invasives removed on a monthly basis. Install replacement plants as necessary. 	
	Watercourse Level I	<ul style="list-style-type: none"> The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Should be cleaned when there is a noticeable accumulation of debris. 	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

APRIL - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Playgrounds Level I	<ul style="list-style-type: none"> Inspect safety surface materials at all playgrounds. Schedule additional or replacement surface materials. Remove trash daily from playground area Paved surfaces are swept daily. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Turf Level II	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Athletic Fields Level I	<ul style="list-style-type: none"> Review all athletic field surface conditions for winter damage, hazardous or unsafe conditions Weather permitting, fields can be lined for spring sports Inspect fencing for winter damage Review irrigation systems for winter damage, notify Water Department for scheduling repairs Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Remove winter mulch and debris from beds Edge beds and remove excess material Top dress beds with mulch Trash removal completed three times per week 	
	Gardens Level I	<ul style="list-style-type: none"> Remove winter mulch and debris from beds Edge beds and remove excess material Top dress beds with mulch 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Plantings are maintained by properly trained personnel. Mulching and pruning as needed. Invasives removed on a monthly basis. Install replacement plants as necessary. 	
	Watercourse Level I	<ul style="list-style-type: none"> The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	

Maintenance Calendar and Monitoring Checklist

APRIL - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Should be cleaned when there is a noticeable accumulation of debris.	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Back Bay Fens South and Sears Parking Lot	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Turf Level I	▪ Rake and dethatch turf areas affected by snow molds or other winter damage.	
		▪ Start core aerating and mat dragging schedule.	
		▪ If there are problem areas, conduct soil test to establish base condition.	
	Embankment Plantings Level I	▪ Plantings are maintained by properly trained personnel. Mulching and pruning as needed. Invasives removed on a monthly basis.	
		▪ Install replacement plants as necessary.	
	Watercourse Level I	▪ The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris.	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
Riverway	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Woodlands Level I	▪ Pick up litter and trash weekly	
		▪ Start scheduled tree replacements and proposed tree installations according to standard specifications and details.	
		▪ Review with arborist and schedule pruning of trees infected last year by anthracnose, cankers and galls before new growth begins.	
		▪ Prune out dead or damaged branches of trees.	
		▪ Fertilize trees as determined by soil analysis.	
		▪ Remove stakes and guy wires installed on replacement trees planted last spring.	
		▪ Remove winter protection systems once weather temperature reliably rises above 45-50 degrees.	

Maintenance Calendar and Monitoring Checklist

APRIL - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Woodlands Level I	<ul style="list-style-type: none"> Provide mulch in a two-foot diameter around the base of all new trees and trees planted the previous year. Consult with the arborist about applying dormant oil to trees with a history of aphid, scale or spider mite infestations ie. Hemlocks, beeches, honeylocust and elm. 	
	Turf Level I	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Turf Level II	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Remove winter mulch and debris from beds Edge beds and remove excess material Top dress beds with mulch Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Plantings are maintained by properly trained personnel. Mulching and pruning as needed. Invasives removed on a monthly basis. Install replacement plants as necessary. 	
	Watercourse Level I	<ul style="list-style-type: none"> The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Should be cleaned when there is a noticeable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Pick up litter and trash weekly Start scheduled tree replacements and proposed tree installations according to standard specifications and details. Review with arborist and schedule pruning of trees infected last year by anthracnose, cankers and galls before new growth begins. Prune out dead or damaged branches of trees. Fertilize trees as determined by soil analysis. 	

Maintenance Calendar and Monitoring Checklist

APRIL - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Woodlands Level I	<ul style="list-style-type: none"> Remove stakes and guy wires installed on replacement trees planted last spring. Remove winter protection systems once weather temperature reliably rises above 45-50 degrees. Provide mulch in a two-foot diameter around the base of all new trees and trees planted the previous year. Consult with the arborist about applying dormant oil to trees with a history of aphid, scale or spider mite infestations ie. Hemlocks, beeches, honeylocust and elm. 	
	Turf Level I	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Turf Level II	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Athletic Fields Level I	<ul style="list-style-type: none"> Review all athletic field surface conditions for winter damage, hazardous or unsafe conditions Weather permitting, fields can be lined for spring sports Inspect fencing for winter damage Review irrigation systems for winter damage, notify Water Department for scheduling repairs Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Remove winter mulch and debris from beds Edge beds and remove excess material Top dress beds with mulch Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Plantings are maintained by properly trained personnel. Mulching and pruning as needed. Invasives removed on a monthly basis. Install replacement plants as necessary. 	
	Watercourse Level I	<ul style="list-style-type: none"> The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Should be cleaned when there is a noticeable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	

Maintenance Calendar and Monitoring Checklist

APRIL - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Pick up litter and trash weekly Start scheduled tree replacements and proposed tree installations according to standard specifications and details. Review with arborist and schedule pruning of trees infected last year by anthracnose, cankers and galls before new growth begins. Prune out dead or damaged branches of trees. Fertilize trees as determined by soil analysis. Remove stakes and guy wires installed on replacement trees planted last spring. Remove winter protection systems once weather temperature reliably rises above 45-50 degrees. Provide mulch in a two-foot diameter around the base of all new trees and trees planted the previous year. Consult with the arborist about applying dormant oil to trees with a history of aphid, scale or spider mite infestations ie. Hemlocks, beeches, honeylocust and elm. 	
	Turf Level I	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Turf Level II	<ul style="list-style-type: none"> Rake and dethatch turf areas affected by snow molds or other winter damage. Start core aerating and mat dragging schedule. If there are problem areas, conduct soil test to establish base condition. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Remove winter mulch and debris from beds Edge beds and remove excess material Top dress beds with mulch Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Plantings are maintained by properly trained personnel. Mulching and pruning as needed. Invasives removed on a monthly basis. Install replacement plants as necessary. 	
	Watercourse Level I	<ul style="list-style-type: none"> The watercourse is inspected weekly for trash and/or debris. A small boat is used as necessary to access the watercourse and remove debris. 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	

Maintenance Calendar and Monitoring Checklist

APRIL - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Paved Surfaces Level II	▪ Should be cleaned when there is a noticeable accumulation of debris.	
	Soft Surface Level I	▪ Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

May - GENERAL TASKS

May - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none">▪ Keep all roads and paths clear of debris▪ Remove fallen trees immediately	
	Turf Level I	<ul style="list-style-type: none">▪ Apply a complete (N-P-K) fertilizer to all turf areas▪ Based on soil tests apply lime to turf areas at the recommended amounts▪ Mow on a 5-7 day schedule. Cutting height shall be 3".▪ Apply approved weed and insect control products according to manufacturers' recommendations▪ Water newly seeded areas daily to maintain even surface moisture▪ Core aerate and mat drag scheduled turf areas▪ Overseed all irrigated athletic fields and turf areas having bare spots▪ Dethatch turf areas▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary	
	Embankment Plantings Level I	<ul style="list-style-type: none">▪ Invasive removal completed by trained personnel on a monthly basis▪ Replacement plantings as necessary	
	Watercourse Level I	<ul style="list-style-type: none">▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris.▪ Invasive removal completed by trained personnel on a monthly basis	
Trash Removal Level I	<ul style="list-style-type: none">▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.		
Paved Surfaces Level II	<ul style="list-style-type: none">▪ Swept and cleaned when there is a noticable accumulation of debris.		
Park Furniture Level I	<ul style="list-style-type: none">▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.		
Structures Level I	<ul style="list-style-type: none">▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.		
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	<ul style="list-style-type: none">▪ Keep all roads and paths clear of debris▪ Remove fallen trees immediately	
	Turf Level I	<ul style="list-style-type: none">▪ Apply a complete (N-P-K) fertilizer to all turf areas▪ Based on soil tests apply lime to turf areas at the recommended amounts▪ Mow on a 5-7 day schedule. Cutting height shall be 3".▪ Apply approved weed and insect control products according to manufacturers' recommendations▪ Water newly seeded areas daily to maintain even surface moisture▪ Core aerate and mat drag scheduled turf areas▪ Overseed all irrigated athletic fields and turf areas having bare spots▪ Dethatch turf areas	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Turf Level I	<ul style="list-style-type: none"> Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Turf Level II	<ul style="list-style-type: none"> Fertilizer if necessary Based on soil tests apply lime to turf areas at the recommended amounts Mow on a 7-12 day schedule. Cutting height shall be 4". Apply approved weed and insect control products according to manufacturers' recommendations. Some weeds and bare spots acceptable. Water newly seeded areas daily to maintain even surface moisture Core aerate and mat drag scheduled turf areas Dethatch turf areas Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Turf Level III	<ul style="list-style-type: none"> Mow on a 14-18 day schedule. Cutting height shall be 4.5". 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. Inspect safety surface materials at all playgrounds. Schedule additional or replacement surface materials. Remove trash daily from playground area Paved surfaces are swept daily. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Apply a complete (N-P-K) fertilizer to all turf areas Based on soil tests apply lime to turf areas at the recommended amounts Mow on a 5-7 day schedule. Cutting height shall be 3". Apply approved weed and insect control products according to manufacturers' recommendations 	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Turf Level I	<ul style="list-style-type: none"> Water newly seeded areas daily to maintain even surface moisture Core aerate and mat drag scheduled turf areas Overseed all irrigated athletic fields and turf areas having bare spots Dethatch turf areas Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Turf Level II	<ul style="list-style-type: none"> Fertilizer if necessary Based on soil tests apply lime to turf areas at the recommended amounts Mow on a 7-12 day schedule. Cutting height shall be 4". Apply approved weed and insect control products according to manufacturers' recommendations. Some weeds and bare spots acceptable. Water newly seeded areas daily to maintain even surface moisture Core aerate and mat drag scheduled turf areas Dethatch turf areas Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Athletic Fields Level I	<ul style="list-style-type: none"> Review all althletic field surface conditions for winter damage, hazardous or unsafe conditions Weather permitting, fields can be lined for spring sports Inspect fencing for winter damage Review irrigation systems for winter damage, notify Water Department for scheduling repairs Apply a complete (N-P-K) fertilizer to all turf areas Based on soil tests apply lime to turf areas at the recommended amounts Mow on a 5-7 day schedule. Cutting height shall be 2 to 2.5 " Apply approved weed and insect control products according to manufacturers' recommendations Water newly seeded areas daily to maintain even surface moisture Core aerate and mat drag scheduled turf areas Overseed all irrigated athletic fields and turf areas having bare spots Dethatch turf areas Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Planting Areas Level I	<ul style="list-style-type: none"> Apply three inches of mulch to new plant beds, avoid placing mulch against the bark of trees and shrubs. Turn over last year's mulch layer in existing beds and top dress with new mulch. Fertilize new shrubs as determined by soil analysis Review shrubs on site with arborist to determine the best method of pruning flowering and non-flowering shrubs Remove dead shrubs, note their locations and schedule replacements Deadhead fading blossoms 	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Planting Areas Level I	<ul style="list-style-type: none"> Remove spring bulbs in mid-May or after passing Add additional screened loam, lime and slow release 10-6-4 fertilizer Water daily in the morning Trash removal completed 3 times per week 	
	Gardens Level I	<ul style="list-style-type: none"> Apply three inches of mulch to new plant beds, avoid placing mulch against the bark of trees and shrubs. Turn over last year's mulch layer in existing beds and top dress with new mulch. Fertilize as determined by soil analysis Deadhead fading blossoms Remove spring bulbs in mid-May or after passing Add additional screened loam, lime and slow release 10-6-4 fertilizer Water daily in the morning 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens South and Sears Parking Lot	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Plant storm related replacement trees Maintain mulch 2-foot diameter mulch beds around new and existing trees 	
	Woodlands Level I	<ul style="list-style-type: none"> Fertilize trees as determined by soil analysis Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> Apply a complete (N-P-K) fertilizer to all turf areas Based on soil tests apply lime to turf areas at the recommended amounts Mow on a 5-7 day schedule. Cutting height shall be 3". Apply approved weed and insect control products according to manufacturers' recommendations Water newly seeded areas daily to maintain even surface moisture 	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens South and Sears Parking Lot	Turf Level I	<ul style="list-style-type: none"> ▪ Core aerate and mat drag scheduled turf areas ▪ Overseed all irrigated athletic fields and turf areas having bare spots ▪ Dethatch turf areas ▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Turf Level II	<ul style="list-style-type: none"> ▪ Fertilizer if necessary ▪ Based on soil tests apply lime to turf areas at the recommended amounts ▪ Mow on a 7-12 day schedule. Cutting height shall be 4". ▪ Apply approved weed and insect control products according to manufacturers' recommendations. Some weeds and bare spots acceptable. ▪ Water newly seeded areas daily to maintain even surface moisture ▪ Core aerate and mat drag scheduled turf areas ▪ Dethatch turf areas ▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Apply three inches of mulch to new plant beds, avoid placing mulch against the bark of trees and shrubs. Turn over last year's mulch layer in existing beds and top dress with new mulch. ▪ Fertilize new shrubs as determined by soil analysis ▪ Review shrubs on site with arborist to determine the best method of pruning flowering and non-flowering shrubs ▪ Remove dead shrubs, note their locations and schedule replacements ▪ Deadhead fading blossoms ▪ Remove spring bulbs in mid-May or after passing ▪ Add additional screened loam, lime and slow release 10-6-4 fertilizer ▪ Water daily in the morning ▪ Trash removal completed 3 times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Plant storm related replacement trees ▪ Maintain mulch 2-foot diameter mulch beds around new and existing trees ▪ Fertilize trees as determined by soil analysis ▪ Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Apply a complete (N-P-K) fertilizer to all turf areas ▪ Based on soil tests apply lime to turf areas at the recommended amounts ▪ Mow on a 5-7 day schedule. Cutting height shall be 3". ▪ Apply approved weed and insect control products according to manufacturers' recommendations ▪ Water newly seeded areas daily to maintain even surface moisture ▪ Core aerate and mat drag scheduled turf areas ▪ Overseed all irrigated athletic fields and turf areas having bare spots ▪ Dethatch turf areas ▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Turf Level II	<ul style="list-style-type: none"> ▪ Fertilizer if necessary ▪ Based on soil tests apply lime to turf areas at the recommended amounts ▪ Mow on a 7-12 day schedule. Cutting height shall be 4". ▪ Apply approved weed and insect control products according to manufacturers' recommendations. Some weeds and bare spots acceptable. ▪ Water newly seeded areas daily to maintain even surface moisture ▪ Core aerate and mat drag scheduled turf areas ▪ Dethatch turf areas ▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Review all athletic field surface conditions for winter damage, hazardous or unsafe conditions ▪ Weather permitting, fields can be lined for spring sports ▪ Inspect fencing for winter damage ▪ Review irrigation systems for winter damage, notify Water Department for scheduling repairs ▪ Apply a complete (N-P-K) fertilizer to all turf areas ▪ Based on soil tests apply lime to turf areas at the recommended amounts ▪ Mow on a 5-7 day schedule. Cutting height shall be 2 to 2.5 " 	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Apply approved weed and insect control products according to manufacturers' recommendations ▪ Water newly seeded areas daily to maintain even surface moisture ▪ Core aerate and mat drag scheduled turf areas ▪ Overseed all irrigated athletic fields and turf areas having bare spots ▪ Dethatch turf areas ▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Apply three inches of mulch to new plant beds, avoid placing mulch against the bark of trees and shrubs. Turn over last year's mulch layer in existing beds and top dress with new mulch. ▪ Fertilize new shrubs as determined by soil analysis ▪ Review shrubs on site with arborist to determine the best method of pruning flowering and non-flowering shrubs ▪ Remove dead shrubs, note their locations and schedule replacements ▪ Deadhead fading blossoms ▪ Remove spring bulbs in mid-May or after passing ▪ Add additional screened loam, lime and slow release 10-6-4 fertilizer ▪ Water daily in the morning ▪ Trash removal completed 3 times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Start scheduled tree replacements and proposed tree installations according to standard specifications and details. 	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Woodlands Level I	<ul style="list-style-type: none"> ▪ Review with arborist and schedule pruning of trees infected last year by anthracnose, cankers and galls before new growth begins. ▪ Prune out dead or damaged branches of trees. ▪ Fertilize trees as determined by soil analysis. ▪ Remove stakes and guy wires installed on replacement trees planted last spring. ▪ Remove winter protection systems once weather temperature reliably rises above 45-50 degrees. ▪ Provide mulch in a two-foot diameter around the base of all new trees and trees planted the previous year. ▪ Consult with the arborist about applying dormant oil to trees with a history of aphid, scale or spider mite infestations ie. Hemlocks, beeches, honeylocust and elm. ▪ Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Apply a complete (N-P-K) fertilizer to all turf areas ▪ Based on soil tests apply lime to turf areas at the recommended amounts ▪ Mow on a 5-7 day schedule. Cutting height shall be 3". ▪ Apply approved weed and insect control products according to manufacturers' recommendations ▪ Water newly seeded areas daily to maintain even surface moisture ▪ Core aerate and mat drag scheduled turf areas ▪ Overseed all irrigated athletic fields and turf areas having bare spots ▪ Dethatch turf areas ▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Turf Level II	<ul style="list-style-type: none"> ▪ Fertilizer if necessary ▪ Based on soil tests apply lime to turf areas at the recommended amounts ▪ Mow on a 7-12 day schedule. Cutting height shall be 4". ▪ Apply approved weed and insect control products according to manufacturers' recommendations. Some weeds and bare spots acceptable. ▪ Water newly seeded areas daily to maintain even surface moisture ▪ Core aerate and mat drag scheduled turf areas ▪ Dethatch turf areas ▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Review all athletic field surface conditions for winter damage, hazardous or unsafe conditions ▪ Weather permitting, fields can be lined for spring sports ▪ Inspect fencing for winter damage ▪ Review irrigation systems for winter damage, notify Water Department for scheduling repairs 	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Apply a complete (N-P-K) fertilizer to all turf areas ▪ Based on soil tests apply lime to turf areas at the recommended amounts ▪ Mow on a 5-7 day schedule. Cutting height shall be 2 to 2.5 " ▪ Apply approved weed and insect control products according to manufacturers' recommendations ▪ Water newly seeded areas daily to maintain even surface moisture ▪ Core aerate and mat drag scheduled turf areas ▪ Overseed all irrigated athletic fields and turf areas having bare spots ▪ Dethatch turf areas ▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Apply three inches of mulch to new plant beds, avoid placing mulch against the bark of trees and shrubs. Turn over last year's mulch layer in existing beds and top dress with new mulch. ▪ Fertilize new shrubs as determined by soil analysis ▪ Review shrubs on site with arborist to determine the best method of pruning flowering and non-flowering shrubs ▪ Remove dead shrubs, note their locations and schedule replacements ▪ Deadhead fading blossoms ▪ Remove spring bulbs in mid-May or after passing ▪ Add additional screened loam, lime and slow release 10-6-4 fertilizer 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Water daily in the morning ▪ Trash removal completed 3 times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Woodlands Level I	▪ Plant storm related replacement trees	
		▪ Maintain mulch 2-foot diameter mulch beds around new and existing trees	
		▪ Fertilize trees as determined by soil analysis	
		▪ Pick up litter and trash weekly	
	Turf Level I	▪ Apply a complete (N-P-K) fertilizer to all turf areas	
		▪ Based on soil tests apply lime to turf areas at the recommended amounts	
		▪ Mow on a 5-7 day schedule. Cutting height shall be 3".	
		▪ Apply approved weed and insect control products according to manufacturers' recommendations	
		▪ Water newly seeded areas daily to maintain even surface moisture	
		▪ Core aerate and mat drag scheduled turf areas	
		▪ Overseed all irrigated athletic fields and turf areas having bare spots	
		▪ Dethatch turf areas	
		▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary	
	Turf Level II	▪ Fertilizer if necessary	
		▪ Based on soil tests apply lime to turf areas at the recommended amounts	
		▪ Mow on a 7-12 day schedule. Cutting height shall be 4".	
		▪ Apply approved weed and insect control products according to manufacturers' recommendations. Some weeds and bare spots acceptable.	
		▪ Water newly seeded areas daily to maintain even surface moisture	
		▪ Core aerate and mat drag scheduled turf areas	
		▪ Dethatch turf areas	
		▪ Inspect mower blades each day, sharpen a minimum of once a week or as necessary	
	Planting Areas Level I	▪ Apply three inches of mulch to new plant beds, avoid placing mulch against the bark of trees and shrubs. Turn over last year's mulch layer in existing beds and top dress with new mulch.	
		▪ Fertilize new shrubs as determined by soil analysis	
		▪ Review shrubs on site with arborist to determine the best method of pruning flowering and non-flowering shrubs	
		▪ Remove dead shrubs, note their locations and schedule replacements	
		▪ Deadhead fading blossoms	
		▪ Remove spring bulbs in mid-May or after passing	
		▪ Add additional screened loam, lime and slow release 10-6-4 fertilizer	

Maintenance Calendar and Monitoring Checklist

May - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Planting Areas Level I	<ul style="list-style-type: none"> Water daily in the morning Trash removal completed 3 times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

JUNE - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Turf Level I	▪ Continue scheduled mowing; cutting height shall be 3" . Mow on a 5-7 day schedule.	
		▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing.	
		▪ Mow lawns when turf is dry to minimize the chance of spreading disease.	
		▪ Water newly seeded areas daily to maintain surface moisture for successful germination.	
		▪ When approved apply a pre-emergent weed control where needed.	
		▪ When approved apply a broadleaf weed control where needed.	
		▪ Inspect turf areas for lawn insects. Apply approved insect control materials where needed.	
		▪ Core aerate followed by mat dragging.	
		▪ Overseed turf areas having adequate irrigation.	
	Embankment Plantings Level I	▪ Invasive removal completed by trained personnel on a monthly basis	
		▪ Replacement plantings as necessary	
	Watercourse Level I	▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris.	
		▪ Invasive removal completed by trained personnel on a monthly basis	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Turf Level I	▪ Continue scheduled mowing; cutting height shall be 3" . Mow on a 5-7 day schedule.	
		▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing.	
		▪ Mow lawns when turf is dry to minimize the chance of spreading disease.	
		▪ Water newly seeded areas daily to maintain surface moisture for successful germination.	
		▪ When approved apply a pre-emergent weed control where needed.	
		▪ When approved apply a broadleaf weed control where needed.	

Maintenance Calendar and Monitoring Checklist

JUNE - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Turf Level I	<ul style="list-style-type: none"> Inspect turf areas for lawn insects. Apply approved insect control materials where needed. Core aerate followed by mat dragging. Overseed turf areas having adequate irrigation. 	
	Turf Level II	<ul style="list-style-type: none"> Continue scheduled mowing; cutting height shall be 4" . Mow on a 7-12 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. Mow lawns when turf is dry to minimize the chance of spreading disease. Water newly seeded areas daily to maintain surface moisture for successful germination. When approved apply a pre-emergent weed control where needed. When approved apply a broadleaf weed control where needed. Inspect turf areas for lawn insects. Apply approved insect control materials where needed. Core aerate followed by mat dragging. Overseed turf areas having adequate irrigation. 	
	Turf Level III	<ul style="list-style-type: none"> Mow on a 14-18 day schedule. Cutting height shall be 4.5 ". 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. Inspect safety surface materials at all playgrounds. Schedule additional or replacement surface materials. Remove trash daily from playground area Paved surfaces are swept daily. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

JUNE - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Continue scheduled mowing; cutting height shall be 3" . Mow on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. Mow lawns when turf is dry to minimize the chance of spreading disease. Water newly seeded areas daily to maintain surface moisture for successful germination. When approved apply a pre-emergent weed control where needed. When approved apply a broadleaf weed control where needed. Inspect turf areas for lawn insects. Apply approved insect control materials where needed. Core aerate followed by mat dragging. Overseed turf areas having adequate irrigation. 	
	Turf Level II	<ul style="list-style-type: none"> Continue scheduled mowing; cutting height shall be 4" . Mow on a 7-12 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. Mow lawns when turf is dry to minimize the chance of spreading disease. Water newly seeded areas daily to maintain surface moisture for successful germination. When approved apply a pre-emergent weed control where needed. When approved apply a broadleaf weed control where needed. Inspect turf areas for lawn insects. Apply approved insect control materials where needed. Core aerate followed by mat dragging. Overseed turf areas having adequate irrigation. 	
	Athletic Fields Level I	<ul style="list-style-type: none"> Continue scheduled mowing; cutting height shall be 2.5 to 3" . Mow on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. Mow lawns when turf is dry to minimize the chance of spreading disease. Water newly seeded areas daily to maintain surface moisture for successful germination. When approved apply a pre-emergent weed control where needed. When approved apply a broadleaf weed control where needed. Inspect turf areas for lawn insects. Apply approved insect control materials where needed. 	

Maintenance Calendar and Monitoring Checklist

JUNE - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Athletic Fields Level I	<ul style="list-style-type: none"> Core aerate followed by mat dragging. Overseed turf areas having adequate irrigation. Line and maintain athletic fields for summer sports and recreation activities. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Deadhead fading blossoms. Inspect for and remove weeds. Provide soaker hoses in shrub beds if not irrigated. Apply mulch over hoses. Water daily in the morning Maintain mulch beds. Inspect and maintain bed edging. Trash removal completed three times per week 	
	Gardens Level I	<ul style="list-style-type: none"> Deadhead fading blossoms. Inspect for and remove weeds. Provide soaker hoses in shrub beds if not irrigated. Apply mulch over hoses. Water daily in the morning Maintain mulch beds. Inspect and maintain bed edging. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Swept and cleaned when there is a noticable accumulation of debris.	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Back Bay Fens South and Sears Parking Lot	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Continue scheduled mowing; cutting height shall be 3" . Mow on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. Mow lawns when turf is dry to minimize the chance of spreading disease. 	

JUNE - GENERAL TASKS

JUNE - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens South and Sears Parking Lot	Turf Level I	<ul style="list-style-type: none"> ▪ Water newly seeded areas daily to maintain surface moisture for successful germination. ▪ When approved apply a pre-emergent weed control where needed. ▪ When approved apply a broadleaf weed control where needed. ▪ Inspect turf areas for lawn insects. Apply approved insect control materials where needed. ▪ Core aerate followed by mat dragging. ▪ Overseed turf areas having adequate irrigation. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticeable accumulation of debris. 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Riverway	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Inspect trees for insects and diseases, note and report all trees and their locations to the arborist. ▪ Take preventative actions, by providing mulch around trees, to protect the base of trees from string trimmer and mower damage. ▪ Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Continue scheduled mowing; cutting height shall be 3" . Mow on a 5-7 day schedule. ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. ▪ Mow lawns when turf is dry to minimize the chance of spreading disease. ▪ Water newly seeded areas daily to maintain surface moisture for successful germination. ▪ When approved apply a pre-emergent weed control where needed. ▪ When approved apply a broadleaf weed control where needed. ▪ Inspect turf areas for lawn insects. Apply approved insect control materials where needed. ▪ Core aerate followed by mat dragging. ▪ Overseed turf areas having adequate irrigation. 	

Maintenance Calendar and Monitoring Checklist

JUNE - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Turf Level II	<ul style="list-style-type: none"> Continue scheduled mowing; cutting height shall be 4" . Mow on a 7-12 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. Mow lawns when turf is dry to minimize the chance of spreading disease. Water newly seeded areas daily to maintain surface moisture for successful germination. When approved apply a pre-emergent weed control where needed. When approved apply a broadleaf weed control where needed. Inspect turf areas for lawn insects. Apply approved insect control materials where needed. Core aerate followed by mat dragging. Overseed turf areas having adequate irrigation. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Deadhead fading blossoms. Inspect for and remove weeds. Provide soaker hoses in shrub beds if not irrigated. Apply mulch over hoses. Water daily in the morning Maintain mulch beds. Inspect and maintain bed edging. Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Swept and cleaned when there is a noticable accumulation of debris.	
	Soft Surface Level I	Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	Inspect trees for insects and diseases, note and report all trees and their locations to the arborist.	

JUNE - GENERAL TASKS

JUNE - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Woodlands Level I	▪ Take preventative actions, by providing mulch around trees, to protect the base of trees from string trimmer and mower damage.	
		▪ Pick up litter and trash weekly	
	Turf Level I	▪ Continue scheduled mowing; cutting height shall be 3" . Mow on a 5-7 day schedule.	
		▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing.	
		▪ Mow lawns when turf is dry to minimize the chance of spreading disease.	
		▪ Water newly seeded areas daily to maintain surface moisture for successful germination.	
		▪ When approved apply a pre-emergent weed control where needed.	
		▪ When approved apply a broadleaf weed control where needed.	
		▪ Inspect turf areas for lawn insects. Apply approved insect control materials where needed.	
		▪ Core aerate followed by mat dragging.	
		▪ Overseed turf areas having adequate irrigation.	
	Turf Level II	▪ Continue scheduled mowing; cutting height shall be 4" . Mow on a 7-12 day schedule.	
		▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing.	
		▪ Mow lawns when turf is dry to minimize the chance of spreading disease.	
		▪ Water newly seeded areas daily to maintain surface moisture for successful germination.	
		▪ When approved apply a pre-emergent weed control where needed.	
		▪ When approved apply a broadleaf weed control where needed.	
		▪ Inspect turf areas for lawn insects. Apply approved insect control materials where needed.	
▪ Core aerate followed by mat dragging.			
Athletic Fields Level I	▪ Continue scheduled mowing; cutting height shall be 2.5 to 3 " . Mow on a 5-7 day schedule.		
	▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing.		
	▪ Mow lawns when turf is dry to minimize the chance of spreading disease.		
	▪ Water newly seeded areas daily to maintain surface moisture for successful germination.		
	▪ When approved apply a pre-emergent weed control where needed.		
	▪ When approved apply a broadleaf weed control where needed.		
	▪ Inspect turf areas for lawn insects. Apply approved insect control materials where needed.		
	▪ Core aerate followed by mat dragging.		

Maintenance Calendar and Monitoring Checklist

JUNE - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Athletic Fields Level I	<ul style="list-style-type: none"> Overseed turf areas having adequate irrigation. Line and maintain athletic fields for summer sports and recreation activities. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Deadhead fading blossoms. Inspect for and remove weeds. Provide soaker hoses in shrub beds if not irrigated. Apply mulch over hoses. Water daily in the morning Maintain mulch beds. Inspect and maintain bed edging. Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Inspect trees for insects and diseases, note and report all trees and their locations to the arborist. Take preventative actions, by providing mulch around trees, to protect the base of trees from string trimmer and mower damage. Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> Continue scheduled mowing; cutting height shall be 3" . Mow on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. Mow lawns when turf is dry to minimize the chance of spreading disease. Water newly seeded areas daily to maintain surface moisture for successful germination. When approved apply a pre-emergent weed control where needed. 	

Maintenance Calendar and Monitoring Checklist

JUNE - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Turf Level I	<ul style="list-style-type: none"> ▪ When approved apply a broadleaf weed control where needed. ▪ Inspect turf areas for lawn insects. Apply approved insect control materials where needed. ▪ Core aerate followed by mat dragging. ▪ Overseed turf areas having adequate irrigation. 	
	Turf Level II	<ul style="list-style-type: none"> ▪ Continue scheduled mowing; cutting height shall be 4" . Mow on a 7-12 day schedule. ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing. ▪ Mow lawns when turf is dry to minimize the chance of spreading disease. ▪ Water newly seeded areas daily to maintain surface moisture for successful germination. ▪ When approved apply a pre-emergent weed control where needed. ▪ When approved apply a broadleaf weed control where needed. ▪ Inspect turf areas for lawn insects. Apply approved insect control materials where needed. ▪ Core aerate followed by mat dragging. ▪ Overseed turf areas having adequate irrigation. 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Deadhead fading blossoms. ▪ Inspect for and remove weeds. ▪ Provide soaker hoses in shrub beds if not irrigated. Apply mulch over hoses. ▪ Water daily in the morning ▪ Maintain mulch beds. ▪ Inspect and maintain bed edging. ▪ Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

JULY - GENERAL TASKS

JULY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Turf Level I	▪ Water lawns as needed, providing a minimum of 2" of water/week	
		▪ Inspect irrigation systems with water department.	
		▪ Provide water cannon system for large fields and open spaces	
		▪ Inspect for lawn insects	
		▪ Core aerate compacted fields followed by mat dragging	
		▪ Where adequate irrigation and water cannon usage is available, overseed	
		▪ Mow at a height of 3" on a 5 -7 day mowing schedule	
		▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing	
		▪ Mow lawns when turf is dry to minimize the chance of spreading disease	
	Embankment Plantings Level I	▪ Invasive removal completed by trained personnel on a monthly basis	
		▪ Replacement plantings as necessary	
	Watercourse Level I	▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris.	
		▪ Invasive removal completed by trained personnel on a monthly basis	
Trash Removal Level I	▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.		
Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.		
Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.		
Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.		
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Turf Level I	▪ Water lawns as needed, providing a minimum of 2" of water/week	
		▪ Inspect irrigation systems with water department.	
		▪ Provide water cannon system for large fields and open spaces	
		▪ Inspect for lawn insects	
		▪ Core aerate compacted fields followed by mat dragging	
		▪ Where adequate irrigation and water cannon usage is available, overseed	
		▪ Mow at a height of 3" on a 5 -7 day mowing schedule	
		▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing	

Maintenance Calendar and Monitoring Checklist

JULY - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest		<ul style="list-style-type: none"> Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Turf Level II	<ul style="list-style-type: none"> Water lawns as needed, providing a minimum of 2" of water/week Inspect irrigation systems with water department. Provide water cannon system for large fields and open spaces Inspect for lawn insects Core aerate compacted fields followed by mat dragging Where adequate irrigation and water cannon usage is available, overseed Mow at a height of 4" on a 7-12 day mowing schedule Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Turf Level III	<ul style="list-style-type: none"> Mow on a 14-18 day schedule. Cutting height shall be 4". 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. Inspect safety surface materials at all playgrounds. Schedule additional or replacement surface materials. Remove trash daily from playground area Paved surfaces are swept daily. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Water lawns as needed, providing a minimum of 2" of water/week Inspect irrigation systems with water department. Provide water cannon system for large fields and open spaces 	

Maintenance Calendar and Monitoring Checklist

JULY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Turf Level I	<ul style="list-style-type: none"> ▪ Inspect for lawn insects ▪ Core aerate compacted fields followed by mat dragging ▪ Where adequate irrigation and water cannon usage is available, overseed ▪ Mow at a height of 3" on a 5 -7 day mowing schedule ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Turf Level II	<ul style="list-style-type: none"> ▪ Water lawns as needed, providing a minimum of 2" of water/week ▪ Inspect irrigation systems with water department. ▪ Provide water cannon system for large fields and open spaces ▪ Inspect for lawn insects ▪ Core aerate compacted fields followed by mat dragging ▪ Where adequate irrigation and water cannon usage is available, overseed ▪ Mow at a height of 4" on a 7-12 day mowing schedule ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Water lawns as needed, providing a minimum of 2" of water/week ▪ Inspect irrigation systems with water department. ▪ Provide water cannon system for large fields and open spaces ▪ Inspect for lawn insects ▪ Core aerate compacted fields followed by mat dragging ▪ Where adequate irrigation and water cannon usage is available, overseed ▪ Mow at a height of 3" on a 5 -7 day mowing schedule ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Continue to line and maintain ball fields for summer leagues. 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Maintain daily and nighttime watering schedule ▪ Weed beds and deadhead fading blossoms. ▪ Prune deadwood from plants as needed. ▪ Train vines and roses ▪ Remove dead plants noting locations. Create replacement schedule ▪ Maintain plant bed edging and mulch. 	

Maintenance Calendar and Monitoring Checklist

JULY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Gardens Level I	<ul style="list-style-type: none"> ▪ Trash removal completed three times per week ▪ Maintain daily and nighttime watering schedule ▪ Weed beds and deadhead fading blossoms. ▪ Prune deadwood from plants as needed. ▪ Train vines and roses 	
	Gardens Level I	<ul style="list-style-type: none"> ▪ Remove dead plants noting locations. Create replacement schedule ▪ Maintain plant bed edging and mulch. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Back Bay Fens South and Sears Parking Lot	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Water lawns as needed, providing a minimum of 2" of water/week ▪ Inspect irrigation systems with water department. ▪ Provide water cannon system for large fields and open spaces ▪ Inspect for lawn insects ▪ Core aerate compacted fields followed by mat dragging ▪ Where adequate irrigation and water cannon usage is available, overseed ▪ Mow at a height of 3" on a 5 -7 day mowing schedule ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. 	

Maintenance Calendar and Monitoring Checklist

JULY - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens South and Sears Parking Lot	Watercourse Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Riverway	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Water newly planted trees, avoid wetting trunks and foliage. Prune and remove suckers from cherry, crab and other ornamental trees as directed by arborist. Inspect and maintain mulch beds at the base of trees Inspect for insects like the tent caterpillar, remove infected branches by pruning. Inspect for other pest problems, note problem areas and notify the arborist Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> Water lawns as needed, providing a minimum of 2" of water/week Inspect irrigation systems with water department. Provide water cannon system for large fields and open spaces Inspect for lawn insects Core aerate compacted fields followed by mat dragging Where adequate irrigation and water cannon usage is available, overseed Mow at a height of 3" on a 5 -7 day mowing schedule Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Turf Level II	<ul style="list-style-type: none"> Water lawns as needed, providing a minimum of 2" of water/week Inspect irrigation systems with water department. Provide water cannon system for large fields and open spaces Inspect for lawn insects Core aerate compacted fields followed by mat dragging Where adequate irrigation and water cannon usage is available, overseed Mow at a height of 4" on a 7-12 day mowing schedule 	

Maintenance Calendar and Monitoring Checklist

JULY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Turf Level II	<ul style="list-style-type: none"> Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Planting Areas Level I	<ul style="list-style-type: none"> Maintain daily and nighttime watering schedule Weed beds and deadhead fading blossoms. Prune deadwood from plants as needed. Train vines and roses Remove dead plants noting locations. Create replacement schedule 	
	Planting Areas Level I	<ul style="list-style-type: none"> Maintain plant bed edging and mulch. Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticeable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Water newly planted trees, avoid wetting trunks and foliage. Prune and remove suckers from cherry, crab and other ornamental trees as directed by arborist. Inspect and maintain mulch beds at the base of trees Inspect for insects like the tent caterpillar, remove infected branches by pruning. Inspect for other pest problems, note problem areas and notify the arborist Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> Water lawns as needed, providing a minimum of 2" of water/week Inspect irrigation systems with water department. Provide water cannon system for large fields and open spaces Inspect for lawn insects Core aerate compacted fields followed by mat dragging 	

Maintenance Calendar and Monitoring Checklist

JULY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Turf Level I	<ul style="list-style-type: none"> Where adequate irrigation and water cannon usage is available, overseed Mow at a height of 3" on a 5 -7 day mowing schedule Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Turf Level II	<ul style="list-style-type: none"> Water lawns as needed, providing a minimum of 2" of water/week Inspect irrigation systems with water department. Provide water cannon system for large fields and open spaces Inspect for lawn insects Core aerate compacted fields followed by mat dragging Where adequate irrigation and water cannon usage is available, overseed Mow at a height of 4" on a 7-12 day mowing schedule Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Athletic Fields Level I	<ul style="list-style-type: none"> Water lawns as needed, providing a minimum of 2" of water/week Inspect irrigation systems with water department. Provide water cannon system for large fields and open spaces Inspect for lawn insects Core aerate compacted fields followed by mat dragging Where adequate irrigation and water cannon usage is available, overseed Mow at a height of 3" on a 5 -7 day mowing schedule Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing Mow lawns when turf is dry to minimize the chance of spreading disease Continue to line and maintain ball fields for summer leagues. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Maintain daily and nighttime watering schedule Weed beds and deadhead fading blossoms. Prune deadwood from plants as needed. Train vines and roses Remove dead plants noting locations. Create replacement schedule Maintain plant bed edging and mulch. Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis 	

▪ Replacement plantings as necessary

JULY - GENERAL TASKS

JULY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Watercourse Level I	<ul style="list-style-type: none">▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris.▪ Invasive removal completed by trained personnel on a monthly basis	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Soft Surface Level I	▪ Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
	Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Circulation	<ul style="list-style-type: none">▪ Keep all roads and paths clear of debris▪ Remove fallen trees immediately
Woodlands Level I		<ul style="list-style-type: none">▪ Water newly planted trees, avoid wetting trunks and foliage.▪ Prune and remove suckers from cherry, crab and other ornamental trees as directed by arborist.▪ Inspect and maintain mulch beds at the base of trees▪ Inspect for insects like the tent caterpillar, remove infected branches by pruning.▪ Inspect for other pest problems, note problem areas and notify the arborist▪ Pick up litter and trash weekly	
Turf Level I		<ul style="list-style-type: none">▪ Water lawns as needed, providing a minimum of 2" of water/week▪ Inspect irrigation systems with water department.▪ Provide water cannon system for large fields and open spaces▪ Inspect for lawn insects▪ Core aerate compacted fields followed by mat dragging▪ Where adequate irrigation and water cannon usage is available, overseed▪ Mow at a height of 3" on a 5 -7 day mowing schedule▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing▪ Mow lawns when turf is dry to minimize the chance of spreading disease	
Turf Level II		<ul style="list-style-type: none">▪ Water lawns as needed, providing a minimum of 2" of water/week▪ Inspect irrigation systems with water department.▪ Provide water cannon system for large fields and open spaces▪ Inspect for lawn insects▪ Core aerate compacted fields followed by mat dragging	

Maintenance Calendar and Monitoring Checklist

JULY - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Turf Level II	<ul style="list-style-type: none"> ▪ Where adequate irrigation and water cannon usage is available, overseed ▪ Mow at a height of 4" on a 7-12 day mowing schedule ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Maintain daily and nighttime watering schedule ▪ Weed beds and deadhead fading blossoms. ▪ Prune deadwood from plants as needed. ▪ Train vines and roses ▪ Remove dead plants noting locations. Create replacement schedule ▪ Maintain plant bed edging and mulch. ▪ Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

AUGUST - GENERAL TASKS

AUGUST - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Turf Level I	▪ Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule.	
		▪ Inspect lawn mower blades, keep blades sharp, replace if necessary	
		▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease	
		▪ Water daily using irrigation systems, water truck or water cannon	
		▪ Aerate and overseed compacted turf areas	
		▪ Inspect for and reseed bare areas as needed.	
		▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application.	
	Embankment Plantings Level I	▪ Invasive removal completed by trained personnel on a monthly basis	
		▪ Replacement plantings as necessary	
Watercourse Level I	▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris.		
	▪ Invasive removal completed by trained personnel on a monthly basis		
Trash Removal Level I	▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.		
Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.		
Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.		
Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.		
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
	Turf Level I	▪ Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule.	
		▪ Inspect lawn mower blades, keep blades sharp, replace if necessary	
		▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease	
		▪ Water daily using irrigation systems, water truck or water cannon	
		▪ Aerate and overseed compacted turf areas	
		▪ Inspect for and reseed bare areas as needed.	
		▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application.	

Maintenance Calendar and Monitoring Checklist

AUGUST - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Turf Level II	<ul style="list-style-type: none"> Continue to mow open fields at a height of 4", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 7-12 day schedule. Inspect lawn mower blades, keep blades sharp, replace if necessary Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease Water daily using irrigation systems, water truck or water cannon Aerate and overseed compacted turf areas Inspect for and reseed bare areas as needed. Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Turf Level III	<ul style="list-style-type: none"> Continue to mow open fields at a height of 4.5", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 14-18 day schedule. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. Inspect safety surface materials at all playgrounds. Schedule additional or replacement surface materials. Remove trash daily from playground area Paved surfaces are swept daily. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule. Inspect lawn mower blades, keep blades sharp, replace if necessary Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease 	

Maintenance Calendar and Monitoring Checklist

AUGUST - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Turf Level I	<ul style="list-style-type: none"> ▪ Water daily using irrigation systems, water truck or water cannon ▪ Aerate and overseed compacted turf areas ▪ Inspect for and reseed bare areas as needed. ▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Turf Level II	<ul style="list-style-type: none"> ▪ Continue to mow open fields at a height of 4", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 7-12 day schedule. ▪ Inspect lawn mower blades, keep blades sharp, replace if necessary ▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease ▪ Water daily using irrigation systems, water truck or water cannon ▪ Aerate and overseed compacted turf areas ▪ Inspect for and reseed bare areas as needed. ▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule. ▪ Inspect lawn mower blades, keep blades sharp, replace if necessary ▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease ▪ Water daily using irrigation systems, water truck or water cannon ▪ Aerate and overseed compacted turf areas ▪ Inspect for and reseed bare areas as needed. ▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Shrubs and flower beds need to be watered deeply during the hot and dry period of the summer. Supply water by irrigation system, water cannon or hand held hose from water truck. ▪ Weed beds and deadhead fading blossoms ▪ Maintain plant bed edging and mulch ▪ Trash removal completed three times per week 	
	Gardens Level I	<ul style="list-style-type: none"> ▪ Shrubs and flower beds need to be watered deeply during the hot and dry period of the summer. Supply water by irrigation system, water cannon or hand held hose from water truck. ▪ Weed beds and deadhead fading blossoms ▪ Maintain plant bed edging and mulch 	

Maintenance Calendar and Monitoring Checklist

AUGUST - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Swept and cleaned when there is a noticable accumulation of debris.	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Back Bay Fens South and Sears Parking Lot	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule. Inspect lawn mower blades, keep blades sharp, replace if necessary Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease Water daily using irrigation systems, water truck or water cannon Aerate and overseed compacted turf areas Inspect for and reseed bare areas as needed. Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Swept and cleaned when there is a noticable accumulation of debris.	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

AUGUST - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Water trees, avoiding wetting trunks and foliage Maintain mulch around trees to prevent damage by lawn mowing and weed trimming operations Prune and remove suckers from the base of trees as they appear Rake and remove fallen leaves and fruit to prevent any insect and disease cycles from continuing Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule. Inspect lawn mower blades, keep blades sharp, replace if necessary Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease Water daily using irrigation systems, water truck or water cannon Aerate and overseed compacted turf areas Inspect for and reseed bare areas as needed. Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Turf Level II	<ul style="list-style-type: none"> Continue to mow open fields at a height of 4", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 7-12 day schedule. Inspect lawn mower blades, keep blades sharp, replace if necessary Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease Water daily using irrigation systems, water truck or water cannon Aerate and overseed compacted turf areas Inspect for and reseed bare areas as needed. Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Shrubs and flower beds need to be watered deeply during the hot and dry period of the summer. Supply water by irrigation system, water cannon or hand held hose from water truck. Weed beds and deadhead fading blossoms Maintain plant bed edging and mulch Trash removal completed three times per week 	

AUGUST - GENERAL TASKS

AUGUST - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Embankment Plantings Level I	<ul style="list-style-type: none">▪ Invasive removal completed by trained personnel on a monthly basis▪ Replacement plantings as necessary	
	Watercourse Level I	<ul style="list-style-type: none">▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris.▪ Invasive removal completed by trained personnel on a monthly basis	
	Trash Removal Level I	<ul style="list-style-type: none">▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	<ul style="list-style-type: none">▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Soft Surface Level I	<ul style="list-style-type: none">▪ Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	<ul style="list-style-type: none">▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none">▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	<ul style="list-style-type: none">▪ Keep all roads and paths clear of debris▪ Remove fallen trees immediately	
	Woodlands Level I	<ul style="list-style-type: none">▪ Water trees, avoiding wetting trunks and foliage▪ Maintain mulch around trees to prevent damage by lawn mowing and weed trimming operations▪ Prune and remove suckers from the base of trees as they appear▪ Rake and remove fallen leaves and fruit to prevent any insect and disease cycles from continuing▪ Pick up litter and trash weekly	
	Turf Level I	<ul style="list-style-type: none">▪ Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule.▪ Inspect lawn mower blades, keep blades sharp, replace if necessary▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease▪ Water daily using irrigation systems, water truck or water cannon▪ Aerate and overseed compacted turf areas▪ Inspect for and reseed bare areas as needed.▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application.	
	Turf Level II	<ul style="list-style-type: none">▪ Continue to mow open fields at a height of 4", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 7-12 day schedule.▪ Inspect lawn mower blades, keep blades sharp, replace if necessary▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease	

Maintenance Calendar and Monitoring Checklist

AUGUST - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Turf Level II	<ul style="list-style-type: none"> ▪ Water daily using irrigation systems, water truck or water cannon ▪ Aerate and overseed compacted turf areas ▪ Inspect for and reseed bare areas as needed. ▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule. ▪ Inspect lawn mower blades, keep blades sharp, replace if necessary ▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease ▪ Water daily using irrigation systems, water truck or water cannon ▪ Aerate and overseed compacted turf areas ▪ Inspect for and reseed bare areas as needed. ▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Shrubs and flower beds need to be watered deeply during the hot and dry period of the summer. Supply water by irrigation system, water cannon or hand held hose from water truck. ▪ Weed beds and deadhead fading blossoms ▪ Maintain plant bed edging and mulch ▪ Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

AUGUST - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Water trees, avoiding wetting trunks and foliage ▪ Maintain mulch around trees to prevent damage by lawn mowing and weed trimming operations ▪ Prune and remove suckers from the base of trees as they appear ▪ Rake and remove fallen leaves and fruit to prevent any insect and disease cycles from continuing ▪ Pick up litter and trash weekly 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Continue to mow open fields at a height of 3", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 5-7 day schedule. ▪ Inspect lawn mower blades, keep blades sharp, replace if necessary ▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease ▪ Water daily using irrigation systems, water truck or water cannon ▪ Aerate and overseed compacted turf areas ▪ Inspect for and reseed bare areas as needed. ▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Turf Level II	<ul style="list-style-type: none"> ▪ Continue to mow open fields at a height of 4", do not remove more than 1/3 of the leaf blades at a mowing. Mow on a 7-12 day schedule. ▪ Inspect lawn mower blades, keep blades sharp, replace if necessary ▪ Mow when turf is dry to minimize grass clumping, thatch build up and the chance of spreading disease ▪ Water daily using irrigation systems, water truck or water cannon ▪ Aerate and overseed compacted turf areas ▪ Inspect for and reseed bare areas as needed. ▪ Inspect turf for ground insects and apply approved materials. Water well into ground after application. 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Shrubs and flower beds need to be watered deeply during the hot and dry period of the summer. Supply water by irrigation system, water cannon or hand held hose from water truck. ▪ Weed beds and deadhead fading blossoms ▪ Maintain plant bed edging and mulch ▪ Trash removal completed three times per week 	

Maintenance Calendar and Monitoring Checklist

AUGUST - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Soft Surface Level I	▪ Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. Core aerate drag mat and over seed all areas with compacted soils Top dress turf areas with screened loam and sand Reseed bare spots and overused areas as necessary. Seeding should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination Fertilize all turf areas with a complete (N-P-K) fertilizer containing 50% Water Insoluble Nitrogen (WIN) at a rate of 2 lb/1000 square feet. Use fertilizer with a 3-1-2 ratio, ie. 15-5-10. Check the fertilizer bed for the recommended spreader settings Mow at a height of 3" on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing Mow lawns when turf is dry to minimize the chance of spreading disease Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels and benches and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. Core aerate drag mat and over seed all areas with compacted soils Top dress turf areas with screened loam and sand 	

Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Turf Level I	<ul style="list-style-type: none"> ▪ Reseed bare spots and overused areas as necessary. Seeding should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination ▪ Fertilize all turf areas with a complete (N-P-K) fertilizer containing 50% Water Insoluble Nitrogen (WIN) at a rate of 2 lb/1000 square feet. Use fertilizer with a 3-1-2 ratio, ie. 15-5-10. Check the fertilizer bed for the recommended spreader settings ▪ Mow at a height of 3" on a 5-7 day schedule. ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions 	
	Turf Level II	<ul style="list-style-type: none"> ▪ If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. ▪ Core aerate drag mat and over seed all areas with compacted soils ▪ Top dress turf areas with screened loam and sand ▪ Reseed bare spots and overused areas as necessary. Seeding should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination ▪ Fertilize if necessary ▪ Mow at a height of 4" on a 7-12 day schedule. ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions 	
	Turf Level III	▪ Reduce mowing height to 2.5-3". Mow on a 14-18 day schedule.	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Playgrounds Level I	▪ Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Playgrounds Level I	<ul style="list-style-type: none"> Inspect safety surface materials at all playgrounds. Schedule additional or replacement surface materials. Remove trash daily from playground area Paved surfaces are swept daily. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. Core aerate drag mat and over seed all areas with compacted soils Top dress turf areas with screened loam and sand Reseed bare spots and overused areas as necessary. Seeing should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination Fertilize all turf areas with a complete (N-P-K) fertilizer containing 50% Water Insoluble Nitrogen (WIN) at a rate of 2 lb/1000 square feet. Use fertilizer with a 3-1-2 ratio, ie. 15-5-10. Check the fertilizer bed for the recommended spreader settings Mow at a height of 3" on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing Mow lawns when turf is dry to minimize the chance of spreading disease Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions 	
	Turf Level II	<ul style="list-style-type: none"> If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. Core aerate drag mat and over seed all areas with compacted soils Top dress turf areas with screened loam and sand Reseed bare spots and overused areas as necessary. Seeing should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination Fertilize if necessary Mow at a height of 4" on a 7-12 day schedule. Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing 	

Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Turf Level II	<ul style="list-style-type: none"> ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. ▪ Core aerate drag mat and over seed all areas with compacted soils ▪ Top dress turf areas with screened loam and sand ▪ Reseed bare spots and overused areas as necessary. Seeding should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination ▪ Fertilize all turf areas with a complete (N-P-K) fertilizer containing 50% Water Insoluble Nitrogen (WIN) at a rate of 2 lb/1000 square feet. Use fertilizer with a 3-1-2 ratio, ie. 15-5-10. Check the fertilizer bed for the recommended spreader settings ▪ Mow at a height of 2.5-3" ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions ▪ Continue to line and maintain ball fields for summer leagues. 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Rake and remove fallen leaves, twigs, fruits and debris throughout sites ▪ Review shrub pruning schedule ▪ Install new and replacement plants as needed ▪ Water all beds on a daily basis ▪ Maintain plant bed edging and mulch surface ▪ Train and support vines and climbing roses ▪ Inspect for and remove weeds ▪ During the last week, start removing all annual flowers from beds ▪ Install fall flowers in designated beds ▪ Start to prepare designated beds for the installation of fall bulbs. Turn over existing bed materials, regrade and edge area to proposed design ▪ Trash removal completed three times per week 	
	Gardens Level I	<ul style="list-style-type: none"> ▪ Rake and remove fallen leaves, twigs, fruits and debris throughout sites ▪ Review shrub pruning schedule ▪ Install new and replacement plants as needed ▪ Water all beds on a daily basis 	

SEPTEMBER - GENERAL TASKS

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SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens South and Sears Parking Lot	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Riverway	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately
	Woodlands Level I	<ul style="list-style-type: none"> Remove dead, diseased and damaged trees, suckers and crossing branches. Prune selective trees so as to improve their form and structural stability. Inspect for insect damage and any signs of decay or disease. Notify arborist for proper treatment. Remove storm-damaged trees and stumps as necessary Maintain mulch rings around tree trunks to prevent any damage during lawn cutting operations Install new and replacement trees Inspect guying systems on trees installed during the spring. Adjust, repair or replace as necessary Consult with arborist on deep root fertilizing certain trees within the park system Pick up litter and trash regularly 	
	Turf Level I	<ul style="list-style-type: none"> If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. Core aerate drag mat and over seed all areas with compacted soils Top dress turf areas with screened loam and sand Reseed bare spots and overused areas as necessary. Seeding should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination Fertilize all turf areas with a complete (N-P-K) fertilizer containing 50% Water Insoluble Nitrogen (WIN) at a rate of 2 lb/1000 square feet. Use fertilizer with a 3-1-2 ratio, ie. 15-5-10. Check the fertilizer bed for the recommended spreader settings Mow at a height of 3" on a 5-7 day schedule. 	

Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Turf Level I	<ul style="list-style-type: none"> ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions 	
	Turf Level II	<ul style="list-style-type: none"> ▪ If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. ▪ Core aerate drag mat and over seed all areas with compacted soils ▪ Top dress turf areas with screened loam and sand ▪ Reseed bare spots and overused areas as necessary. Seeding should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination ▪ Fertilize if necessary ▪ Mow at a height of 4" on a 7-12 day schedule. ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Rake and remove fallen leaves, twigs, fruits and debris throughout sites ▪ Review shrub pruning schedule ▪ Install new and replacement plants as needed ▪ Water all beds on a daily basis ▪ Maintain plant bed edging and mulch surface ▪ Train and support vines and climbing roses ▪ Inspect for and remove weeds ▪ During the last week, start removing all annual flowers from beds ▪ Install fall flowers in designated beds ▪ Start to prepare designated beds for the installation of fall bulbs. Turn over existing bed materials, regrade and edge area to proposed design ▪ Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	

Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Remove dead, diseased and damaged trees, suckers and crossing branches. Prune selective trees so as to improve their form and structural stability. ▪ Inspect for insect damage and any signs of decay or disease. Notify arborist for proper treatment. ▪ Remove storm-damaged trees and stumps as necessary ▪ Maintain mulch rings around tree trunks to prevent any damage during lawn cutting operations ▪ Install new and replacement trees ▪ Inspect guying systems on trees installed during the spring. Adjust, repair or replace as necessary ▪ Consult with arborist on deep root fertilizing certain trees within the park system ▪ Pick up litter and trash regularly 	
	Turf Level I	<ul style="list-style-type: none"> ▪ If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. ▪ Core aerate drag mat and over seed all areas with compacted soils ▪ Top dress turf areas with screened loam and sand ▪ Reseed bare spots and overused areas as necessary. Seeding should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination ▪ Fertilize all turf areas with a complete (N-P-K) fertilizer containing 50% Water Insoluble Nitrogen (WIN) at a rate of 2 lb/1000 square feet. Use fertilizer with a 3-1-2 ratio, ie. 15-5-10. Check the fertilizer bed for the recommended spreader settings ▪ Mow at a height of 3" on a 5-7 day schedule. ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease 	

Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Turf Level II	<ul style="list-style-type: none"> ▪ If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. ▪ Core aerate drag mat and over seed all areas with compacted soils ▪ Top dress turf areas with screened loam and sand ▪ Reseed bare spots and overused areas as necessary. Seeing should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination ▪ Fertilize if necessary ▪ Mow at a height of 4" on a 7-12 day schedule. ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. ▪ Core aerate drag mat and over seed all areas with compacted soils ▪ Top dress turf areas with screened loam and sand ▪ Reseed bare spots and overused areas as necessary. Seeing should be completed by the end of September or by the second week of October depending on weather conditions. Water daily to keep soil surface moist during germination ▪ Fertilize all turf areas with a complete (N-P-K) fertilizer containing 50% Water Insoluble Nitrogen (WIN) at a rate of 2 lb/1000 square feet. Use fertilizer with a 3-1-2 ratio, ie. 15-5-10. Check the fertilizer bed for the recommended spreader settings ▪ Mow at a height of 2.5-3" ▪ Keep lawn mower blades sharp and do not remove more than 1/3 of the leaf blades at a mowing ▪ Mow lawns when turf is dry to minimize the chance of spreading disease ▪ Review and identify weeds in turf areas. Apply the recommended and approved weed controls according to manufacturers directions ▪ Continue to line and maintain ball fields for summer leagues. 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Rake and remove fallen leaves, twigs, fruits and debris throughout sites ▪ Review shrub pruning schedule ▪ Install new and replacement plants as needed ▪ Water all beds on a daily basis ▪ Maintain plant bed edging and mulch surface ▪ Train and support vines and climbing roses 	

Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Planting Areas Level I	<ul style="list-style-type: none"> Inspect for and remove weeds During the last week, start removing all annual flowers from beds Install fall flowers in designated beds Start to prepare designated beds for the installation of fall bulbs. Turn over existing bed materials, regrade and edge area to proposed design Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day. 	
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Remove dead, diseased and damaged trees, suckers and crossing branches. Prune selective trees so as to improve their form and structural stability. Inspect for insect damage and any signs of decay or disease. Notify arborist for proper treatment. Remove storm-damaged trees and stumps as necessary Maintain mulch rings around tree trunks to prevent any damage during lawn cutting operations Install new and replacement trees Inspect guying systems on trees installed during the spring. Adjust, repair or replace as necessary Consult with arborist on deep root fertilizing certain trees within the park system Pick up litter and trash regularly 	
	Turf Level I	<ul style="list-style-type: none"> If not done in the spring, take new samples for testing. Apply soil amendments and fertilizer as recommended by soil test results. Core aerate drag mat and over seed all areas with compacted soils Top dress turf areas with screened loam and sand 	

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Maintenance Calendar and Monitoring Checklist

SEPTEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 7 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Soft Surface Level I	▪ Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

OCTOBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Mow at a height of 3" on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging Top dress damaged turf areas with loam/sand Over seed all damaged and heavily used turf areas until mid October or as weather permits Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Mow at a height of 3" on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging Top dress damaged turf areas with loam/sand Over seed all damaged and heavily used turf areas until mid October or as weather permits Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	

Maintenance Calendar and Monitoring Checklist

OCTOBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Turf Level II	<ul style="list-style-type: none"> Mow at a height of 4" on a 7-12 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging Top dress damaged turf areas with loam/sand Over seed all damaged and heavily used turf areas until mid October or as weather permits Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	
	Turf Level III	<ul style="list-style-type: none"> Mow at a height of 4" on a 14-18 day schedule. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect for damaged equipment and hazardous conditions. Inspect for loose safety base materials around play structures, add and regrade material where necessary Inspect safety tiles and poured in place materials. Remove, replace or repair as necessary. Remove or repair damaged equipment 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Mow at a height of 3" on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. 	

OCTOBER - GENERAL TASKS

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Maintenance Calendar and Monitoring Checklist

OCTOBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Planting Areas Level I	<ul style="list-style-type: none"> Start installing bulbs during the last week of the month as specified and according to design All bulb beds are to be edged and covered with two to three inches of mulch Trash removal completed three times per week 	
	Gardens Level I	<ul style="list-style-type: none"> Rake and remove leaves, fruit and debris from grounds Install new or replacement deciduous or evergreen shrubs Weed, edge and mulch beds Continue to install fall flowers in designated beds Continue to remove all annuals from flowerbeds as scheduled Remove fall flowers after first frost Continue to prepare designated beds for bulb installations Prepare beds and containers by adding soil amenities as necessary (peat moss, compost and bone meal) Start installing bulbs during the last week of the month as specified and according to design All bulb beds are to be edged and covered with two to three inches of mulch Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. 	
	Park Furniture Level I	<ul style="list-style-type: none"> Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens South and Sears Parking Lot	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Turf Level I	<ul style="list-style-type: none"> Mow at a height of 3" on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging 	

OCTOBER - GENERAL TASKS

OCTOBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens South and Sears Parking Lot	Turf Level I	<ul style="list-style-type: none">▪ Top dress damaged turf areas with loam/sand▪ Over seed all damaged and heavily used turf areas until mid October or as weather permits▪ Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November.	
	Embankment Plantings Level I	<ul style="list-style-type: none">▪ Invasive removal completed by trained personnel on a monthly basis▪ Replacement plantings as necessary	
	Watercourse Level I	<ul style="list-style-type: none">▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris.▪ Invasive removal completed by trained personnel on a monthly basis	
	Trash Removal Level I	<ul style="list-style-type: none">▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	<ul style="list-style-type: none">▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Park Furniture Level I	<ul style="list-style-type: none">▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
Structures Level I	<ul style="list-style-type: none">▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.		
Riverway	Circulation	<ul style="list-style-type: none">▪ Keep all roads and paths clear of debris▪ Remove fallen trees immediately	
	Woodlands Level I	<ul style="list-style-type: none">▪ Install new or replacement deciduous or evergreen trees▪ Maintain mulch rings around tree trunks to prevent any damage during lawn cutting operations▪ Inspect for diseased and unhealthy trees. Consult with arborist for scheduling pruning or removal▪ Consult with arborist and schedule trees that need deep root feeding▪ Pick up litter and trash regularly	
	Turf Level I	<ul style="list-style-type: none">▪ Mow at a height of 3" on a 5-7 day schedule.▪ Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing.▪ Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates.▪ Schedule core aeration, mat dragging▪ Top dress damaged turf areas with loam/sand▪ Over seed all damaged and heavily used turf areas until mid October or as weather permits▪ Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November.	

Maintenance Calendar and Monitoring Checklist

OCTOBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Turf Level II	<ul style="list-style-type: none"> ▪ Mow at a height of 4" on a 7-12 day schedule. ▪ Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. ▪ Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. ▪ Schedule core aeration, mat dragging ▪ Top dress damaged turf areas with loam/sand ▪ Over seed all damaged and heavily used turf areas until mid October or as weather permits ▪ Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	
	Planting Areas Level I	<ul style="list-style-type: none"> ▪ Rake and remove leaves, fruit and debris from grounds ▪ Install new or replacement deciduous or evergreen shrubs ▪ Weed, edge and mulch beds ▪ Continue to install fall flowers in designated beds ▪ Continue to remove all annuals from flowerbeds as scheduled ▪ Remove fall flowers after first frost ▪ Continue to prepare designated beds for bulb installations ▪ Prepare beds and containers by adding soil amenities as necessary (peat moss, compost and bone meal) ▪ Start installing bulbs during the last week of the month as specified and according to design ▪ All bulb beds are to be edged and covered with two to three inches of mulch ▪ Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Patch, refill and roll stonedust pathways as necessary 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Maintenance Calendar and Monitoring Checklist

OCTOBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Install new or replacement deciduous or evergreen trees Maintain mulch rings around tree trunks to prevent any damage during lawn cutting operations Inspect for diseased and unhealthy trees. Consult with arborist for scheduling pruning or removal Consult with arborist and schedule trees that need deep root feeding Pick up litter and trash regularly 	
	Turf Level I	<ul style="list-style-type: none"> Mow at a height of 3" on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging Top dress damaged turf areas with loam/sand Over seed all damaged and heavily used turf areas until mid October or as weather permits Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	
	Turf Level II	<ul style="list-style-type: none"> Mow at a height of 4" on a 7-12 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging Top dress damaged turf areas with loam/sand Over seed all damaged and heavily used turf areas until mid October or as weather permits Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	
	Athletic Fields Level I	<ul style="list-style-type: none"> Reduce mowing height to 2.5 " Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging Top dress damaged turf areas with loam/sand 	

Maintenance Calendar and Monitoring Checklist

OCTOBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Athletic Fields Level I	<ul style="list-style-type: none"> Over seed all damaged and heavily used turf areas until mid October or as weather permits Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Rake and remove leaves, fruit and debris from grounds Install new or replacement deciduous or evergreen shrubs Weed, edge and mulch beds Continue to install fall flowers in designated beds Continue to remove all annuals from flowerbeds as scheduled Remove fall flowers after first frost Continue to prepare designated beds for bulb installations Prepare beds and containers by adding soil amenities as necessary (peat moss, compost and bone meal) Start installing bulbs during the last week of the month as specified and according to design All bulb beds are to be edged and covered with two to three inches of mulch Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Swept and cleaned when there is a noticable accumulation of debris.	
	Soft Surface Level I	Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately 	
	Woodlands Level I	<ul style="list-style-type: none"> Install new or replacement deciduous or evergreen trees Maintain mulch rings around tree trunks to prevent any damage during lawn cutting operations Inspect for diseased and unhealthy trees. Consult with arborist for scheduling pruning or removal Consult with arborist and schedule trees that need deep root feeding 	

Maintenance Calendar and Monitoring Checklist

OCTOBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Woodlands Level I	<ul style="list-style-type: none"> Pick up litter and trash regularly 	
	Turf Level I	<ul style="list-style-type: none"> Mow at a height of 3" on a 5-7 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging Top dress damaged turf areas with loam/sand Over seed all damaged and heavily used turf areas until mid October or as weather permits Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	
	Turf Level II	<ul style="list-style-type: none"> Mow at a height of 4" on a 7-12 day schedule. Keep lawn mower blades sharp and do not remove more than one third of the leaf blades at a mowing. Review latest soil reports and apply recommended amounts of fall fertilizer at the appropriate rates. Schedule core aeration, mat dragging Top dress damaged turf areas with loam/sand Over seed all damaged and heavily used turf areas until mid October or as weather permits Review latest soil tests for lime requirements. Set schedule to start liming by mid October or by early November. 	
	Planting Areas Level I	<ul style="list-style-type: none"> Rake and remove leaves, fruit and debris from grounds Install new or replacement deciduous or evergreen shrubs Weed, edge and mulch beds Continue to install fall flowers in designated beds Continue to remove all annuals from flowerbeds as scheduled Remove fall flowers after first frost Continue to prepare designated beds for bulb installations Prepare beds and containers by adding soil amenities as necessary (peat moss, compost and bone meal) Start installing bulbs during the last week of the month as specified and according to design All bulb beds are to be edged and covered with two to three inches of mulch Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	

Maintenance Calendar and Monitoring Checklist

OCTOBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.	
	Soft Surface Level I	▪ Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

NOVEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Turf Level I	<ul style="list-style-type: none"> Apply fall applications of lime and fertilizer 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Circulation	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. Shovel and remove snow as needed 	
	Turf Level I	<ul style="list-style-type: none"> Apply fall applications of lime and fertilizer 	
	Turf Level II	<ul style="list-style-type: none"> Apply fall applications of lime and fertilizer 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. Shovel and remove snow as needed 	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect for damaged equipment and hazardous conditions. Inspect for loose safety base materials around play structures, add and regrade material where necessary 	

Maintenance Calendar and Monitoring Checklist

NOVEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Playgrounds Level I	<ul style="list-style-type: none"> Inspect safety tiles and poured in place materials. Remove, replace or repair as necessary. Remove or repair damaged equipment Shovel and remove snow as needed 	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> Monitor structures for storm damage Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Turf Level I	Apply fall applications of lime and fertilizer	
	Turf Level II	Apply fall applications of lime and fertilizer	
	Athletic Fields Level I	Apply fall applications of lime and fertilizer	
	Planting Areas Level I	<ul style="list-style-type: none"> Remove fall leaves, dead branches and debris from all surfaces. Review those plants which require winter protection Inspect shrubs and prune any diseased or damaged wood Remove one third of the oldest wood on non-flowering shrubs to improve growth Inspect shrubs for insects, consult with arborist and schedule appropriate controls Trash removal completed three times per week 	
	Gardens Level I	<ul style="list-style-type: none"> Remove fall leaves, dead branches and debris from all surfaces. Review those plants which require winter protection Inspect shrubs and prune any diseased or damaged wood Remove one third of the oldest wood on non-flowering shrubs to improve growth Inspect shrubs for insects, consult with arborist and schedule appropriate controls Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. Shovel and remove snow as needed 	

Maintenance Calendar and Monitoring Checklist

NOVEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens Central: Rose Garden/ Clemente Field	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Back Bay Fens South and Sears Parking Lot	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Reduce mowing height to 2.5 " Mow on a 5-7 day schedule. ▪ Apply fall applications of lime and fertilizer 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
Riverway	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Swept and cleaned when there is a noticable accumulation of debris. ▪ Shovel and remove snow as needed 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels and benches and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Prune and remove storm related trees ▪ All newly planted trees should be wrapped with a commercial tree wrap to protect them from sunscald and frost crackling ▪ Inspect tree stakes and guy wires and adjust where necessary ▪ Inspect trees for insects and schedule the appropriate controls ▪ Pick up litter and trash regularly 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Apply fall applications of lime and fertilizer 	
	Turf Level II	<ul style="list-style-type: none"> ▪ Apply fall applications of lime and fertilizer 	

Maintenance Calendar and Monitoring Checklist

NOVEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Riverway	Planting Areas Level I	<ul style="list-style-type: none"> Remove fall leaves, dead branches and debris from all surfaces. Review those plants which require winter protection Inspect shrubs and prune any diseased or damaged wood Remove one third of the oldest wood on non-flowering shrubs to improve growth Inspect shrubs for insects, consult with arborist and schedule appropriate controls Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	<ul style="list-style-type: none"> Swept and cleaned when there is a noticable accumulation of debris. Shovel and remove snow as needed 	
	Soft Surface Level I	Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> Monitor structures for storm damage Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Woodlands Level I	<ul style="list-style-type: none"> Prune and remove storm related trees All newly planted trees should be wrapped with a commercial tree wrap to protect them from sunscald and frost crackling Inspect tree stakes and guy wires and adjust where necessary Inspect trees for insects and schedule the appropriate controls Pick up litter and trash regularly 	
	Turf Level I	Apply fall applications of lime and fertilizer	
	Turf Level II	Apply fall applications of lime and fertilizer	
	Athletic Fields Level I	Apply fall applications of lime and fertilizer	
	Planting Areas Level I	<ul style="list-style-type: none"> Remove fall leaves, dead branches and debris from all surfaces. Review those plants which require winter protection 	

Maintenance Calendar and Monitoring Checklist

NOVEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park North: Leverett Pond/Daisy Pond	Planting Areas Level I	<ul style="list-style-type: none"> Inspect shrubs and prune any diseased or damaged wood Remove one third of the oldest wood on non-flowering shrubs to improve growth Inspect shrubs for insects, consult with arborist and schedule appropriate controls Trash removal completed three times per week 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Swept and cleaned when there is a noticable accumulation of debris.	
		Shovel and remove snow as needed	
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Soft Surface Level I	Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> Monitor structures for storm damage Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Woodlands Level I	<ul style="list-style-type: none"> Prune and remove storm related trees All newly planted trees should be wrapped with a commercial tree wrap to protect them from sunscald and frost crackling Inspect tree stakes and guy wires and adjust where necessary Inspect trees for insects and schedule the appropriate controls Pick up litter and trash regularly 	
	Turf Level I	Apply fall applications of lime and fertilizer	
	Turf Level II	Apply fall applications of lime and fertilizer	
	Planting Areas Level I	<ul style="list-style-type: none"> Remove fall leaves, dead branches and debris from all surfaces. Review those plants which require winter protection Inspect shrubs and prune any diseased or damaged wood Remove one third of the oldest wood on non-flowering shrubs to improve growth Inspect shrubs for insects, consult with arborist and schedule appropriate controls Trash removal completed three times per week 	

Maintenance Calendar and Monitoring Checklist

NOVEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted Park South: Wards Pond/ Willow Pond/ Nickerson Hill	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Swept and cleaned when there is a noticable accumulation of debris.	
		▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Patch, refill and roll stonedust pathways as necessary	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage	
		▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	

Maintenance Calendar and Monitoring Checklist

DECEMBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Charlesgate	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Turf Level I	Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
Back Bay Fens North: Victory Gardens/ Mother's Rest	Paved Surfaces Level II	Shovel and remove snow as needed	
	Park Furniture Level I	Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	<ul style="list-style-type: none"> Monitor structures for storm damage Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> Keep all roads and paths clear of debris Remove fallen trees immediately Shovel and remove snow as needed 	
	Turf Level I	Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Embankment Plantings Level I	<ul style="list-style-type: none"> Invasive removal completed by trained personnel on a monthly basis Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	Shovel and remove snow as needed	
	Playgrounds Level I	<ul style="list-style-type: none"> Inspect all playground and park equipment for damage and hazardous conditions. Note all areas for repair or replacement. Repairs are done within 3-5 working days. Remove trash daily from playground area Snow removal as necessary 	

Maintenance Calendar and Monitoring Checklist

DECEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens North: Victory Gardens/ Mother's Rest	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Back Bay Fens Central: Rose Garden/ Clemente Field	Circulation	▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Athletic Fields Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. ▪ Maintain signs indicating that playing fields are closed for the season.	
	Embankment Plantings Level I	▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary	
	Watercourse Level I	▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
Back Bay Fens South and Sears Parking Lot	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
	Circulation	▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Embankment Plantings Level I	▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary	
	Watercourse Level I	▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis	

Maintenance Calendar and Monitoring Checklist

DECEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Back Bay Fens South and Sears Parking Lot	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
	Structures Level I	▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Riverway	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
		▪ Shovel and remove snow as needed	
	Woodlands Level I	▪ Pick up litter and trash regularly	
		▪ Remove storm related tree damage and pruning of trees along the tree lawns that present a public safety hazard	
	Turf Level I	▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact.	
	Embankment Plantings Level I	▪ Invasive removal completed by trained personnel on a monthly basis	
		▪ Replacement plantings as necessary	
	Watercourse Level I	▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris.	
		▪ Invasive removal completed by trained personnel on a monthly basis	
	Trash Removal Level I	▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day.	
	Paved Surfaces Level II	▪ Shovel and remove snow as needed	
	Soft Surface Level I	▪ Shovel and remove snow as needed	
	Park Furniture Level I	▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements.	
		▪ Monitor structures for storm damage	
		▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days.	
Olmsted Park North: Leverett Pond/Daisy Pond	Circulation	▪ Keep all roads and paths clear of debris	
		▪ Remove fallen trees immediately	
		▪ Shovel and remove snow as needed	
	Woodlands Level I	▪ Pick up litter and trash regularly	
		▪ Remove storm related tree damage and pruning of trees along the tree lawns that present a public safety hazard	

Maintenance Calendar and Monitoring Checklist

DECEMBER - GENERAL TASKS

Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted park north: Leverett Pond/Daisy Pond	Turf Level I	<ul style="list-style-type: none"> ▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. 	
	Athletic Fields Level I	<ul style="list-style-type: none"> ▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. ▪ Maintain signs indicating that playing fields are closed for the season. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Shovel and remove snow as needed 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Shovel and remove snow as needed 	
	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	
	Circulation	<ul style="list-style-type: none"> ▪ Keep all roads and paths clear of debris ▪ Remove fallen trees immediately ▪ Shovel and remove snow as needed 	
	Woodlands Level I	<ul style="list-style-type: none"> ▪ Pick up litter and trash regularly ▪ Remove storm related tree damage and pruning of trees along the tree lawns that present a public safety hazard 	
	Turf Level I	<ul style="list-style-type: none"> ▪ Snow fence that was erected to protect seeded areas is inspected weekly to ensure that it is intact. 	
	Embankment Plantings Level I	<ul style="list-style-type: none"> ▪ Invasive removal completed by trained personnel on a monthly basis ▪ Replacement plantings as necessary 	
	Watercourse Level I	<ul style="list-style-type: none"> ▪ Trash removed from watercourse weekly. A small boat is used monthly to access the watercourse and remove debris. ▪ Invasive removal completed by trained personnel on a monthly basis 	
	Trash Removal Level I	<ul style="list-style-type: none"> ▪ Trash is removed minimum of once a day 5 days/week. No overflowing cans. May require more than one servicing per day. 	
	Paved Surfaces Level II	<ul style="list-style-type: none"> ▪ Shovel and remove snow as needed 	
	Soft Surface Level I	<ul style="list-style-type: none"> ▪ Shovel and remove snow as needed 	

Maintenance Calendar and Monitoring Checklist

DECEMBER - GENERAL TASKS			
Sector	Feature Type/Area	Maintenance Action	Task Completed
Olmsted park North: Leverett Pond/Daisy Pond	Park Furniture Level I	<ul style="list-style-type: none"> ▪ Note areas that have damaged trash barrels, benches, light poles and signage and schedule replacements. 	
	Structures Level I	<ul style="list-style-type: none"> ▪ Monitor structures for storm damage ▪ Small, routine in house repairs done within 3-5 working days. Contracted repairs assessed within 3-5 working days. 	

Appendix B: LANDSCAPE MAINTENANCE SPECIFICATIONS – CHARLESGATE

SECTION 02950
LANDSCAPE MAINTENANCE

PART I - GENERAL

1.01 SCOPE OF WORK

- A. The Limit of Work of the one-year Maintenance Period shall be the Limit of Work Line of the Contract as shown on the Contract Documents. These limits shall be staked by the Contractor for the Engineer's approval, especially near the Richardson Bridge and at Storow Drive, to establish the official limit of maintenance under this Section of the Specifications.
- B. The two-year lawn maintenance shall include, but is not limited to the following: reseeding, mowing, watering, weeding, edging, fertilizing, rolling, aeration, disease and pest control, weed control, soil testing and leaf and litter pick-up. Areas of lawn that dieback during the two-year period shall be reseeded if originally seeded as directed by the Engineer.
- C. The two-year plant maintenance shall consist of keeping the plants in a healthy growing condition and shall include watering, weeding, disease and pest control, pruning, cultivating, mulching and removal and replacement of dead material with equivalent plants. The work shall also include removal of litter and trash from planting beds.
- D. The two-year maintenance shall include maintenance of pathways, sidewalks, and stonedust surfacing areas to keep them in good condition and shall include removing and legally disposing of debris, leaves, and litter, general maintenance of paving, replenishing and compacting stonedust, and replacing or repairing paving surfaces in kind as required. The work shall not include snow removal.
- E. The two-year maintenance shall include maintenance of the waterway including removal of trash and debris from the Muddy River.
- F. The two-year maintenance shall include maintaining and/or replacing erosion control at catch basins within the stonedust surfacing areas.
- G. Plants that are dead or show obvious decline or loss of 5% of healthy growth during the either the first or second year of the two-year maintenance period, shall be removed and replaced with plants of equal size, unless designated otherwise in writing by the Owner. All replacements shall be plants of the same kind and size specified in the PLANT LIST and all costs shall be borne by the Contractor, except for possible replacements due to vandalism, theft or neglect on the part of others.
- H. The following items of related work are specified and included in other Divisions and Sections of the Specifications:
 - 1. Division I - General Requirements
 - 2. Section 01025 - Measurement and Payment
 - 3. Section 01046 - Control of Work

4. Section 01110 - Environmental Protection Procedures
 5. Section 01300 - Submittals
 6. Section 01562 - Dust Control
 7. Section 02270 - Erosion and Sedimentation Control
 8. Section 02901 - Miscellaneous Work and Cleanup
 9. Section 02915 - Traffic Controls for Construction and Maintenance
 10. Section 02930 - Lawns
 11. Section 02940 - Planting
- I. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.
 - J. Examine Section 01046 CONTROL OF WORK, herein, for Limitation of Operations, which specifically limits work that impacts public street on specific dates and times.
 - K. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.
 - L. Contractor shall comply with the "Order of Conditions Massachusetts Wetlands Protection Act, G. L. c. 131, S. 40, Requirements of Submittals and Signage".
 - M. Contractor shall comply with the requirements of Section 01015 PROJECT PERMITS, herein, for all permit requirements.
 - N. At the completion of the Two-year Maintenance Period the Contractor shall meet with the Metropolitan District Commission (MDC) maintenance staff to review the maintenance procedures and to discuss specifics of plant maintenance.

1.02 SUBMITTALS

- A. Samples: Prior to ordering the below listed materials, submit representative samples to Landscape Architect for selection and approval in accordance with requirements of GENERAL REQUIREMENTS as follows. Do not order materials until Landscape Architect's approval has been obtained. Delivered materials shall closely match the approved samples.
 1. Screened Loam: The Contractor shall provide representative samples for testing and approval. Two test samples of ten (10) pounds each shall be taken and analyzed from each potential loam source. Contractor shall deliver samples to testing laboratory, have testing report sent directly to the Landscape Architect and pay all costs. Report shall be submitted at least one month before any loam is brought on to the site.
 - a. Mechanical and chemical analysis shall be by a public extension service agency and/or a certified private testing laboratory in accordance with the current "Standards" of the Association of Official Agriculture Chemists.
 - b. Soil test report shall include a mechanical sieve analysis with soil classification. Organic content shall be reported. Chemical analysis shall include pH (1:1 soil-water ratio), buffer pH, Soluble Salts (1:2 soil-water ratio), Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Manganese, Ferric Iron and Sulfate.

- c. Test report shall clearly recommend appropriate application of limestone, fertilizer, organic matter or other soil additives required.
 2. Pine Bark Mulch: Submit one cubic yard sample.
 3. Soil testing: Submit test results and product literature for the recommended treatment.
 4. Fertilizer: Submit one (1) sample packet of fertilizer and a certificate showing composition and analysis for fertilizer.
 5. Lime: Submit a certificate showing composition for lime.
 6. Disease and pest controls: Submit test results and product literature for proposed use of chemical applications.
 7. Weed controls: Submit test results and product literature for the proposed use of chemical applications.
 8. Legal disposal or storage of materials: Provide notarized copies of agreements between the Contractor and owners of land used as disposal or storage areas.
 9. Aeration methods: Submit proposed method (s).
- B. Storage and Spill Prevention Plans: Contractor shall submit a Storage Plan and a Spill Prevention Plan for on site storage of materials and equipment. Refer to Contract Documents for approved locations for storage and for site access.
- C. Certification: Submit Certification of license/certification for the Arborist.
- D. Certification: Submit manufacturer's certified analysis for standard products. Submit certified analysis by a recognized laboratory made in accordance with methods established by the Association of Official Agricultural Chemists for other materials.
- E. Schedule for plant tagging: At least ten days prior to the expected replanting date, the Contractor shall request, in writing, that the Engineer/Landscape Architect provide a representative to select and tag stock to be replanted.
- F. Schedule of Work: Prior to starting the work of maintenance the Contractor shall submit the following to the Engineer/Landscape Architect for Landscape Architect approval:
1. Schedule for Maintenance including yearly, weekly, and daily tasks;
 2. Business (Maintenance) Plan for implementing maintenance;
 3. Staffing and Equipment Plan including timed and untimed tasks, crew categories and staffing;
 4. Equipment requirements; and
 5. Dress code requirements for employees.
- G. Weekly Maintenance Reports: Prior to starting the work of maintenance the Contractor shall submit the following to the Engineer/Landscape Architect for approval:
1. Form for Weekly Maintenance Log which shall cover all maintenance categories specified herein; and
 2. Submission of Weekly Maintenance Logs detailing all work performed.
- H. Reports: During the Two-Year Maintenance Period the Contractor shall submit the following reports to the Engineer/Landscape Architect for approval:
1. General Yearly Report on Plant Health: Submit annually by October 1st.

2. Reports of inspection by certified Arborists for pruning: Submit in the spring (by March 1st) and fall (by October 1st) each year.
3. Reports of inspection for plant replacements and/or resetting of plant materials: Submit monthly reports by the 15th of each month May 15th through September 15th.
4. Reports of inspection of planting areas for weeds and invasives in general: Submit three times per year by the 15th of May, July, and September. Submittal shall identify weeds and appropriate treatment including any chemical applications with timing and rates.
5. Reports of inspection of plants for disease and pests: Submit three times per year by the 15th of May, July, and September. Submittal shall identify disease and/or pests and appropriate treatment including any chemical applications with timing and rates.
6. Report on pathway, sidewalk and stonedust surfacing areas: Submit a yearly report by September 1st.
7. Written requests for approval to aerate lawns: Submit yearly by April 15th.
8. Written requests for approval to roll lawns: Submit yearly by April 15th.
9. MEPA Annual Update Report: Submit to the Owner by October 1st a yearly compilation of all yearly reports required for MEPA compliance. Consult with Owner for report submittals required for the MEPA submittal.

1.03 CERTIFICATE OF ACCEPTANCE AND GUARANTEE FOR REPLACEMENT PLANTS AFTER COMPLETION OF THE TWO-YEAR MAINTENANCE PERIOD

- A. Following completion of both the first year of the two-year maintenance period, the Contractor shall request the Landscape Architect in writing for a formal inspection. If plant materials are in acceptable condition after the first year, written notice will be given by the Landscape Architect to the Contractor stating that the maintenance period shall continue into the second year.
- B. Following completion of the second year of the two-year maintenance period, the Contractor shall request the Landscape Architect in writing for a formal inspection. If plant materials are in acceptable condition after the second year, written notice will be given by the Landscape Architect to the Contractor stating that the maintenance period is complete.
- C. When inspection is made by the Landscape Architect at the end of both the first year and the second year of the two-year maintenance period, any plant required under this contract that is dead or unsatisfactory shall be removed from the site and replaced. Each plant shall show at least ninety-five (95%) percent healthy growth and shall have the natural character of a plant of its species in accordance with the American Nurserymen's Association Standards. All replacements shall be plants of the same kind and size specified in the PLANT LIST and all costs shall be borne by the Contractor, except for possible replacements due to vandalism or neglect on the part of others.
- D. Dead or unsatisfactory plants replaced after the second year of the two-year maintenance period is complete shall be replaced during the normal planting season, until the plants live through two years. Upon a written request by the Contractor the Landscape Architect shall make a final inspection for acceptance after the replacements have lived through two years.

1.04 EXAMINATION OF CONDITIONS AND DOCUMENTS

- A. All areas to be maintained shall be inspected by the Contractor before starting maintenance work and any defects shall be reported to the Engineer prior to beginning this work. The commencement of the work of maintenance by the Contractor shall indicate his acceptance of the condition of the site and the areas to be maintained and that the Contractor has assumed full responsibility for the work of this Section.
- B. The Contractor shall be solely responsible for judging the full extent of work requirements involved, including, but not limited to, the potential need for storing materials, maintaining replacement plants temporarily and/or rehandling replacement plants prior to final installation.

1.05 QUALITY ASSURANCE

- A. Contractor must be knowledgeable of National Arborist Association standards and have at least five (5) years' experience involving this scale and type of work. The Contractor shall be an experienced and qualified landscaping contractor employing experienced workmen under the full-time supervision of a qualified foreman with a minimum of five years experience on projects similar in scale to this one. In addition the Contractor shall employ a licensed/certified Arborist in the Commonwealth of Massachusetts for this project. Submit license/certification for Arborist for approval by Engineer.
- A. Subcontractor Qualifications: If landscaping work is assigned to a Subcontractor the Subcontractor shall be an experienced and qualified landscaping subcontractor employing experienced workmen under the full-time supervision of a qualified foreman with a minimum of five years experience on projects similar in scale to this one. In addition the Subcontractor shall employ, for this project, a licensed/certified Arborist in the Commonwealth of Massachusetts. Submit license/certification for Arborist for approval by Engineer.
- B. Contractor shall establish an employee dress code with all employees outfitted with uniforms. Submit proposed dress code to the Engineer for approval.

1.06 MAINTENANCE OF EQUIPMENT AND ON SITE STORAGE OF MATERIALS

- A. Equipment necessary for this contract shall be properly maintained and in good operating condition to the Engineer's satisfaction. The Contractor shall promptly remove and replace equipment, which the Engineer deems to be in unsatisfactory repair or condition or otherwise unsuitable.
- B. Vehicles shall display prominently the Contractor's name, address, and telephone number on both doors. No personal vehicles shall be allowed on the project area. No equipment or vehicles shall be left overnight on the project area.

- C. Store and handle packaged materials in strict compliance with manufacturer's instructions and recommendations. Protect all materials from damage, injury and theft. No materials shall be left overnight on the project area.
- D. Based on the Order of Conditions Massachusetts Wetlands Protection Act G.L.c. 131, 5.40 the Contractor shall submit a Storage Plan and Spill Prevention Plan for approval of the Engineer. No material shall be brought on to the site until approval of the Storage Plan and Spill Plan.
- E. Storage shall be outside the one hundred (100') foot Water Resource Line and shall occur in areas designated on the Drawings or approved by the Engineer in the field.
- F. No equipment or unconsolidated material shall be stored in the twenty-five (25') foot Riparian Zone or over the water. Any equipment used in the Wetland Resource Area or Riparian Zone that uses fuel, oil, and/or hydraulic fluid shall be inspected daily for leakage.
- G. Any such equipment requiring repair shall be repaired outside of the Wetland Resource Area and the Riparian Zone. Any equipment that uses fuel, oil, and/or hydraulic fluid shall be manned at all times while operational within the Wetland Resource Area or Riparian Zone.
- H. No materials shall be stored within the driplines of existing trees to remain or trees planted under this Contract.

1.07 PROTECTION OF EXISTING CONDITIONS AND MAINTENANCE OF PLANT PROTECTION FENCING

- A. The Contractor shall see that throughout maintenance operations all necessary measures are employed by him to prevent any damage to the site during his maintenance operations. This shall include, but shall not be limited to the following: the water edges, river banks, existing trees, shrubs and ground cover, or existing paving, furnishings and utility systems on the site and outside of the limits of the site.
- B. Fence for protection of planting areas installed under Section 02940 PLANTING, herein, shall be maintained in place during the two-year maintenance period. The protection fence shall be maintained in good condition and shall be repaired or replaced, if beyond repair, as required during the two-year maintenance period at no increased cost to the Owner.
- C. Protection fence shall be removed in its entirety after the two year maintenance period is complete, but only after written approval to remove it has been issued by the Engineer/Landscape Architect. Contractor shall protect the plantings removal from any damage during the fence.
- C. Should any damage occur to the above planting due to Contractor's lack of diligence in maintaining fence in good condition or during the removal of the fencing the Contractor shall bear the full cost of replacement of plant materials to the satisfaction of the Owner. All plant replacements shall be in accordance with the original contract installation. All

restorations shall be in kind and shall be approved by the Engineer/Landscape Architect and the Owner.

1.08 SAFETY

- A. All equipment to be used and all work to be performed must be in full compliance with all standards as promulgated by OSHA at the time of bidding, including, but not limited to those regulations concerning noise levels, protective devices and operator safety.
- B. The Contractor shall be solely responsible for pedestrian and vehicular safety and control within the worksite and shall protect the public and its property from injury or damage that could be caused by the progress of the work. To this end the Contractor shall post work areas, provide police details and/or erect and maintain protective devices as necessary to the Engineer's satisfaction, including but not limited to, barricades, lights and warning signs.
- C. Any practice employed by the Contractor, which is obviously hazardous as determined by the Engineer shall be immediately discontinued by the Contractor upon receipt of either written or oral notice from the Engineer to discontinue such practice.

1.09 MANNER OF CONDUCTING THE WORK

- A. The work shall be conducted with prime consideration given to the following:
 - 1. Compliance with Americans with Disabilities Act requirements.
 - 2. Compliance with governing laws and building codes.
 - 3. Safety, protection, and convenience of the public and workmen.
 - 4. Protection of the existing building structure, materials and finishes from damage.
 - 5. Minimization of dirt and dust proliferation.
 - 6. Avoidance of any damage to vegetation.
 - 7. Maintenance of existing site drainage and drainage structures and protection of structures from siltation during construction.
 - 8. Provide unobstructed legal exits and entrances at all times.
- B. All work shall be done in accordance with the governing laws and building codes and the Contractor shall procure all necessary permits required for the work, other than those provided by the Owner. Refer to Section 01015, PROJECT PERMITS, herein.
- C. The burning of trees, brush, stumps, etc., will not be permitted. The Contractor shall provide satisfactory off-site methods of disposal without additional compensation from the Owner.
- D. Upon request the Engineer shall be provided with notarized copies of agreements between the Contractor and owners of land used as disposal areas. The Contractor shall make arrangements and negotiations necessary for the satisfactory legal disposal of trees, shrubs, stumps, roots, dead-wood, boulders, debris, removals of any kind, and litter off site at no increased cost to the Owner.

1.10 REFERENCES AND STANDARDS

- A. Where references are made in these Specifications to Standard Specifications, codes, etc., of the U.S. Government, State or local authorities, or professional and industrial societies and associations, the applicable portions thereof shall govern as fully as if they were recited at length herein, and shall include all revisions thereto issued as of the date of the Notice to Contractors pertaining hereto.
- B. The following references are used herein and shall mean:
 1. ASNS: "American Standard for Nursery Stock," ASNA 260.1, latest edition, published by the American Association of Nurserymen (AAN).
 2. SPN: "Standardized Plant Names," latest edition, by the American Joint Committee on Horticultural Nomenclature.
 3. AOAC: Association of Official Agricultural Chemists.
 4. Pruning Standards: The "Standards for Pruning Shade Trees" of the National Arborist Association, 174 Route 101, Bedford, NH 03102.
 5. ASTM: American Society for Testing and Materials, latest edition.
 6. OSHA: Occupational Safety and Health Administration.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Contractor shall provide all required materials and equipment required to perform landscape maintenance as specified, herein.
- B. All plant replacements made during both the first and second year of the two-year maintenance period shall be of the same species and size specified in the original project PLANT LIST. Refer to Section 02940 PLANTING, herein, for requirements for planting. All costs of replacements shall be borne by the Contractor, except for possible replacements due to vandalism, theft, or neglect on the part of others.
- C. The Contractor shall be responsible for furnishing his own supply of water to the site at no extra cost to the Owner. Any work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.
- D. Fertilizer for Lawns and Plants:
 1. **Lawns:** Standard application for lawn fertilizers, three times per year minimum, shall be:

<u>Type of Fertilizer</u>	<u>Date of Application and Pounds</u>		
	<u>Applied per 1,000 Square Feet for Lawns</u>		
	<u>April 1</u>	<u>May 1</u>	<u>Sept 1</u>
20-10-5, 20-6-4 or similar analysis	5-7 lbs.	4-5 lbs.	4-5 lbs.
10-6-4, 10-5-5 or similar analysis	10-12 lbs.	10-12 lbs.	6-8 lbs.

8-6-4, 8-6-2 15-20 lbs. 10-15 lbs. 10-15 lbs.

Note: Only one of the above lawn fertilizing schedules shall be used during any one growing season.

2. **Trees and Shrubs:** High-nitrogen commercial dry fertilizers such as 10-8-6, 10-6-4, 8-6-4 and 8-6-2 shall be used for trees and shrubs. The important point is that the mix shall be a complete mix, which includes nitrogen, phosphorus and potassium.
3. Submit certification of fertilizer for Engineer's approval.

E. Liming:

1. Ground limestone shall be applied to bring lawn areas to desired 6.0-6.5 pH level. Rate of application shall be determined by soil test done on a yearly basis. Rate of application of ground limestone shall not exceed 70 pounds per 1,000 square feet at any one time, with at least 30 days between applications to bring the pH to the desired level.
2. Submit certification of lime for Engineer's approval.

F. Mulch:

1. Mulch shall be aged pine bark mulch aged a minimum of six months. The mulch shall be dark brown in color, free of chunks and pieces thicker than 1/4 inch. Mulch must be free of stringy material, and shall not contain, in the judgment of the Landscape Architect, an excess of fine particles.
2. Submit sample for Engineer's approval.

G. Weed Control for Lawns and Plants:

1. Any chemical applications recommended for control of weeds must conform to the Order of Conditions issued by the Department of Environmental Protection (DEP) and all Municipality, State, and Federal laws and regulations.
2. The proposed chemicals, the timing for control, and method application of chemicals shall be submitted to the Engineer in writing for approval. No material or method of application shall be employed on the site until the Owner has granted written approval.
3. Submit certification of proposed weed control and product literature for Engineer's approval.

H. Disease and Pest Control for Lawns and Plants:

1. Any chemical applications recommended for control of diseases and pests must conform to the Order of Conditions issued by the Department of Environmental Protection (DEP) and all Municipality, State, and Federal laws and regulations.
2. The proposed chemicals, the timing for control, and method application of chemicals shall be submitted to the Engineer in writing for approval. No material or method of application shall be employed on the site until the Engineer has granted written approval.
3. Submit certification of proposed weed control and product literature for Engineer's approval.

- I. Screened Loam: Screened loam shall meet the requirements of screened loam as specified in Section 02930 LAWNS, herein. Submit test results for Owner's approval.
- J. Planting Backfill: Backfill for planting beds taken from the planting hole and/or loam borrow and soil additives shall meet the requirements specified in Section 02940 PLANTING, herein. Submit test results for Owner's approval.

PART 3 - EXECUTION

3.01 LAWN MAINTENANCE

A. Watering:

1. The Contractor shall water as required all lawn areas to maintain adequate moisture in the upper six inches (6") of soil necessary for the promotion of deep root growth especially during the months of June, July and August and/or as required by weather conditions. Watering shall be done in a manner, which will provide uniform coverage, prevent erosion due to application of excessive quantities over a small area, and prevent damage to the finished surface.
2. Water sources for manual watering shall be a combination of yard hydrants (if available from BWSC) or watering trucks. The Contractor shall provide conventional hoses and sprinklers and/or watering trucks, at no increased cost to the Owner. Refer to Section 01046 CONTROL OF WORK, herein, for use of BWSC hydrants.
3. Materials and methods for manual watering shall be those, which encourage slow and deepwater penetration without compacting or otherwise disturbing the mulched beds or lawn surface.
4. The Contractor shall supply and maintain in good working order all hoses, sprinklers, watering trucks, safety barriers, warning signs, and other equipment and materials employed for manual watering.

B. Mowing:

1. During the spring and fall growing season when precipitation is normal grass shall be maintained at a maximum height of two inches (2") and a minimum of one and one-half inches (1-1/2"). Lawn clippings shall be removed.
2. During drought conditions or during July and August, if these months are dry, the grass shall be maintained at a maximum height of three inches (3") and a minimum of two and one-half inches (2-1/2"). Lawn clippings shall be removed.
3. Mowing and necessary trimming and edging shall be performed weekly, or when the grass is of sufficient length to produce one half-inch (1/2") of clippings.
4. Before the first mowing in the spring all debris, leaves, paper and trash that have accumulated over the winter should be picked up and removed from the property and the lawn areas shall be raked.
5. Collect litter prior to each grass cut. In areas of reduced grass cutting frequency collect the litter at least once a week between April and October inclusive

C. Soil Testing for Fertilizer and Lime Applications:

1. In the event that the lawn areas are not growing well, the Contractor shall perform soil tests in these areas to discover lime needs fertilizer requirements or potential polluting contaminants. Soil tests shall be taken in the early spring, early fall, or as required. The Contractor shall implement corrective and remedial measures as recommended by soil testing. Submit a copy of test results and recommended applications of materials to the Owner for approval prior to application.
2. Lawn fertilizer shall be applied three times per year minimum in April, May and September. Lime applications shall be either early spring or late fall, with early spring (April) being preferred.
 - a. At least fifty (50%) percent of nitrogen should be in an organic form.
 - b. Fertilizer shall be applied only when the grass is dry. After the application, the fertilizer shall be washed into the soil to prevent discoloration or burning of the grass.
 - c. If water is not available, the turf shall be brushed lightly with the back of a rake.
3. In order to determine the yearly lime and fertilizer needs, soil samples shall be taken to a depth of 3-6 inches from varying parts of the lawn on a yearly basis. If the area to be tested is of considerable size, or if it varies in texture to any marked degree, several samples shall be obtained.
4. If there is a decided variance in the general character of the soil, the samples shall be kept separate. If the soil is uniform in character, the samples may be mixed together to form a composite sample. The sample(s) shall be protected from contamination while being spread out to dry on clean paper. After the soil is thoroughly dry, it should be sent to the testing agency.
5. The soils will be tested for the following:
 - pH
 - K. Nitrogen (total)
 - Ammonium Nitrogen
 - Phosphorus
 - Potassium (Potash)
 - Contaminants
6. Soil samples shall be sent for analysis to the State Agriculture Experiment Station in Waltham, MA or a similar testing agency approved by the Owner.

D. Weed Control:

1. When weeds start to invade, the Contractor should first identify the weed and then the appropriate treatment for its removal. The Contractor shall submit in writing the identification results and proposed treatment for removal to the Owner prior to starting any removal operations.
2. Hand removal is preferred, but if chemical removal with a selective herbicide is to be considered the best timing for control shall be established and the proposed time and method application of chemicals shall be submitted to the Owner in writing for approval. Do not proceed with removal until written approval has been given by the Owner.

E. Disease and Pest Control:

1. The Contractor shall submit diseased or distressed portions of the lawn to Middlesex County Agricultural agent in Concord, Massachusetts or the University of Massachusetts Cooperative Extension in Amherst, Massachusetts for recommended spray and application. The Contractor shall submit in writing the identification results and proposed treatment for control to the Owner prior to starting any treatment operations.
2. Any chemical applications recommended for control of diseases and pests must conform to the Order of Conditions issued by the Department of Environmental Protection (DEP) and all Municipality, State, and Federal laws and regulations. The best timing for control shall be established and the proposed time and method of application of chemicals shall be submitted to the Owner in writing for approval. Contractor shall submit in writing to the Owner the chemical (s) to be used and shall be given written approval by Owner prior to proceeding with application. Do not proceed with treatment until written approval has been given by the Owner.

F. Aeration:

1. In areas subject to overuse, aeration shall be performed yearly by the Contractor. Work shall be performed at the same time that fertilizer is applied in the spring.
2. Contractor shall submit proposed equipment to be used and the method and schedule of aeration to the Owner for approval. Do not proceed with the aeration until written approval has been given by the Owner.

G. Plant Litter, Leaf Pick-up and Trash and Debris:

1. Complete plant litter pick-up and leaf removal of all lawn areas shall be done weekly.
2. Complete trash and debris removal of all lawn areas shall be done weekly.

H. Grading and Reseeding or Resodding:

1. In the spring and in the fall any bare spots and any mounds or depressions in lawn areas, which inhibit proper drainage of the area shall be regraded and repaired.
2. These areas shall be smoothly blended into surrounding grades, scarified and reseeded in areas originally seeded or resodded in areas originally sodded, both with the original seed species.

I. Rolling:

1. Lawns shall be rolled in the early spring (but not sooner than April 1) to level grass uprooted by frost action. This shall be done only after all frost is out of the ground and the soil has dried out enough so that it is not wet or soggy. Do not proceed with the aeration until written approval has been given by the Owner.
2. The roller shall weigh less than 100 pounds and shall not be used at any other time of the year.

3.02 PLANT MAINTENANCE

A. Watering:

1. The Contractor shall be responsible for watering all plants including trees, shrub beds, ground cover, and perennials as required by weather conditions. At each watering the soil around each plant shall be thoroughly saturated.
2. Water sources for manual watering shall be a combination of yard hydrants (if available) or watering trucks. The Contractor shall provide conventional hoses and sprinklers and/or watering trucks, at no increased cost to the Owner.
3. Materials and methods for manual watering shall be those which encourage slow and deep water penetration without compacting or otherwise disturbing the mulched beds or lawn surface.
4. The Contractor shall supply and maintain in good working order all hoses, sprinklers, watering trucks, safety barriers, warning signs, and other equipment and materials employed for manual watering.

B. Fertilizing:

1. Once a year in the spring, all shrubs, groundcovers and perennials shall be fertilized. Individual specimen shrubs shall be fertilized at the rate of 1/2 to 1 pound per plant, depending on the size of the plant. Groups of shrubs shall be fertilized at the rate of 2 to 4 pounds per 100 square feet of soil surface area.
2. Where shrubs are planted in a cultivated border, fertilizer applications shall be evenly broadcast on the soil surface beneath the shrubs, then lightly worked into the soil.

C. Litter and Leaf Pick-up:

1. Complete litter and leaf pick-up including fall leaf removal of all plant areas shall be done weekly.

D. Weeding and Edging:

1. Thorough inspection of all plantings for required weed control shall be done three times per year. Submit a written summary of findings and proposed treatment for Owner's approval prior to proceeding with any removal.
2. The Contractor shall first identify the weed(s) and then the appropriate treatment for their removal. Hand removal is preferred.
3. Any chemical applications recommended for control of weeds must conform to the Order of Conditions issued by the Department of Environmental Protection (DEP) and all Municipality, State, and Federal laws and regulations. The best timing for control shall be established and the proposed time and method of application of chemicals shall be submitted to the Owner in writing for approval. Contractor shall submit in writing to the Owner the chemical (s) to be used and shall be given written approval by Owner prior to proceeding with application. No material shall be used until the Owner has granted written approval.
4. Complete edging and weeding of all shrubs and all planting beds shall be done once a month or as necessary from mid-April through September. Beds shall be neat in appearance and maintained to the lines originally laid out.

E. Mulching:

1. All individual trees and shrub beds shall be mulched yearly in April. Mulch shall be a minimum of three inches in depth. Mulch shall be pine bark mulch. Submit sample to Owner for approval prior to spreading any mulch.

F. Disease and Pest Control:

1. Thorough inspection of all plantings for required disease and pest control shall be done three times per year. Diseased or distressed portions of plants shall be submitted to Middlesex County Agriculture Agent for the recommended treatment method and application. Submit a written summary of findings and proposed treatment for Owner's approval prior to proceeding with any removal.
2. Any chemical applications recommended for control of diseases and pests must conform to the Order of Conditions issued by the Department of Environmental Protection (DEP) and all Municipality, State, and Federal laws and regulations. The best timing for control shall be established and the proposed time and method of application of chemicals shall also be submitted to the Owner in writing for approval. Contractor shall submit in writing to the Owner the chemical (s) to be used and shall be given written approval by Owner prior to proceeding with application. No material shall be used until the Owner has granted written approval.

G. Pruning:

1. Plant material shall be pruned only as necessary during the two-year period. In order to determine "necessary pruning" the following procedure shall be followed.
 - a. All trees and shrubs to be pruned shall be inspected in the spring and fall by the Contractor's Arborist for any unusual safety or tree health concerns and a written report shall be submitted to the Owner which shall include proposed pruning.
 - b. After the report is submitted, the Owner or his representative and the Contractor's Arborist shall perform a site inspection of all plant material in order to determine the extent of pruning to be performed.
 - c. The Contractor's Arborist shall submit a report outlining all pruning to be performed as determined during the site visit.
 - d. The Owner shall review and approve the proposed pruning report and shall issue a work order to the Contractor's Arborist prior to the start of any work.
 - e. Upon completion of pruning, the Owner or his representative and the Contractor's Arborist shall make a site inspection again. If the work has been satisfactorily completed as determined by the Owner's Representative the Contractor's Arborist shall submit a written report to the Owner detailing the work performed and the Owner shall issue written approval of the pruning.
2. The Contractor's Arborist shall be certified by the International Society of Arboriculture. All pruning must be done in compliance with American National Standards Institute Z133 and A300 standards.
3. All pruning cuts shall be made according to ANSI A300 Section 5.2.5. No stubs shall be left nor will flush cuts be made, the branch collar shall be left intact. Severed limbs shall be removed before the end of the workday. Wound dressing shall not be applied.
4. Tree branches shall be removed in a manner, which does not damage the tree, other plants or property. Where necessary to protect the public, ropes will be used to lower large branches. Not more than 1/4 of the leaf surface of a tree shall be removed.

5. Pruning of shrubs shall include removal of all dead or broken branches and branches, which interfere with the proper development of the shrub. Broken or badly bruised branches shall be removed with a clean cut. No shrubs shall be sheered or cut into shapes. The natural character of the shrub shall be maintained and shrubs shall be pruned and shaped to maintain their natural character.

H. Plant Inspection and Replacement and/or Resetting:

1. All trees and shrubs shall be inspected monthly during the growing season by the Contractor for any unusual safety or tree health concerns or for evidence of plants that need to be replaced or need to be reset to proper grades or upright position. All dead, diseased, damaged plants, or plants that have safety issues shall be replaced as soon as planting conditions allow.. A written report shall be submitted to the Owner which shall include proposed plant replacements or resetting of material and a schedule for replacement and resetting.
2. After the report is submitted, the Owner or his representative and the Contractor shall perform a site inspection of the plant material in order to determine the extent of replacements and/or resetting required and to determine the schedule for replacement and resetting.
3. The Contractor shall submit a report outlining the schedule and providing a species list and size for all material to be replaced.. Size of all material shall conform to original PLANT LIST. Only top-quality plants shall be used.
4. The Owner shall review and approve the proposed plant replacement report and shall issue a work order to the Contractor prior to the start of any work.
5. All plant replacements shall be selected by the Owner's Representative as follows:
 - a. At least ten days prior to the expected replanting date, the Contractor shall request, in writing, that the Owner provide a representative to select and tag stock to be replanted. The Contractor shall arrange and pay for the transportation and overnight accommodations, if necessary, for the Owner's Representative during the period of time required to select and tag plant material.
 - b. The Contractor shall be responsible to certify the availability of required plants in specified sizes from his sources of supply prior to requesting the Owner's Representative to make plant source inspections. In the event that plants at the inspection location are found to be unavailable or if insufficient size, the Contractor shall be liable to reimburse the Owner for all costs of the Owner's Representative's hourly services incurred during unproductive inspection trips as well as travel expenses and overnight accommodation.
 - c. The Contractor shall be responsible for timing the delivery of materials for replanting so as to minimize on-site storage time prior to installation. Plant quantities brought to the site shall be scheduled to be planted within the work day they arrive on the site. Other materials stored on the site shall be protected from weather, careless handling or vandalism, but shall be stored for a minimum time on site. The Contractor shall comply with the "Order of Conditions Massachusetts Wetlands Protection Act, G. L. c. 131, S. 40, Requirements of Submittals and Signage" as contained in the Contract Documents.
 - d. The Contractor shall schedule plant selection and digging operations so as to comply with nursery industry recognition of 'Spring Dig Only' or "Fall Hazard" plant materials. No substitutions of plant materials will be allowed for fall planting based on unavailability due to the 'Spring Dig Only' restrictions.

6. Upon completion of plant replacement and /or resetting of plant materials, the Owner or his representative and the Contractor shall make a site inspection again. If the work has been satisfactorily completed as determined by the Owner's Representative the Contractor shall submit a written report within two weeks of replanting or resetting to the Owner detailing the work performed and the Owner shall issue written approval of the plant replacement and/or resetting.

3.03 PATHWAYS, SIDEWALKS AND STONEDUST SURFACING AREAS

- A. The area within the shadow of the elevated highway is stonedust surfacing. Pathways within the project area and City sidewalks are brick or concrete.
 1. Collect litter weekly.
 2. Soft surfacing materials i.e. stonedust shall have the material replenished and re-compacted yearly in the spring.
 3. Inspect all paving surfaces within the Contract Limit Line yearly and repair or replace as required. All replacements shall be in-kind.

END OF SECTION

Appendix C: HISTORIC BRIDGE RESTORATION SPECIFICATIONS

SECTION 04500

HISTORIC MASONRY RESTORATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

This section specifies the following items required to complete the restoration of stone masonry. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1, Specification sections, apply to the Work of this Section.

- A. This includes the 100% removal and repointing of all mortar joints, not otherwise treated, on the spandrel faces of the arches and all parapet and bridge wing walls on each of the individual bridges to a depth of 2.5 times the joint width or a minimum of 1", or to sound mortar, whichever is greater. Repoint all walls to a depth of 8" below the present ground line.
- B. On the underside of the arches of the Chapel Street, Bridle Path and Cove Bridges, repoint the deep split between the stone spandrel walls and the brick arch elements with a soft mortar. Color to match adjacent brick mortar. Exact mix to be determined in field in consultation with the Engineer. The repointing of this location is included under the work covered by this item and the base bid of the contract. This work is not to be construed to be part of the add alternate.
- C. All masonry restoration shall be consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties. A copy of these standards are attached to this section.
- D. The Contractor must take care to protect all existing historic fabric from damage.
- E. Removal of any debris shall be done in such a way as to minimize the impact on surrounding historic fabric.
- F. Replace missing and/or mis-matched stones with new stones to match the color texture, grain size, surface finish and profiles of the existing historic stone work. Replace 50 linear feet of coping stone on the Bridle Path Bridge, selectively replace and/or relocate coping and wall stones as called for on the drawings.
- G. Develop and follow a documentation plan to ensure that all rebuilt areas will exactly match the original stone configuration.
- H. Extend existing holes in the Chapel Street Bridge coping stones and spandrel wall to a depth of 6" below underside of stones for installation of refurbished railing with extended posts.
- I. Epoxy repair all cracked or broken stone to be reused.
- J. Note that the Contractor shall verify and be responsible for field survey of all quantities and measurements called for and/or noted

in the Contract Documents. The Contractor or masonry sub-contractor shall notify the Engineer in writing, at least seven days prior to the bid due date of any variation from the quantities called for. In the absence of such notification, the Contractor, by submitting their bid, certifies agreement with and acceptance of the quantities called for.

- K. If additive alternates are accepted, repoint the brick masonry and replace missing/damaged brickwork on the underside of the arches, to the quantities called for in the alternative description.

1.2 RELATED WORK

- A. 04510 - HISTORIC MASONRY RESTORATION CLEANING
- B. 05500 - MISCELLANEOUS METALS

1.3 QUALITY ASSURANCE

- A. The Contractor or sub-contractor (whoever is directly responsible for the execution of the work under this section) shall have not less than five years experience restoring historic stone masonry.
- B. The Contractor or sub-contractor shall be certified by the Commonwealth of Massachusetts, Division of Capital Planning and Operations for Historic Masonry.

1.4 SAMPLE PANELS

- A. Field-Sample Panels: Prior to start of general masonry restoration, two (2) separate field sample panels shall be prepared to demonstrate; cutting and removal of existing mortar and, repointing. Undertake sample panels where directed by the Engineer. These may be done in the area where the test cleaning panels have been completed. Notify Engineer at least one week prior to beginning of work, so that they may be present to observe test panels. Obtain approval of cutting materials, methods, equipment and practices prior to commencement of mortar removal work. Review mortar materials, mixes and methods as well as mortar finish color and joint detailing. Allow sufficient time for curing of mortar in this review process. No additional work shall be performed without prior written approval of test panels. Retain acceptable panels in undisturbed condition, suitably marked, during construction as a standard for judging work.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturers' technical data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with requirements.

- B. Restoration Process: Submit written program for each phase of the restoration process including protection of surrounding materials. Describe in detail materials, methods, and equipment to be used for each phase of restoration work.
- C. Submit to the Engineer for review and approval a written plan to document the configuration of the existing masonry to ensure rebuilt masonry sections match existing coursing etc. Do not begin dismantling or rebuilding until all procedures and methods have been reviewed and accepted.

1.7 SCAFFOLDING, STAGING AND HOISTING

- A. Comply with all safety regulations and requirements regarding scaffolding, hoisting and staging.
- B. Move stones only using nylon slings or padded tools to keep from damaging or staining existing stone masonry to remain.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.
- B. Protect mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.
- C. Store stone off ground, properly blocked and supported to avoid damage or staining to the stone during storage.
- D. Restore any damage to site caused by storage, mixing or construction work.

1.9 PROJECT CONDITIONS

- A. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 degrees F (4 degrees C) and 80 degrees F (27 degrees C) and will remain so for at least 48 hours after completion of work.
- B. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Immediately remove grout and mortar in contact with masonry and other surfaces.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stone: All stone shall match the existing in grain size, color and color dispersion, texture, overall appearance and shall be indistinguishable from the original at a distance of 15 feet.

1. Stone for walls shall be seam faced Cape Anne Granite available from Johnson's Quarry Inc., 68 Johnson Road, Rockport, MA 01966.
Tel: (508) 546-1002 or approved equal.

2. Stone for cap stones shall match the existing stone identified as Cape Anne Pink. The current source of this material is unknown. Match existing material to remain meeting the criteria outline above..

A. Brick: All new brick shall match the existing brick that it is intended to replace in face dimension (size), color and surface texture.

B. Ironspot Brick shall be a custom size similar to modular Belden Brick 470-479 Light Range A, Made at Sugar Creek Plant 4, actual brick will have to be culled from the range to match the uniform color or the brick arch.

C. Red Brick: Shall match the existing brick arch that it is intended to replace in face dimension (size), color and surface texture.

D. Portland Cement: C 150, Type I, Type II or Type III as needed to match existing color.

E. Hydrated Lime: ASTM C 207, Type S.

F. Mortar Aggregate: Natural sand selected to produce mortar color match after repointing and cleaning.

G. Match size, texture and gradation of existing aggregate.

H. Grading of Sand for Stone Mortars.

I. Sieve	Bedding Mortar % Passing	Pointing Mortar % Passing
4.75 mm (#4)	97	96
2.36 mm (#8)	83	81
1.37 mm (#16)	58	50
600 um (#30)	28	21
300 um (#50)	7	8
150 um (#100)	0	1

The aggregate taken from the test samples will be provided to the successful bidder to assist them in matching the correct stone masonry mortar.

- b) Sand color for Brick Mortar: Shall be determined by the Engineer in the field. Contractor will be required to pay for any laboratory test that may be required to break down the mortar for further assessment.

F. Coloring Agents: by Frank Davis, True Tone or equal.

G. Water: Potable, clean, free of oils, acids, alkalis and organic matter.

H. Cleaner: Approved manufacturer's Detergent Masonry Cleaner.

I. Stone Anchor Pins

Fabricate anchors and dowels from AISI Type 304 stainless steel. Anchors to be set in existing stone as indicated on the Drawings. Submit sample of steel to Engineer within one week of award of bid.

Wire Pins shall be Dur-O-Wall 9 gauge stainless steel.

J. Epoxy Materials

Stone Repair Epoxy: Epoxy for stone repair or adhesion of stone fragments at non-visible contact surface areas shall be Sikadur 23, Lo-Mod Gel mixed with stone materials as indicated on the Drawings.

Other materials: Furnish all labor, services, equipment, and furnish and install all materials required to reconstruct the areas indicated on the Drawings and Specification.

2.2 MORTAR MIXES

A. General:

B. Measurement and Mixing: Measure cementitious and aggregate material (sand) in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials (sands) together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 1 to 2 hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within 30 minutes of final mixing; do not re-temper or use partially hardened material.

C. No admixtures of any kind shall be used in the mortar.

D. Mortar Mix and Proportions:

1. The intent of the masonry work is to replace the existing masonry joint with an historically detailed, accurate and properly engineered mortar joint. The repointing work shall be completed within the chiseled margins of all stones. No finish mortar is to spread onto the face of the chiseled margins of any of the rock faced stones at the completion of the work.
2. Mortar Mix Proportions for Brick and Stone Masonry
1 part cement / 1 part hydrated lime / 6 parts sand

PART 3 - EXECUTION

3.1 GRANITE REPOINTING

1. Aesthetic Effect: Remove existing pointing mortar. Do not damage in any manner the existing granite blocks. No finish mortar is to spread onto the rock face. Depending on location, joints are to be struck off smooth or receive a vine joint. All are pitched to shed water.
2. Do no repointing until Engineer has reviewed and approved preparation work and samples in each area. Schedule work so as to minimize number of inspection visits by having large areas ready for inspection.
3. Rake out mortar joints to a depth equal to 2.5 times the joint width but not less than 1" nor less than that required to expose sound, un-weathered mortar.
4. Remove mortar from all stone surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum or flush joints to remove dirt and loose debris.
5. Cut out old mortar by hand with chisel and mallet. Small hand-held power tools may be used if, and only if, all specified criteria are met. Do not spall edges of masonry units or widen joints. Protect all surfaces. . As specified herein, all work including the use of power tools by individual workmen must be approved by the Engineer in the sample panels prior to the actual commencement of the work. If stone or brick are damaged by power tools, the use of power tools shall stop and all remaining mortar shall be done by hammer and chisel.
6. Mortar Installation: Joint surfaces are to be damp but free of standing water. Fill joints solidly with mortar in layers approximately equal to joint thickness, installing successive layers as soon as previous layers are thumb-print hard. Step back layers at daily terminations to avoid full depth joint

when following work is done. Tool finish surface of joint solid, matching profiles of original joints. Take special care to reproduce joint system under which joints are raked back slightly recessed.

7. After mortar has set sufficiently to prevent damage, clean masonry facing with burlap, stiff bristle brushes and water. No mortar shall remain on granite. Expose aggregate to give appropriate weathered appearance to the new mortar joints.
8. Cure mortar by maintaining in a damp condition for not less than seven (7) days.

3.2 REPAIR OF STONE ELEMENTS

1. The following Work shall be performed by a company or individual having at least 5 years of experience in stone conservation:
2. Re-adhesion of Separated Elements Repair:
3. Remove cracked elements at specific areas to be repaired as indicated on the Drawings and Specification. Mask at least 6" on either side of and joint to be epoxied.
4. Place Stone Repair Epoxy in pin holes and on contact surfaces. Apply a very light coating of epoxy such that no epoxy occurs within 1/4" of the crack visible surface in the final repair. Secure the stone elements and pins in place. Use only light hand pressure to make the contact surfaces join. If any epoxy reaches the visible surface of the crack, remove excess and immediately apply ground Granite dust to the joint. The joint within 1/4" of the surface shall be sealed and the stone mixtures indicated on the Drawings.

3.3 REBUILDING

- 1 Allowable tolerances: Variation from plumb: 1/8" from top to bottom of wall.
2. Variation from level: plus or minus 1/4 " along entire length of wall.
3. Erect wall with joints having uniform width and accurately aligned. Do not set units above until mortar below has set sufficiently to maintain alignment and prevent extrusion.
4. Butter all joints fully; leave no voids in the work.

3.4 FINAL CLEANING

1. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure. Do not use Muriatic acid or other harsh cleaners. Use approved manufacturer's Detergent Masonry Cleaner to etch excess lime and cement and to expose aggregate at surface.
2. Use of metal scrapers or brushes will not be permitted.

4.1 PROPOSED ADDITIVE ALTERNATES

- A. General: Following is a description of the work required under the proposed ADDITIVE ALTERNATES. All work shall be done in accordance with this specification, the other specifications, and the plans.
- B. Removal of excess lime putty on arch underside: Manually remove excess lime putty using chisel and mallet to breakdown areas of 1/8 inch and greater build-up. Other mechanical and abrasive means will not be permitted.
- C. Removal of calcium deposits on arch underside: Remove all calcium deposits and dirt build-up, wash all brick and stone on the underside of the brick arch with two applications of Lime Putty Remover and one application of Heavy Duty Restoration Cleaner (3 to 1 dilution).
- D. Repointing of entire brick and stone arch underside: Repoint 100% of brick and stone arch. Joints may be cut by approved mechanical means.
- E. Repointing of entire brick and stone arch underside: Selective replacement of missing or damaged brick on arch underside at the locations indicated by and as directed by the Engineer. Approximate quantities of selective replacement for each bridge are:

Chapel Street Bridge:	70 s.f.
Bridle Path Bridge:	70 s.f.
Cove Bridge:	55 s.f.
Brookline Ave. Bridge:	10 individual bricks

END OF SECTION

**The Secretary of the Interior's Standards.
for the Treatment of Historic Properties
1992**

**U. S. Department of the Interior
National Park Service
Preservation Assistance Division
Washington, D.C.
October, 1992**

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Standards for Preservation

1. A property shall be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property shall be protected and, if necessary, stabilized until additional work may be undertaken.
2. The historic character of a property shall be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features shall be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.
4. Changes to a property that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. The existing condition of historic features shall be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material shall match the old in composition, design, color, and texture.
7. Chemical or physical treatments, if appropriate, shall be undertaken using the gentlest means possible. Treatments that cause damage to historic materials shall not be used.
8. Archeological resources shall be protected and preserved in place. If such resources must be disturbed, mitigation measures shall be undertaken.

Rehabilitation is defined as the act or process of making possible an efficient compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

Standards for Rehabilitation

1. A property shall be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.
2. The historic character of a property shall be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, shall not be undertaken.
4. Changes to a property that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and, where possible, materials. Replacement of missing features shall be substantiated by documentary and physical evidence.
7. Chemical or physical treatments, if appropriate, shall be undertaken using the gentlest means possible. Treatments that cause damage to historic materials shall not be used.
8. Archeological resources shall be protected and preserved in place. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and shall be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in a such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Restoration *is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.*

Standards for Restoration

1. A property shall be used as it was historically or be given a new use which interprets the property and its restoration period.
2. Materials and features from the restoration period shall be retained and preserved. The removal of materials or alteration of features, spaces, and spatial relationships that characterize the period shall be not be undertaken.
3. Each property shall be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate and conserve materials and features from the restoration period shall be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.
4. Materials, features, spaces, and finishes that characterize other historical periods shall be documented prior to their alteration or removal.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize the restoration period shall be preserved.
6. Deteriorated features from the restoration period shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and, where possible, materials.
7. Replacement of missing features from the restoration period shall be substantiated by documentary and physical evidence. A false sense of history shall not be created by adding conjectural features, features from other properties, or by combining features that never existed together historically.
8. Chemical or physical treatments, if appropriate, shall be undertaken using the gentlest means possible. Treatments that cause damage to historic materials shall not be used.
9. Archeological resources affected by a project shall be protected and preserved in place. If such resources must be disturbed, mitigation measures shall be undertaken.
10. Designs that were never executed historically shall not be constructed.

Reconstruction is defined as the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Standards for Reconstruction

1. Reconstruction shall be used to depict vanished or non-surviving portions of a property when documentary and physical evidence is available to permit accurate reconstruction with minimal conjecture, and such reconstruction is essential to the public understanding of the property.
2. Reconstruction of a landscape, building, structure, or object in its historic location shall be preceded by a thorough archeological investigation to identify and evaluate those features and artifacts which are essential to an accurate reconstruction. If such resources must be disturbed, mitigation measures shall be undertaken.
3. Reconstruction shall include measures to preserve any remaining historic materials, features, and spatial relationships.
4. Reconstruction shall be based on the accurate duplication of historic features and elements substantiated by documentary or physical evidence rather than on conjectural designs or the availability of different features from other historic properties. A reconstructed property shall re-create the appearance of the non-surviving historic property in materials, design, color, and texture.
5. A reconstruction shall be clearly identified as a contemporary re-creation.
6. Designs that were never executed historically shall not be constructed.

SECTION 04510

HISTORIC MASONRY RESTORATION CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

The general provisions of the Contract, including General and Supplementary Conditions, and relevant sections of these Specifications, apply to the work specified in this Section.

- A. It is the intent of this section to provide for the removal of all atmospheric dirt, staining and graffiti on the Riverway Bridges without harm to the existing stone. Wherever possible use cleaning agents designed to remove specific stains or coatings. All cleaning treatments shall be undertaken using the gentlest means possible.
- B. After completion of the graffiti and paint removal on Cove Bridge, coat with Graffiti Control as per manufacturers published instructions.
- C.. All restoration cleaning shall be consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties. A copy of this document is attached to the end of Section 04500.
- D.. The Contractor must take care to protect all existing historic fabric from damage.
- E.. Prevent chemical cleaning agents used in repointing and repair work from staining face of surrounding masonry and other surfaces. Do not allow unacceptable effluent to run-off into the river. Neutralize in place prior to rinsing. Contain and neutralize all runoff from cleaning operations. Where cleaning takes place over ground, agricultural lime spread over the affected may be acceptable. Provide all required, appropriate and proper protection for persons, property wetlands and adjacent watercourses.
- F.. Prior to commencement of masonry cleaning operations contractor shall submit to the engineer a written plan for environmental protection in conjunction with the cleaning operation. Work to commence only after written approval by the engineer of the proposed protection plan.
- G.. Note that the Contractor shall verify and be responsible for field survey of all quantities and measurements called for and/or noted in the Contract Documents. The Contractor and Sub-contractor shall notify the Project Engineer in writing, at least seven days prior to the bid due date of any variation from the quantities called for. In the absence of such notification, the Contractor, by submitting its bid, certifies agreement with and acceptance of the quantities called for.

1.02 RELATED WORK

- A. 04500 - HISTORIC MASONRY - REPOINTING

1.05 INTENT

- A. The intent of the work of this section is to clean masonry surfaces using the gentlest materials and techniques possible which produce an acceptable degree of cleaning. It is understood that some surfaces will not be fully cleaned by these methods and, when approved by the Engineer, will remain incompletely cleaned.

1.04 QUALITY ASSURANCE

- A. The subcontractor shall have not less than five years experience cleaning historic masonry.
- B. The subcontractor shall be certified by the Commonwealth of Massachusetts, Division of Capital Planning and Operations for Historic Masonry.

1.05 SAMPLE CLEANING PANELS

- A. Field-Sample Panels: Prior to start of general masonry restoration, prepare a sample cleaning panel to demonstrate use of proper materials and methods for masonry cleaning. Undertake sample panels where directed by the Engineer. Notify Engineer at least one week prior to beginning of work, so that they may be present to observe test panels. Allow sufficient time for complete and proper drying in this review process. No additional work shall be performed without prior written approval of test panels. Retain a portion of acceptable panels in undisturbed condition, suitably marked, during construction as a standard for judging work.

1.06 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, installation instructions, use limitations, and recommendations for each material used.
- B. Work Program: Submit written program for each phase of the work, including protection of surrounding materials and property. Describe in precise detail all materials, equipment, solutions, concentrations, and techniques to be used. Program shall duplicate procedures used to make accepted mockups and test panels.
- C. Environmental Regulations: In written program, describe testing, handling, containment, collection, transport, disposal and discharge of hazardous materials to be cleaned. Submit copies of local environmental regulations.

- D. Protection: In written program, describe methods for protecting surrounding areas, the Muddy River, landscaping, pedestrians, vehicles, and non masonry surfaces during the work from contact with chemical restoration cleaners, residues, rinse water, fumes, wastes and cleaning effluents.
- E. Surface Preparation: In written program, describe surface preparation to be completed prior to application of restoration cleaners.
- F. V.O.C. Certification: Submit certification that the coatings used on this project comply with all regulations controlling the use of volatile organic compounds (VOCs).

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened factory labeled packages. Store and handle in strict compliance with the manufacturer's instructions and recommendations. Protect from all damage.

1.08 PROJECT CONDITIONS

- A. Weather: Perform work only when temperature of air and surfaces to be cleaned are between 50 degrees F and 80 degrees F and forecasted temperature is expected to be 40 degrees F or above for at least one week after cleaning. Weather conditions shall also be within the limits established by manufacturers of the materials and products used if more restrictive than specified in this section.
- B. Protection: Protect persons, property, motor vehicles, non-masonry surfaces, the site and the Muddy River from injury or damage due to Contractor's operations. Do not clean during windy weather. Dispose of runoff from cleaning in a legal manner which does not cause erosion or other damage.
- C. Environmental Regulations: Comply with all State, local, and Federal environmental regulations regarding testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous waste and cleaning effluents.

1.09 COORDINATION, SEQUENCING AND SCHEDULING

- A. Conference: Convene a pre-project conference to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
- B. Sequence of Work: Perform work of this section and other sections in the optimum sequence to prevent damage to or interference with other work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cleaning Materials: All cleaning products shall be from the same manufacturer. Provide cleaning products from one of the following pre-approved manufacturers:

1. ProSoCo, Inc.
2. HydroChemical Techniques, Inc.
3. Diedrich Chemical Co.

Provide masonry cleaning materials of following types as specified in the Construction Specifications.

- B. Restoration Cleaner: Provide a general purpose acidic restoration cleaner for granite and other masonry surfaces that is proven to dissolve heavy atmospheric soiling. This is the mildest cleaning agent specified.

1. Form: Clear Liquid;
2. Color: Light Amber;
3. pH (concentrate): 1.2;
4. Specific Gravity: 1.05;
5. Flash Point: None.

- C. Heavy Duty Restoration Cleaner: A single component, concentrated, acidic cleaning compound formulated as carbon solubilizer. Designed for use with high pressure, cold water rinsing to remove atmospheric dirt, carbon stain, paint oxidation, embedded clay and mud stains, algae and mold formations from existing masonry surfaces. To be used when Regular Restoration Cleaner has inadequate strength.

1. Form: Clear Liquid;
2. Color: Light Amber;
3. pH (1:3 dilution): 2.9;
4. Specific Gravity: 1.13;
5. Flash Point: None.

- D. Acid Neutralizing Rinse: Single component, alkaline based liquid. designed for use in conjunction with acidic cleaning compounds to allow for a reduction in rinse water volume or to ensure a neutralized pH for any rinse water that may flow into the adjacent watercourse. To be used, as needed, in conjunction with restoration cleaners noted above.

1. Form: Clear Liquid
2. pH: 14.0
3. Weight per gallon: 8.8 lbs.
4. Specific Gravity: 1.06

- E. Lime Putty Remover is a blend of organic and inorganic acids combined with special wetting systems and inhibitors and is designed for the effective removal of heavy lime deposits.
1. Form: Clear Liquid
 2. Specific Gravity: 1.127
 3. pH. 0.4
 4. Wt./Gal. 9.4
- F. Heavy Duty Paint Stripper is an alkaline/solvent compound designed specifically for removing multiple layers of paint from masonry surfaces.
1. Form: Light brown gel
 2. Specific Gravity: 1.056
 3. Wt./Gal. 10.8
- G. Fast Acting Gaffiti Remover dissolves most spray paints, marking pens, lacquers and other graffiti from masonry, wood and metal surfaces.
1. Form: Clear Gel.
 2. Specific Gravity: 1.220
 3. Flash Point Over 175 degrees F
 4. Weight per gallon: 10.17 lbs.
- H. Heavy Duty Graffiti Remover is a slow working, extended contact remover that remains active for 24 hours. It is effective on brick, concrete and other masonry surfaces. It contains no methanol, methylene chloride or other halogenated solvents.
1. Form: Light Brown Gel
 2. Specific Gravity: 1.270
 3. Flash Point: Over 175 degrees F
 4. pH: 14
 5. Weight per gallon: 10.6 lbs.
- I. Ink and Shadow Remover extracts deep-seated marking pen and paint shadows that remain after the use of other graffiti removal products. Part A and B are designed for job site mixing to create a smooth poultice paste suitable for trowel application.

Dry powder - Part A

Form: Powder
Specific Gravity: 0.60
Flash Point: n/a
Weight per gallon: 9.28 lbs.

Additive - Part B

Form: Liquid
Specific Gravity: 1.113
Flash Point: 16 degrees F
Weight per Gallon: 9.28 lbs.

- J. Graffiti Control is a clear, single part , high solids protective coating formulated for application to exterior masonry surfaces. The excellent chemical resistance of the coating makes it ideal for anti-graffiti applications.

1. Form: Clear
2. Specific Gravity: 0.923
3. Flash Point - 80 degrees F
4. Weight per gallon: 7.7 lbs
5. Solids 27.4%
6. Viscosity (#4 Ford): 20 seconds

2.02 MIXING

- A. Cleaning materials should be diluted to the greatest dilution possible that will still allow desired cleaning results. Refer to paragraphs A & B in Section 1.01 - Description of Work, above.

PART 3 - EXECUTION

3.01 INSPECTION

- A. The Installer shall examine conditions under which this work is to be performed and notify the Contractor, in writing, of conditions detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected. Beginning work means Installer accepts conditions.

3.02 PREPARATION AND INSTALLATION

- A. General Requirements: Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this section. Use products, concentrations and techniques used on approved sample panels.
- B. Protection: Protect adjacent non-masonry surfaces and areas not to be cleaned from coming in contact with chemical cleaning solutions by using strippable masking agent, plastic sheeting and waterproof tape, or another effective isolator approved by the engineer.
- C. Cleaning: Do not use wire brushes, steel wool, abrasive blasting, nor high pressure water spray (over 400 psi). Work in an orderly manner, from top to bottom and from one edge of the surface to the other. Ensure complete coverage into all corners, interstices and the like.
1. Perform work in a manner to result in uniform final appearance without streaking. Do not apply chemical solutions to one area more than twice. Do not allow chemical cleaning solutions to

dwell on surfaces for periods longer than done for mock-ups,
 nor longer than recommended by the manufacturer.

2. Thoroughly rinse off chemicals and brush off surfaces with Tampico type fiber brushes as necessary to produce uniform cleaning that matches approved sample panels.

3.03 FIELD QUALITY CONTROL

- A. The Contractor shall establish and maintain throughout the work of this section an effective quality control program to ensure that work is performed as required by the Contract Documents. Establish specific procedures to prevent chemical bleaching and damage of masonry surfaces.

3.04 FINAL CLEANING & PROTECTION

- A. Re-clean masonry surfaces after repointing, using only low pressure water and brush methods recommended by Brick Institute of America. Do not use Muriatic acid or other harsh cleaners.

END OF SECTION

SECTION 05500

HISTORIC METALS

PART 1 - GENERAL

1.01 DESCRIPTION

The general provisions of the Contract, including General and Supplementary Conditions, and all Division 1 sections of the Specifications apply to the work specified in this section.

- A. All work shall be in strict conformance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*.
- B. Document and identify each railing section, its location and sequence prior to disassembly. Disassemble existing railing as required to allow for reinstallation in three bay sections. Review plan and schedule for documentation and removal of railing with Engineer prior to commencement of the work.
- C. The Contractor must take care to protect all existing fabric from damage during disassembly and reinstallation. Particular care must be taken to ensure the retention of the maximum amount of historic fabric possible. Completely remove all embedded ferrous elements set in lead in sleeves in the stone masonry structure. Cutting of posts and/or damage to stone from removal of lead shall not be permitted.
- D. Refurbish existing railing elements. Retain as much of the original historic fabric as possible. All new elements to match existing elements being replaced in dimension, configuration and texture.
- E. Where existing channel is severely damaged and/or missing, cut out section, weld in new metal, grind smooth, prepare and paint. Repair areas noted in the plans and assume 3 feet of additional repairs determined by the engineer after sandblasting.
- F. Fill with weld and grind smooth all defects greater than 1/8" deep and all existing welded joints.
- G. Tack weld all loose balusters.
- H. Fabricate and attach new stainless steel post extensions. For welding dissimilar materials to stainless steel use #309 rod. Coordinate to ensure proper fit with existing cap stones to remain.
- I. Install new cap similar and equal to Blum #4441 on refurbished top channel.
- J. Prepare shop drawings for all work specified in this section.
- K. Blast clean prior to galvanizing and painting.
- L. Reinstall in units of three pre-assembled sections. Install plumb, level and true. Match existing configuration.
- M. Set posts of restored railing in epoxy to within 1-1/2" of the top of the granite coping stones. Finish last 1-1/2" with poured lead or lead wool hammered tight and pitched to shed water away from the posts.

1.02 QUALITY ASSURANCE

- A. The Iron Restoration Contractor shall have at least five years of documentable experience with historic work of comparable size and complexity. This specialist shall have successfully completed a minimum of three comparable wrought iron restoration projects on National Register Historic Properties within the last five years.
- B. The Contractor shall submit to the Engineer a description of these three projects including name, address, current telephone numbers of the Engineers and Owners.

1.03 SUBMITTALS

- A. Submit to the Engineer for concurrence a written plan and schedule for removal and reinstallation of historic railing. This plan will include a description of how the existing railing, set in lead joints, will be removed without cutting of posts or damage to the existing cap stones. It will also include a description of shop cleaning and repair methods. Describe the particular care required to install and reassemble the railing in place and any touch-up to be employed.
- B. Submit shop drawings for all metal fabrications called for herein or on the drawings.
- C. Prior to submission of the Shop Drawings to the Engineer, they shall be pre-checked by the Contractor for conformity of detail with the Contract Documents and existing conditions and as coordinated with other work under his charge. The signature of a representative of the Contractor indicating that the drawings have been pre-checked will be required. The Contractor shall be wholly responsible for the conformity of dimensions and details of the Shop Drawings with the Contract Documents.

Shop Documents shall be submitted prior to fabrication.

- D. Historic Metals Contractor shall submit a 12+ foot section (three panels) of restored railing as a demonstration of workmanship and finish. After acceptance of restored and painted sample, the sample shall be used as a quality standard for judging all other related work.

1.04 RELATED WORK

- A. 04500 - MASONRY RESTORATION
- B. Section 01530 - Barriers and Enclosures - for temporary barricades when railings are removed.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. Bolts, Nuts and Washers: All new bolts, washers, set screw pins, rods and nuts shall be stainless steel ASTM 304.
- B. Handrail: # 4441 - 20' long Steel Handrail Moulding from Julius Blum & Co. Inc. or equal
- C. Electrodes for Welding: Comply with AWS Code.
- D. Anchor Bolts: Hilti stainless steel renovation anchors.
- E. Sealant: Two-part polyurethane sealant, Sika 2a or approved equivalent.
- F. Epoxy for setting railing posts. Sikadur - Lo-Mod epoxy resin or equal.

- G. Paint: The product given in parenthesis () is by Sherwin Williams Industrial Maintenance Coatings. Equal products by Tnemec or International Coatings may be submitted.

Preparation: Sandblast after restoration or fabrication to SSPC 10 Near-White Blast Cleaning.

1st Coat: Zinc Rich Primer: 3 mils DFT
(S.W. - Zinc Clad Primer)

2nd Coat: Epoxy Mid-Coat: 4 mils DFT
(S.W. - Recoatable Epoxy Primer)

3rd Coat: Hi-Solids Polyurethane: 4 mils DFT
(S.W. - Hi-Solids Polyurethane)

4th Coat: Hi-Solids Polyurethane: 4 mils DFT
(S.W. - Hi-Solids Polyurethane)

PART 3 - EXECUTION

3.01 FABRICATION

- A. Cut existing historic ironwork to remain in a manner that prevents any warping or distortion of the historic material and allows for smooth, even, butt joining of new to historic materials. Cuts in existing upper channel shall be made to allow for hairline joining. Obtain approval of method(s) from engineer.

3.02 ERECTION AND INSTALLATION

- A. Installation: Use nylon slings or padded cables for handling all metal fabrications, especially factory-primed or factory-finished materials.
- B. Install miscellaneous metal items and fabrications in their proper locations, anchored, rigid and secure, plumb and level unless otherwise shown, and in true alignment with related and adjoining work.

3.03 BOLT REPLACEMENT

- A. Bolts shall be removed in a manner approved by the engineer that will not damage the underlying connected material. The contractor shall be responsible for any damages inflicted as a result of his operations and shall rectify said damages to the satisfaction of the Engineer. Upon removal of each fastener the base metal around the hole shall be examined for surface irregularities and deterioration. All oxidized material shall be removed by reaming and grinding.
- B. Contact surfaces of all layers of steel through which fasteners will pass, except those which will not be exposed in the sequence of the work shall be prepared by removing all paint, oil and all other foreign substances as well as rust and loose scale.
- C. Holes may be reamed or drilled oversize as required to provide clearance for inserting or tightening new fasteners only with the permission of the Engineer. Otherwise diameter of holes shall be 1/16" larger than nominal diameter of fastener.

END OF SECTION

Appendix D: Historic Plant Lists

HISTORIC PLANS LIST

The following list of historic plans is a partial selected list of the material available for study and analysis. Our research into the available plans to date has been much more extensive than the following rather short list of plans. The plans listed are those that we have judged to be most significant, and we have, therefore, secured copies for reference purposes.

The total number of plans available at such sources as the Frederick Law Olmsted National Historic Site (FLONHS), Boston Parks and Recreation Department (BPRD), and Metropolitan District Commission (MDC) is extensive. For example, the total number of plans available for study at the Frederick Law Olmsted Historic Site (FLONHS), for the five jobs (916-Back Bay Fens; 923-Leverett Pond; 927 – Muddy River Improvement; 930 – Riverway; and 964-Olmsted Park) is over one thousand.

CHARLESGATE

- | | |
|---------------|---|
| Feb, 18, 1882 | Grading study of banks, Beacon Entrance, Back Bay Fens, by John C. Olmsted, pencil on tracing, FLONHS. |
| March 3, 1882 | Grading Plan for Beacon Entrance by John C. Olmsted, pencil on tracing, FLONHS. |
| March 1884 | Diagram that accompanied the planting contract for Beacon Entrance, Back Bay Fens, by John C. Olmsted, pencil on tracing, FLONHS. |
| c. 1885 | Tree planting plan for the northern basin, Back Bay Fens, by W.L. Fischer, pencil on tracing, FLONHS. |
| 1897 | Charlesgate, Ipswich Street Pier of Bridge on Charlesgate West and Grading, scale as indicated, Boston Street Department. |
| 1899 | Charlesgate, Sea Wall, Gate Chamber & Filling, The Fens, BPRD#12207A, scale as indicated. |
| 1912 | Charlesgate, Commonwealth Avenue Treatment of Subway Incline, Details of Entrance and Portal, Arthur Shurtleff, BPRD, scale 1/4"=1'. |
| 1912 | Charlesgate, Lower basin record construction plan, Berkley Street to Charlesgate West, Charles River Reservation, MDC#9285, scale 1"=50'. |
| 1921 | Charlesgate, Back Bay Fens Compiled Plan, Arthur A. Shurtleff, BPRD, scale 1"=40'. |
| 1923 | Charlesgate, plan for the vicinity of The Charlesgate, Arthur Shurtleff, BPRD, scale 1"=40'. |
| 1923 | Charlesgate, Plan for the vicinity of the Charlesgate and Commonwealth Ave., Arthur Shurtleff, BPRD, scale 1"=40'. |
| 1925 | Charlesgate, Reconstructing Fens Roads, BPRD#12229A, scale 1"=40'. |

1926	Charlesgate, Study for the vicinity of Gaston Square, Back Bay Fens, Arthur Shurtleff, BPRD, scale 1"=40'.
1928	Charlesgate, proposed changes at Charlesgate, Arthur Shurtleff, BPRD, CBA FE0021PM, scale 1"=80'.
1930	Commonwealth Avenue, Proposed underpass on Commonwealth Avenue, Arthur Shurtleff, BPRD CBA CA0002PM scale 1"=40'.
1931	Charlesgate, Charles River Basin, Preliminary Plan, Arthur Shurtleff, City Archives MS0006PM, scale 1"=200'.
1931	Charlesgate, Plan for the Vicinity of Gaston Square, Back Bay Fens, Arthur Shurtleff, BPRD, CBA CA0003PM, scale 1"=40'.
1932	Charlesgate, Charles River Basin, Widening and Extension of Boston Embankment near Mt. Vernon street to Longfellow Bridge, Construction plans, MDC#21007, scale 1"=50'.
1932	Commonwealth Avenue, Governor's Square, Plan for Central area, Arthur Shurtleff, FE0021PM scale 1"=40'.
1934	Charles River Basin, Planting Plan for Shrubs, MDC, Arthur Shurtleff, BPRD#21905, scale 1"=50'.
1935	Commonwealth Ave. Governor's Square, Proposed Planting Plan, Arthur Shurtleff, BPRD CBA FE0021PM, scale 1"=40'.
1949	Charlesgate, Charles River Basin, Cottage Farm Bridge to Charlesgate West, MDC, #21383, scale 1"=50'.
1951	Charlesgate, Charlesgate interchange, Storrow Memorial Drive, Construction plans, MDC#30508X, scale 1"=40'.
1956	Charlesgate, Storrow Drive, Storage-controlled Traffic Signal System, layout plan and controller data, MDC#34671X, scale 1"=20'.
1956	Charlesgate, Commonwealth Avenue reconstruction traffic signal system, Charlesgate East and West, MDC#35430X, scale 1"=50'.
1957	Charlesgate, Charles River Reservation, Record Plans, Storrow Drive, Boston University Bridge to Fiedler Bridge, Embankment Road, Fiedler Bridge to Nashua Street, BPRD, scale 1"=50'.
No date c. 1930's	Charlesgate, Back Bay Fens, proposed Waterways between the Fens and the Charles River basin, (2 sheets), Arthur Shurtleff, BPRD, scale 1"=40'.
No date c. 1930's	Charlesgate, Plan for the vicinity of Charlesgate and Commonwealth Avenue, Arthur Shurtleff, BPRD, scale 1"=40'.
No date c. 1930's	Charlesgate, Compiled survey of vicinity of Gaston Square, Back Bay Fens, Arthur Shurtleff, BPRD, scale 1"=40'.

BACK BAY FENS

- Dec. 4, 1878 Back Bay Park Plan Showing Contour of Hard Bottom (survey), FLONHS #916-1A, scale 1"=100'.
- 1879 Proposed Improvement of Back Bay, Olmsted's first published plan, Lithograph, FLONHS, scale 1"=100'.
- 1885 Improvement of Back Bay Showing Progress of Portions of Work to Dec. 31, 1885, FLONHS, scale 1"=100'.
- 1887 Map of the Back Bay Fens Showing the Public Ways Commonwealth Avenue, Beacon Street and Audubon Road, FLONHS, scale 1"=200'.
- 1894 Park System from Common to Franklin Park including Charles River, Muddy River Improvement, Leverett Park, Jamaica Park, Arborway and Arnold Arboretum, FLONHS, Scale 1"=400'.
- 1895 The Fens Sketch for Location of Boat House at Huntington Entrance, FLONHS, scale 1"=40'.
- 1895 The Fens Sketch for Location of Landing and Storehouse and Storehouse for Boats near Hunting Entrance, FLONHS, scale 1"=40'.
- Jul. 30, 1902 Plan of Lands in Back Bay belonging to Boston Water Power Co., revised October 1907, scale 1"=400'.
- Feb. 1912 Back Bay Fens Plan for the Extension of Jersey Street, Arthur A. Shurtleff, BPRD, scale 1"=40'.
- Aug. 1912 Back Bay Fens Sketch Plan Showing Location for Small Stadium and Small Base Ball Stand, BPRD, Arthur A. Shurtleff, no scale.
- 1912 Back Bay Fens Playgrounds in Vicinity of the Proposed Jersey Street Extension, BPRD, Arthur A. Shurtleff, scale 1"=40'.
- Nov. 1919 Back Bay Fens Plan for the Extension of Jersey Street, Arthur A. Shurtleff, BPRD, scale 1"=40'.
- 1921 Diagram of Tentative Contours to Accompany Revised General Plan for Back Bay Fens, Arthur A. Shurtleff, scale 1"=100'.
- 1921 Filling Studies for 1921 Compiled Surveys. BPRD#12210A-12215A.
- 1921 Compiled Survey Back Bay Fens, scale 1"=150' (master key plan) for sheets 2 through 8, Arthur A. Shurtleff, BPRD#12002J scale 1"=40'.
- 1921 Compiled Survey (sheets 2 through 8) BPRD#12227A-12221A(respectively), scale 1"=40'.
- Feb. 1922 Back Bay Fens, Plan for the Vicinity of the Museum of Fine Arts, Arthur A. Shurtleff, CBA-FE0017AM scale 1"=40'.
- 1923 Back Bay Fens, Plan for Athletic Field, Arthur A. Shurtleff, BPRD#12007A scale 1"=40'.

1923	Back Bay Fens, Contour Plan for Grading, vicinity of Meadows South of Richardson Bridge, Arthur A. Shurtleff, scale 1"=40'.
April, 1927	Back Bay Fens Plan for Vicinity of the Museum of Fine Arts, BPRD, Arthur A. Shurtleff, scale 1"=40'.
1927	Back Bay Fens, Grading and Loaming at Fens Athletic Field Back Bay, BPRD#12228A, scale 1"=40'.
1927	Excavating, Filling, Loaming and Dredging in the Fens between Boylston Street, Audubon Road, Fenway and Agassiz Road., BPRD#12231A, scale 1"=40'.
1927	Fens Playground, Arthur A. Shurtleff, BPRD, scale 1"=40'.
1927	Back Bay Fens, Grading and Loaming in the Fens Between Audubon Road and Fens Pond, BPRD#12235A, scale 1"=40'.
1927	Back Bay Fens, The Lagoon Opposite Art Museum, BPRD#12234A, scale 1"=40'.
1927	Back Bay Fens, Fens improvement opposite Art Museum, BPRD#12232A, scale 1"=40'.
1928	Compiled Survey, City of Boston, from Brookline Avenue at Sears to Perkins and the Jamaicaaway only to Burroughs St., Arthur A. Shurtleff, scale 1"=80'.
1929	Back Bay Fens, Filling and Loaming in Fens Athletic Field, Back Bay, BPRD#12239A, Arthur A. Shurtleff, scale 1"=40'.
1927	Fens Pond-Back Bay, rustic wooden bridges, BPRD#12233A, scale ½"=1'.
1929	Back Bay Fens, Building Granite Composite Bleachers in the Fens Athletic Field, Back Bay, BPRD#12237A.
1930	Back Bay Fens, no title, Grading and dredging study for the lagoon and lawn area with sections to show grading, BPRD, scale 1"=40'.
April 29, 1931	Back Bay Fens Vicinity of Art Museum, BPRD, Arthur A. Shurtleff, scale 1"=40'.
1931	Fens Playground, BPRD, Arthur A. Shurtleff, scale 1"=40'.
1931	Back Bay Fens, enlargement of Rose Garden, Arthur A. Shurtleff, scale ¼"=1'.
1931	Back Bay Fens, Rose Garden, details for water basin, BPRD, Arthur A. Shurtleff, scale ½"=1'.
1931	Back Bay Fens, sections, BPRD, no scale.
1931	Back Bay Fens, no title, Plan showing the Layout of the Rose Garden, BPRD, Arthur A. Shurtleff, no scale.
1933	Back Bay Fens, No Title, Plan for Athletic Field and Lagoon Behind Museum of Fine Arts, Arthur A. Shurtleff, no scale.
Feb.18, 1933	Back Bay Fens Sketch for Lagoon near Art Museum, BPRD, Arthur A. Shurtleff, scale 1"=40'.

1934	Back Bay Fens, Rose Garden, Plan, showing location of interior beds and arches, Arthur A. Shurtleff, scale 1"=20'.
1948	Park Drive, Aggasiz Road, BPRD, scale 1"=30'.
1959	Back Bay Fens, The Fens—North Meadows, Preliminary Plan of Proposed Parking Area, BPRD#12208B, scale 1"=40'.
1989	Proposal for Sears Parking Lot, Olmsted Plaza Association, scale 1/32"=1'.
No date c. 1930's	Back Bay Fens, Jersey Street Extension, Arthur A. Shurtleff, scale 1"=150'.
No date c. 1930's	Back Bay Fens, Sketch for Jersey Street Extension, BPRD, scale 1"=300'.

RIVERWAY

July 23, 1881	Plan of Proposed Muddy River Improvement showing contours, left and right halves, Riverway and Olmsted Park, (survey prior to Olmsted's work), FLONHS #930-1, scale 1"=100'(2 photos).
1890	Riverway (Boston Side) Grading Plan Downer Street Section D, BPRD#14202B, scale 1"=40'.
1890	Riverway (Boston Side) Grading Plan, Section A, BPRD#14005A, scale 1"=40'.
1890	Riverway (Boston Side) Grading Plan, Section B, BPRD#14003A, scale 1"=40'.
1890	Riverway (Boston Side) Grading Plan, Section C, BPRD#14002A, scale 1"=40'.
Dec. 1891	Muddy River Improvement, Planting Plan along B & A R.R. from St. Mary's to Longwood Ave, right and left halves, FLONHS #927-90, Scale 1"=20'(2 photos).
Dec. 1891	Muddy River Improvement, Planting Plan, Downer Street Section, right and left halves, FLONHS #927-93, Scale 1"=20'(2 photos).
Dec. 1891	Muddy River Improvement, Planting Plan along B & A R.R., right side, FLONHS #927-91, scale 1"=20'(photo).
Mar. 12, 1892	Muddy River Improvement, right and left halves, Along B & A R.R.-planting study with views, FLONHS #927-96, scale 1"=20' (2 photos).
Dec. 1892	Plan of the Parkway between Muddy River Gate House and Jamaica Park, FLONHS# 923-95B, scale 1"=100' (also photo)
Mar. 7, 1892	Planting study with massings and views from Riverway, Saint Mary's to Longwood Avenue, FLONHS #927-95, scale 1"=20'.
Mar. 12, 1892	Planting study with massings and views from Riverway, along B & A RR FLONHS #927-96, scale 1"=20'.
Mar. 1892	Muddy River Improvement, Island Section Planting Plan, Brookline Avenue to B & A R.R., (date on plan is Dec 1891), FLONHS #927-92, scale 1"=20'(photo).

- Mar. 12, 1892 Planting study with massings and views from Riverway, Island Section FLONHS #927-97, scale 1"=20'.
- Mar. 12, 1892 Muddy River Improvement, right and left halves, Island Section, planting study with views, FLONHS #927-97, scale 1"=20' (2 photos).
- Mar. 13, 1892 Planting study with massings and views from Riverway, Downer Street Section FLONHS #927-98, scale 1"=20'.
- Mar. 13, 1892 Muddy River Improvement, right and left halves, Downer Street Section, planting study with views, FLONHS #927-98, scale 1"=20' (2 photos).
- Apr. 11, 1892, Planting study with massings and views from Riverway, Longwood Avenue to Francis Street, FLONHS #927-102, scale 1"=20'.
- Apr. 12, 1892 Planting study with massings and views from Riverway, Island Section FLONHS #927-106, scale 1"=20'.
- Apr. 12, 1892 Planting study with massings and views from Riverway, Downer Street Section FLONHS #927-107, scale 1"=20'.
- Apr. 14, 1892 left and right halves of Planting Plan for Muddy River Improvement, Section from Longwood Avenue to Francis Street, FLONHS #927-103, scale 1"=10' (2 photos).
- Mar 1892 (Drawing also states Dec 1891) Grading Plan, Brookline Side, Muddy River Improvement Island Section from Brookline Avenue to the B & A R.R., FLONHS#927-92, scale 1"=20'.
- 1893 The Parkway, Topographic Plan for Planting Study Section 1 Brookline Ave. to St. Mary's, FLONHS#930-60, scale 1"=10'.
- 1893 The Parkway, Topographic Plan for Planting Study Section 2 St. Mary's to Longwood, FLONHS#930-61, scale 1"=10'.
- 1893 The Parkway, Topographic Plan for Planting Study Section 3 Longwood to Brookline Ave. St. Mary's, FLONHS#930-62, scale 1"=10'.
- 1893 The Parkway, Topographic Plan for Planting Study Section 5 Brookline Ave. to Tremont St., FLONHS#930-63 scale 1"=10'.
- Jan. 9, 1893 Riverway, Audubon Road to Saint Mary's, Enlargement for planting, FLONHS#930-55, scale 1"=20'(photo)
- 1894 Riverway and Leverett Park, Plan showing position of electric lights and conduits (sheet # 1), BPRD#14203A, scale 1"=40'.
- 1894 Riverway and Leverett Park, Plan showing position of electric lights and conduits (sheet # 3), BPRD#14202A scale 1"=40'.
- 1894 Riverway and Leverett Park, Plan showing position of electric lights and conduits (sheet # 5), BPRD#18214A, scale 1"=40'.
- 1894 Riverway and Leverett Park, Plan showing position of electric lights and conduits (sheet # 6), BPRD#14200A, scale 1"=40'.
- 1894 Riverway and Leverett Park, Plan showing position of electric lights and conduits (sheet # 7), BPRD#14203A, scale 1"=40'.

- 1921 Riverway, Record Plan, (Sheet 2), BPRD#14206A, scale 1"=40'.
- 1922 Riverway, Record Plan, (Sheet 3), BPRD#14207A, scale 1"=40'.
- 1942 Riverway, Fenway to Huntington Ave., BPRD#14215, scale 1"=200'.
- 1951 Construction of By-pass Roadway between Park Drive and Riverway, BPRD #14217A, scale as noted.
- 1960 Arborway-Jamaicaway-Riverway Construction plans (12 sheets) Center St. to Longwood Avenue, MDC, scale 1"=40'.

OLMSTED PARK

- July 23, 1881 Plan of Proposed Muddy River Improvement showing contours, left and right halves, Riverway and Olmsted Park, (survey prior to Olmsted's work), FLONHS #930-1, scale 1"=100' (2 photos).
- 1881 General Plan for the Sanitary Improvement of Muddy River and for Completing a Continuous Promenade Between Boston Common and Jamaica Pond, Lithograph, FLONHS, scale 1"=100'.
- c.1890 Olmsted Park, Grading Plan, Section D, BPRD, #18204A, scale 1"=40'.
- c.1890 Olmsted Park, Grading Plan, Section E, BPRD, #18205A, scale 1"=40'.
- c.1890 Ward's Pond, Grading Plan, BPRD, #18207A, scale 1"=40'.
- Dec. 1891 Muddy River Improvement, Planting Plan, Brookline Road from Washington Street to Cumberland Avenue, right and left halves, FLONHS #927-94, Scale 1"=20' (2 photos).
- 1892 Olmsted's revised plan for the Muddy River Improvement titled Plan of the Parkway Between Muddy River Gate House and Jamaica Park, as published in 1892, Lithograph, FLONHS, scale 1"=100'.
- Oct. 18, 1892 Leverett Park, Grading Study, Willow Pond Road and Perkins Street, FLONHS #923-52, scale 1"=40'.
- 1892 Outline of revised Plan for the Parkway and Sanitary Improvement of the Muddy River, dated 1889, FLONHS #930-81, scale 1"=300', with notes by John Charles Olmsted and Warren Manning, dated 1892.
- Mar. 15, 1893 Muddy River Improvement, Planting Plan from Cumberland Avenue to Chestnut Street FLONHS #927-137 & FLONHS #927-136, scale 1"=20'.
- *Mar. 15, 1893 Muddy River Improvement, Planting Plan from Cumberland Ave. to Chestnut Street (includes plant list). FLONHS #927-136, scale 1"=20'.
- Apr. 20, 1893 Leverett Park, The Parkway, Grading plan for Walks and Ponds between Willow Pond Road and Perkins Street, FLONHS #923-99, scale 1"=40'.
- Feb. 8, 1893 Topographic Plan for Planting Study, Planting Plan Washington Street to Cumberland Avenue, FLONHS #927-133, scale 1"=10'.

Feb. 9, 1893	Topographic Plan for Planting Study, Section 6-from Cumberland Road to Highland Road, FLONHS #923-94, scale 1"=10'
1896	Leverett Park, Drain between Bynner Street and Leverett Pond, BPRD #18218A, scale 1"=40'.
1898	Leverett Pond Grading Plan (also labeled as Olmsted Park engineering drawing 1903), John Furlong, Brookline Park Department, scale 1"=50'
1930	Planting on Riverway and Olmsted Park, BPRD #14208A, scale 1"=40'.
1929	Olmsted Park, (Sheet 1 of 5) Works Progress Administration (WPA) Project #15401 BPRD #18203A, scale 1"=40".
1930	Olmsted Park, (Sheet 2 of 5) WPA Project #15401, BPRD #18202A, scale 1"=40".
1933	Jamaicaway, Jamaica Pond Outlet and Overflow to Ward's Pond, BPRD, scale as indicated.
Dec. 1936	Leverett Pond, Planting Plan, (2 sheets), BPRD # 2473, scale 1"=20'.
1984	Shore Line Rehabilitation of Leverett Pond, Town of Brookline DPW, scale 1"=40'.
No date	The Parkway, Grading Plan for walks and ponds between Willow Pond and Perkins Street, BPRD #18000A, scale 1"=40'.

FLONHS	Frederick Law Olmsted National Historic Site
BPRD	Boston Parks & Recreation Department
MDC	Metropolitan District Commission
BPL	Boston Public Library
Brookline PL	Brookline Public Library
SPNEA	Society for the Preservation of New England Antiquities

HISTORIC PLANT LISTS

The following list of Historic Plant Lists is the published lists. We are currently preparing a list that will cite the original lists at the Frederick Law Olmsted National Historic Site (FLONHS). It should be noted that what Cynthia Zaitzevsky has published in Frederick Law Olmsted and the Boston Park System. Cambridge, MA., Harvard University Press, 1982 are exact versions of given original lists from FLONHS. Additional lists that has not been published, but are available at FLONHS have been included.

Back Bay Fens

Fischer, William L. "Key to Tree Planting Plan for the Northern Basin of the Back Bay Fens, ca. 1885, FLONHS (reproduced in Cynthia Zaitzevsky, Frederick Law Olmsted and the Boston Park System. Cambridge, MA., Harvard University Press, 1982, 190.

Olmsted, Frederick, Law. Plants for Beacon Entrance, 1884. Reconstructed from Olmsted's letters to F. L. Temple, the contract between the Boston Park Commission and Temple, and Charles Eliot's diaries. Published in Cynthia Zaitzevsky, Frederick Law Olmsted and the Boston Park System. Cambridge, MA., Harvard University Press, 1982, 188.

Olmsted, Olmsted and Eliot, Warren H. Manning, Superintendent of Planting. Order for Plants for the John Boyle O'Reilly Monument, August 9, 1897. FLONHS.

Riverway

Muddy River Improvement Plant Lists for Brookline and Boston, 1892 and 1893. Published in Cynthia Zaitzevsky, Frederick Law Olmsted and the Boston Park System. Cambridge, MA.: Harvard University Press, 1982, 216-218.

Plants deleted by Sargent from April 1892 plant list for Brookline side: Saint Mary's Street to Cumberland Avenue. Published in Cynthia Zaitzevsky, Frederick Law Olmsted and the Boston Park System. Cambridge, MA.: Harvard University Press, 1982, 219

Additional plants ordered by Olmsted firm for Brookline, 1893. Published in Cynthia Zaitzevsky, Frederick Law Olmsted and the Boston Park System. Cambridge, MA.: Harvard University Press, 1982, 220.

Olmsted Firm list prepared for William Fisher for the Boston side of the Muddy River and Olmsted Park, 1893, FLONHS.

**Appendix E: MEMORANDA OF AGREEMENT BETWEEN
CITY OF BOSTON AND TOWN OF BROOKLINE**

**1999 MEMORANDUM OF AGREEMENT BETWEEN CITY
OF BOSTON AND TOWN OF BROOKLINE**

**MEMORANUM OF AGREEMENT
BETWEEN
CITY OF BOSTON AND TOWN OF BROOKLINE**

AGREEMENT made this 8th day of June by and between the Town of Brookline, a municipal corporation located in Norfolk county, Massachusetts acting through its Department of Public Works (hereinafter, "Brookline") and the City of Boston, a municipal corporation located in Suffolk County, Massachusetts acting through its Parks and Recreation Department (hereafter, "Boston").

WHEREAS, the Muddy River in the Emerald Necklace is a joint responsibility of Boston and Brookline due to the municipal boundaries running through the center of the Muddy River, Leverett Pond, the Bubbling Brook, Willow Pond, and the stream from Wards Pond (See Exhibit "A"); and,

WHEREAS, Boston and Brookline seek to remedy the flooding, water quality, and habitat of the Muddy River system through the engineering and construction of restoration work; and,

WHEREAS, the Federal Emergency Management Agency (hereinafter, "FEMA"), the Federal Housing and Urban Development (hereinafter, "HUD") and the Massachusetts Emergency Management Agency (hereinafter, "MEMA") have granted funds for flood hazard mitigation of the Muddy River, and the Commonwealth of Massachusetts Department of Environmental Management (hereinafter "DEM"), the Boston Water and Sewer Commission (hereinafter, "BWSC") and the Brookline Public Works Department have allocated funds for the Muddy River; and,

WHEREAS, Boston and Brookline seek to investigate and secure additional monies for the Muddy River Restoration; and,

WHEREAS, it has been determined that a jointly undertaken design and contract process will inure to the mutual benefit of the citizens of Boston and Brookline; and,

NOW, THEREFORE, in consideration of the mutual covenants herein contained, the sufficiency of which is hereby acknowledged, the parties hereto do mutually agree as follows:

ARTICLE I. PARTIES RESPONSIBILITIES

A. Boston shall:

1. in accordance with applicable provisions of Massachusetts General Laws, contract for design and construction services to accomplish the goals of the restoration of the Muddy River; and,
2. through contract services, provide all labor, equipment, materials, and other services necessary for the Phase I Muddy River work as described in "The Emerald Necklace Environmental Improvements Master Plan; Phase I Muddy River Flood Control, Water Quality and Habitat Enhancement; Environmental Notification Form, January 1999;" and,
3. prior to publication or execution, provide Brookline with all documents related to the above described work; and,
4. notify Brookline in writing of any change in the Scope of Work as defined through the contract documents, including therein an explanation of the same so that any necessary amendment or revision to the contract agreement may be made to cover the work; and

5. furnish to Brookline a written report on the progress of the project as such reports are produced in accordance with the provisions of the contract documents.

Brookline shall:

1. upon request, be permitted to inspect and copy all records related to the work;
and,
2. at all reasonable times, have access to the work site to inspect the work; and,
3. provide existing specifications or drawings for any projects or programs that impact the Muddy River and its watershed; and,
4. review all documents provided by Boston in timely manner;
5. provide a detailed maintenance plan to Boston, delineating the care and responsibilities for the upkeep of all improvements pursuant to the provisions of this agreement; and
6. Cooperate and assist Boston with scheduling and communicating to Brookline regulatory agencies and coordinating public meetings and hearings.

ARTICLE II. INCORPORATION

This Agreement is subject to the terms and conditions of the Massachusetts Standard Contract, and attachments appurtenant thereto, by and between the City of Boston and the Commonwealth of Massachusetts Department of Environmental Management relative to the Muddy River.

ARTICLE III. MUTUAL COOPERATION

Boston and Brookline shall designate representatives to meet regularly with the Citizens Advisory Committee, Massachusetts Environmental Protection Agency, and other agencies as necessary for the purposes of design review and project status reports.

ARTICLE IV. INDEMNIFICATION/LIABILITY

Any contractor working on the project shall indemnify Boston and Brookline, and their officers, agents, servants and employees against any and all claims, suits or liability of any nature whatsoever arising out of or resulting from the project in the amount of forty-five million dollars (\$45,000,000).

ARTICLE V. TIME/METHOD OF PAYMENT

1. Boston shall act as the fiscal agent for Brookline. Boston shall finance the planning, design, engineering, permitting, and construction associated with the Muddy River restoration, and be reimbursed by FEMA, HUD, MEMA, DEM and other agencies for expenditures made pursuant to the terms of their respective agreements.
2. In the event of additional work, involving costs not provided for by any other grant program or existing appropriated municipal funds, Brookline shall consider, subject to appropriation and subject to prior approval by Brookline, paying Boston for all or a portion of the additional work upon its completion. Should Brookline not approve Funds for additional work, then Boston has no obligation to conduct additional work involving costs not otherwise provided for and has complete discretion as to what additional work, if any it will undertake.
3. Proposals from Boston for additional work, shall be approved in advance by Brookline except in the case of a condition which is an actual threat to the public safety in which case Boston shall endeavor to notify Brookline of the need for the work as soon as practicable.

ARTICLE VI. RECORD KEEPING AND REPORTS

Boston shall keep accurate and comprehensive records of the services performed, the costs incurred and the reimbursements and contributions received. Every six months and upon termination of this agreement, Boston shall make available all records for Brookline to prepare a financial statement detailing, among other things, the services performed, the costs, incurred and reimbursements and contributions received for the work in the previous six months.

ARTICLE VII. SEVERABILITY

If any provision of this Agreement is declared or found to be illegal, unenforceable, or void by a court of competent jurisdiction, then both parties shall be relieved of all obligations under that provision. The balance of the Agreement shall be enforced to the full extent permitted by Massachusetts law unless one or both parties would be materially prejudiced.

ARTICLE VIII. ARTICLE HEADINGS

The headings of the Articles set forth herein are for convenience or reference only and are not a part of this Agreement and shall be disregarded in construing or interpreting any of the provisions of this Agreement.

ARTICLE IX. GOVERNING LAW

This agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts.

ARTICLE X. TERM

This Agreement shall take effect as of the day and year first written above and shall terminate on June 30, 2005, or upon completion of the Muddy River restoration,

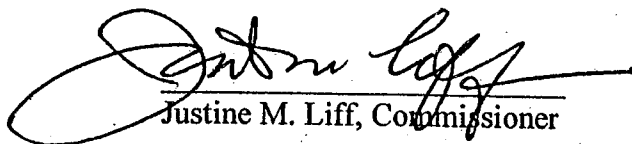
whichever is sooner; provided that, in the event that funding is not available, or for any reason whatsoever, cannot be made available for this project, this Agreement shall terminate.

In the event that Boston is notified by the FEMA, HUD, MEMA, DEM, or other funding agency that the project is terminated, Boston shall immediately notify Brookline in writing and, thereafter, neither Boston nor Brookline shall have any obligations under this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their respective duly authorized representative.

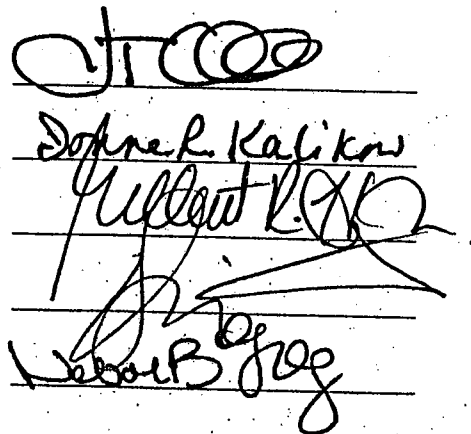
CITY OF BOSTON

By: The Parks and Recreation
Department

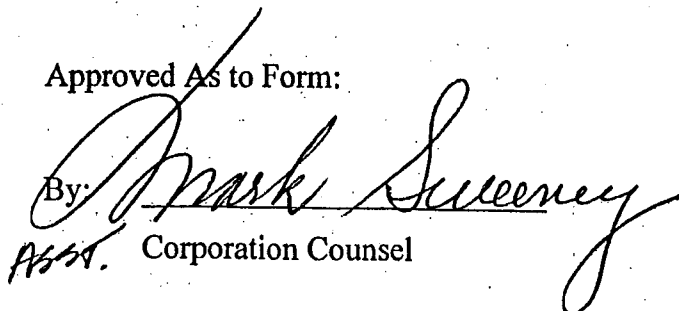

Justine M. Liff, Commissioner

TOWN OF BROOKLINE

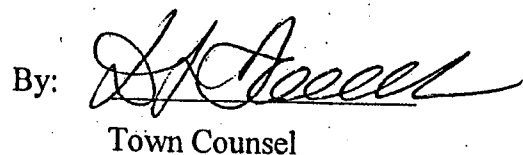
By: Board of Selectmen


Daniel Kalikow
Pullover R. K. K.
W. B. B. B. B.

Approved As to Form:

By: 
Mark Sweeney
Asst. Corporation Counsel

Approved As to Form:

By: 
H. Stacey
Town Counsel

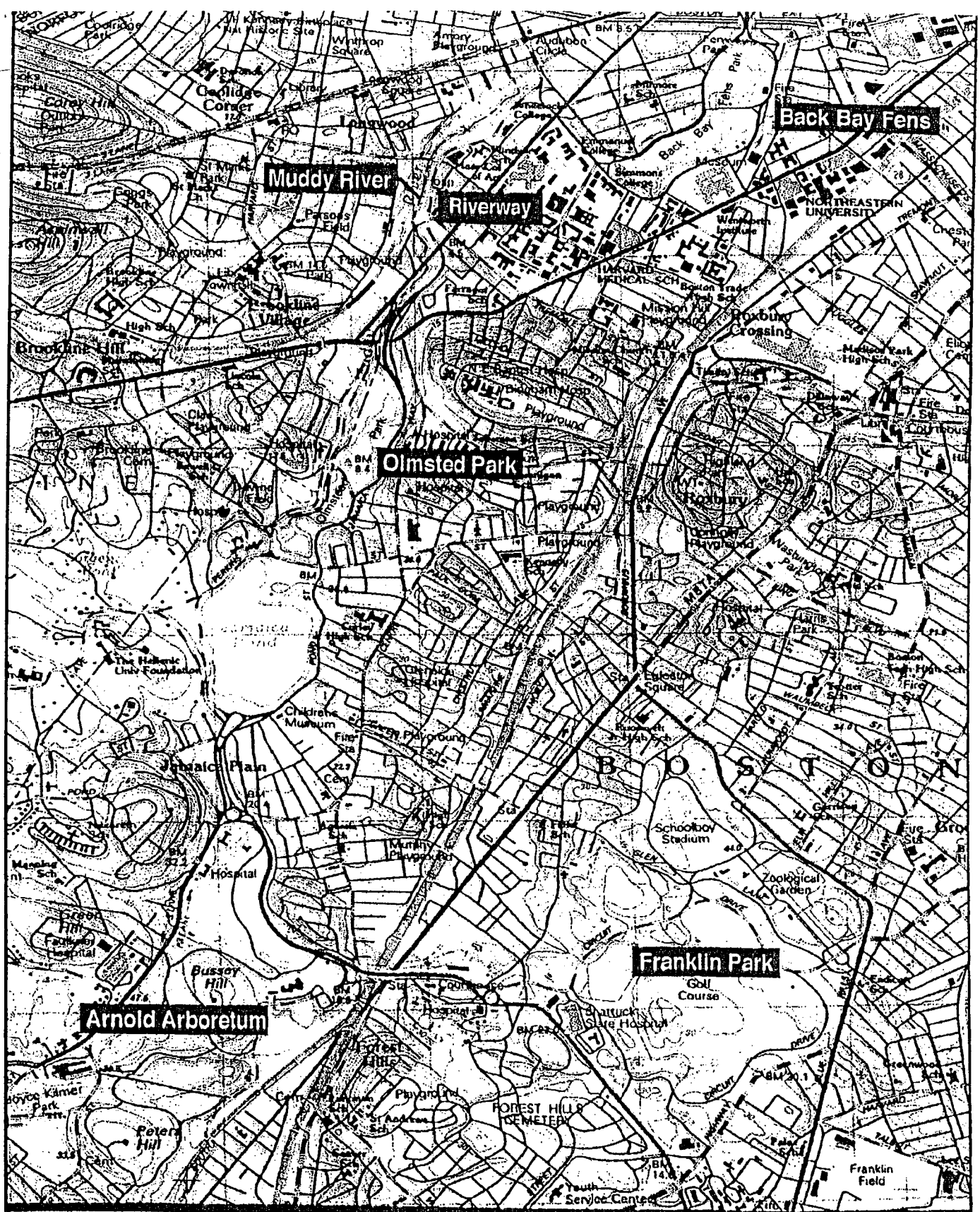


EXHIBIT "A"

PROJECT LOCATION

SOURCE: U.S.G.S. (1987)



Boston Parks
and Recreation
Department

***Emerald Necklace Environmental
Improvements Master Plan***
Environmental Notification Form
Boston, Massachusetts

Figure **CORTELL
ASSOCIATES**

0' 2083'

1



DRAFT MEMORANDUM OF AGREEMENT BETWEEN CITY OF BOSTON AND TOWN OF BROOKLINE

- **Draft Memorandum of Agreement**
- **Memorandum from Emerald Necklace Conservancy**
- **MMOC Draft of Memorandum of Agreement**

**MEMORANDUM OF AGREEMENT
BY AND AMONG
THE EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, THE DEPARTMENT OF CONSERVATION
AND RECREATION¹, THE CITY OF BOSTON, THE TOWN OF BROOKLINE, THE EMERALD
NECKLACE CONSERVANCY, THE MAINTENANCE AND MANAGEMENT OVERSIGHT COMMITTEE,
CONCERNING ROLES AND RESPONSIBILITIES FOR
MAINTENANCE AND MANAGEMENT FOR THE
MUDDY RIVER RESTORATION PROJECT
IN THE CITY OF BOSTON AND THE TOWN OF BROOKLINE**

WHEREAS, Frederick Law Olmsted left the people of the nation and of the Commonwealth of Massachusetts a magnificent historic, cultural and environmental legacy of public parks and open spaces;

WHEREAS, in January of 1984 the Commonwealth of Massachusetts committed itself to reclaiming that legacy by creating the Olmsted Historic Landscape Preservation Program and the “Emerald Necklace Master Plan” of 1990, updated in 2001; and, the Commonwealth’s mission is to preserve significant historic landscapes and to encourage the public’s appreciation, understanding, wise use and maintenance of this historic legacy;

WHEREAS, the health, safety and quality of life of the residents and communities of Boston and Brookline have been threatened by and subject to flooding, impaired water quality and degraded habitat related to the Muddy River in the Boston Park System known as the Emerald Necklace;

WHEREAS, in accordance with a Memorandum of Agreement (“MOA”), dated June 8, 1999, the City of Boston and the Town of Brookline---accepted responsibility for the implementation of the Emerald Necklace Environmental Improvements Master Plan and the Phase I Muddy River Flood Control, Water Quality, Landscape Restoration and Habitat Enhancement Project (EOEA# 11865) (the master plan and the projects contained therein and Phase I for the area between the Charles River and Perkins Street by Jamaica Pond collectively referred to as the “Project”, and the first portion of Phase I referred to as “Charlesgate”);

WHEREAS, the Executive Office of Environmental Affairs (“EOEA”), the Department of Environmental Management, the Massachusetts Emergency Management Agency, the Boston Water and Sewer Commission, the Town of Brookline (“Town”) and the City of Boston (“City”) committed to a Memorandum of Understanding, dated November 4, 1999, concerning the funding and administering of the planning, permitting, and design of Phase I of the Project and the construction and implementation of Charlesgate, and in which the City and Town accepted responsibility for their respective shares of future maintenance and management activities, including the implementation of best management practices, as will be identified in a maintenance and management plan, to be submitted jointly by the City and the Town to the Secretary of Environmental Affairs, and to be reviewed as part of the review for adequacy of the environmental impact report pursuant to the Massachusetts Environmental Policy Act (“MEPA”), sections 61-62H of Chapter 30 of the General Laws and its associated regulations;

¹ The Department of Conservation and Recreation is the successor agency to both the Department of Environmental Management and the Metropolitan District Commission pursuant to Chapters 26 and 41 of the Acts of 2003.

WHEREAS, the Secretary of Environmental Affairs issued pursuant to MEPA a certificate, dated May 1, 2003 reaffirming that maintenance and management are key to ensuring that the Project meets its long-term goals and that the significant public investment in the project, is adequately protected; and the certificate further acknowledges the need and requirement to clearly define the structure, roles and responsibilities, and develop adequate enforceable commitments for long-term maintenance and management of the Project area to protect the substantial investment, both the incurred and anticipated, of federal, state, and local public funds to implement the Project, for which the state is assuming most of the City's and the Town's share of the non-federal portion of the capital costs of the Project in recognition of the commitment by the City and Town to the implementation of such long-term maintenance and management obligations;

WHEREAS, the Secretary of Environmental Affairs required the establishment, pursuant to the Final Record of Decision on the Phase One Waiver concerning Charlesgate, of an independent oversight committee known as the Muddy River Restoration Project Maintenance and Management Oversight Committee ("MMOC");

WHEREAS, the parties firmly believe that ongoing coordination between the Parties, the development of public-private partnerships, fostering public education and participation and the evaluation of the short- and long-term maintenance and management are critical components of ensuring appropriate stewardship of the Project area;

WHEREAS, the parties agree that proper maintenance and management are critical for achieving all of the project goals, as absent these elements, sediment will quickly reaccumulate in the river, degrading water quality and wildlife habitat and endangering the historic landscape with the direct threat of invasive species and the indirect threat of benign neglect;

WHEREAS, the parties to this memorandum (hereinafter the "parties") believe it is appropriate to recognize and outline their respective roles and responsibilities relative to maintenance and management of the Project area to ensure the preservation and protection of this unique Olmsted park system;

NOW, THEREFORE, in order to clearly define the roles and responsibilities for certain maintenance and management activities associated with the Project area, the parties agree as follows:

1. Purpose. The parties commit to this agreement concerning the Project to:
 - (a) protect the substantial public investment to restore, improve, and provide proper stewardship of the natural, recreation, and cultural resources in the Project area;
 - (b) comply with state, federal and local laws and permits, and the anticipated conditions of state and federal project agreements associated with the Project;
 - (c) make clear the roles and responsibilities for the implementation of the required maintenance and management plan in a transparent and comprehensive manner;

(d) establish a framework for ongoing, public participation and evaluation of the progress on the implementation of the maintenance and management plan and associated activities both in the short- and long-term;

(e) foster mechanisms to create and maintain public-private partnerships to support the stewardship and improvement of the natural, recreational and cultural resources;

(f) further consistent, coordinated inter-, intra-, and extra-governmental communications in furtherance of seamless and, from the perspective of the public, transparent implementation of the maintenance and management obligations of various public landowners proximate to the Project.

2. Maintenance and Management.

- (a) The City and the Town shall undertake maintenance and management obligations: as stated in the maintenance and management plan submitted by the City and Town, and reviewed and deemed adequate by the Secretary of Environmental Affairs (“Plan”); any conditions contained in relevant MEPA certificates of the Secretary; and any Section 61 findings issued pursuant to MEPA. Conformance with the Plan by the City and Town shall be considered independent legal obligations, specifically enforceable by the Commonwealth, and shall be incorporated as a condition of any contract for state financial assistance associated with the Project, as well as by any state agency to the extent conformance to the maintenance and management plan is a condition of a permit from that agency, regardless of availability of funds or appropriation by either the City or Town.
- (b) The parties agree that maintenance and management for parklands shall be conducted in accordance with the standards detailed in the plan. A portion of the plan, specifically pertaining to parklands, is attached as Appendix A to this agreement.
- (c) The parties agree that maintenance and management for parkways and roadways shall be conducted in accordance with the standards detailed in the plan. A portion of the plan, specifically pertaining to parkways and roadways, is attached as Appendix B to this agreement.
- (d) The parties agree that maintenance and management for stormwater shall be conducted in accordance with the standards detailed in the plan. A portion of the plan, specifically pertaining to stormwater, is attached as Appendix C to this agreement.
- (e) In a manner consistent with the practices used by City and the Town under the Plan, the DCR will use best management practices for the maintenance and management of the parkways and associated infrastructure under its care, custody and control.

3. Cabinet Management Structure

- (a) The long-term success of the Project is dependant upon maintenance and management in conformance with the maintenance and management plan for the stewardship of resources for which a substantial public investment will be committed. Essential measures in this stewardship include commitments to implementation and maintenance of storm-water best management practices, historic preservation and maintenance of project infrastructure and parklands and parkways. The parties recognize that long-term success of fulfilling project goals cannot be achieved without open lines of communication and sharing of information among the parties and the public, as well as coordination of activities across jurisdictional boundaries and appropriate staffing to implement the maintenance and management plan. To this end, the parties hereby establish a Management Cabinet (the “Cabinet”) to formalize a maintenance and management structure to oversee the Project in furtherance of these purposes and achieving and maintaining the long-term success of the Project.
 - (b) DCR, the City, the Town, the Emerald Necklace Conservancy (“ENC”) and the MMOC, or their respective designees, shall be voting members of the Cabinet, each possessing one vote. The Cabinet shall meet at least quarterly, with one of those meetings being an open and public meeting. A quorum necessary to conduct a meeting of the Cabinet shall consist of a simple majority of the voting members of the Cabinet. All decisions of the Cabinet shall be by made by simple majority of the quorum present at the meeting. The Cabinet shall hold meetings at least quarterly and otherwise as needed.
 - (c) The Cabinet shall have a Chair that shall preside over the Cabinet and its meetings. The Chair shall serve for a term of one year. The Chair shall be elected by a majority vote of the Cabinet.
 - (d) The Cabinet shall serve primarily as a mechanism and forum for high-level management officials to discuss and consider: the range of issues associated with maintenance and management, historic preservation, stewardship and performance standards, including the appropriate capital and operating funding; the implementation, review, potential modification, and enforcement of standards pertaining to these issues; achievements and ongoing cooperation in furtherance of implementing new knowledge and lessons learned in the Project area; any needs of and potential assistance that could be provided by the parties.
 - (e) The Cabinet shall be the forum to facilitate coordination of the implementation of the maintenance and management plan among the parties. While the cabinet shall be the forum to address conformance with the maintenance and management plan, including the standards specified therein, the parties confirm that the Cabinet shall not administer or otherwise control day-to-day management or operation of any park lands, including lands, facilities, parkways or water courses, under the care and control of either the City, the Town or DCR; it being expressly understood that such is reserved to the City, the Town and DCR, respectively.
4. Maintenance and Management Oversight Committee (MMOC)
- (a) The parties agree that proper maintenance and management of the Project area are critical for achieving project goals, and that implementation of a continuing, independent

oversight body for the Project is essential to meeting these goals continually for the long-term and protecting the significant public investment in the Project. The parties agree that the MMOC, referenced and described in the MEPA Certificate dated May 1, 2003, shall fulfill such a role in the project management structure associated with the Project. The parties agree to communicate and share information with the MMOC, so that the MMOC may fulfill its function. The MMOC shall communicate and share information directly with the parties, so that the parties may fulfill their functions, including maintenance and management obligations as applicable. The MMOC shall inform the Cabinet of outstanding issues that require consideration and resolution.

- (b) The MMOC shall consist of a member from the following agencies or organizations (or their designee from within that agency or organization) provided that the Secretary, in her discretion, may add to or remove members from the MMOC:

[insert list]

- (c) Without limiting the role of the MMOC, the MMOC shall provide the primary forum and conduit for public participation in the independent review, oversight and decision-making process of the parties associated with the maintenance and management of the resources within the Project area. The MMOC shall endeavor to hold monthly meetings and additional meetings as necessary.
- (d) In implementing its role as described in paragraph (b), the MMOC shall have the following responsibilities: review and evaluate the implementation and progress of construction activities and maintenance and management standards; evaluate progress and provide independent oversight of maintenance and management activities; provide independent review and comment concerning reports and filings related to the Project area; monitor and evaluate compliance with permit, contract and legal obligations associated with the Project, including Section 61 findings; promote coordination and communication concerning maintenance and management activities among the Parties and the public; encourage representation of a broad public constituency on the MMOC; serve as a conduit for public participation and access to information concerning maintenance and management of the Project area; and report frequently any issues to the Cabinet for its discussion and consideration.
- (e) The Town and the City shall provide funding for the duration of the construction of the Project plus five years to support certain activities of the MMOC. Funding shall include \$35,000 per year from the City, \$20,000 per year from the Town, \$20,000 per year from DCR. . Funding for the MMOC shall be administered and distributed both in a manner and through a qualified organization acceptable to the parties *[Insert additional fiscal procedures text]*.

5. Role of the Emerald Necklace Conservancy

- (a) The ENC shall use best efforts to work with the Parties to assess and identify annual funding necessary for the maintenance and management of the Project area, funding for the administration and activities, and to assist DCR, the City and the Town to secure the necessary annual funding for DCR's, the City's and the Town's maintenance and management and capital obligations.

- (b) The ENC will facilitate the development of partnerships among the Parties and non-profit organizations; act as a liaison with the cultural and educational institutions in the neighborhoods along the Muddy River; and develop and implement public education and other programs to promote an understanding and appreciation of the landscape, waterways, parkways and features of the Emerald Necklace.
- (c) The ENC shall assist the Cabinet in its administration through, at the request of the Cabinet: assisting in convening meetings; identifying locations of Cabinet meetings; and disseminating materials relating to Cabinet meetings and activities.

6. Dispute Resolution.

In the event of a dispute related to this Agreement, the parties shall use the following as a condition precedent to either party pursuing other available remedies:

- (a) A party who believes a dispute exists (the “disputing party”) shall put such dispute in writing to the other party (the “responding party”). Such writing shall clearly, though as briefly as practicable, state the substance and scope of the dispute, the disputing party’s position relative thereto, including legal and factual justifications therefore, the remedy sought, and any other pertinent matters.
- (b) The responding party shall respond in writing to the disputing party within ten (10) days of receiving such writing. Such writing shall clearly, though as briefly as practicable, state the responding party’s response to each of the items included in the disputing party’s writing, and any other pertinent matters.
- (c) A telephone conference shall be held within ten (10) days between representatives of the parties having decision-making authority regarding the dispute, to negotiate in good faith a resolution of the dispute.
- (d) If, within ten (10) business days after such telephone conference, the parties have not succeeded in negotiating a resolution of the dispute, the parties’ representatives shall submit the dispute to mediation by contacting the MA Office of Dispute Resolution (MODR), who will administer the mediation process. The fees of, and authorized expenses incurred by, the mediation shall be shared equally by the parties.
- (e) The parties hereby agree to mediate in good faith for a minimum period of ten (10) days from the actual commencement of the mediation. If the parties are not successful in resolving the dispute through mediation, then the parties may agree to submit the matter to binding arbitration, or either party may pursue other available remedies upon ten (10) days written notice to the other party specifying its intended course of action. Any decision associated with the resolution of a dispute shall be presented and ratified at a meeting of the Cabinet.
- (f) The parties may mutually agree to extend any of the time periods stated herein.

- (g) The parties agree that the mediation provided for here is a compromise negotiation for purposes of all international, federal and state rules of evidence. The entire procedure will be confidential to the extent permitted by law. All conduct, statements, promises, offers, views and opinions, whether oral or written, made in the course of the mediation by any of the parties, their agents, employees, representatives or other invitees to the mediation and by the neutral, who is the parties' joint agent for the purpose of these compromise negotiations, are confidential and shall, in addition and where appropriate, be deemed to be privileged. Such conduct, statements, promises, offers, views and opinions shall not be discoverable or admissible for any purposes, including impeachment, in any litigation or other proceeding involving the parties and shall not be disclosed to anyone not an agent, employee, expert, witness, or representative for any of the parties. However, evidence otherwise discoverable or admissible in a later proceeding is not excluded from discovery or admission as a result of its use in the mediation. If not entirely enforceable, the parties intend that the court enforce this provision to the extent enforceable by such court.
- (h) The parties agree that nothing contained herein shall affect or limit, in any way, any party, as applicable, from independently exercising or enforcing its authority under any applicable statute, regulation or other provision of law that it is charged with administering.
7. US Army Corps of Engineers Project Agreement Conditions. The parties recognize that certain obligations and conditions will be associated with the Project that must be fulfilled by certain parties independent of this memorandum as part of any project agreement for the Project with the United States Army Corp of Engineers and local, state and federal project permits. The parties agree, however, that fulfillment of those conditions and obligations (in force or as lawfully modified) by the relevant parties shall be considered binding maintenance and management obligations under this memorandum.
8. Nothing in this memorandum, except as expressly stated, shall be construed to diminish, enlarge or modify any right or liability of any of the parties, or create liability on the part of any public agency for the act or omission of another public agency or a private person. Nothing in this memorandum shall be construed to amend, repeal or otherwise alter the authority or jurisdiction of any public agency. Nothing in this memorandum, including any process established herein, shall be construed to amend, repeal or otherwise alter any mitigation commitment, obligation or requirement pursuant to MEPA.

9. Effective Date and Term. The effective date of this agreement shall be the date of execution by the last of the parties to sign. The agreement shall remain in effect from the effective date and shall not expire until thirty-years from the completion date of the capital investments of the Project, unless the term is extended or modified with the unanimous agreement of all of the parties. This duration of the agreement represents the currently estimated expected life of the capital investments implemented, if maintained as anticipated, as part of the Project.

**For the Executive Office of
Environmental Affairs:**

Secretary Ellen Roy Herzfelder

Date: _____

**For the Department of
Conservation and Recreation:**

Commissioner Katharine Abbott

Date: _____

**For the Boston Parks and
Recreation Department:**

Commissioner Antonia Pollack

Date: _____

**For the Brookline Public
Works Department:**

Commissioner Thomas DeMaio

Date: _____

For the MMOC:

For the ENC:

Memorandum – Via e-mail and mail

to: Jim Hunt, MEPA

from: Simone Auster, ENC

date: December 21, 2004

re: Muddy River Restoration Project Memorandum of Agreement (MOA)

This memorandum summarizes the Emerald Necklace's Conservancy's ("ENC") major comments and questions on the first draft of the Memorandum of Agreement ("MOA") that you circulated. While this memo focuses on the major issues that are of concern to the ENC, we would also be happy to provide you with our proposed language changes and other content suggestions either in connection with this current draft or the next revised draft. We look forward to finalizing this agreement with you and the other parties.

1. **ENC Roles and Responsibilities:** We have drafted a new Section 5 of the MOA to replace the section in your current draft, and have enclosed that re-drafted section with this memo. The new provisions expand upon what we believe should be the ENC's dynamic role in connection with the Project and the Necklace as a whole. Please let us know if you have any comments on this revised section.
2. **Cabinet Management Structure:** We propose a number of changes to Section 3 in order to shore up the Cabinet's structure and procedures:
 - Section 3(b) should specify which individuals will serve as the Cabinet representatives for each party. Paragraph (d) calls for "high-level" officials, yet the Section does not specify who the representatives will be. The parties should agree on their representatives in advance.
 - As drafted, Section 3(b) requires three of the five Cabinet members in attendance for a quorum, and then allows that quorum to act on behalf of the Cabinet with a vote of the majority in attendance. That provision means that the Cabinet could act even if only two of the five members agree. We believe that the decisions of the Cabinet should require a higher degree of agreement to give the Cabinet's actions more legitimacy and a greater likelihood of enforceability. Please consider requiring three out of the five Cabinet members to agree on any decision; if a

quorum consists of only three members, all three must vote to take a given action.

- Section 3(b) should include additional detail about the process for calling special meetings. We suggest that the Chair should have the power to call such meetings, and that other parties should be able to call a limited number of special meetings per year.

- The version of the MOA drafted by the ENC's counsel (and discussed by a working group of representatives of the ENC, MMOC and the proponents) addressed each of the issues noted above, as well as additional details regarding the Cabinet's management procedures. If you would like a copy of that section for your reference, we would be happy to provide it.

3. **MMOC's Roles and Responsibilities:** While the ENC recognizes the important role that the MMOC will play in the Project, we propose certain revisions to the description of that role. Section 4(a) should make clear that while the parties agree to reasonably share information related to the Project with the MMOC, each other party retains a right to safeguard information related to its public or private organizational mission as it sees fit (or in the case of the public parties, as far as the Public Records Law will allow). In addition, Section 4(c) should be revised to clarify that the MMOC's direct participation in the "decision-making process of the parties" is limited to its role on the Cabinet, although the other parties will, of course, welcome any MMOC input at any time.
4. **Term:** The ENC proposes that the MOA's term consist of an initial term, which would expire five years from Project completion, followed by five-year extension terms that run automatically unless the parties agree to terminate the MOA, up to a total term of thirty years.
5. **Dispute Resolution:** We suggest that before two parties bring a dispute to the MODR, they should submit the dispute to the Cabinet for discussion. That step might generate a resolution agreeable to both parties, and thereby avoid the time-consuming and costly mediation process. Also, we would eliminate the requirement that the Cabinet ratify the results of mediations or arbitrations; as drafted, the MOA does not explain what would happen in the event that the Cabinet refused to ratify such result.

6. **Maintenance of Parkways and Roadways:** Section 2(c) appears to require that all parties (which would include DCR) will maintain and manage roadways in accordance with the Maintenance and Management Plan. Section 2(e), however, seems only to require DCR to maintain and manage the parkways “in a manner consistent with the practices used by City and the Town under the Plan.” We believe that DCR should commit to follow the standards set forth in the Plan, in order to promote consistent maintenance and management practices throughout the Necklace.

cc: Antonia Pollak, Margaret Dyson – Boston Parks Department
Erin Chute – Brookline Parks and Open Space
Marjorie Bakken - Chair, Emerald Necklace Conservancy
Peter Kochansky, Esq. – Goulston & Storrs

5. Role of the Emerald Necklace Conservancy

The Emerald Necklace Conservancy's role in the Muddy River Restoration Project may include but not be limited to facilitation and provision of private sector and community input to, and support for, the Project and related Emerald Necklace activities. Such input and support may take the form of:

- Advocacy on behalf of the Project and related Emerald Necklace issues;
- Review of budgets and contracts related to Project activities, as required; including compliance with MOUs and other project agreements;
- Assessment of on-going parks maintenance in light of established maintenance standards;
- Assist the Cabinet in its administration, including but not limited to serving as meeting convener; developing meeting agendas and collecting materials related to Cabinet meetings and activities; helping to identify priority projects related to restoration and maintenance; monitoring maintenance and other standards; and implementing reviews of agreed-upon plans;
- Promotion and implementation of volunteer/stewardship initiatives;
- Planning and facilitation of Project outreach and related public dialogue, as required, including ensuring coordination with, and collaboration among, the numerous non-profit organizations, residential groups and institutions surrounding the Emerald Necklace.
- Advocacy to ensure adequate project funding, including the continuation of the Conservancy's role as convener of the Project "funding coalition;"
- Implementation of public education efforts, including: sponsorship of public meetings on Project issues and progress; presentations, a newsletter, web site and other communications, as required, in order to raise public awareness of the Project and related issues such as parks restoration and maintenance.
- Encourage individuals to donate financial resources toward improvement of the park system in order to supplement and extend the capabilities of the public sector without replacing the public sector's responsibility for baseline maintenance and related funding;

- Establish cooperative management, restoration and maintenance projects in the parks, and collaborative masterplanning, as required; and,
- Develop, through the established public-private partnership, consistent Emerald Necklace standards (i.e., lighting, benches, trash barrels and other infrastructure) to ensure a seamlessly managed and maintained, and readily identifiable, park system.

**MEMORANDUM OF AGREEMENT
BY AND AMONG
THE EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, THE DEPARTMENT OF CONSERVATION
AND RECREATION¹, THE CITY OF BOSTON, THE TOWN OF BROOKLINE, THE EMERALD
NECKLACE CONSERVANCY, THE MUDDY RIVER RESTORATION PROJECT MAINTENANCE AND
MANAGEMENT OVERSIGHT COMMITTEE
CONCERNING ROLES AND RESPONSIBILITIES FOR
MAINTENANCE AND MANAGEMENT FOR THE
MUDDY RIVER RESTORATION PROJECT
IN THE CITY OF BOSTON AND THE TOWN OF BROOKLINE**

WHEREAS, Frederick Law Olmsted left the people of the nation and of The Commonwealth of Massachusetts a magnificent historic, cultural and environmental legacy of public parks and open spaces;

WHEREAS, in January of 1984 the Commonwealth of Massachusetts committed itself to reclaiming that legacy by creating the Olmsted Historic Landscape Preservation Program and the “Emerald Necklace Master Plan” of 1990, updated in 2001; and, the Commonwealth’s mission is to preserve significant historic landscapes and to encourage the public’s appreciation, understanding, wise use and maintenance of this historic legacy;

WHEREAS, the health, safety and quality of life of the residents and communities of Boston and Brookline have been threatened by and subject to flooding, impaired water quality and degraded habitat related to the Muddy River in the Boston Park System known as the Emerald Necklace;

WHEREAS, in accordance with a Memorandum of Agreement (“MOA”), dated June 8, 1999, the City of Boston and the Town of Brookline---accepted responsibility for the implementation of the Emerald Necklace Environmental Improvements Master Plan and the Phase I Muddy River Flood Control, Water Quality, Landscape Restoration and Habitat Enhancement Project (EOEA# 11865) (the master plan and the projects contained therein and Phase I for the area between the Charles River and Perkins Street by Jamaica Pond collectively referred to as the “Project”, and the first portion of Phase I referred to as “Charlesgate”);

WHEREAS, the goals of the Project include, but are not limited to, flood control, water quality improvements, habitat enhancements and historic preservation of the Project area, which includes the parkways that surround the Project and the storm water drainage systems that serve it and are within the care, custody and control of each of the signatories to this Memorandum of Agreement;

¹ The Department of Conservation and Recreation is the successor agency to both the Department of Environmental Management and the Metropolitan District Commission pursuant to Chapters 26 and 41 of the Acts of 2003.

WHEREAS, the parties recognize that the unique nature of this historic landscape located in multiple jurisdictions offers the parties a unique opportunity to work together cooperatively to ensure outstanding stewardship of the entire Project area;

WHEREAS, the Executive Office of Environmental Affairs (“EOEA”), the Department of Environmental Management, the Massachusetts Emergency Management Agency, the Boston Water and Sewer Commission, the Town of Brookline (“Town”) and the City of Boston (“City”) committed to a Memorandum of Understanding, dated November 4, 1999, concerning the funding and administering of the planning, permitting, and design of Phase I of the Project and the construction and implementation of Charlesgate, and in which the City and Town accepted responsibility for their respective shares of future maintenance and management activities, including the implementation of best management practices, which are identified in a maintenance and management plan, submitted jointly by the City and the Town to the Secretary of Environmental Affairs, and reviewed as part of the review for adequacy of the environmental impact report pursuant to the Massachusetts Environmental Policy Act (“MEPA”), sections 61-62H of Chapter 30 of the General Laws and its associated regulations, and which maintenance and management plan is attached hereto and incorporated herein (the “Plan”);

WHEREAS, pursuant to MEPA the Secretary of Environmental Affairs issued a certificate, dated May 1, 2003 reaffirming that maintenance and management are key to ensuring that the Project meets its long-term goals and that the significant public investment in the project is adequately protected; and the certificate further acknowledges the need and requirement to clearly define the structure, roles and responsibilities, and develop adequate enforceable commitments for the short-term and long-term maintenance and management of the Project area to protect the substantial investment, both the incurred and anticipated, of federal, state, and local public funds to implement the Project, for which the state is assuming most of the City’s and the Town’s share of the non-federal portion of the capital costs of the Project in recognition of the commitment by the City and Town to the implementation of such long-term maintenance and management obligations;

WHEREAS, the Division of Conservation and Recreation (“DCR”) also recognizes the critical importance of maintenance and management of the Project area and is committed to maintaining and managing the parkways and other areas within and abutting the Project area that are subject to its care, custody and control to the same standard to which the City and the Town are obligated to maintain the areas subject to their respective care, custody and control;

WHEREAS, the Secretary of Environmental Affairs required the establishment, pursuant to the Final Record of Decision on the Phase One Waiver concerning Charlesgate, of an independent oversight committee known as the Muddy River Restoration Project Maintenance and Management Oversight Committee (“MMOC”);

WHEREAS, the Emerald Necklace Conservancy is a non profit corporation organized and existing for the purpose of contributing to the protection, restoration and preservation of the landscape, waterways and parkways of the Emerald Necklace park system as special places for people to visit and enjoy;

WHEREAS, the signatories to this Memorandum of Agreement (together, the “parties”) firmly believe that ongoing coordination and cooperation among the parties, the development of public-private partnerships, fostering public education and participation and the implementation of effective short- and long-term maintenance and management systems are critical components to ensuring effective stewardship of the Project area and the preservation of this significant and historic public resource;

WHEREAS, the parties agree that proper maintenance and management of the Project area are critical for achieving all of the project goals, as absent these elements, sediment will quickly reaccumulate in the river, degrading water quality and wildlife habitat and endangering the historic landscape with the direct threat of invasive species and the indirect threat of benign neglect;

WHEREAS, the parties believe it is appropriate to recognize and outline their respective roles and responsibilities relative to maintenance and management of the Project area to ensure the preservation and protection of this unique Olmsted park system;

NOW, THEREFORE, in order to clearly define the roles and responsibilities of the parties to this Memorandum of Agreement for maintenance and management activities associated with the Project area, the parties agree as follows:

1. Purpose.

The parties to this Memorandum of Agreement concerning the Project (the “Agreement”) hereby each commit to:

- (a) protect the substantial public investment in and to restore, improve, and provide proper stewardship for the natural, recreation, and cultural resources in the Project area;
- (b) comply with state, federal and local laws and permits, and the conditions and requirements of all existing and anticipated state and federal project agreements associated with the Project;
- (c) make clear the roles and responsibilities for the implementation of the required maintenance and management plan in a transparent and comprehensive manner;
- (d) establish a framework for ongoing, public participation and evaluation of the progress on the implementation of the maintenance and management plan and associated activities both in the short- and long-term;
- (e) foster mechanisms to create and maintain public-private partnerships to support the stewardship and improvement of the natural, recreational and cultural resources;
- (f) wherever possible, put aside jurisdictional barriers and boundaries and work collaboratively to implement the maintenance and management obligations of the various public landowners with respect to the Project area in a seamless and transparent manner,

and to respect both the specific processes of and the spirit of this unique inter-governmental agreement which may serve as a model for other multi-governmental projects for decades to come; and

- (g) maintain open and consistent communication among themselves regarding any matter which affects the Project or the Project area.

2. Maintenance and Management.

The parties recognize and agree that a substantial public investment is being made in the Project and that the long-term success of the Project is dependant upon responsible and effective stewardship of the entire Project area and maintenance and management in conformance with the standards detailed in and the specific provisions of the maintenance and management plan submitted by the City and Town, and reviewed and deemed adequate by the Secretary of Environmental Affairs (“Plan”). Essential measures in this stewardship include commitments to implementation and maintenance of storm-water best management practices, historic preservation and maintenance of project infrastructure and parklands and parkways. Therefore, the parties hereby agree to the following with respect to maintenance and management of the Project area:

- (a) The parties agree that the parklands within the Project area shall be maintained and managed in accordance with the standards detailed in and the specific provisions of the Plan.. That portion of the Plan specifically pertaining to parklands is attached hereto and incorporated herein as Appendix A to this Agreement.
- (b) The parties agree that the parkways and roadways within the Project area shall be maintained and managed in accordance with the standards detailed in and the specific provisions of the Plan. That portion of the Plan, specifically pertaining to parkways and roadways is attached hereto and incorporated herein as Appendix B to this Agreement.
- (c) The parties agree that the stormwater drainage system within the Project area shall be maintained and managed in accordance with the standards detailed in and the specific provisions of the Plan. That portion of the Plan specifically pertaining to stormwater drainage is attached hereto and incorporated herein as Appendix C to this Agreement.
- (d) The City and the Town shall each implement the maintenance and management obligations stated in the Plan, any conditions contained in relevant MEPA certificates of the Secretary, any Section 61 findings issued pursuant to MEPA, and the requirements of any permit or approval issued in connection with the Project, with respect to those portions of the Project area that are within their respective care, custody or control.
- (e) Compliance with the Plan by the City and by the Town shall be incorporated as conditions of any contract for state financial assistance associated with the Project, and any permits and approvals granted by any state agency with respect to the Project;

- (f) Compliance with the Plan by the City and by the Town shall be considered independent legal obligations, each of which shall be specifically enforceable by the Commonwealth, and also by any state agency to the extent that compliance with the Plan or any part of it is a condition of a permit or approval issued by that agency, and such rights of specific enforcement shall exist regardless of the availability of funds or appropriations by either the City or the Town.
- (g) In a manner consistent with the practices used by the City and the Town under the Plan, DCR shall maintain and manage the parklands, parkways, storm water drains and other infrastructure within or affecting the Project area that are under its care, custody and control, and in doing so shall implement the maintenance and management standards and practices set forth in the Plan.
- (h) The Town, the City and DCR agree to work cooperatively to ensure consistent and seamless maintenance and management of those portions of Project area within their respective care, custody and control, and the ENC and the MMOC agree to work cooperatively with them to achieve these goals.
- (i) The Town, the City and DCR each agree to provide sufficient staffing to implement the maintenance and management standards set forth in the Plan for all portions of the Project area within their respective care, custody and control.
- (j) The parties agree to work cooperatively to urge other landowners, both public and private, which own or control either land or infrastructure which abuts or affects the Project area to implement maintenance and management practices which are consistent with those set forth in the Plan.

3. Creation of Cabinet and its Management Structure.

The parties recognize and agree that long-term success in fulfilling the Project goals cannot be achieved without open lines of communication and sharing of information among the parties to this Agreement and the public, coordination of activities across jurisdictional boundaries and appropriate staffing to implement the maintenance and management plan. To this end, the parties hereby establish a Management Cabinet (the “Cabinet”) to formalize a maintenance and management structure to oversee the Project in furtherance of these purposes and achieving and maintaining the long-term success of the Project.

- (a) The Cabinet shall serve primarily as a mechanism and forum for high-level management officials to discuss, consider, resolve and implement decisions made with respect to: the range of issues associated with maintenance and management, historic preservation, stewardship and performance standards, including the appropriate capital and operating funding; the implementation, review, potential modification, and enforcement of standards pertaining to these issues; achievements; ongoing cooperation in furtherance of implementing new knowledge and lessons learned in the Project area; and any needs for and potential assistance that could be provided by the parties.

- (b) The Cabinet shall be the forum through which the parties shall facilitate coordination of the implementation by the parties of the Plan, and address compliance of the parties with the Plan, including the standards specified therein. Notwithstanding the foregoing, the parties specifically recognize and agree that the Cabinet shall not administer or otherwise control the day-to-day management or operation of any parklands, including lands, facilities, parkways or water courses that are under the care, custody or control of either the City, the Town or DCR; it being expressly understood that such is reserved to the City, the Town and DCR, respectively.
 - (c) The Cabinet shall have five (5) members, the City, the Town, DCR, the ENC and the MMOC, each of which shall designate a representative to serve on the Cabinet. Each member of the Cabinet shall have one vote.
 - (d) The Cabinet shall hold meetings at least quarterly, and otherwise as reasonably requested by any party, and as otherwise needed. At least one meeting each year shall be an open and public meeting.
 - (e) A quorum necessary to conduct a meeting of the Cabinet shall consist of not less than four (4) of the members of the Cabinet. The parties shall make an effort to make all decisions by consensus; but in no event shall any decision of the Cabinet be made by vote of fewer than four (4) members.
 - (f) The MMOC representative shall preside over the meetings of the Cabinet. *(Please note that the MMOC proposes that it chair the meetings as a service to the Cabinet and for consistency since in its oversight role, it has the widest constituency, encompassing not only the specific organizations represented in its membership, but other park advocacy groups and the public at large as well. The MMOC does not consider that the proposal on this issue stated in the original draft of the MOA provides a workable arrangement.)*
4. Muddy River Restoration Project Maintenance and Management Oversight Committee (MMOC).

The parties agree that proper maintenance and management of the Project area are critical to achieving the Project goals, and that implementation of a continuing, independent oversight body for the Project is essential to meeting these goals consistently in both the short and the long-term and to protecting the significant public investment in the Project. The parties agree that the MMOC, referenced and described in the MEPA Certificate dated May 1, 2003, shall fulfill such a role in the project management structure associated with the Project.

Because the MMOC has the widest and most inclusive constituency of all the parties to this Agreement, serves as the formal vehicle for public participation in the Project, , provides ongoing independent evaluation of the Project and serves, when necessary, as an outspoken watchdog to ensure outstanding stewardship of the Project area, the MMOC has a unique and critically important function on the Cabinet. Therefore, the parties agree as follows:

- (a) In order to enable the MMOC to fulfill its function, the parties agree to communicate in good faith and to share directly with the MMOC all information and documentation relating to the Project that are either requested by the MMOC or recognized by another party to be relevant to the Project or the maintenance and management of the Project area, so that the MMOC may fulfill its function. The MMOC shall communicate and share information directly with all parties, so that the parties may fulfill their functions, including maintenance and management obligations as applicable. The MMOC shall inform the Cabinet of outstanding issues that require consideration and resolution.
- (b) The MMOC shall consist of a member (except as otherwise indicated) from each of the agencies and organizations listed in Paragraphs 4 (c) and 4(d) (or the designee from within that agency or organization). Members representing the organizations listed in this Paragraph 4(c) shall be voting members of the MMOC, and those representing the agencies listed in Paragraph 4(d) shall be non-voting ex officio members of the MMOC. The Secretary, in her discretion, may add or remove member agencies and organizations from the MMOC, and shall consider the recommendations of the MMOC itself with respect to organizations and agencies which should be represented on the MMOC.
- (c) Except for the Emerald Necklace Citizens Advisory Committee, each of the following organizations shall have one (1) representative on the MMOC who shall be a voting member of the MMOC:

- Boston GreenSpace Alliance
- Boston Society of Landscape Architects
- Brookline GreenSpace Alliance
- Charles River Watershed Association
- Emerald Necklace Conservancy
- The Fenway Alliance
- Massachusetts Audubon Society
- Muddy River Restoration Project Technical Advisory Committee

The Emerald Necklace Citizens Advisory Committee shall have four (4) representatives on the MMOC, which shall include representatives from Boston and from Brookline, and each such representative shall be a voting member of the MMOC.

- (d) Each of the following agencies and organizations shall have one (1) representative on the MMOC, who shall be a non-voting, ex officio member of the MMOC:

- Boston Landmarks Commission
- Boston Parks and Recreation Department
- Brookline Parks and Open Space Division
- Brookline Preservation Commission
- Massachusetts Emergency Management Agency
- Massachusetts Executive Office of Environmental Affairs
- Massachusetts Historic Commission

Representatives from appropriate divisions of the Massachusetts Department of Conservation and Recreation

- (e) Without limiting the role of the MMOC, the MMOC shall provide the primary forum and conduit for public participation in the independent review, oversight and decision-making process of the parties associated with the maintenance and management of the resources within the Project area. The MMOC shall endeavor to hold monthly meetings and additional meetings as necessary.
- (f) In implementing its role as described in this Paragraph 4, the MMOC shall have the following responsibilities: review and evaluate the implementation and progress of construction activities and maintenance and management standards; evaluate progress and provide independent oversight of short and long-term maintenance and management activities; provide independent review and comment concerning reports and filings related to the Project area; monitor and evaluate compliance with permit, contract and legal obligations associated with the Project, including Section 61 findings; promote coordination and communication concerning maintenance and management activities among the Parties and the public; encourage representation of a broad public constituency on the MMOC; serve as a conduit for public participation and access to information concerning maintenance and management of the Project area; and report frequently to the Cabinet any issues for its discussion and consideration.
- (g) The Town, the City and DCR or other appropriate state agency shall provide funding for the duration of the construction of the Project plus five years to support the activities of the MMOC. Funding shall be not less than \$35,000 per year from the City, \$20,000 per year from the Town, and \$20,000 per year from DCR. Funding for the MMOC shall be administered and distributed both in a manner and through a qualified organization acceptable to the governmental entities that are parties to this Agreement. Such parties recognize that at the time of execution of this Agreement, Mission Hill Main Streets is serving as the MMOC's fiscal agent and they agree that such organization is qualified and acceptable to serve in such capacity. The MMOC shall internally manage the funds through procedures established by the MMOC and overseen by its Steering Committee. The MMOC shall provide an annual financial report to MEPA, the City, the Town and DCR.

5. Role of the Emerald Necklace Conservancy.

- (a) The ENC shall use best efforts to work with the other parties to assess and identify annual funding necessary for the maintenance and management of the Project area, funding for the administration and activities, and to assist DCR, the City and the Town to secure the necessary annual funding for DCR's, the City's and the Town's maintenance and management and capital obligations.
- (b) The ENC will facilitate the development of partnerships among the Parties and non-profit organizations; act as a liaison with the cultural and educational institutions in the neighborhoods along the Muddy River; and develop and implement public education and

other programs to promote an understanding and appreciation of the landscape, waterways, parkways and features of the Emerald Necklace.

- (c) The ENC shall assist the Cabinet in its administration through, at the request of the Cabinet: assisting in convening meetings; identifying locations of Cabinet meetings; and disseminating materials relating to Cabinet meetings and activities.

6. Dispute Resolution.

In the event of a dispute related to this Agreement or the Project, the parties shall use the following as a condition precedent to any party pursuing other available remedies, including legal remedies. Notwithstanding the foregoing, the parties are committed to trying to resolve all issues that relate to this Agreement and the Project informally and expeditiously through the Cabinet, and agree that for the purposes of this Paragraph 6, there shall not be a dispute until such informal efforts though the Cabinet shall have been ineffective:

- (a) A party who believes a dispute exists (the “disputing party”) shall give written notice of such dispute in writing to the party or parties involved in the dispute (the “responding party” or the “responding parties”), and shall provide a copy of such notice simultaneously to each other party to this Agreement. Such notice shall clearly, though as briefly as practicable, state the substance and scope of the dispute, the disputing party’s position relative thereto, including legal and factual justifications therefore, the remedy sought, and any other pertinent matters.
- (b) The responding party or Parties shall respond in writing to the disputing party within ten (10) days of receiving such notice, and shall send a copy of such response to each of the other parties to this Agreement. Such writing shall clearly, though as briefly as practicable, state the responding party’s (of parties’) response to each of the items included in the disputing party’s writing, and any other pertinent matters.
- (c) A telephone conference shall be held within ten (10) days between representatives of the parties having decision-making authority regarding the dispute, to negotiate in good faith a resolution of the dispute.
- (d) If, within ten (10) business days after such telephone conference, the parties have not succeeded in negotiating a resolution of the dispute, the parties’ representatives shall submit the dispute to mediation by contacting the MA Office of Dispute Resolution (MODR), who will administer the mediation process. The fees of, and authorized expenses incurred by, the mediation shall be shared equally by the parties.
- (e) The parties hereby agree to mediate in good faith for a minimum period of ten (10) days from the actual commencement of the mediation. If the parties are not successful in resolving the dispute through mediation, then the parties may agree to submit the matter to binding arbitration, or either party may pursue other available remedies upon ten (10) days written notice to the other party specifying its intended course of action. Any

decision associated with the resolution of a dispute shall be presented and ratified at a meeting of the Cabinet.

- (f) The parties may mutually agree to extend any of the time periods stated herein.
- (g) The parties agree that the mediation provided for here is a compromise negotiation for purposes of all international, federal and state rules of evidence. The entire procedure will be confidential to the extent permitted by law. All conduct, statements, promises, offers, views and opinions, whether oral or written, made in the course of the mediation by any of the parties, their agents, employees, representatives or other invitees to the mediation and by the neutral, who is the parties' joint agent for the purpose of these compromise negotiations, are confidential and shall, in addition and where appropriate, be deemed to be privileged. Such conduct, statements, promises, offers, views and opinions shall not be discoverable or admissible for any purposes, including impeachment, in any litigation or other proceeding involving the parties and shall not be disclosed to anyone not an agent, employee, expert, witness, or representative for any of the parties. However, evidence otherwise discoverable or admissible in a later proceeding is not excluded from discovery or admission as a result of its use in the mediation. If not entirely enforceable, the parties intend that the court enforce this provision to the extent enforceable by such court.
- (h) The parties agree that nothing contained herein shall affect or limit, in any way, any party, as applicable, from independently exercising or enforcing its authority under any applicable statute, regulation or other provision of law that it is charged with administering.

7. U.S. Army Corps of Engineers Project Agreement Conditions.

The parties recognize that certain obligations and conditions associated with the Project must be fulfilled by certain parties independent of this memorandum as part of any project agreement for the Project with the United States Army Corp of Engineers and local, state and federal project permits. The parties agree, however, that fulfillment of those conditions and obligations (in force or as lawfully modified) by the relevant parties shall be considered binding maintenance and management obligations under this Agreement..

8. Rights and Liabilities of the Parties.

Nothing in this Agreement, except as expressly stated, shall be construed to diminish, enlarge or modify any right or liability of any of the parties, or create liability on the part of any public agency for the act or omission of another public agency or a private person. Nothing in this Agreement shall be construed to amend, repeal or otherwise alter the authority or jurisdiction of any public agency. Nothing in this Agreement , including any process established herein, shall be construed to amend, repeal or otherwise alter any mitigation commitment, obligation or requirement pursuant to MEPA.

9. Effective Date and Term.

The effective date of this Agreement shall be the date of execution by the last of the parties to sign. The Agreement shall remain in effect from the effective date and shall not expire until thirty (30) years from the completion date of the capital investments of the Project, unless the term is extended or modified with the unanimous agreement of all of the parties. This duration of the Agreement represents the currently estimated expected life of the capital investments implemented, if maintained as anticipated, as part of the Project.

**For the Executive Office of
Environmental Affairs:**

Secretary Ellen Roy Herzfelder

Date: _____

**For the Department of
Conservation and Recreation:**

Commissioner Katharine Abbott

Date: _____

**For the Boston Parks and
Recreation Department:**

Commissioner Antonia Pollack

Date: _____

**For the Brookline Public
Works Department:**

Commissioner Thomas DeMaio

Date: _____

For the MMOC:

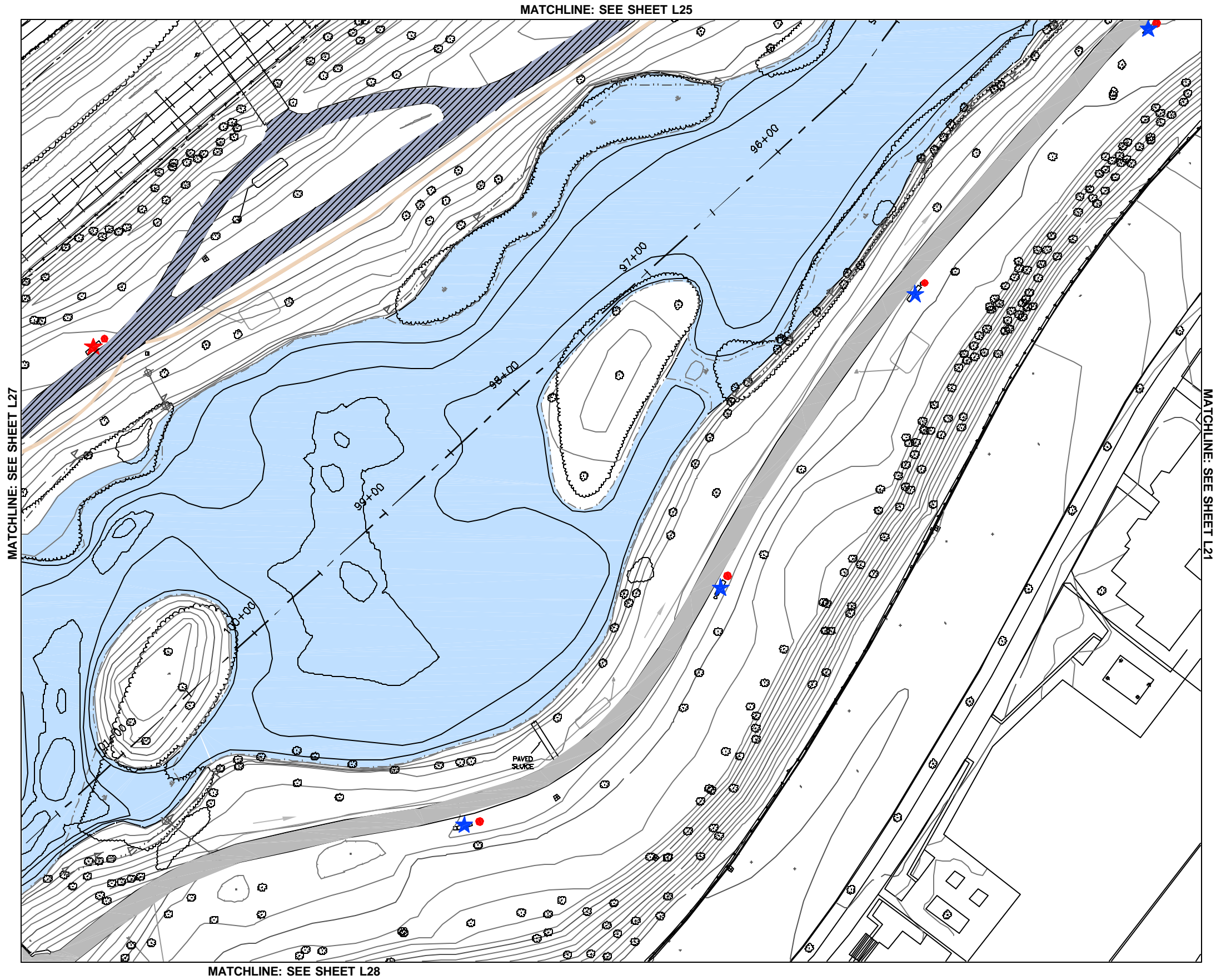
Date: _____

For the ENC:

Date: _____

#00894181

**Appendix F: MUDDY RIVER RESTORATION PROJECT
INVENTORY AND ANALYSIS MAPS –
CIRCULATION & SITE FURNISHINGS**



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/ PAVING

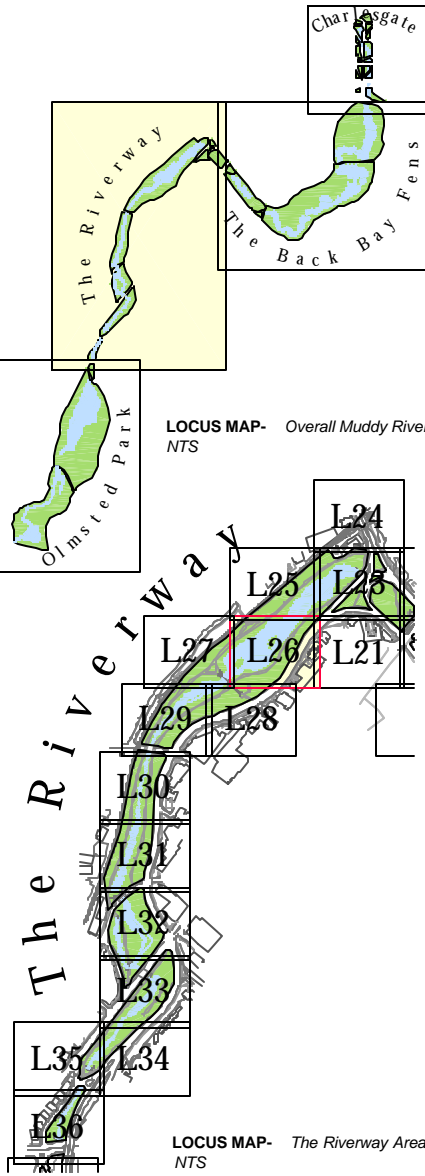
CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



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Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
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The Muddy River Restoration Project

Boston and Brookline, Massachusetts

REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING

GRAPHIC SCALE
0 10 20 40

SCALE
1"=60'

DRAWN BY MC, MM
CHECKED BY MP
DATE 11/21/00
SCALE 1"=60'

DRAWING NO.
L26



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/ PAVING

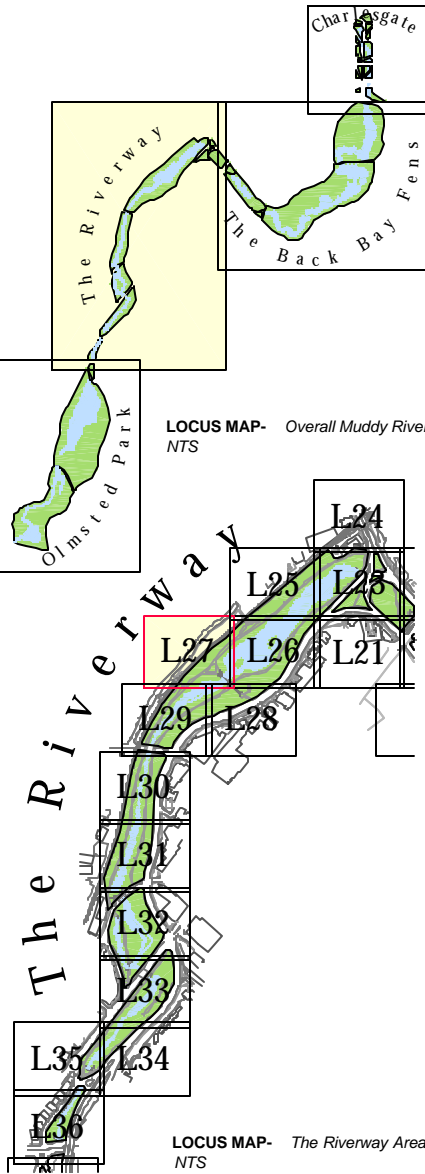
CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



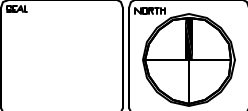
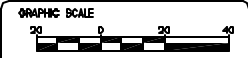
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NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING

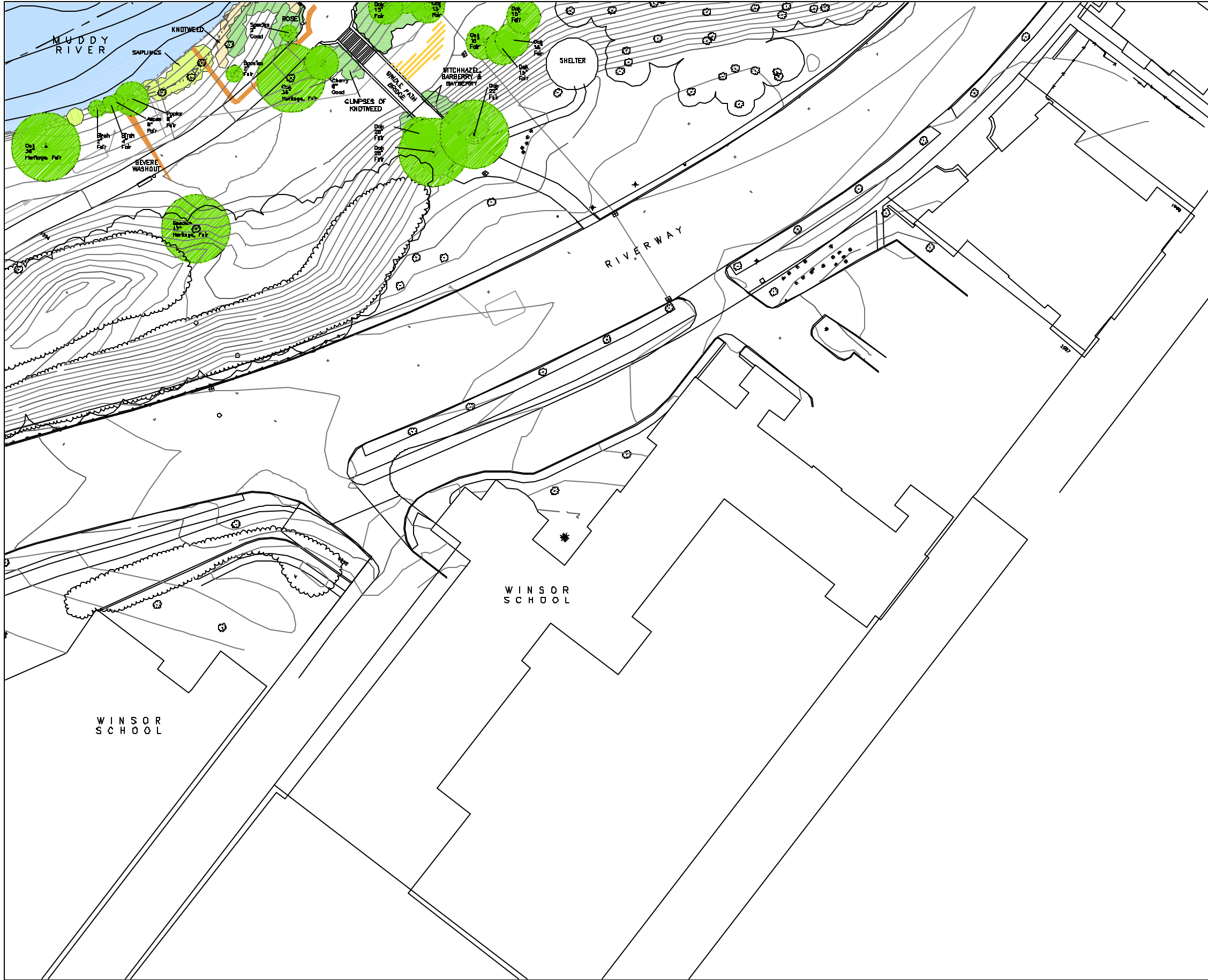


DRAWN BY: MC, LM	DRAWING NO.
CHECKED BY: MP	L27
DATE: 11/21/00	
SCALE: 1"=60'	

MATCHLINE: SEE SHEET L29

MATCHLINE: SEE SHEET L27

MATCHLINE: SEE SHEET L26



LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

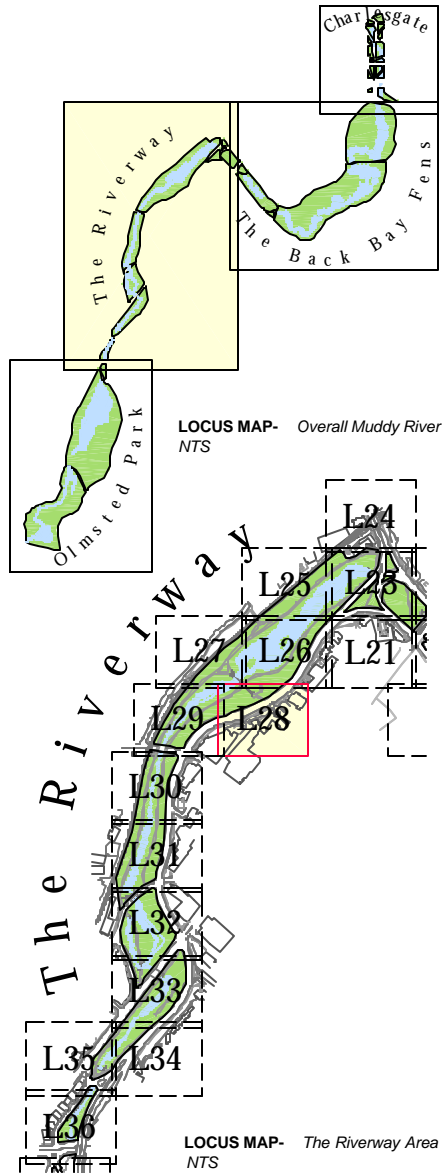
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



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 432 Columbia Street
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[illegible]

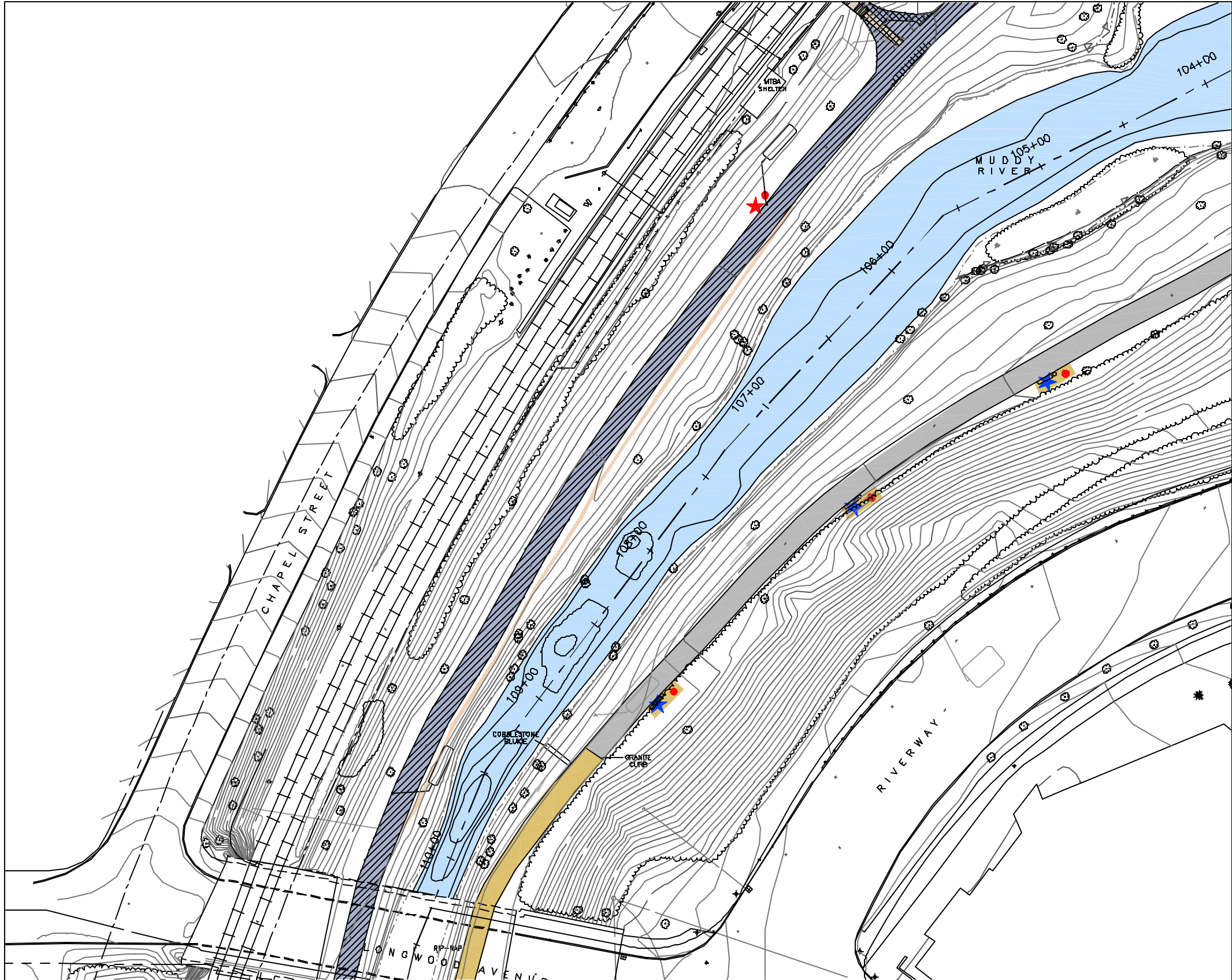
DRAWING TITLE

Inventory and Analysis
VEGETATION /
EROSION

GRAPHIC SCALE



DRAWN BY: MC, MM
 CHECKED BY: MP
 DATE: 11/21/00
 SCALE: 1"=60'

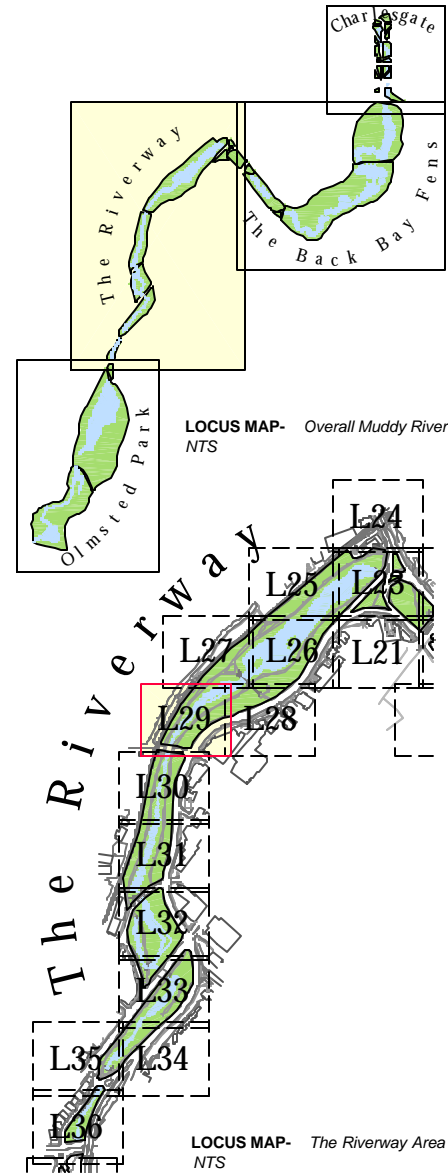


MATCHLINE: SEE SHEET L27

MATCHLINE: SEE SHEET L30

MATCHLINE: SEE SHEET L28

LEGEND	
CIRCULATION / PAVING	
CONCRETE SURFACE	
BITUMINOUS CONCRETE SURFACE	
STONEDUST SURFACE	
BRICK SURFACE	
ROLLED STONE SURFACE	
DESIRE LINES	
DEPRESSION ALONG PATHS	
SITE FURNISHINGS	
BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



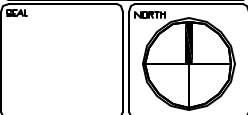
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Landscape Architects
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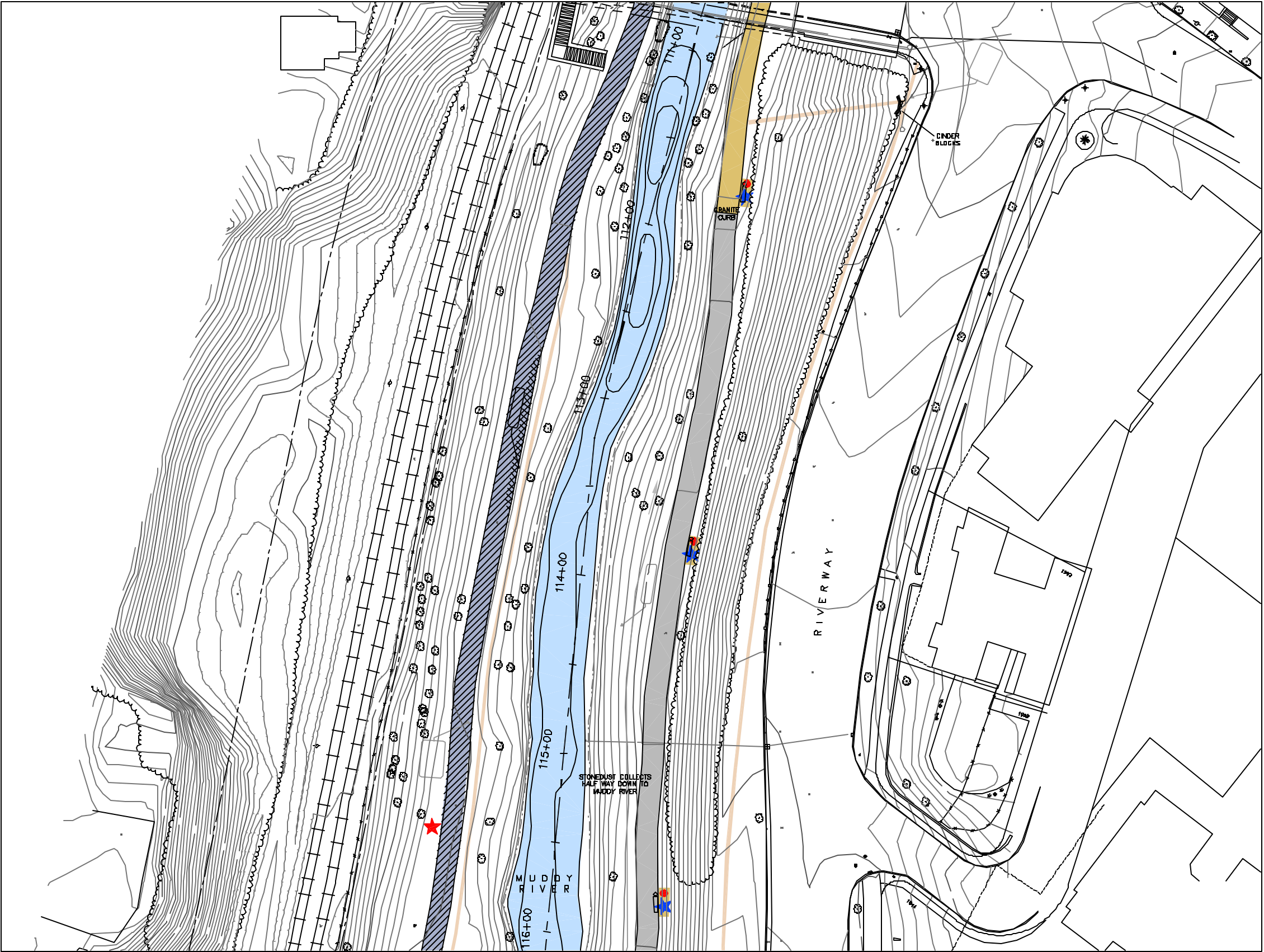
REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=80'
DRAWING NO.
L29

MATCHLINE: SEE SHEET L29



MATCHLINE: SEE SHEET L31

LEGEND
INVENTORY AND ANALYSIS

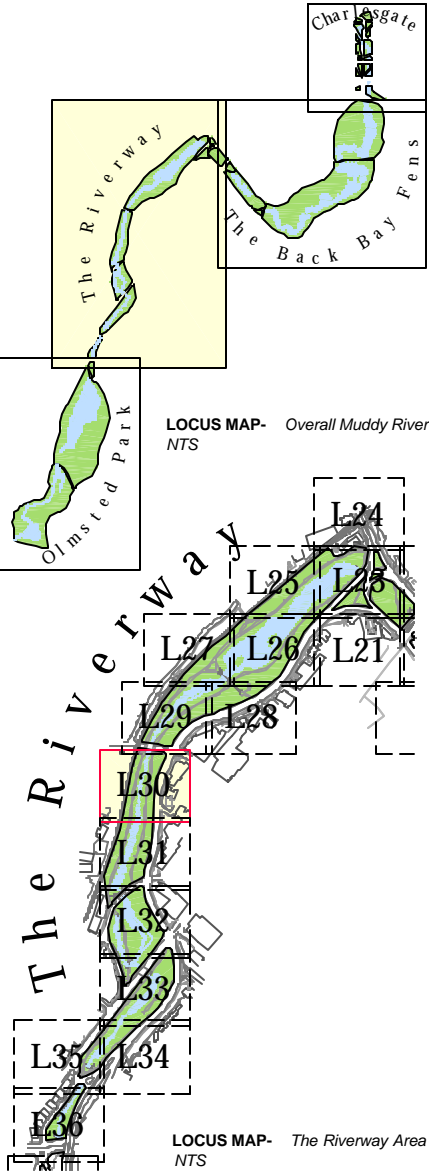
CIRCULATION/ PAVING

CONCRETE SURFACE	[Pattern]	[Pattern]	[Pattern]
BITUMINOUS CONCRETE SURFACE	[Pattern]	[Pattern]	[Pattern]
STONEDUST SURFACE	[Pattern]	[Pattern]	[Pattern]
BRICK SURFACE	[Pattern]	[Pattern]	[Pattern]
ROLLED STONE SURFACE	[Pattern]	[Pattern]	[Pattern]

DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	[Symbol]
HISTORICAL BENCH STANDARD	[Symbol]
MOBILE TRASH RECEPTACLE	[Symbol]
STATIONARY TRASH RECEPTACLE	[Symbol]
HISTORICAL LIGHT FIXTURE	[Symbol]



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FAX: (617) 491-7502
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NO.	DATE	REMARKS
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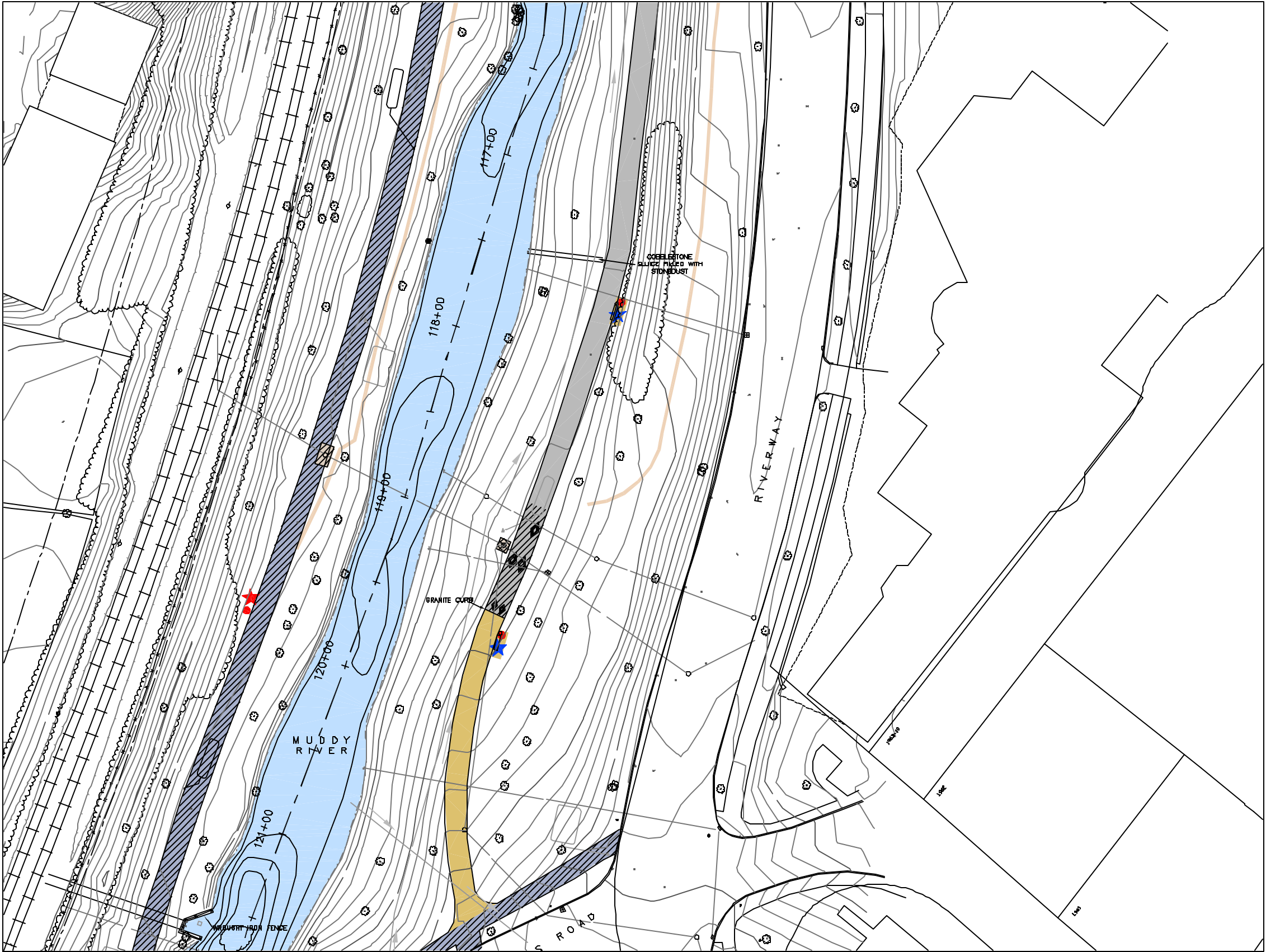
DRAWING TITLE
Inventory and Analysis
CIRCULATION / SITE FURNISHING

GRAPHIC SCALE
0 20 40

SCALE
1"=60'

DRAWING NO.
L30

MATCHLINE: SEE SHEET L30



MATCHLINE: SEE SHEET L32

LEGEND
INVENTORY AND ANALYSIS

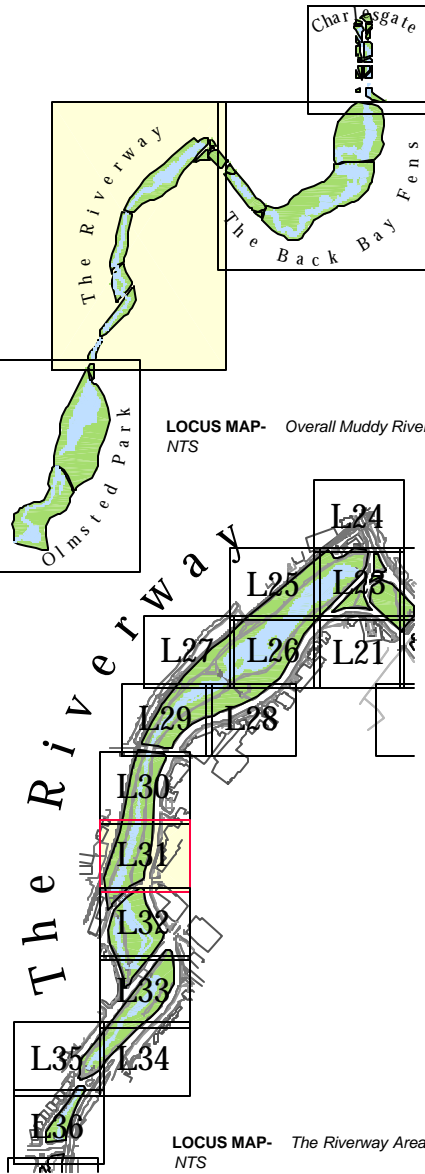
CIRCULATION/ PAVING

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BITUMINOUS CONCRETE SURFACE	[Pattern]	[Pattern]	[Pattern]
STONEDUST SURFACE	[Pattern]	[Pattern]	[Pattern]
BRICK SURFACE	[Pattern]	[Pattern]	[Pattern]
ROLLED STONE SURFACE	[Pattern]	[Pattern]	[Pattern]

DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	[Symbol]
HISTORICAL BENCH STANDARD	[Symbol]
MOBILE TRASH RECEPTACLE	[Symbol]
STATIONARY TRASH RECEPTACLE	[Symbol]
HISTORICAL LIGHT FIXTURE	[Symbol]



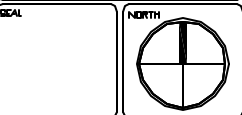
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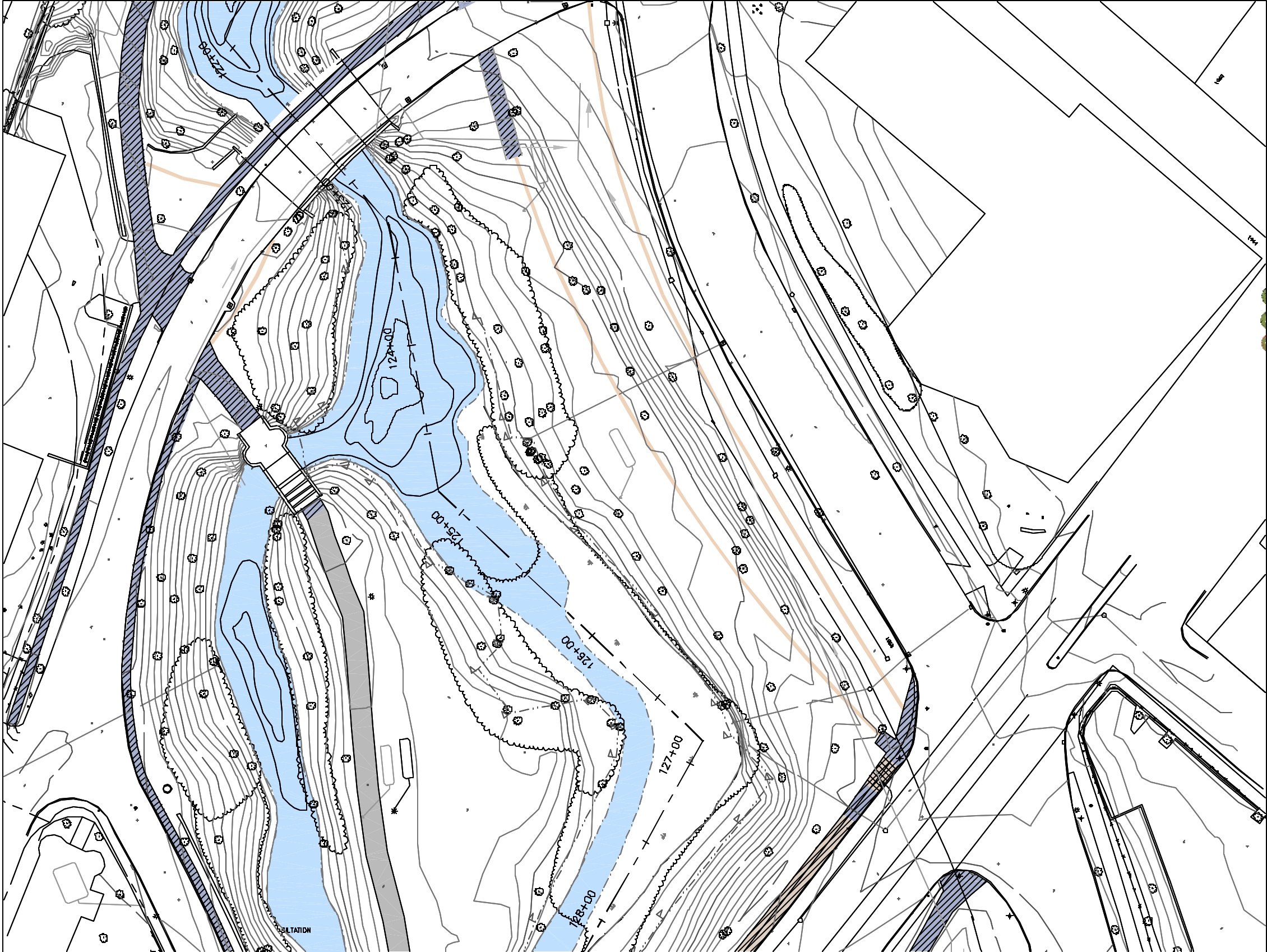
DRAWING TITLE
Inventory and Analysis
**CIRCULATION /
SITE FURNISHING**



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'

DRAWING NO.
L31

MATCHLINE: SEE SHEET L31



MATCHLINE: SEE SHEET L33

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/ PAVING

CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	

LOCUS MAP- Overall Muddy River NTS

The Riverway

LOCUS MAP- The Riverway Area NTS

REVISIONS

NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE

Inventory and Analysis
**CIRCULATION /
SITE FURNISHING**

GRAPHIC SCALE

SCALE

1"=80'

NORTH

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DRAWING TITLE

Inventory and Analysis
**CIRCULATION /
SITE FURNISHING**

GRAPHIC SCALE

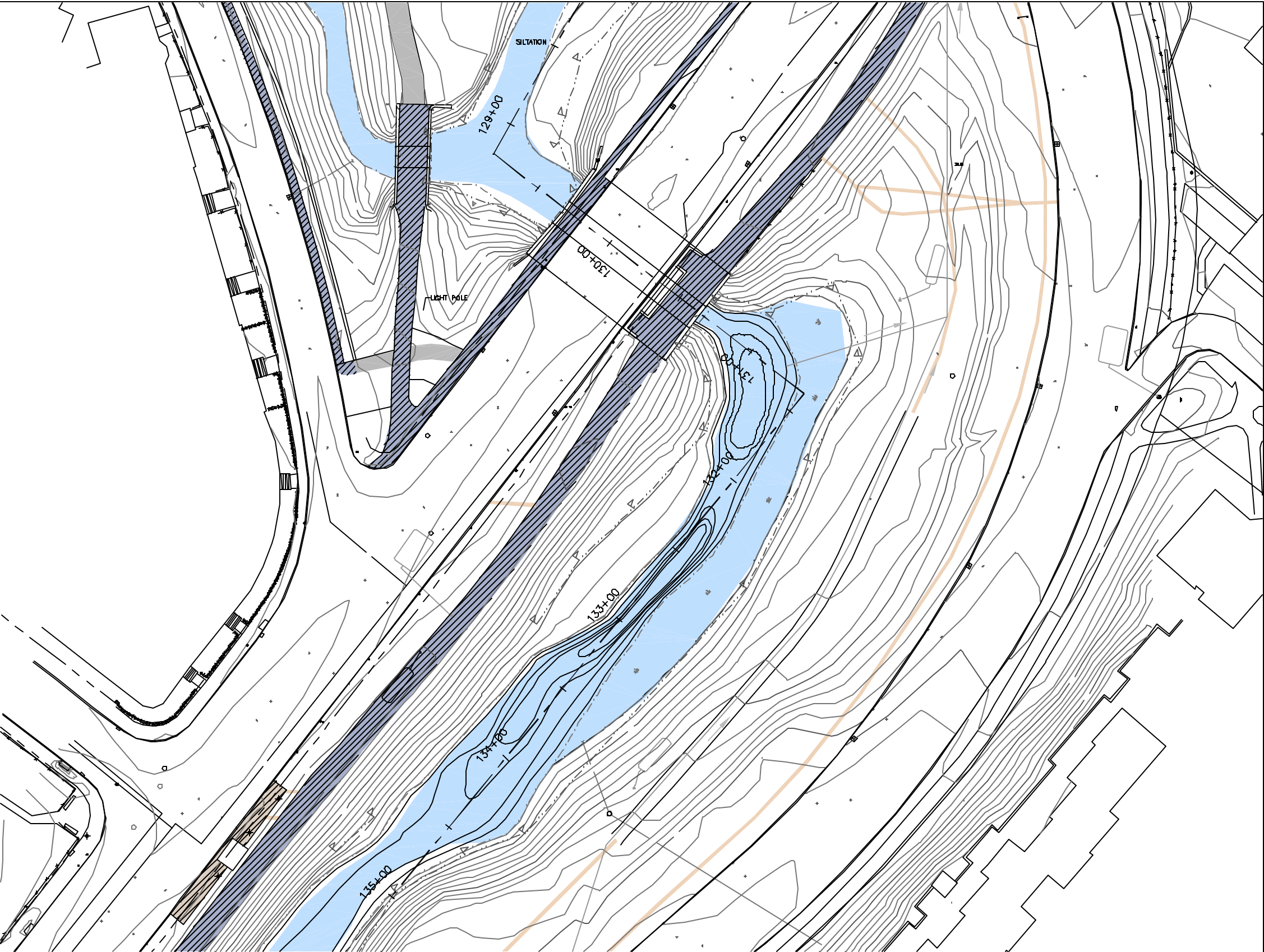
SCALE

1"=80'

NORTH

L32

MATCHLINE: SEE SHEET L32



MATCHLINE: SEE SHEET L34

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/ PAVING

CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	

LOCUS MAP- Overall Muddy River NTS

LOCUS MAP- The Riverway Area NTS

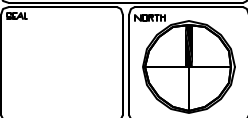
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DRAWING TITLE
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**CIRCULATION /
SITE FURNISHING**



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=80'

DRAWING NO.
L33



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/ PAVING
CONCRETE SURFACE
BITUMINOUS CONCRETE SURFACE
STONEDUST SURFACE
BRICK SURFACE
ROLLED STONE SURFACE
DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS
BENCH (NON-STANDARD)
HISTORICAL BENCH STANDARD
MOBILE TRASH RECEPTACLE
STATIONARY TRASH RECEPTACLE
HISTORICAL LIGHT FIXTURE

LOCUS MAP- NTS Overall Muddy River

LOCUS MAP- NTS The Riverway Area

GRAPHIC SCALE

NORTH

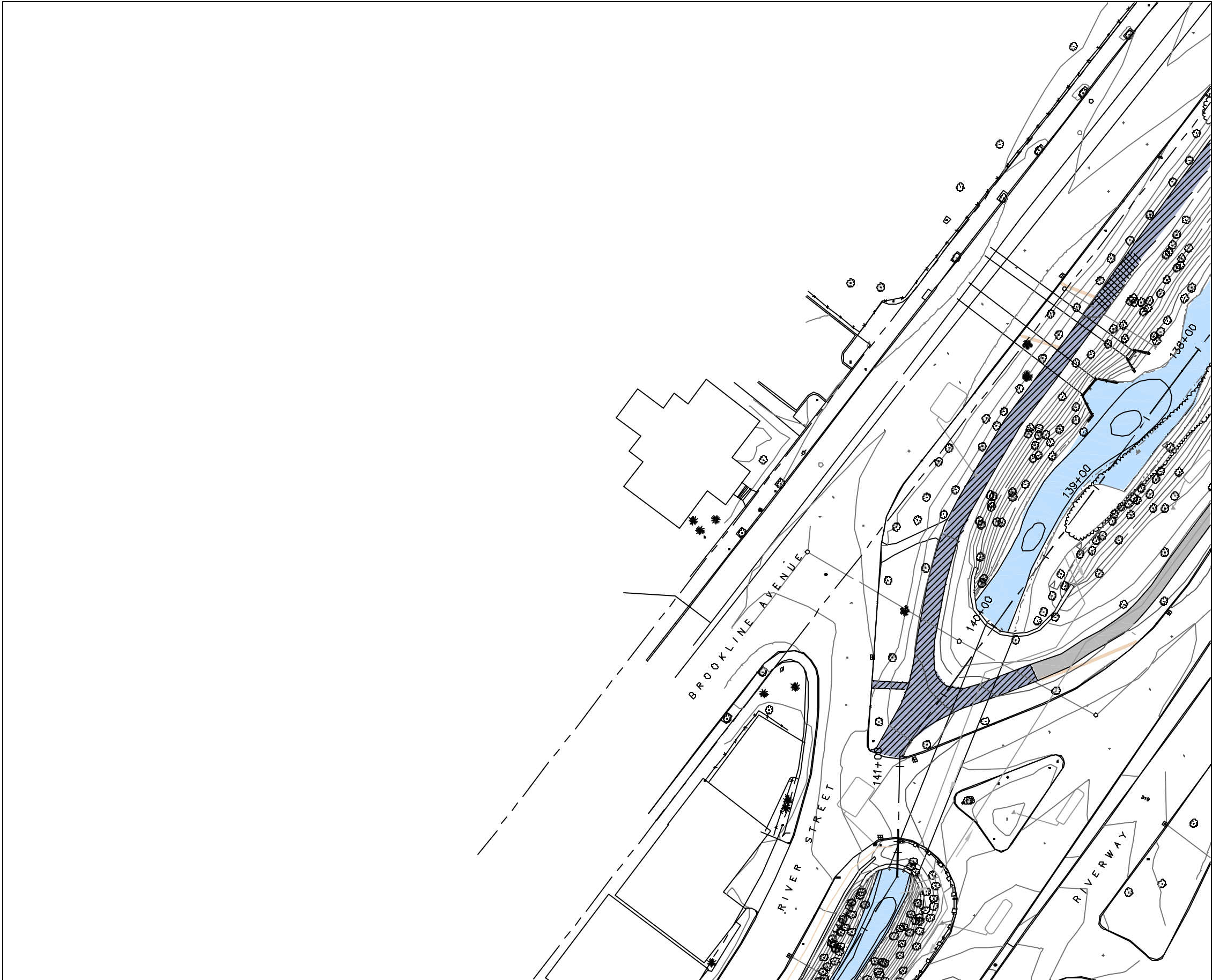
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NO.	DATE	REMARKS
DRAWING TITLE		
Inventory and Analysis CIRCULATION / SITE FURNISHING		
GRAPHIC SCALE		
NORTH		
DRAWN BY: MC, MM		
CHECKED BY: MP		
DATE: 11/21/00		
SCALE: 1"=60'		

L34



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/PAVING

CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

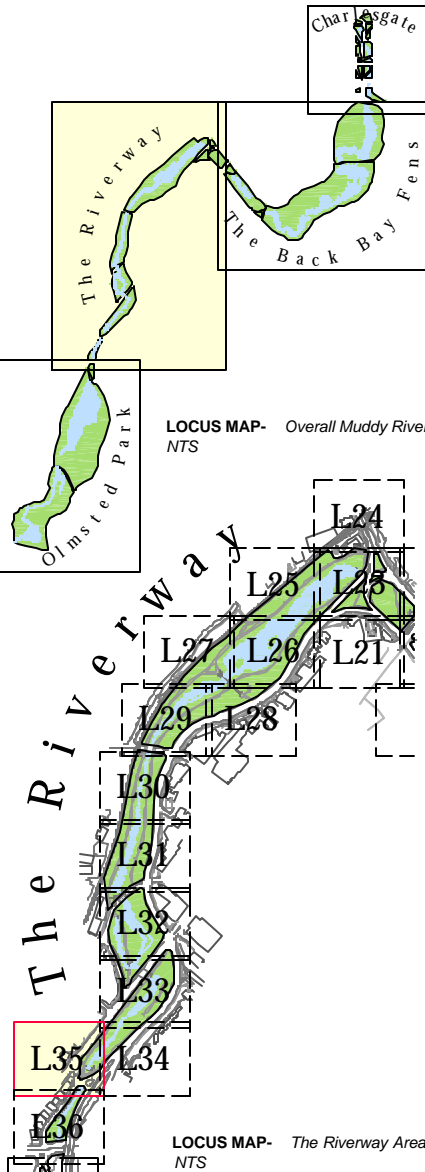
BENCH (NON-STANDARD)

HISTORICAL BENCH STANDARD

MOBILE TRASH RECEPTACLE

STATIONARY TRASH RECEPTACLE

HISTORICAL LIGHT FIXTURE



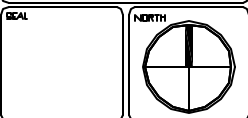
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NO.	DATE	REMARKS

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, LM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'

DRAWING NO.
L35

MATCHLINE: SEE SHEET L35



MATCHLINE: SEE SHEET L37

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION / PAVING

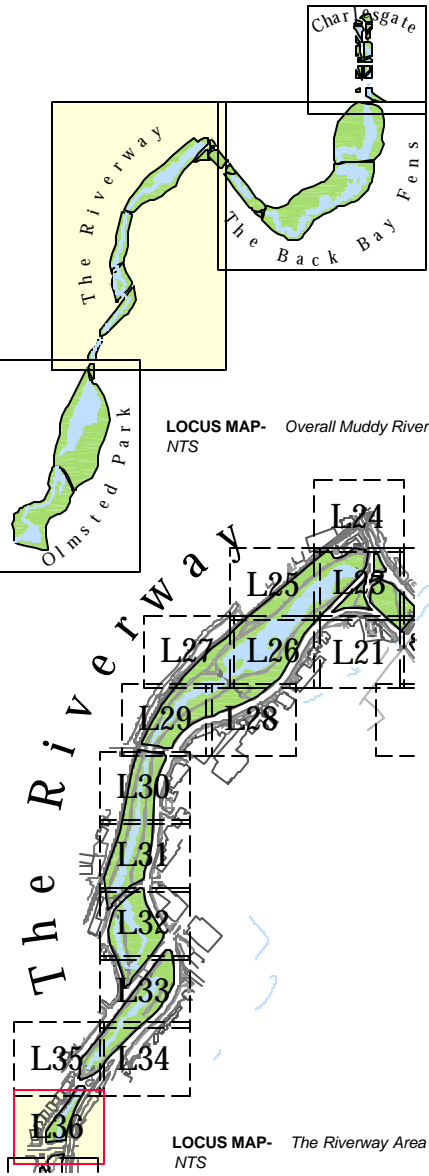
CONCRETE SURFACE		
BITUMINOUS CONCRETE SURFACE		
STONEDUST SURFACE		
BRICK SURFACE		
ROLLED STONE SURFACE		

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

HISTORICAL BENCH STANDARD - OLD	
HISTORICAL BENCH STANDARD - NEW	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



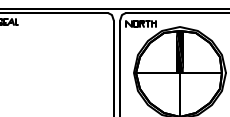
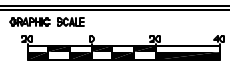
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NO.	DATE	REMARKS

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'

DRAWING NO.
L36



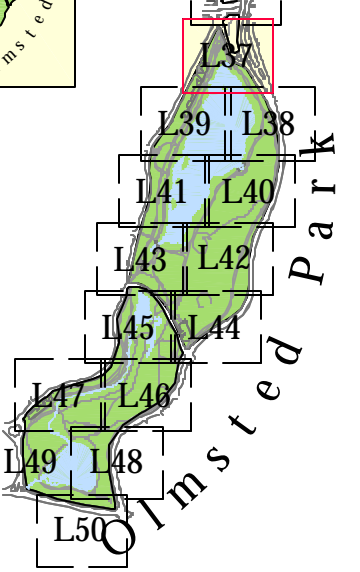
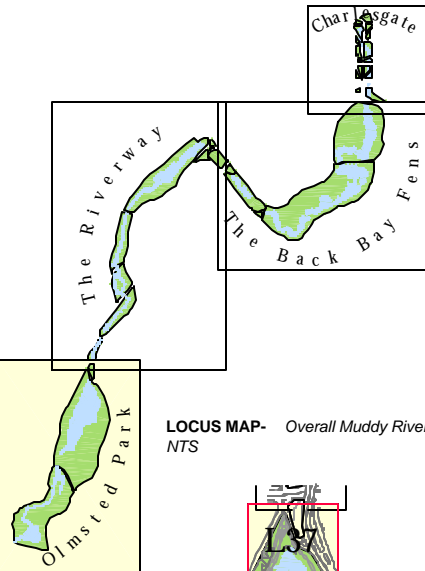
LEGEND
INVENTORY AND ANALYSIS

CIRCULATION / PAVING

CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			
DESIRE LINES			
DEPRESSION ALONG PATHS			

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



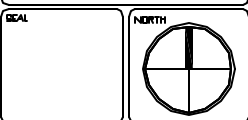
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Landscape Architects
432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
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REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, VM	DRAWING NO.
CHECKED BY: MP	L37
DATE: 11/21/00	
SCALE: 1"=60'	

MATCHLINE: SEE SHEET L39



MATCHLINE: SEE SHEET L37

MATCHLINE: SEE SHEET L40

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION / PAVING

CONCRETE SURFACE

BITUMINOUS CONCRETE SURFACE

STONEDUST SURFACE

BRICK SURFACE

ROLLED STONE SURFACE

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

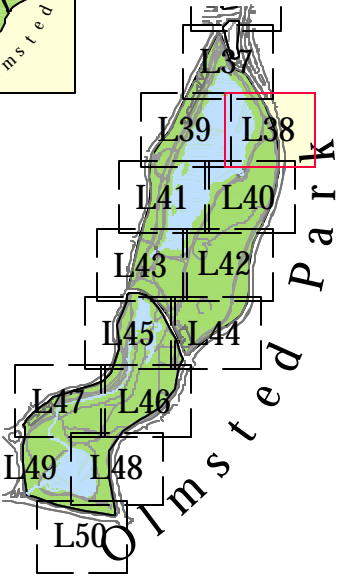
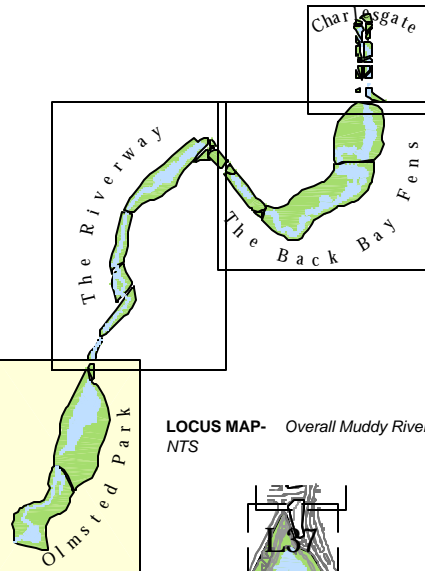
BENCH (NON-STANDARD)

HISTORICAL BENCH STANDARD

MOBILE TRASH RECEPTACLE

STATIONARY TRASH RECEPTACLE

HISTORICAL LIGHT FIXTURE



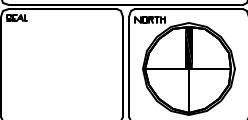
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Engineering Architects
432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
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REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



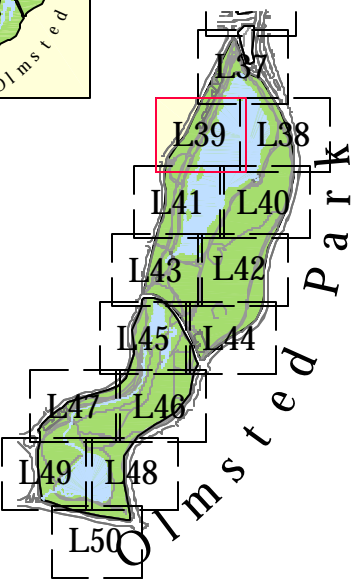
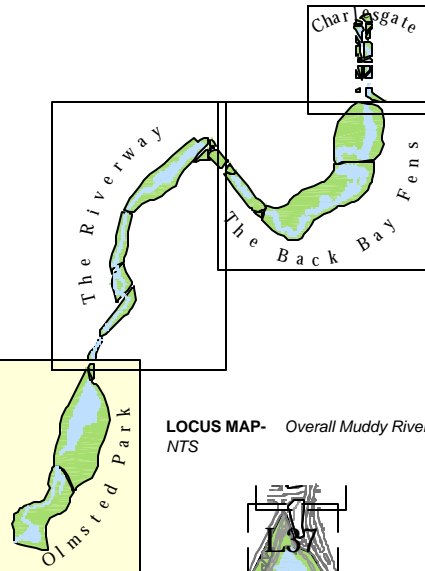
DRAWN BY: MC, NM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L38



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION / PAVING
CONCRETE SURFACE
BITUMINOUS CONCRETE SURFACE
STONEDUST SURFACE
BRICK SURFACE
ROLLED STONE SURFACE
DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS
BENCH (NON-STANDARD)
HISTORICAL BENCH STANDARD
MOBILE TRASH RECEPTACLE
STATIONARY TRASH RECEPTACLE
HISTORICAL LIGHT FIXTURE



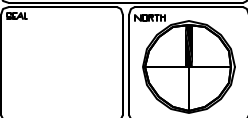
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NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
**CIRCULATION /
SITE FURNISHING**

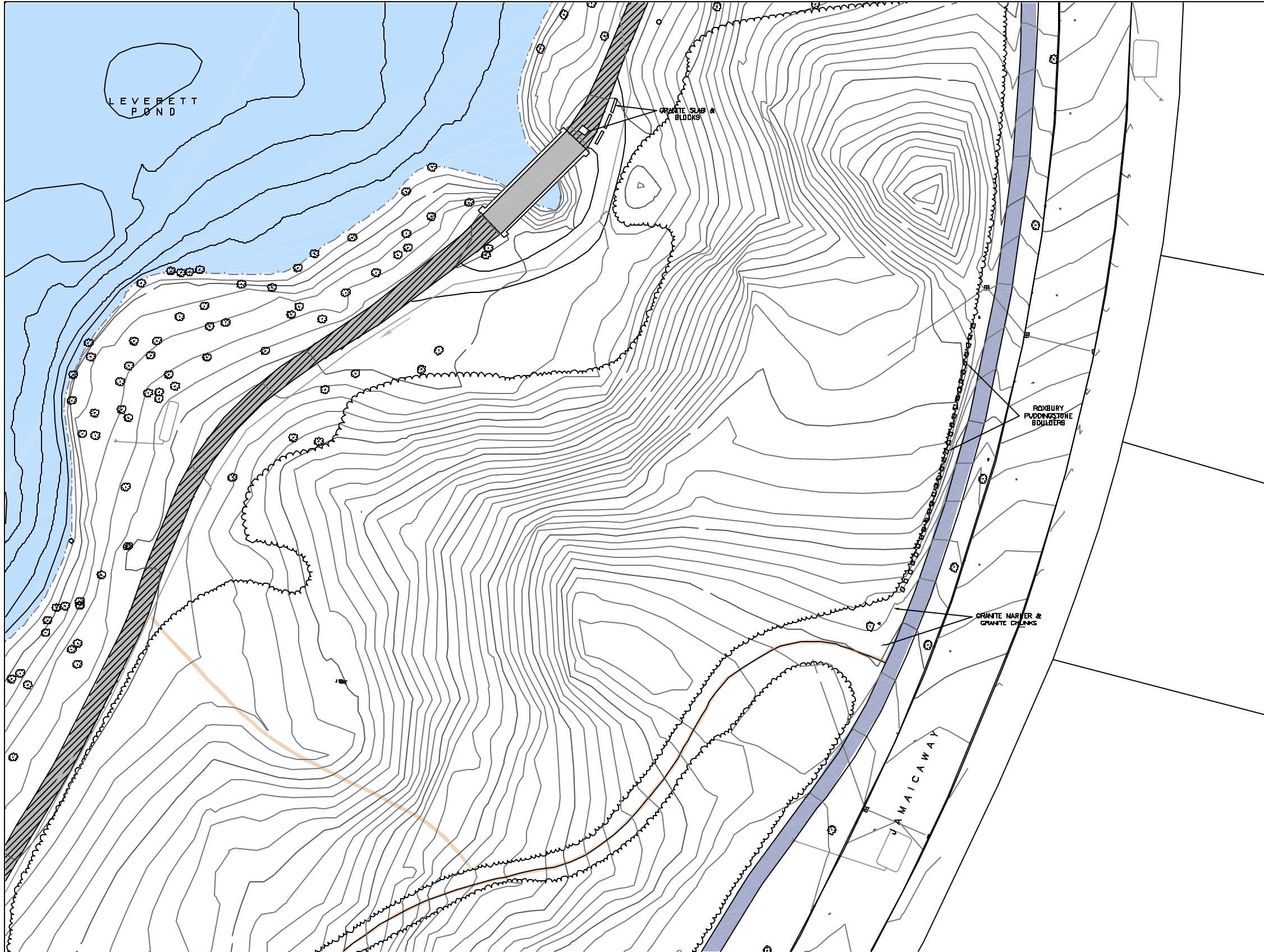


DRAWN BY: MC, NM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
L39

MATCHLINE: SEE SHEET L41

MATCHLINE: SEE SHEET L39

MATCHLINE: SEE SHEET L38



MATCHLINE: SEE SHEET L42

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION / PAVING

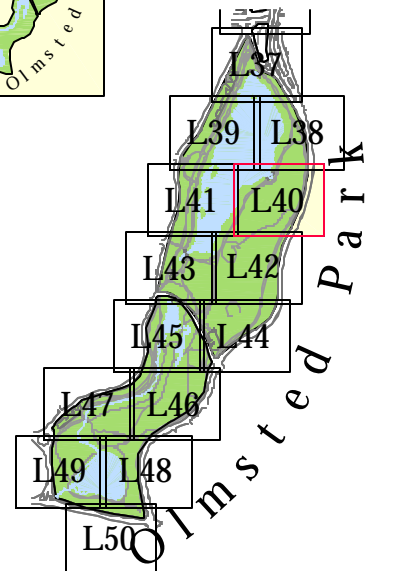
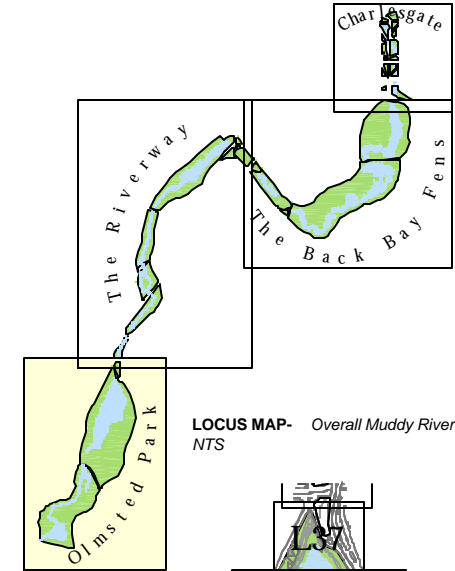
CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



LOCUS MAP- NTS
Olmsted Park

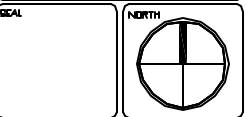
Pressley Associates, Inc.
432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

The Muddy River Restoration Project

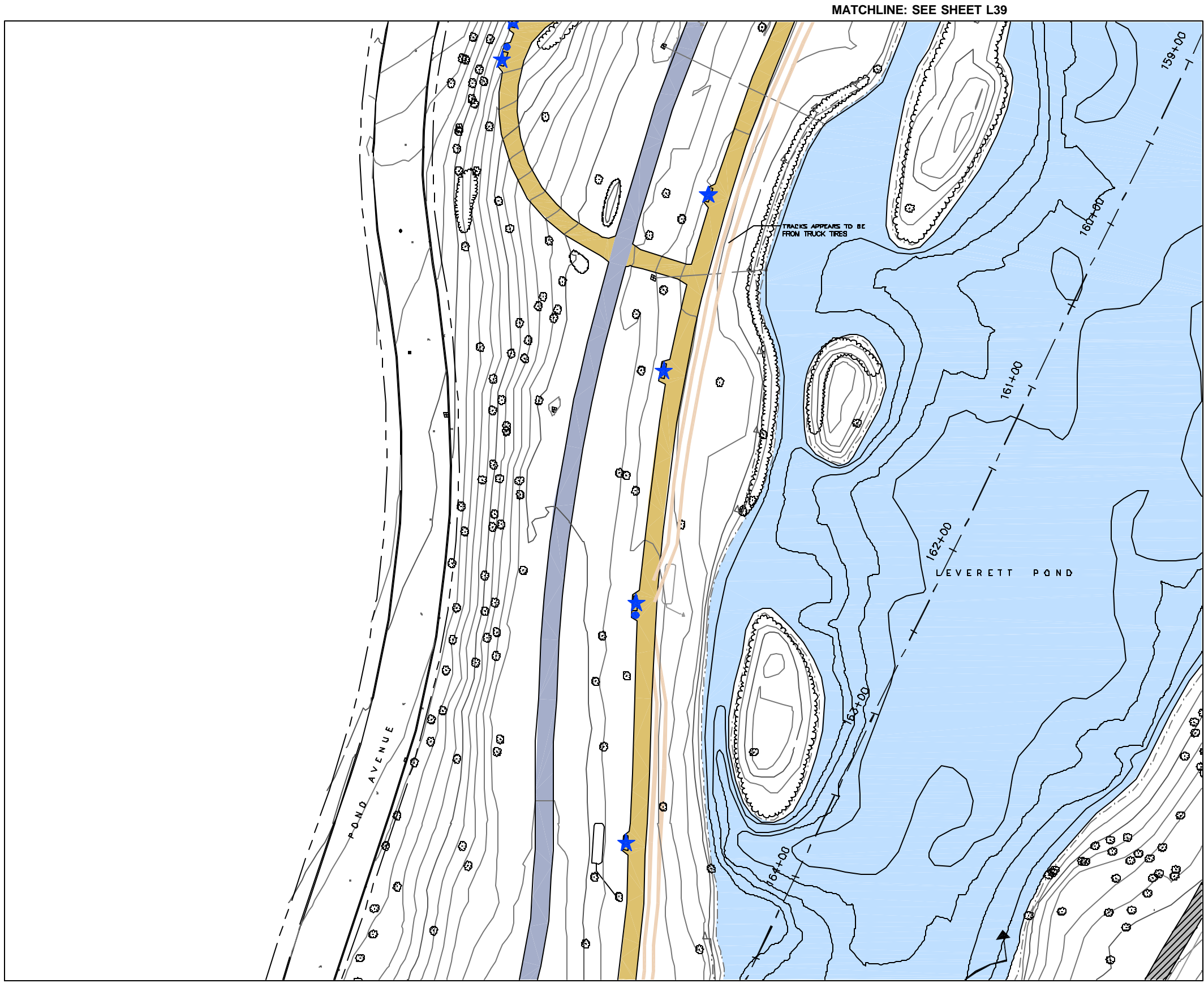
Boston and Brookline, Massachusetts

REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, N/A
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=80'
DRAWING NO.: **L40**



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION / PAVING

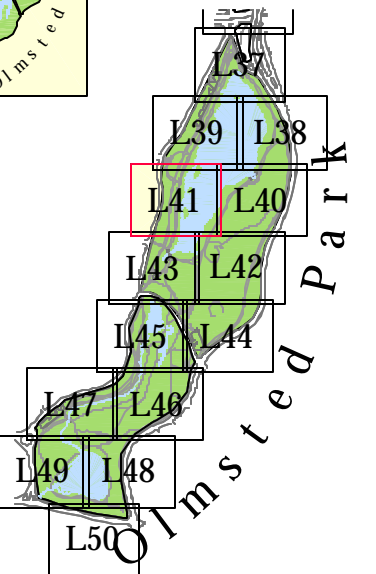
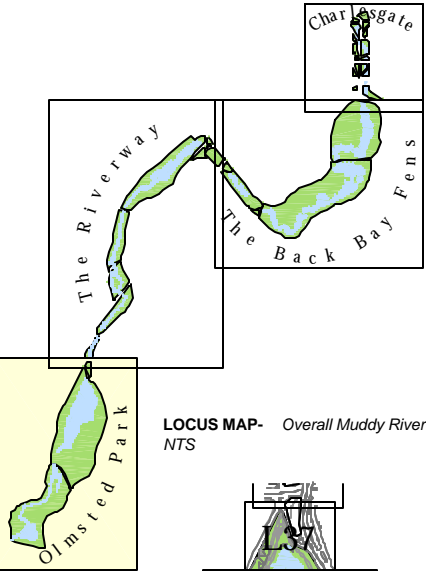
CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



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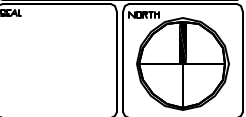
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REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE

Inventory and Analysis
CIRCULATION /
SITE FURNISHING

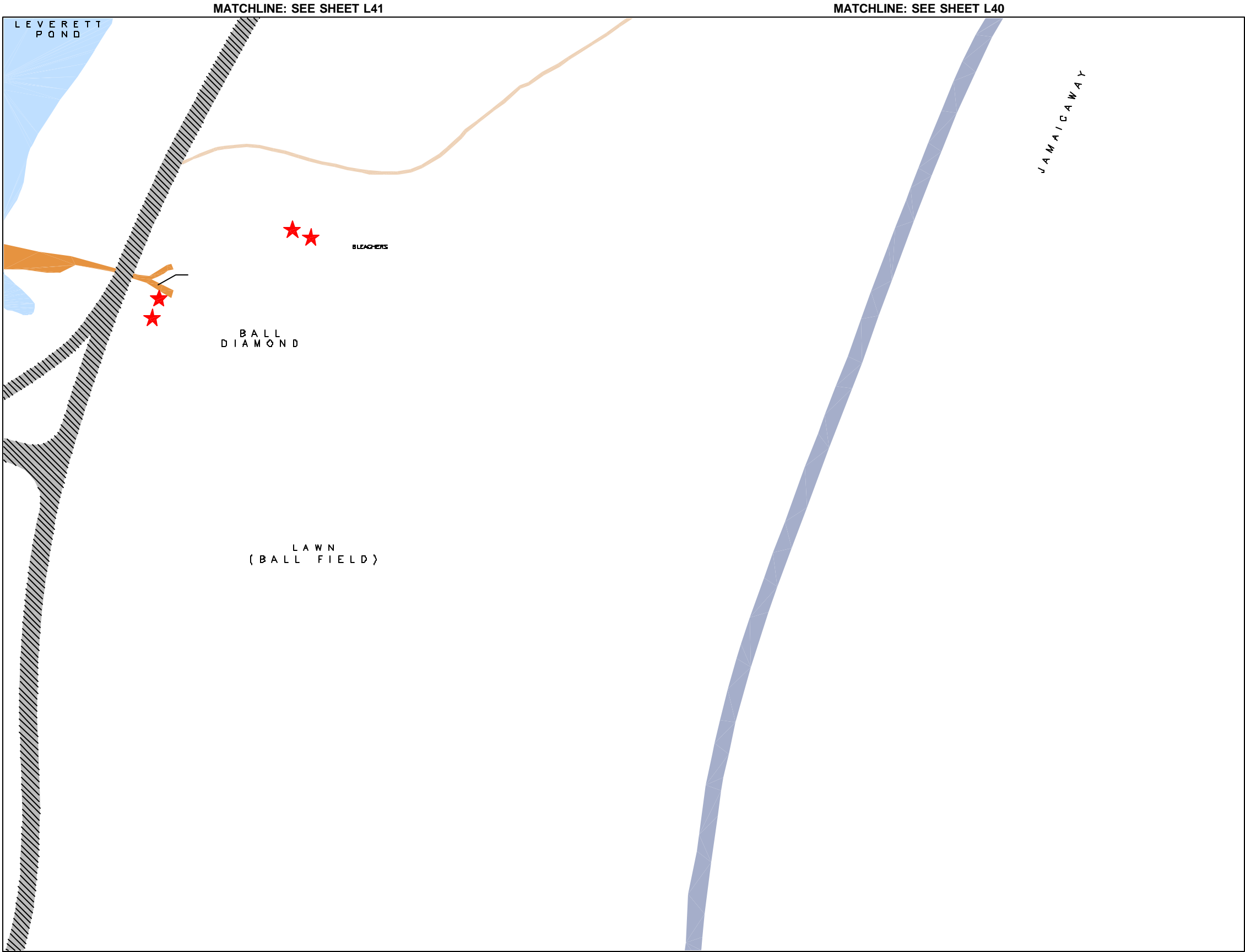


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CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'

DRAWING NO.

L41

MATCHLINE: SEE SHEET L43

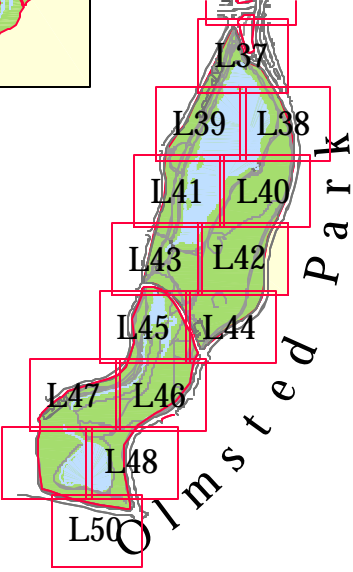
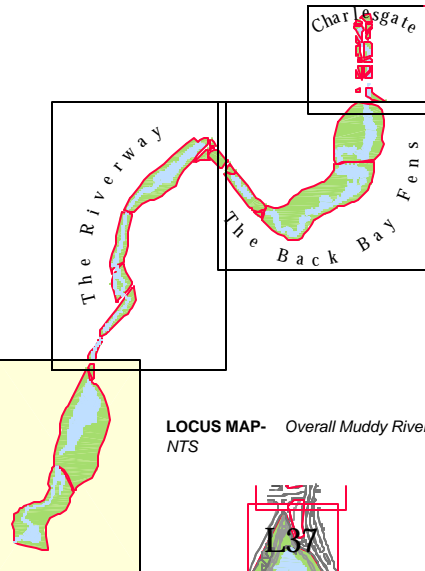


MATCHLINE: SEE SHEET L44

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/PAVING
CONCRETE SURFACE
BITUMINOUS CONCRETE SURFACE
STONEDUST SURFACE
BRICK SURFACE
ROLLED STONE SURFACE
DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS
BENCH (NON-STANDARD)
HISTORICAL BENCH STANDARD
MOBILE TRASH RECEPTACLE
STATIONARY TRASH RECEPTACLE
HISTORICAL LIGHT FIXTURE



LOCUS MAP-
NTS
Olmsted Park

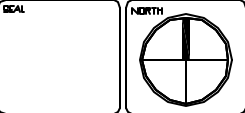
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CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L42



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/PAVING

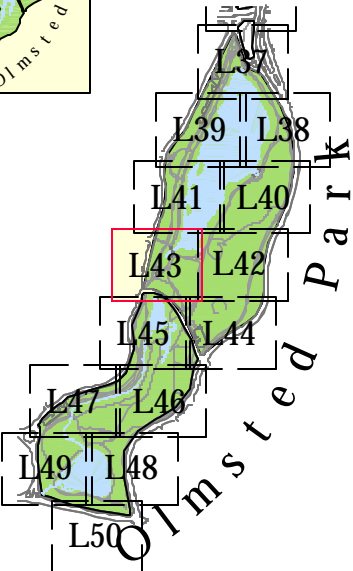
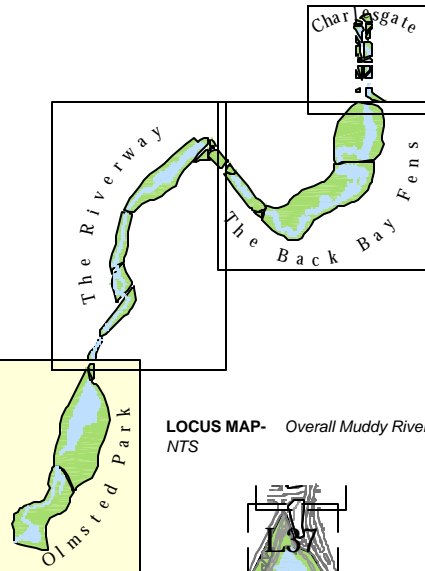
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BITUMINOUS CONCRETE SURFACE	[Pattern]	[Pattern]	[Pattern]
STONEDUST SURFACE	[Pattern]	[Pattern]	[Pattern]
BRICK SURFACE	[Pattern]	[Pattern]	[Pattern]
ROLLED STONE SURFACE	[Pattern]	[Pattern]	[Pattern]

DESIRE LINES [Symbol]

DEPRESSION ALONG PATHS [Symbol]

SITE FURNISHINGS

HISTORICAL BENCH STANDARD - OLD	[Star]
HISTORICAL BENCH STANDARD - NEW	[Star]
MOBILE TRASH RECEPTACLE	[Dot]
STATIONARY TRASH RECEPTACLE	[Dot]
HISTORICAL LIGHT FIXTURE	[Dot]



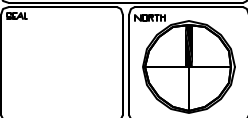
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SITE FURNISHING



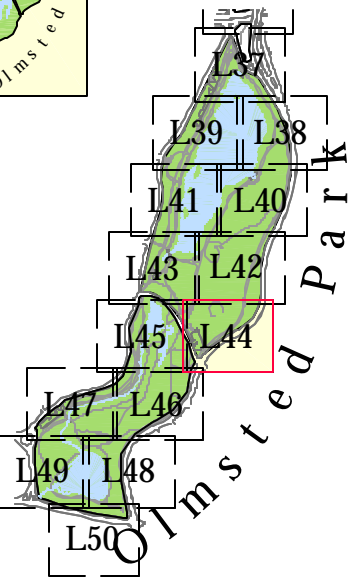
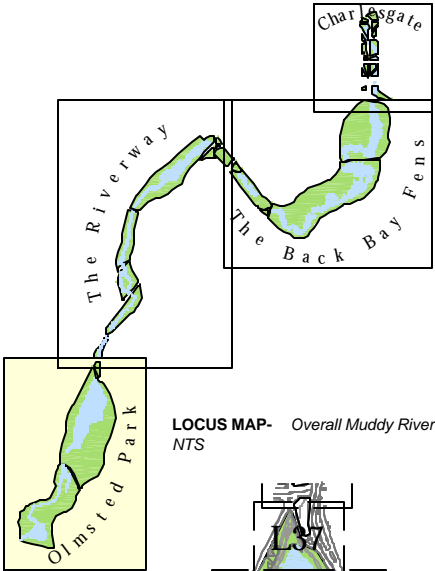
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CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
L43



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/PAVING
CONCRETE SURFACE
BITUMINOUS CONCRETE SURFACE
STONEDUST SURFACE
BRICK SURFACE
ROLLED STONE SURFACE
DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS
BENCH (NON-STANDARD)
HISTORICAL BENCH STANDARD
MOBILE TRASH RECEPTACLE
STATIONARY TRASH RECEPTACLE
HISTORICAL LIGHT FIXTURE



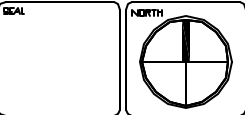
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NO.	DATE	REMARKS
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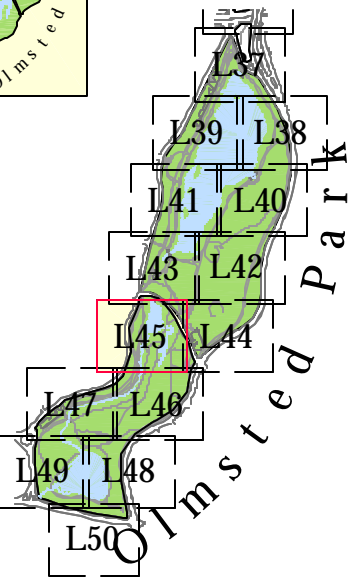
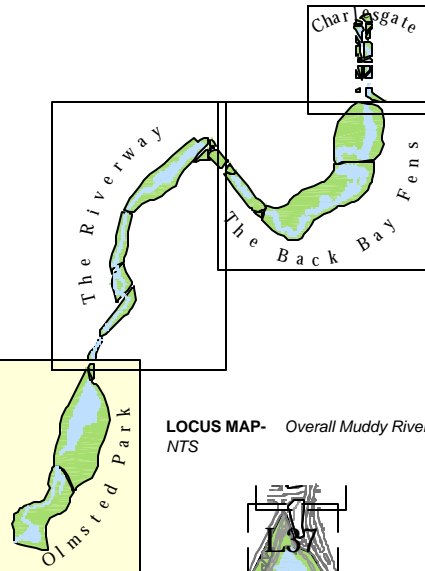
DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=80'
DRAWING NO.
L44



LEGEND	
INVENTORY AND ANALYSIS	
CIRCULATION/ PAVING	
CONCRETE SURFACE	
BITUMINOUS CONCRETE SURFACE	
STONEDUST SURFACE	
BRICK SURFACE	
ROLLED STONE SURFACE	
DESIRE LINES	
DEPRESSION ALONG PATHS	
SITE FURNISHINGS	
BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



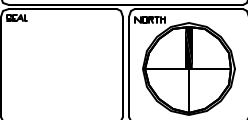
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NO.	DATE	REMARKS
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Inventory and Analysis
CIRCULATION /
SITE FURNISHING

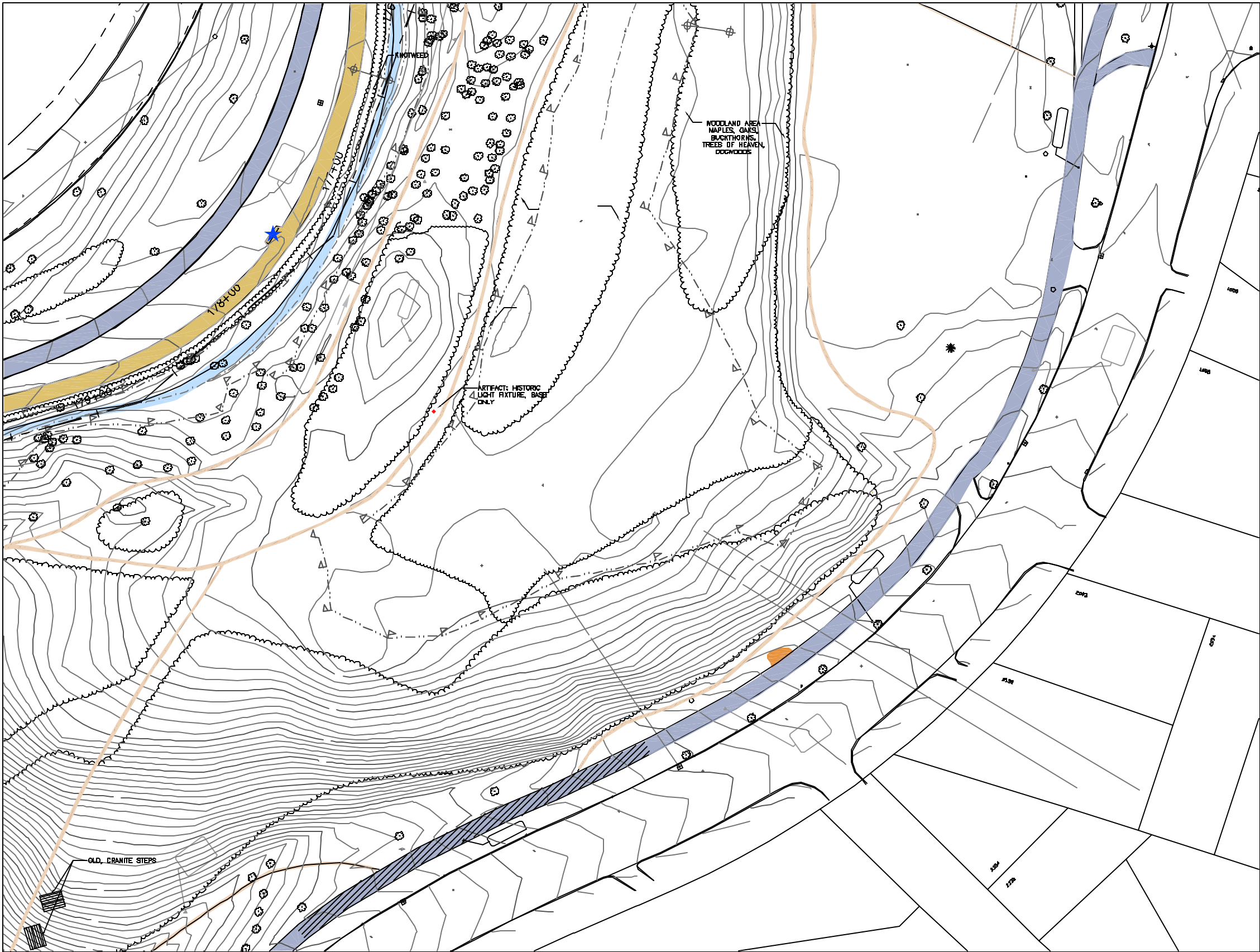


DRAWN BY: MC, LM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L45

MATCHLINE: SEE SHEET L47

MATCHLINE: SEE SHEET L45

MATCHLINE: SEE SHEET L44



MATCHLINE: SEE SHEET L48

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION / PAVING

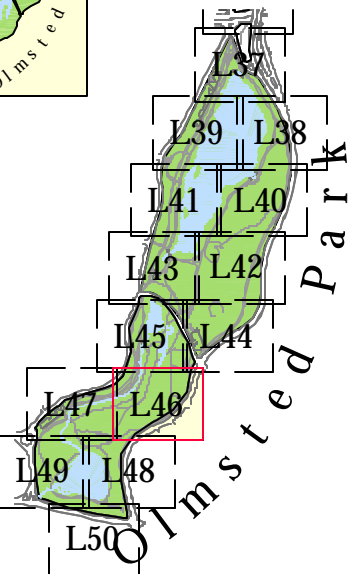
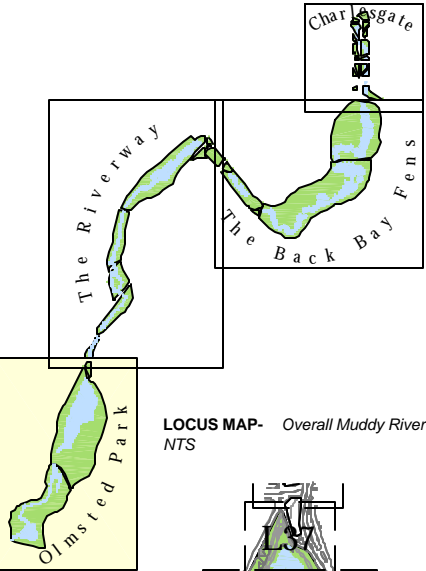
CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



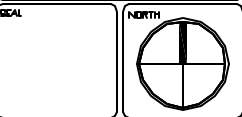
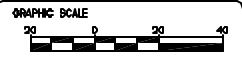
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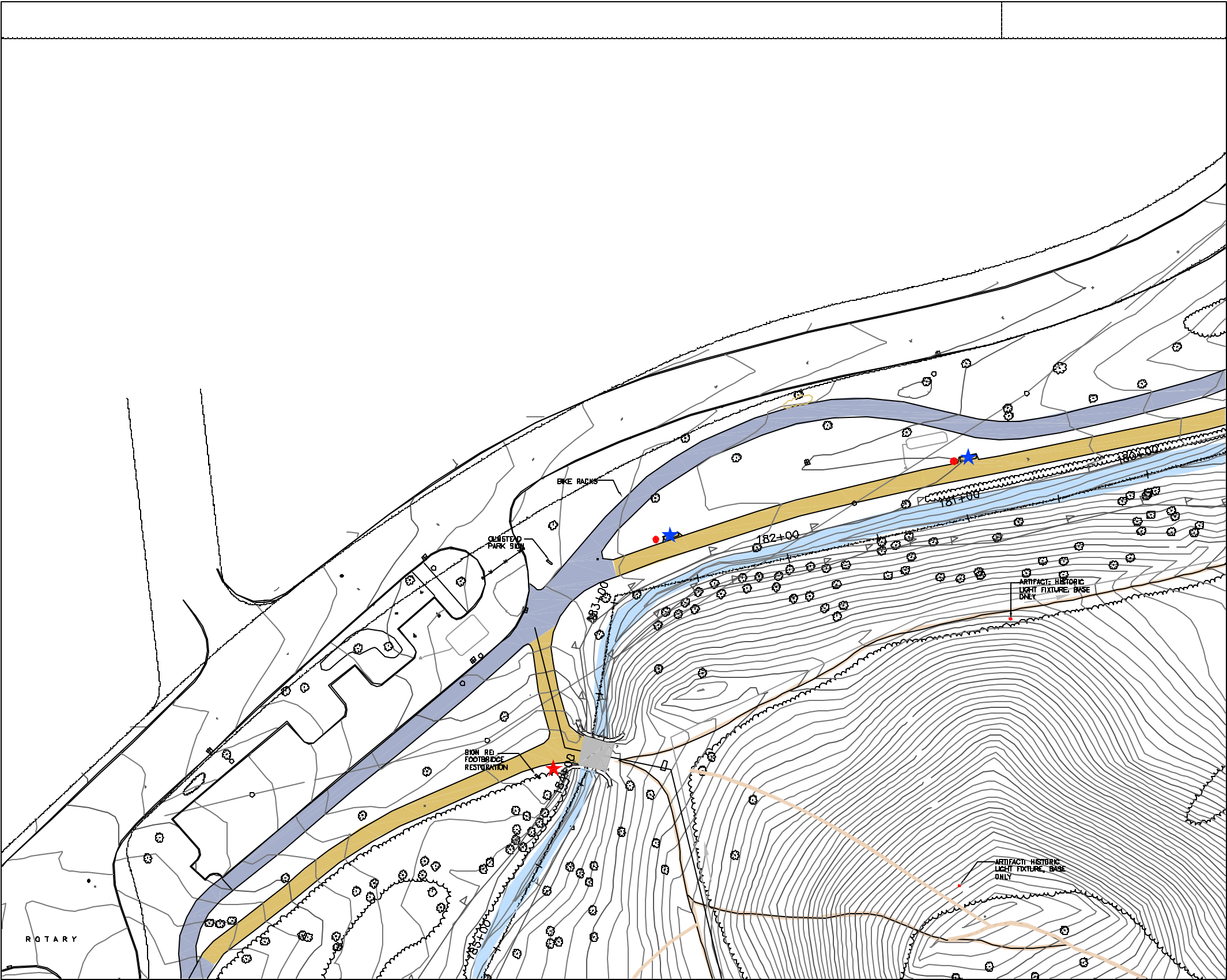
REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, MA
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L46

MATCHLINE: SEE SHEET L45



MATCHLINE: SEE SHEET L49

MATCHLINE: SEE SHEET L48

MATCHLINE: SEE SHEET L46

LEGEND
INVENTORY AND ANALYSIS

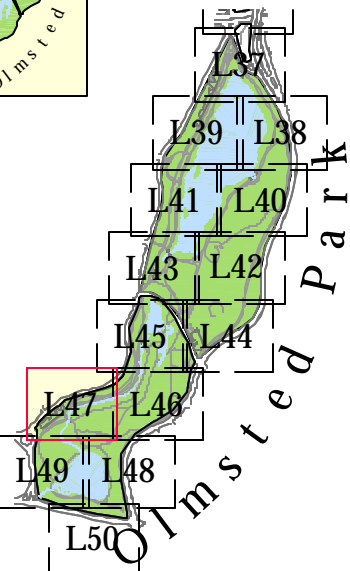
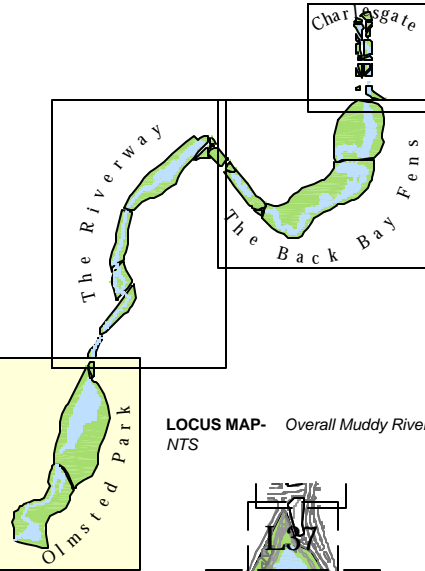
CIRCULATION/ PAVING

CONCRETE SURFACE	[Pattern]	[Pattern]	[Pattern]
BITUMINOUS CONCRETE SURFACE	[Pattern]	[Pattern]	[Pattern]
STONEDUST SURFACE	[Pattern]	[Pattern]	[Pattern]
BRICK SURFACE	[Pattern]	[Pattern]	[Pattern]
ROLLED STONE SURFACE	[Pattern]	[Pattern]	[Pattern]

DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	[Star]
HISTORICAL BENCH STANDARD	[Star]
MOBILE TRASH RECEPTACLE	[Dot]
STATIONARY TRASH RECEPTACLE	[Dot]
HISTORICAL LIGHT FIXTURE	[Dot]



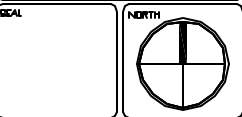
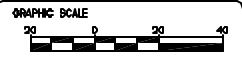
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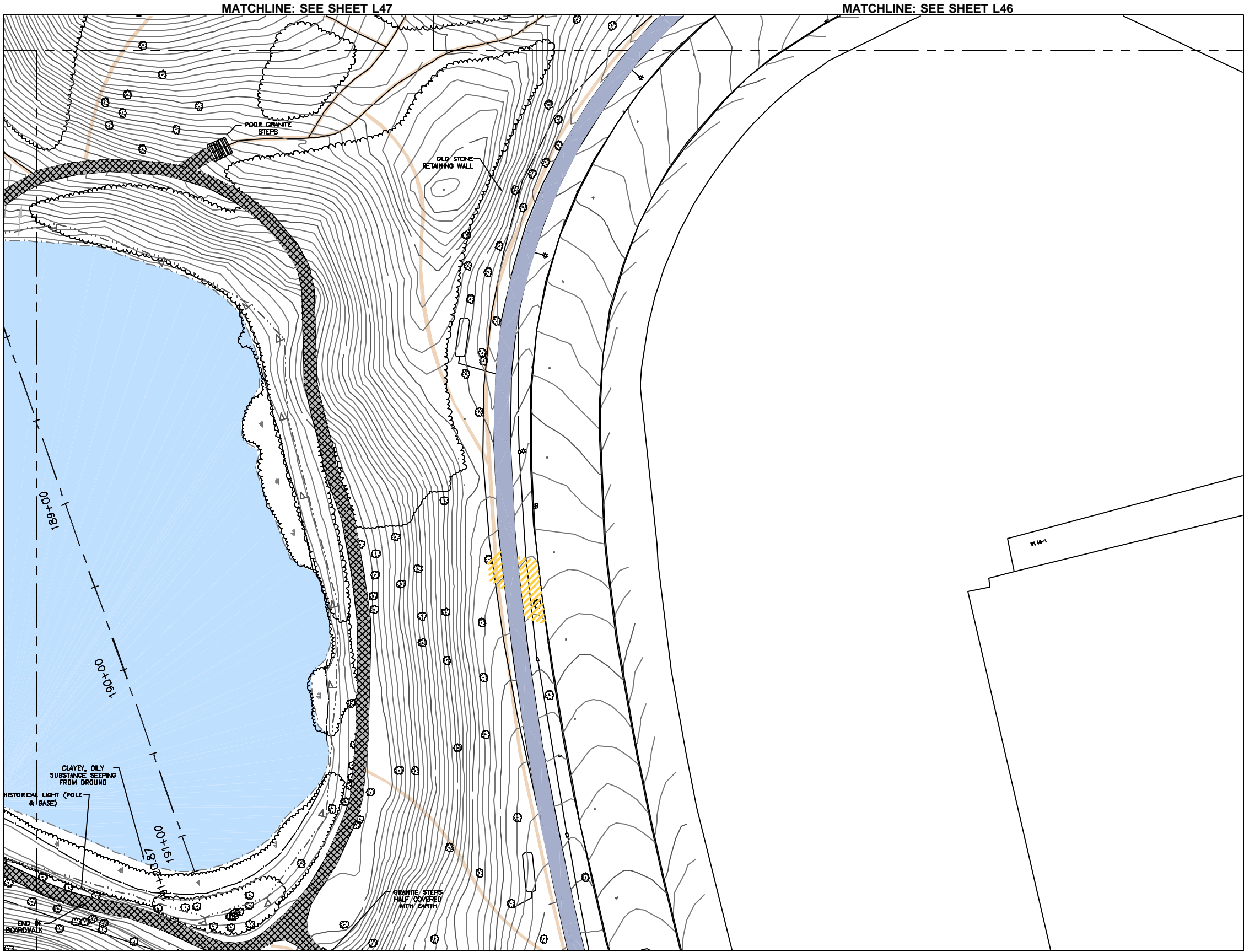
REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
CIRCULATION /
SITE FURNISHING



DRAWN BY: M.C. M4
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.: **L47**

MATCHLINE: SEE SHEET L49



MATCHLINE: SEE SHEET L50

LEGEND
INVENTORY AND ANALYSIS

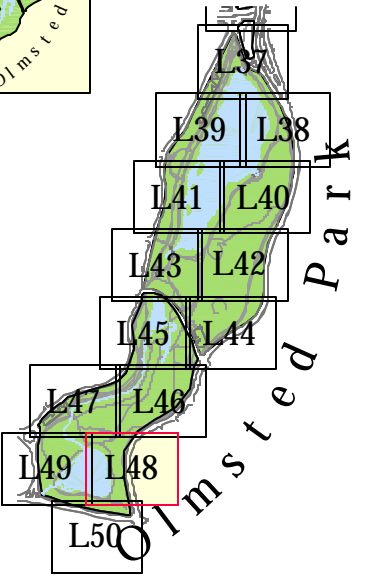
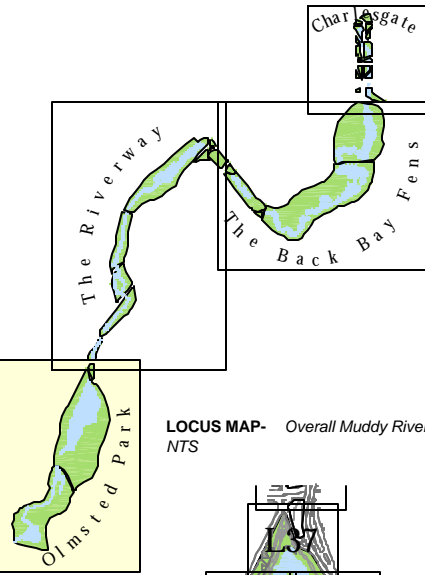
CIRCULATION/PAVING

CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



LOCUS MAP - Olmsted Park NTS

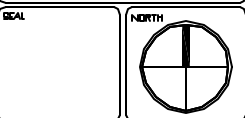
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Landscape Architects
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Cambridge, MA 02141
Phone: (617) 491-5300
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Inventory and Analysis
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SITE FURNISHING



DRAWN BY: MC, UN
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=80'
DRAWING NO.: **L48**



MATCHLINE: SEE SHEET L47

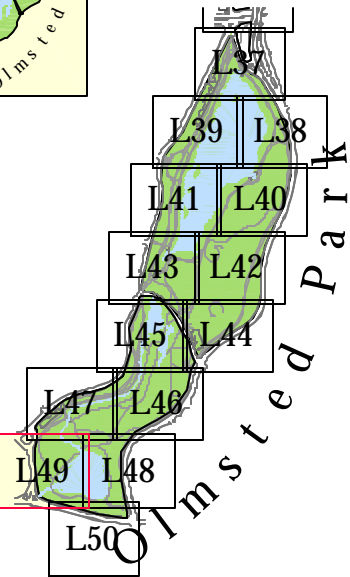
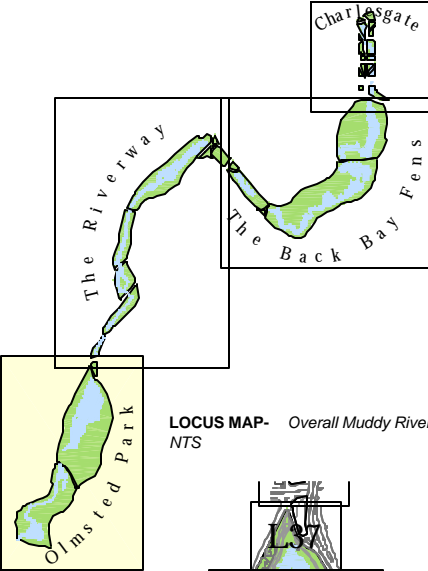
MATCHLINE: SEE SHEET L48

MATCHLINE: SEE SHEET L50

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/ PAVING
CONCRETE SURFACE
BITUMINOUS CONCRETE SURFACE
STONEDUST SURFACE
BRICK SURFACE
ROLLED STONE SURFACE
DESIRE LINES
DEPRESSION ALONG PATHS

SITE FURNISHINGS
BENCH (NON-STANDARD)
HISTORICAL BENCH STANDARD
MOBILE TRASH RECEPTACLE
STATIONARY TRASH RECEPTACLE
HISTORICAL LIGHT FIXTURE



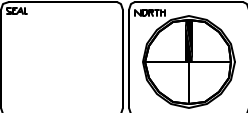
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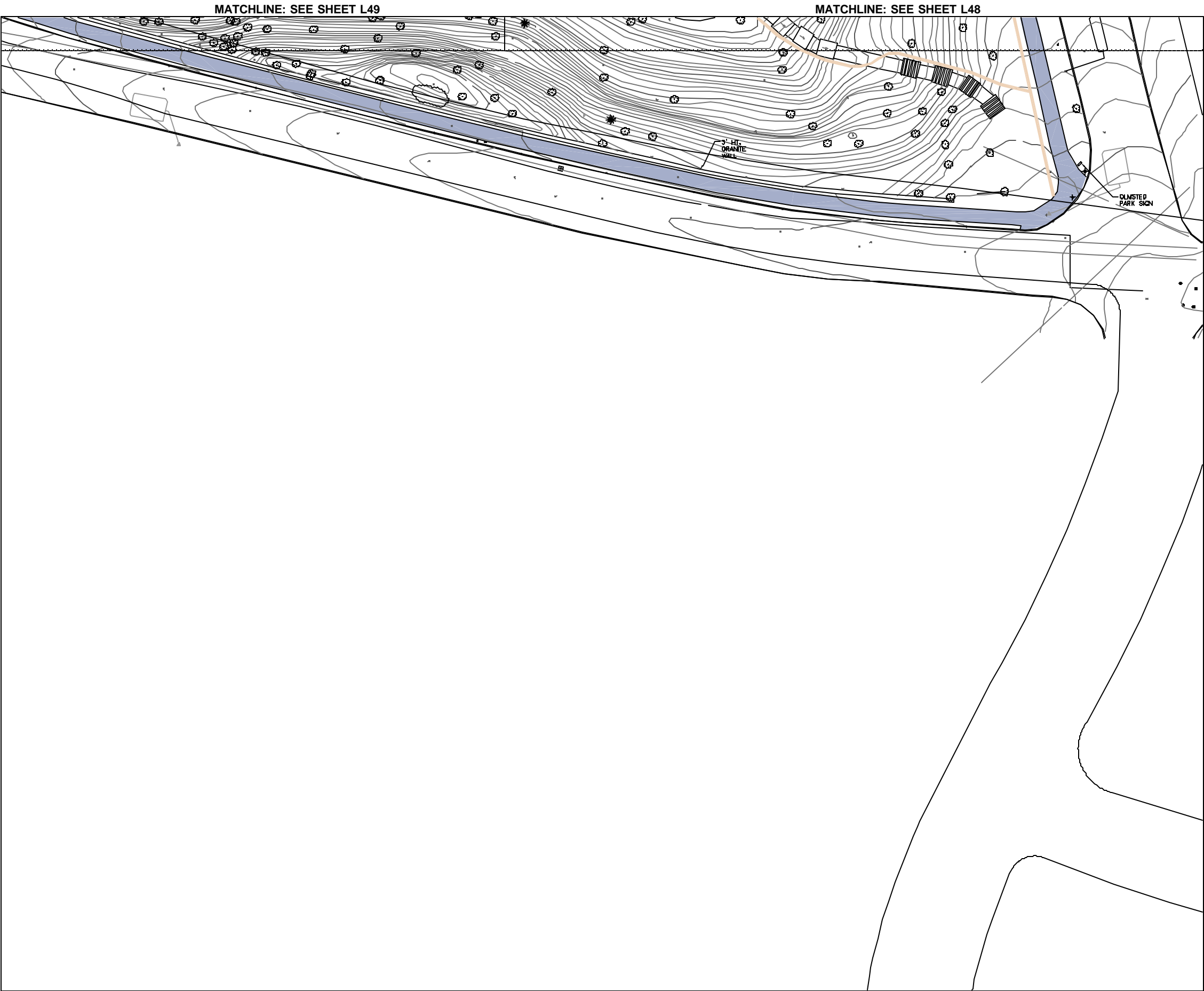
Boston and Brookline, Massachusetts

NO.	DATE	REVISIONS
A	3/1/01	

DRAWING TITLE
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CIRCULATION /
SITE FURNISHING



DRAWN BY: MC, LM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=30'
DRAWING NO.
L49



LEGEND
INVENTORY AND ANALYSIS

CIRCULATION / PAVING

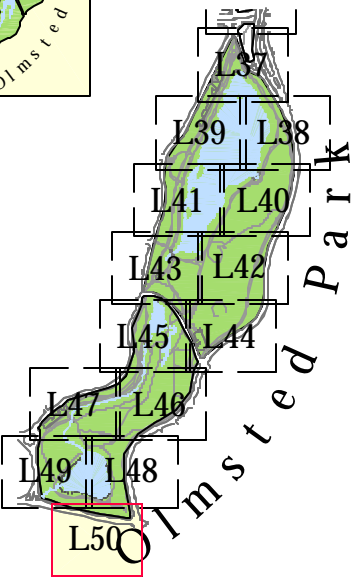
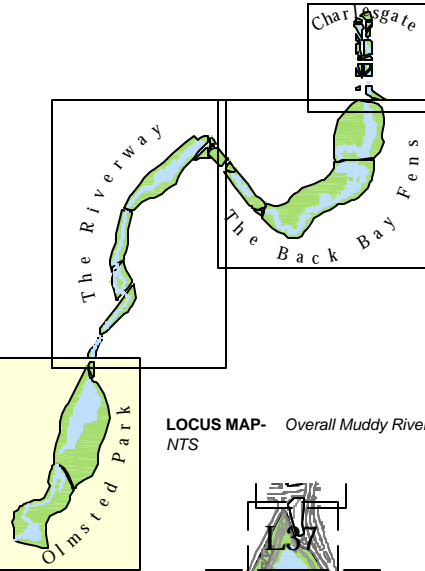
CONCRETE SURFACE			
BITUMINOUS CONCRETE SURFACE			
STONEDUST SURFACE			
BRICK SURFACE			
ROLLED STONE SURFACE			

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

BENCH (NON-STANDARD)	
HISTORICAL BENCH STANDARD	
MOBILE TRASH RECEPTACLE	
STATIONARY TRASH RECEPTACLE	
HISTORICAL LIGHT FIXTURE	



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Landscape Architects
435 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
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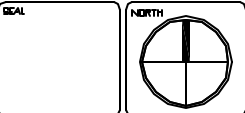
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REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE

Inventory and Analysis
CIRCULATION /
SITE FURNISHING



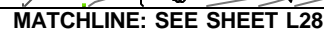
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CHECKED BY: MP
DATE: 11/21/00
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DRAWING NO.

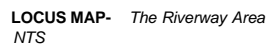
L50









**Appendix G: MUDDY RIVER RESTORATION PROJECT
INVENTORY AND ANALYSIS MAPS
– VEGETATION & EROSION**

MATCHLINE: SEE SHEET L27



MATCHLINE: SEE SHEET L21



LEGEND	
INVENTORY AND ANALYSIS	
VEGETATION	
<u>TREES</u>	
DECIDUOUS TREE	 Species Diversity Condition
EVERGREEN TREE	 Species Diversity Over Time
TREE MASS	
<u>SHRUBS</u>	
MASS OF RESTORED PLANTING	
MASS OF SHRUBS	
INVASIVE PLANT COLONY	
EROSION	
BARE LAWN	
EROSION AREA	

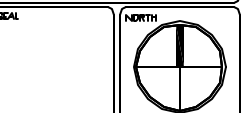
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FAX: (617) 491-7502
Email: pressley@pressleyinc.com

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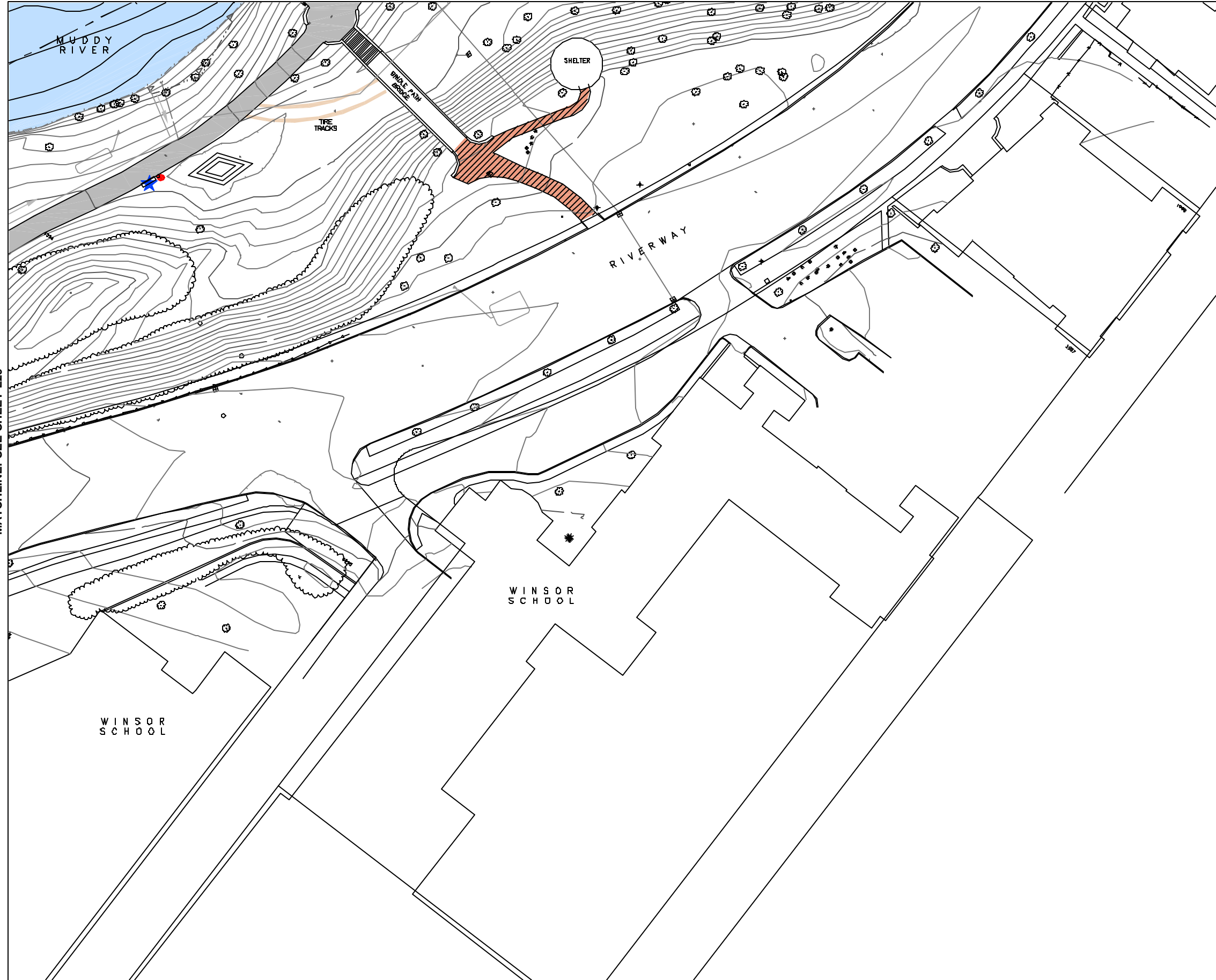
REVISIONS		
NOL.	DATE	REMARKS
A	3/1/01	

Inventory and Analysis
VEGETATION /
EROSION



DRAWN BY: MC, MM
 CHECKED BY: MP
 DATE: 11/21/00
 SCALE: 1"=40'

MATCHLINE: SEE SHEET L26



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Engineering Architects
432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

The Muddy River Restoration Project

Boston and Brookline, Massachusetts

LEGEND
INVENTORY AND ANALYSIS

CIRCULATION/ PAVING

CONCRETE SURFACE

BITUMINOUS CONCRETE

STONEDUST SURFACE

BRICK SURFACE

ROLLED STONE SURFACE

DESIRE LINES

DEPRESSION ALONG PATHS

SITE FURNISHINGS

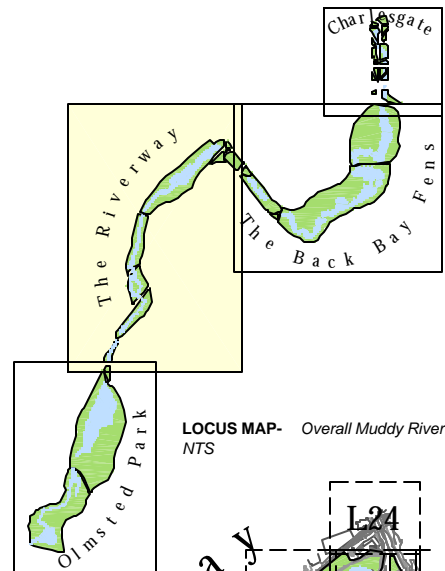
BENCH (NON-STANDARD)

HISTORICAL BENCH STANDARD

MOBILE TRASH RECEPTACLE

STATIONARY TRASH RECEPTACLE

HISTORICAL LIGHT FIXTURE



LOCUS MAP- Overall Muddy River
NTS

The Riverway

L24

L25 L23

L27 L26 L21

L29 L28

L30

L31

L32

L33

L35 L34

L36

LOCUS MAP- The Riverway Area
NTS

LOCUS MAP- *The Riverway Area*
NTS

REVISIONS		
NOL.	DATE	REMARKS
A	3/1/01	

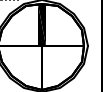
DRAWING TITLE

Inventory and Analysis
CIRCULATION /
SITE FURNISHING

GRAPHIC SCALE

**DEAL**

ORTH



DRAWN BY: MC MM

TRAINING N

NEVER DO

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T

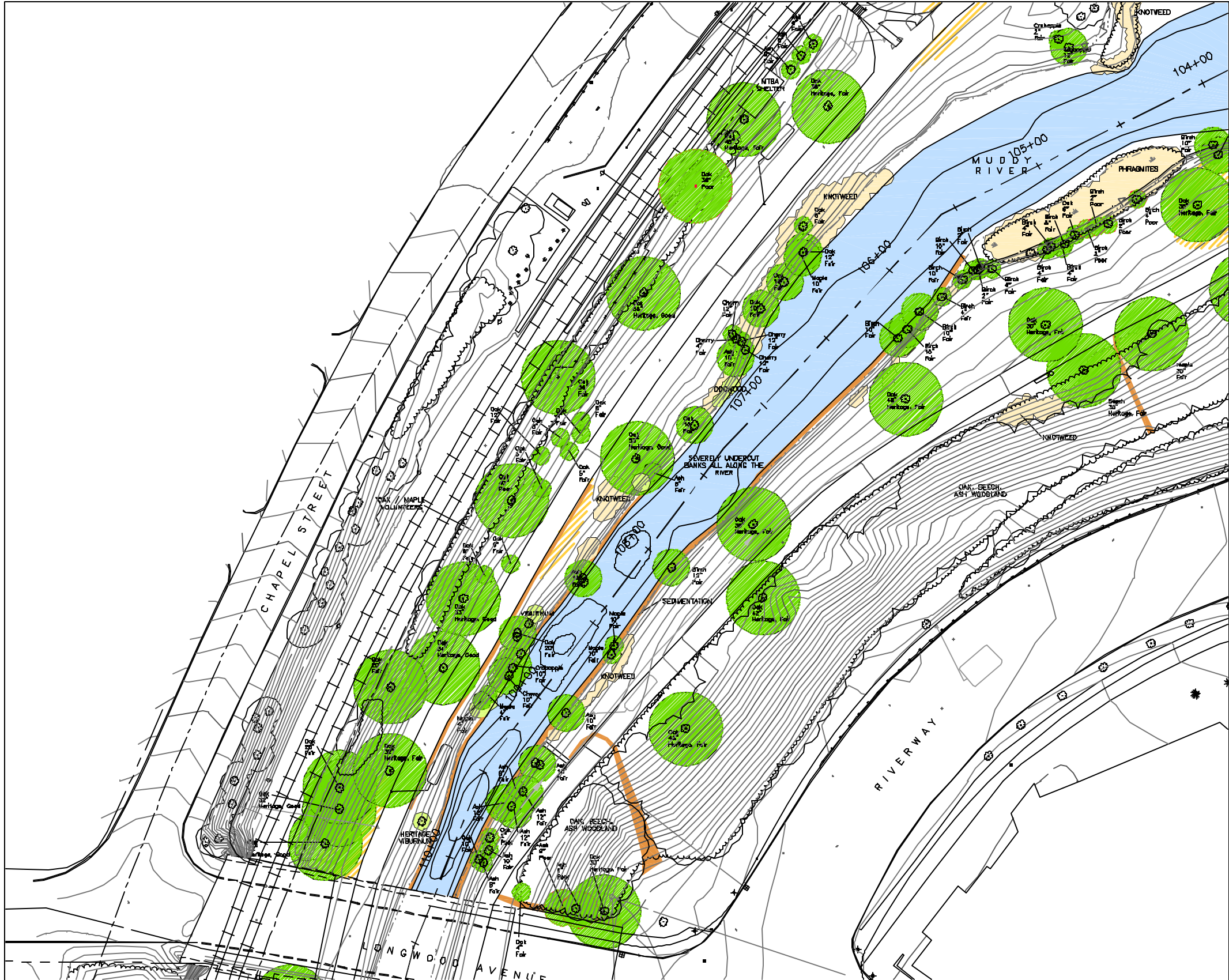
DATE: 11/21/00

4

SCALE: 1"=60'

2

L28



MATCHLINE: SEE SHEET L27

MATCHLINE: SEE SHEET L30

MATCHLINE: SEE SHEET L28

LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA

LOCUS MAP- Overall Muddy River NTS

LOCUS MAP- The Riverway Area NTS

REVISIONS

NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE

Inventory and Analysis
VEGETATION /
EROSION

GRAPHIC SCALE

0 10 20 40

SCALE

1"=60'

DRAWN BY MC, MM
CHECKED BY MP
DATE 11/21/00
SCALE 1"=60'

DRAWING NO.

L29

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Boston and Brookline, Massachusetts

MATCHLINE: SEE SHEET L29



MATCHLINE: SEE SHEET L31

LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

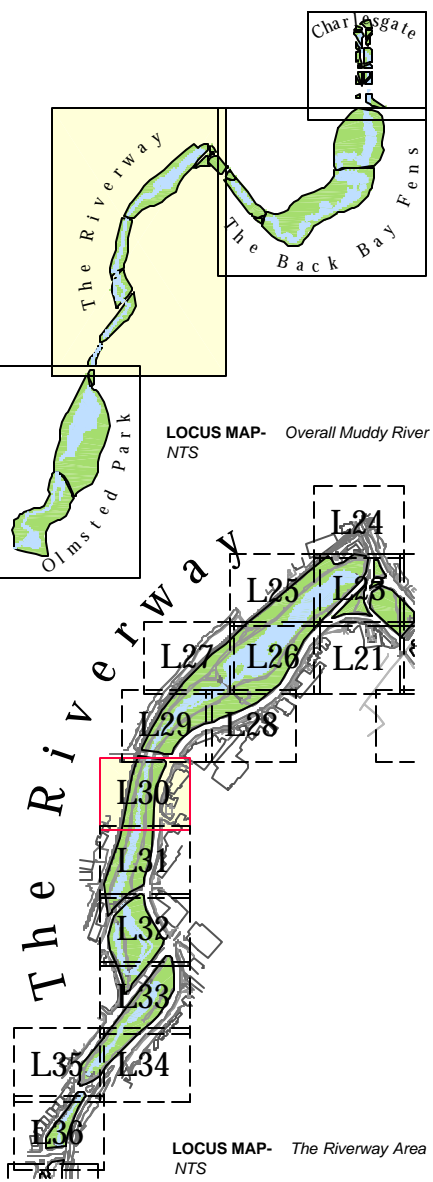
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



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Associates, Inc.
425 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
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This is a detailed landscape architectural plan for a riverway area. The plan shows the Muddy River flowing through the center, with a riverway on the right and a road on the left. Numerous trees are planted along the riverbanks, with labels for species like VIBURNUM, KNOTWEED, and ALBURNUM. The plan also includes a 'FLOWER PATCH' and 'ROSES' area. The river is labeled 'MUDDY RIVER' and the road is labeled 'ROAD'. The plan includes a north arrow and a scale bar.

MATCHLINE: SEE SHEET L32

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Boston and Brookline, Massachusetts


The Muddy River Restoration Project


Boston and Brookline, Massachusetts


LEGEND
INVENTORY AND ANALYSIS

VEGETATION


TREES


DECIDUOUS TREE  Spanish
Oak
Catalpa


EVERGREEN TREE  Bay
Lemon
Dwarf Olive

TREE MASS 


SHRUBS


MASS OF RESTORED PLANTING 

MASS OF SHRUBS 

INVASIVE PLANT COLONY 

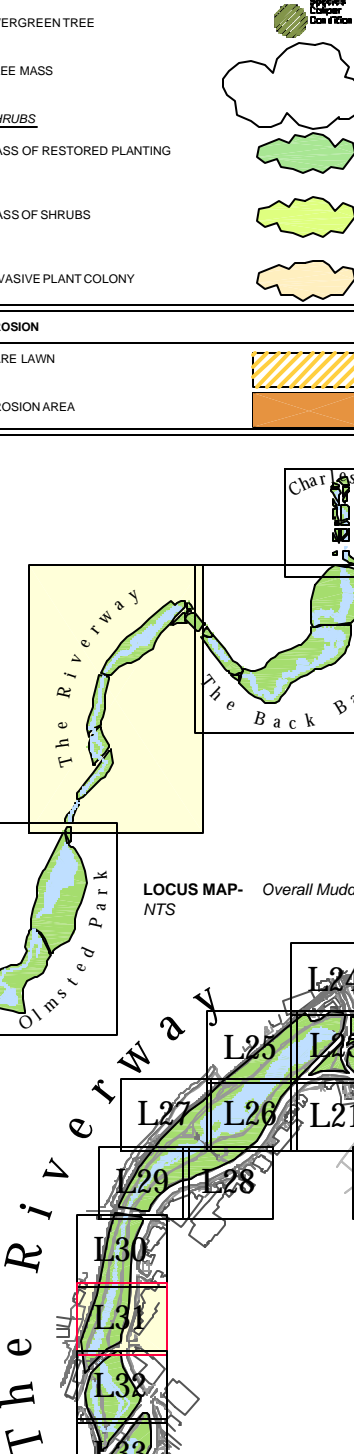
EROSION

BARE LAWN 

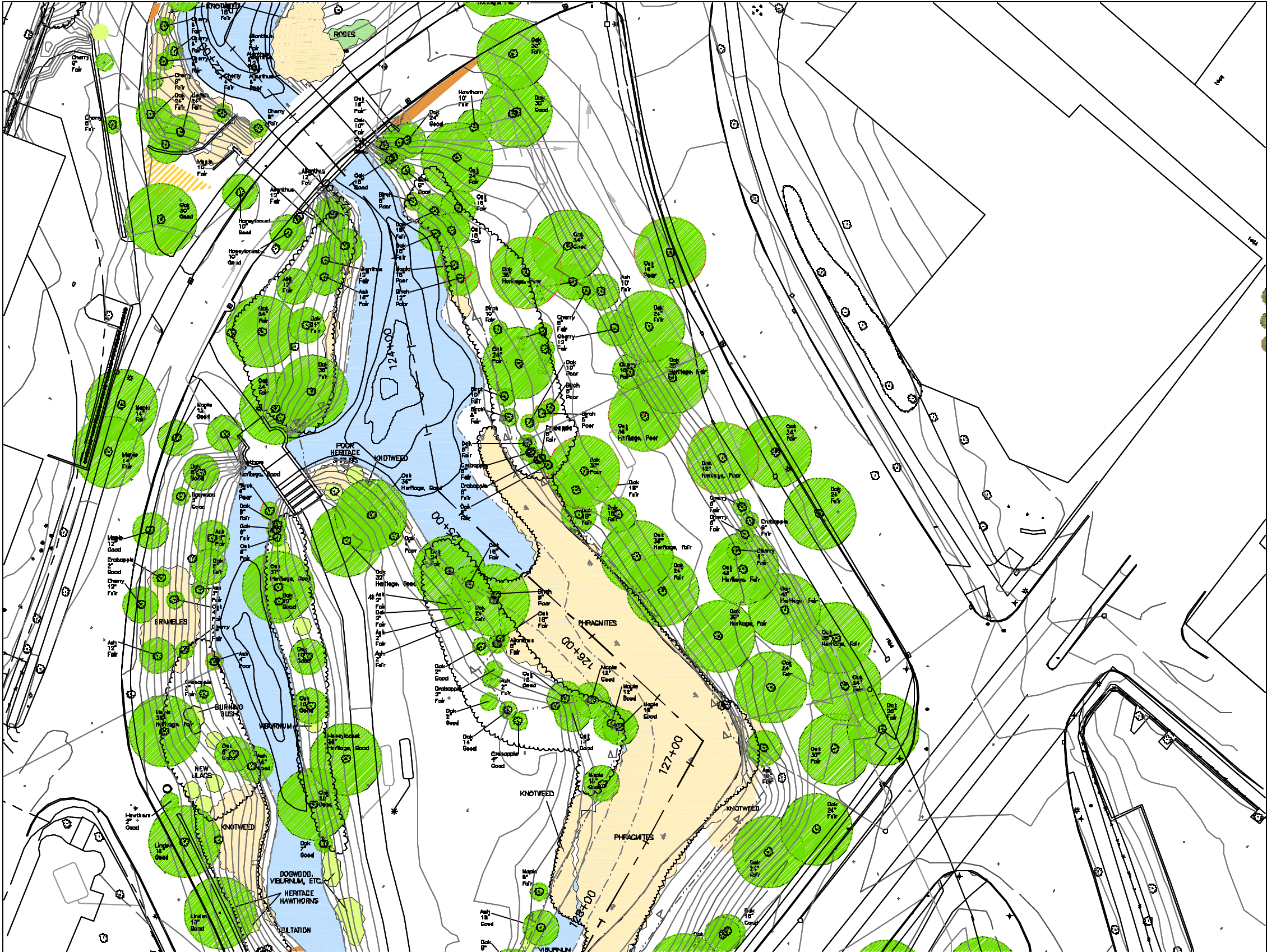
EROSION AREA 

LOCUS MAP- Overall Muddy River NTS

LOCUS MAP- The Riverway Area NTS



MATCHLINE: SEE SHEET L31





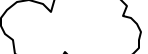
MATCHLINE: SEE SHEET L33

LEGEND
INVENTORY AND ANALYSIS


VEGETATION


TREES


DECIDUOUS TREE  Sapling
Evergreen Tree  Conifer

TREE MASS 


SHRUBS


MASS OF RESTORED PLANTING 

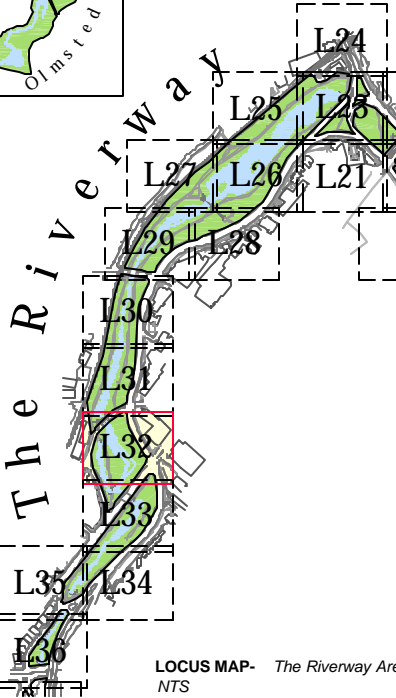
MASS OF SHRUBS 

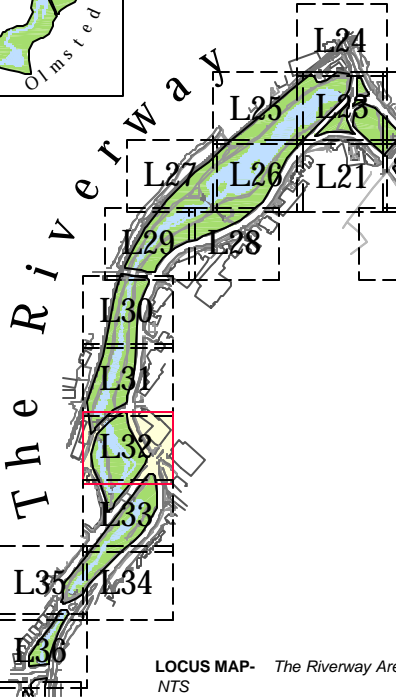
INVASIVE PLANT COLONY 

EROSION

BARE LAWN 

EROSION AREA 


LOCUS MAP- Overall Muddy River NTS


LOCUS MAP- The Riverway Area NTS

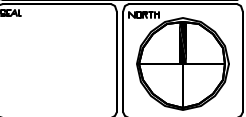
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432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

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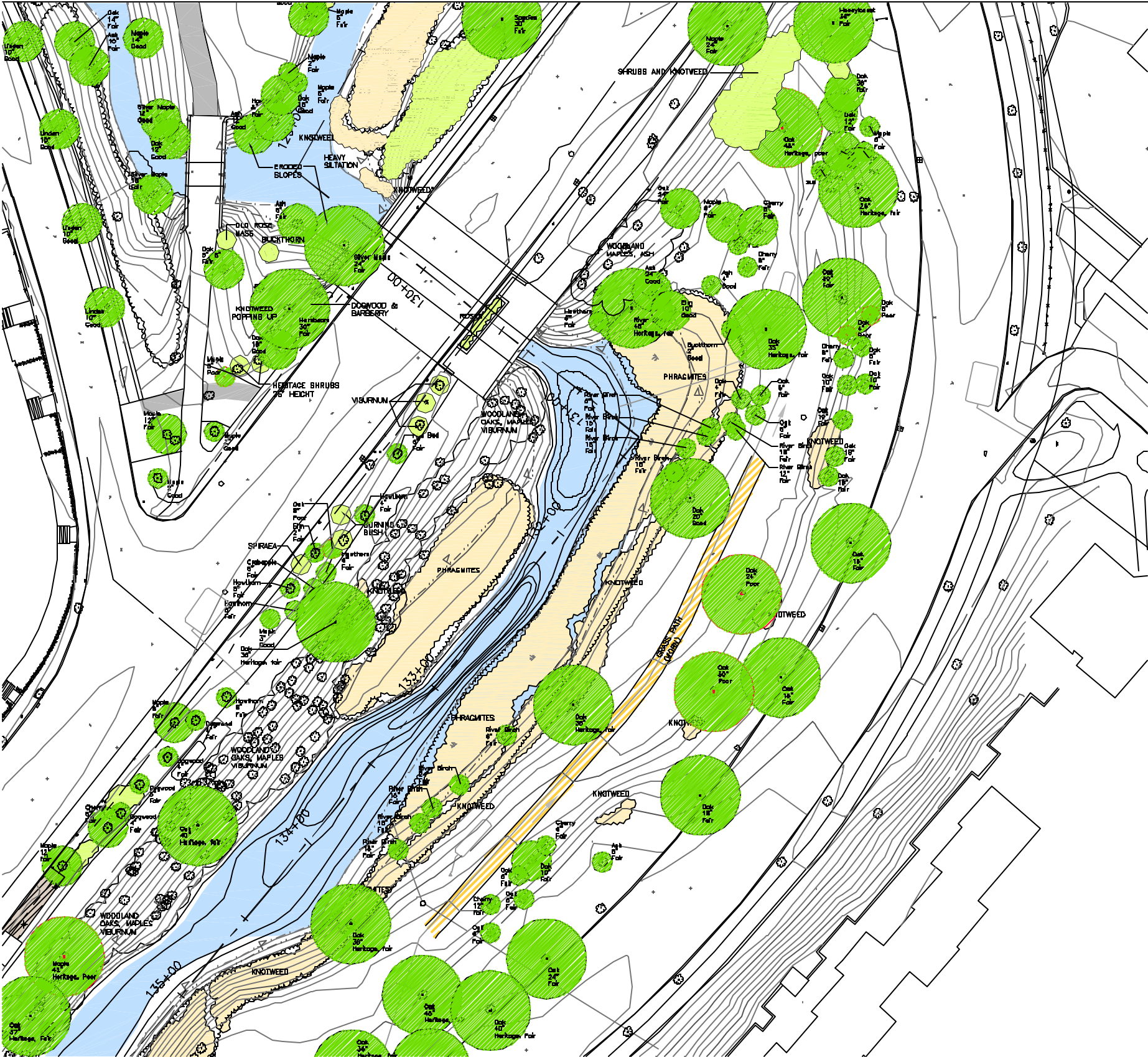
REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
VEGETATION /
EROSION



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CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=80'
DRAWING NO.
L32

MATCHLINE: SEE SHEET L32



MATCHLINE: SEE SHEET L34

LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

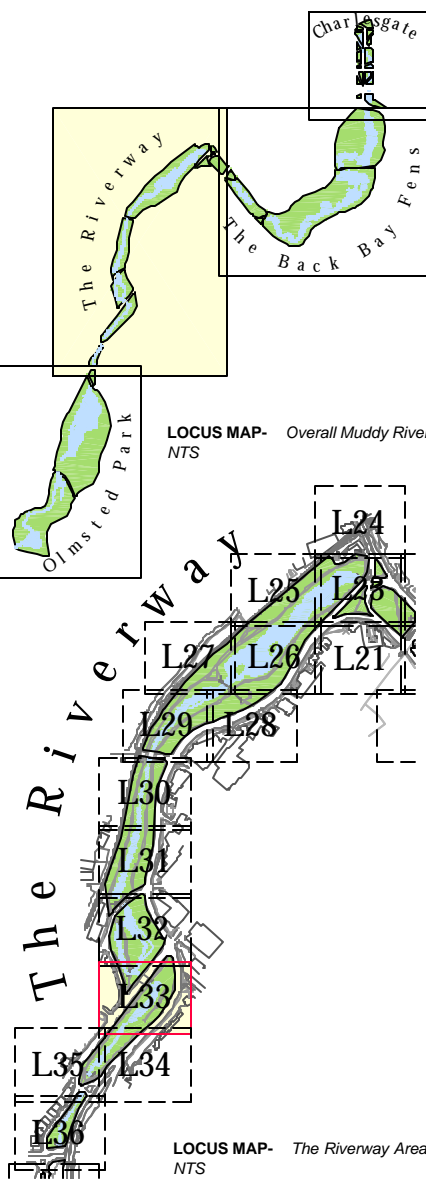
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



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Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

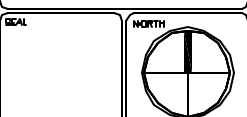
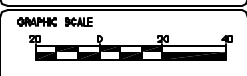
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REVISIONS		REMARKS
NO.	DATE	
A	3/1/01	

DRAWING TITLE

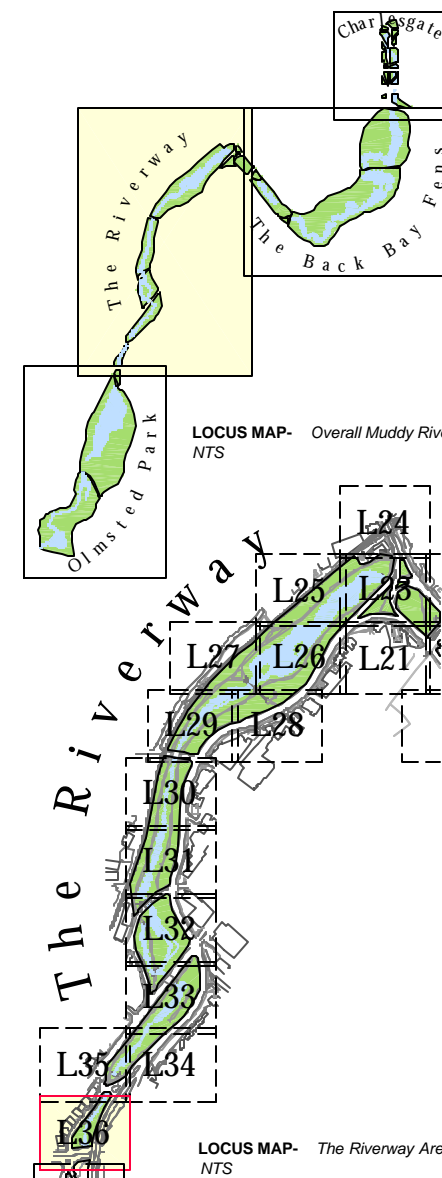
Inventory and Analysis
VEGETATION /
EROSION











DRAWN BY: NC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=80'

DRAWING NO.
L33

MATCHLINE: SEE SHEET L37



LEGEND	
INVENTORY AND ANALYSIS	
VEGETATION	
<u>TREES</u>	
DECIDUOUS TREE	 Species Cover Condition
EVERGREEN TREE	 Species Cover Diameter
TREE MASS	
<u>SHRUBS</u>	
MASS OF RESTORED PLANTING	
MASS OF SHRUBS	
INVASIVE PLANT COLONY	
EROSION	
BARE LAWN	
EROSION AREA	

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432 Columbia Street
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Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@presslevinc.com

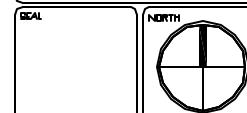
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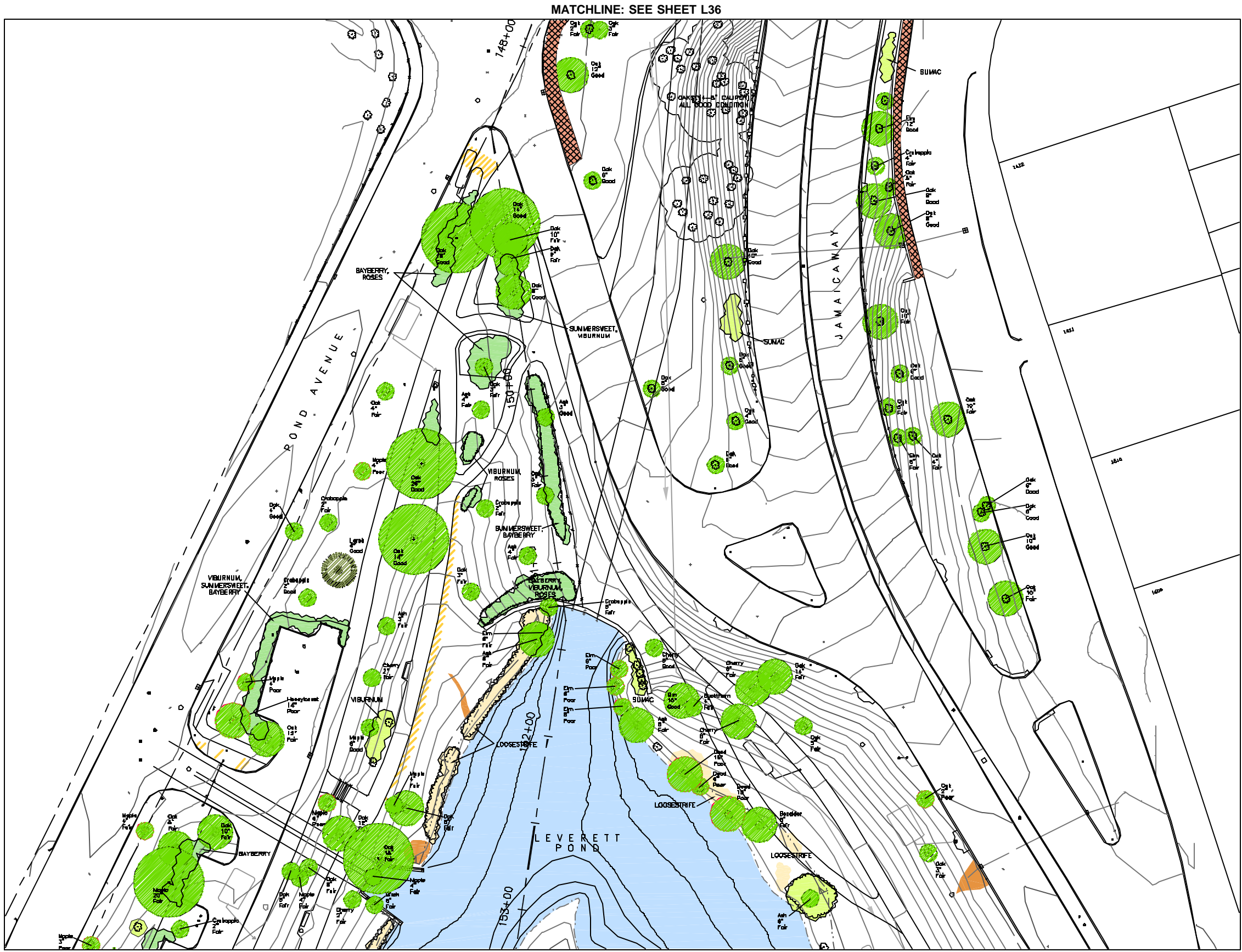
REVISIONS		
NOL.	DATE	REMARKS

DRAWING TITLE

Inventory and Analysis
VEGETATION /
EROSION



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'



LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

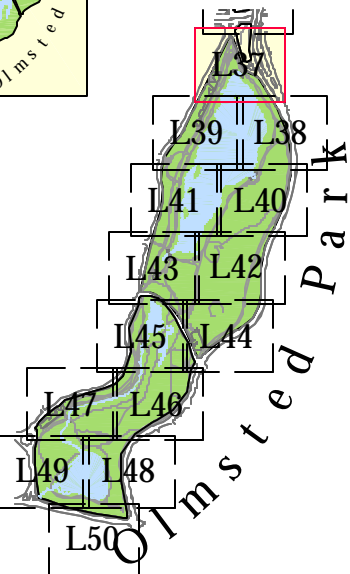
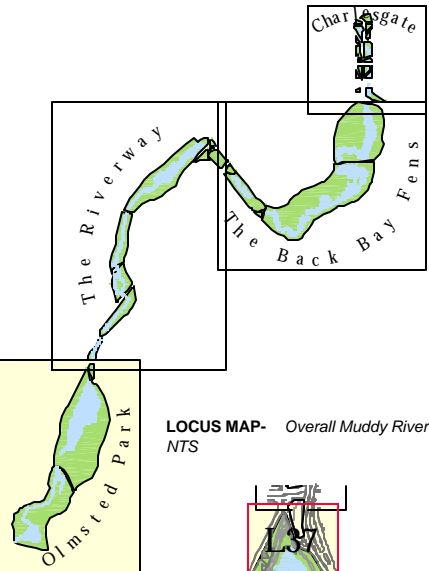
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



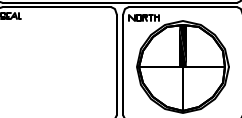
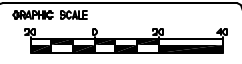
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Associates, Inc.
Landscape Architects
432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
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REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
VEGETATION /
EROSION



DRAWN BY: MC, VM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L37

MATCHLINE: SEE SHEET L39



MATCHLINE: SEE SHEET L40

LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

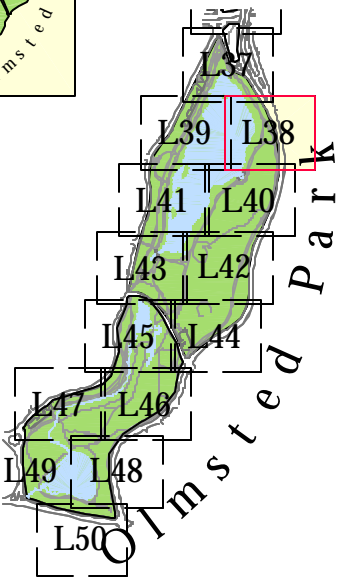
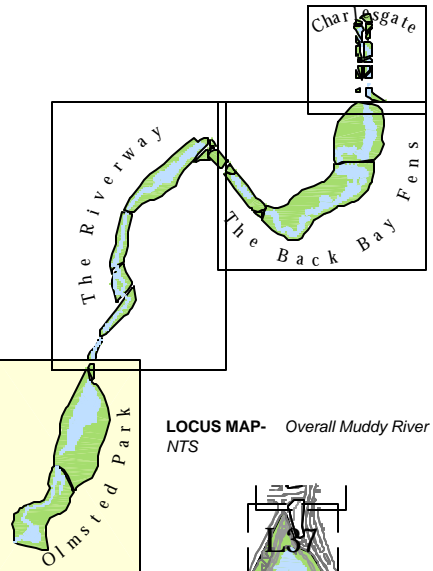
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



LOCUS MAP - Olmsted Park NTS

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Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

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NO.	DATE	
A	3/1/01	

DRAWING TITLE

Inventory and Analysis
VEGETATION /
EROSION

GRAPHIC SCALE

0 20 40

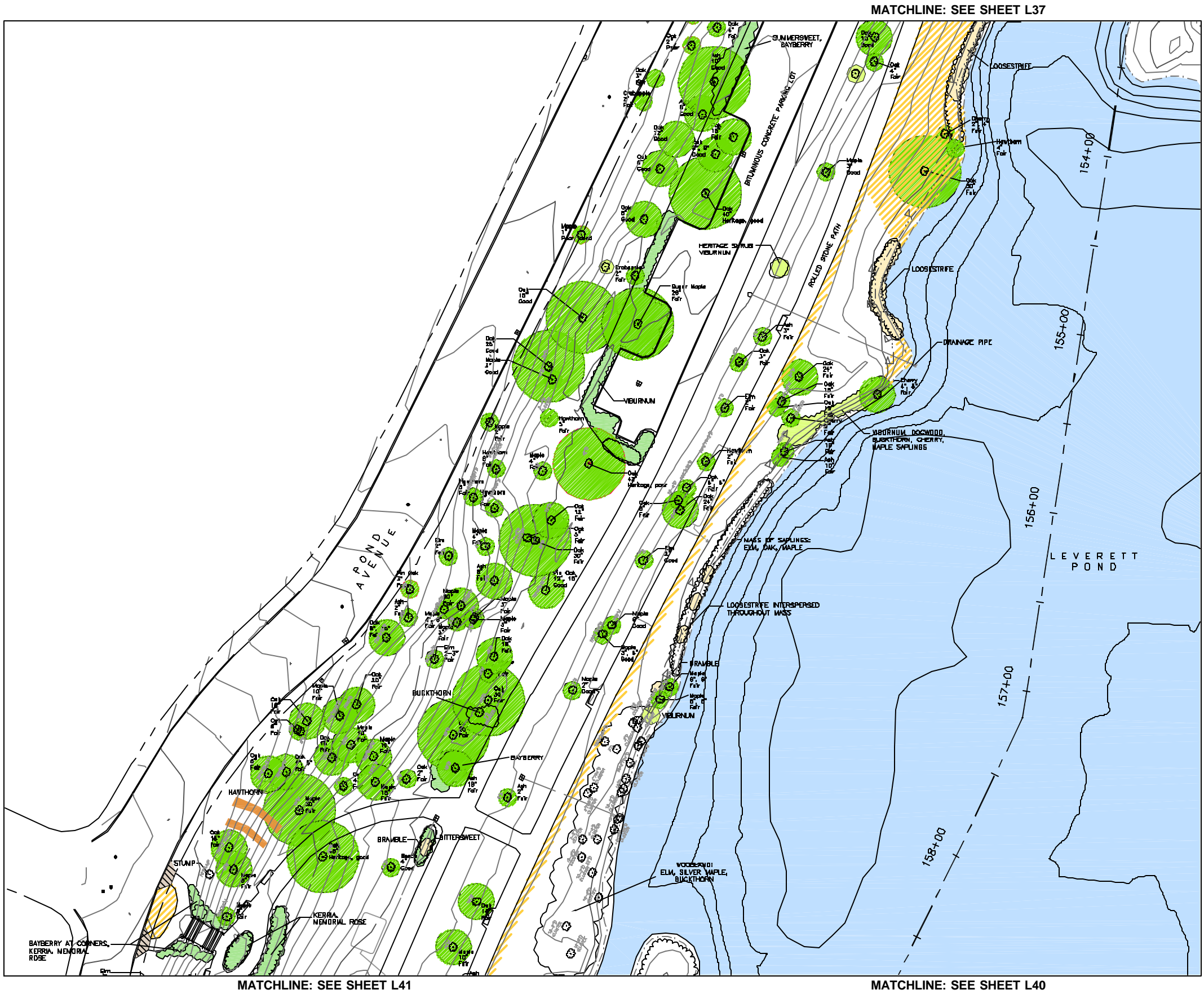
SCALE

1"=60'

NORTH

DRAWN BY MC, MM
CHECKED BY MP
DATE 11/21/00
SCALE 1"=60'

L38



LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREENTREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

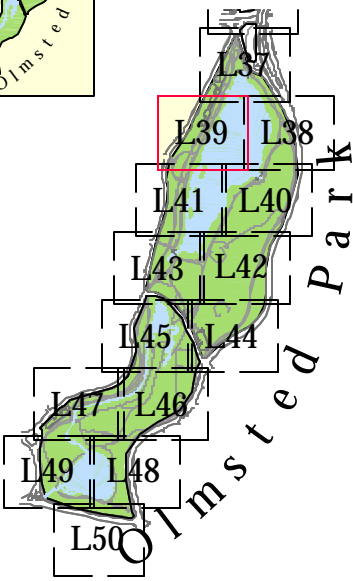
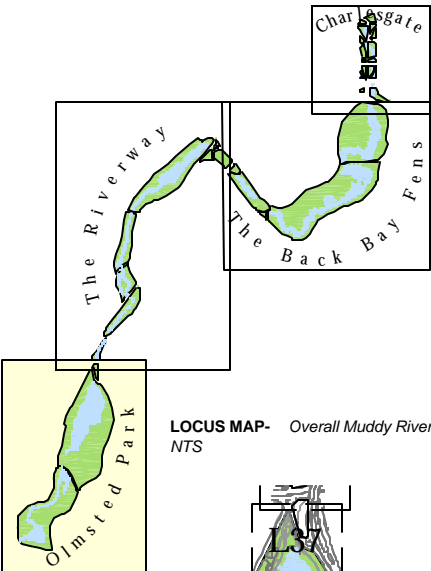
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



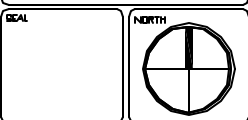
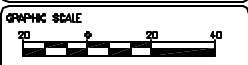
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432 Columbia Street
Cambridge, MA 02141
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The Muddy River Restoration Project

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REVISION	NO.	DATE	REMARKS
A	1	3/1/01	

DRAWING TITLE
Inventory and Analysis
VEGETATION /
EROSION



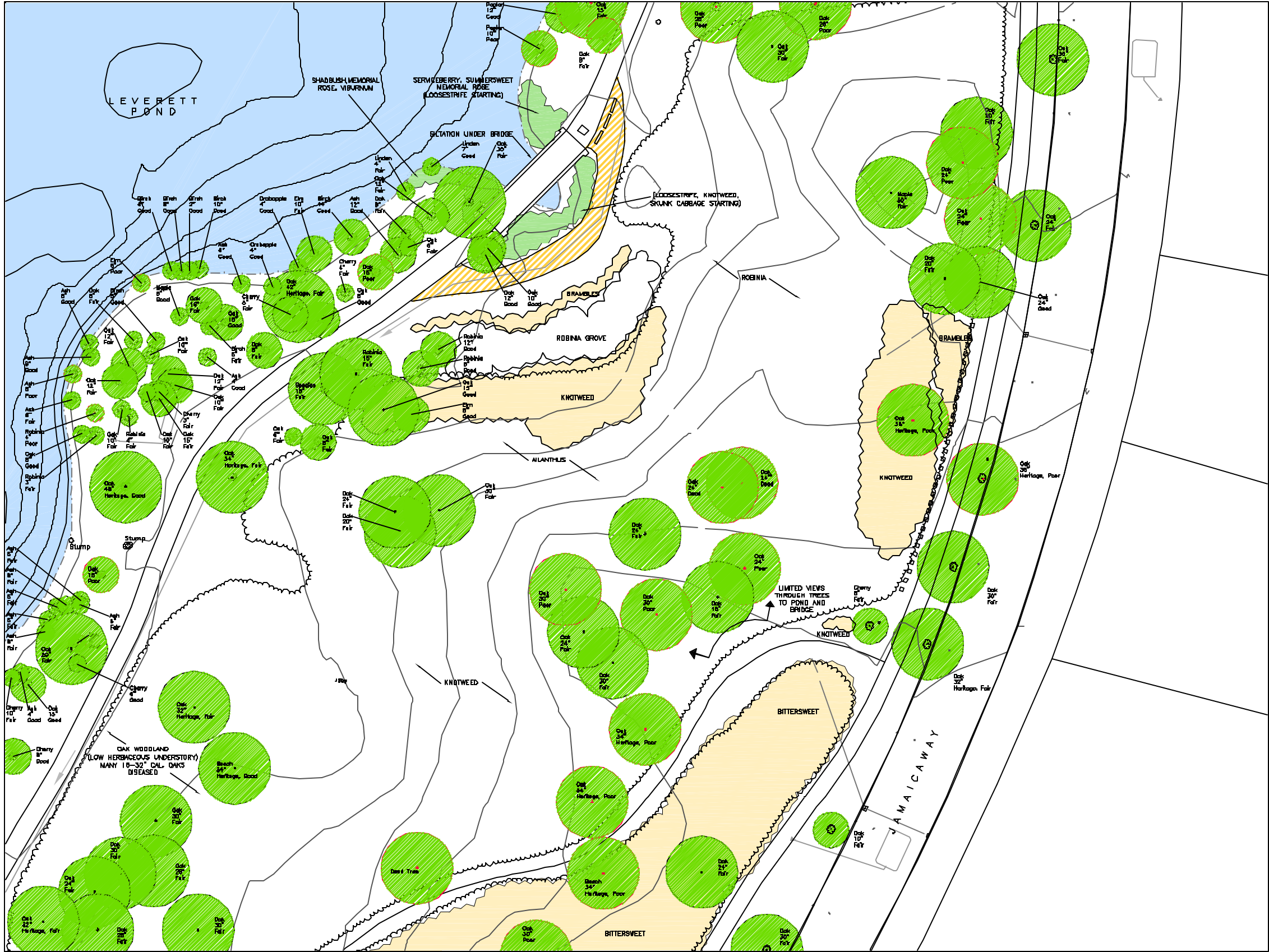
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CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L39

MATCHLINE: SEE SHEET L39

MATCHLINE: SEE SHEET L38

MATCHLINE: SEE SHEET L41

MATCHLINE: SEE SHEET L42



LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

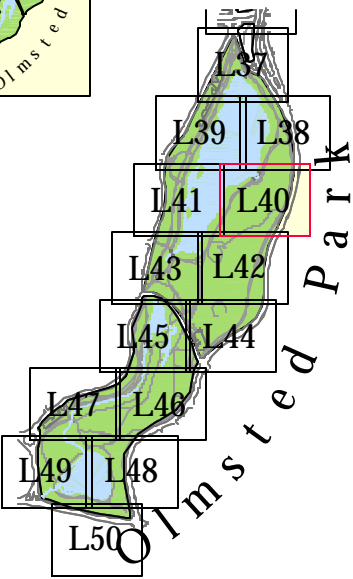
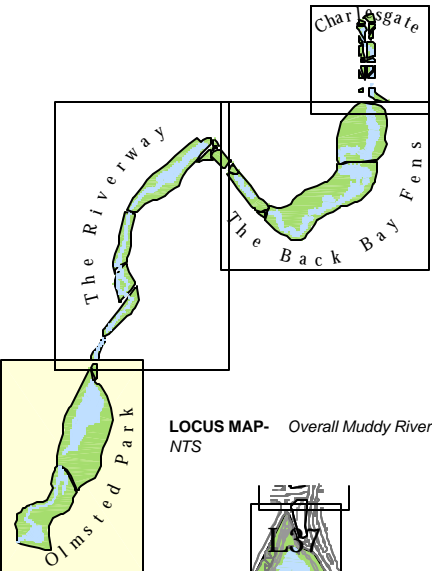
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



LOCUS MAP- NTS
Olmsted Park

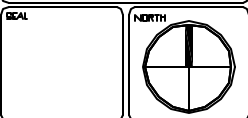
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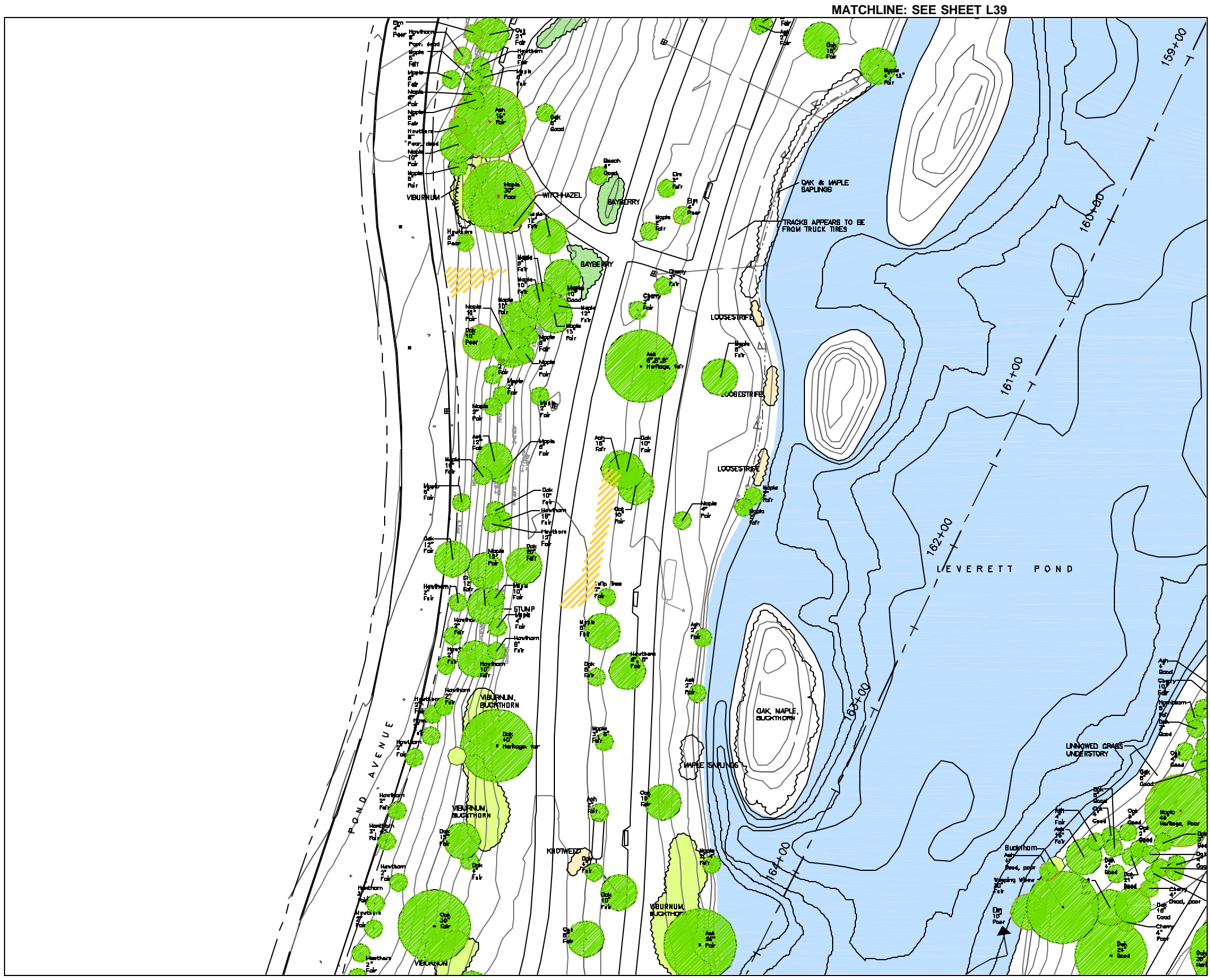
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REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
VEGETATION /
EROSION



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L40



LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

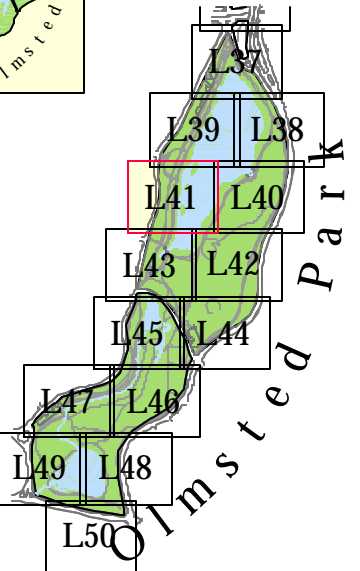
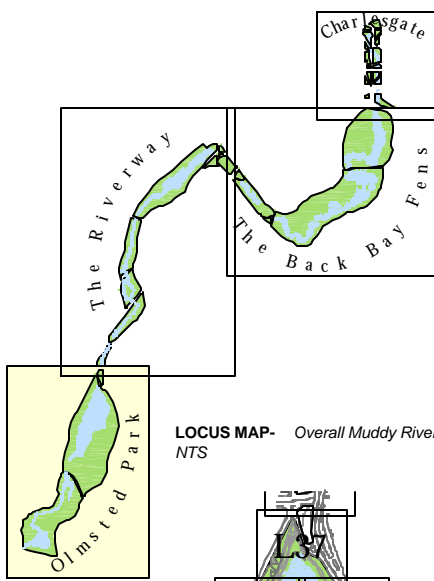
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



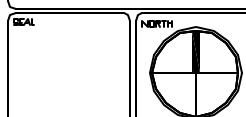
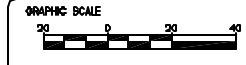
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The Muddy River Restoration Project

Boston and Brookline, Massachusetts

REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
VEGETATION /
EROSION

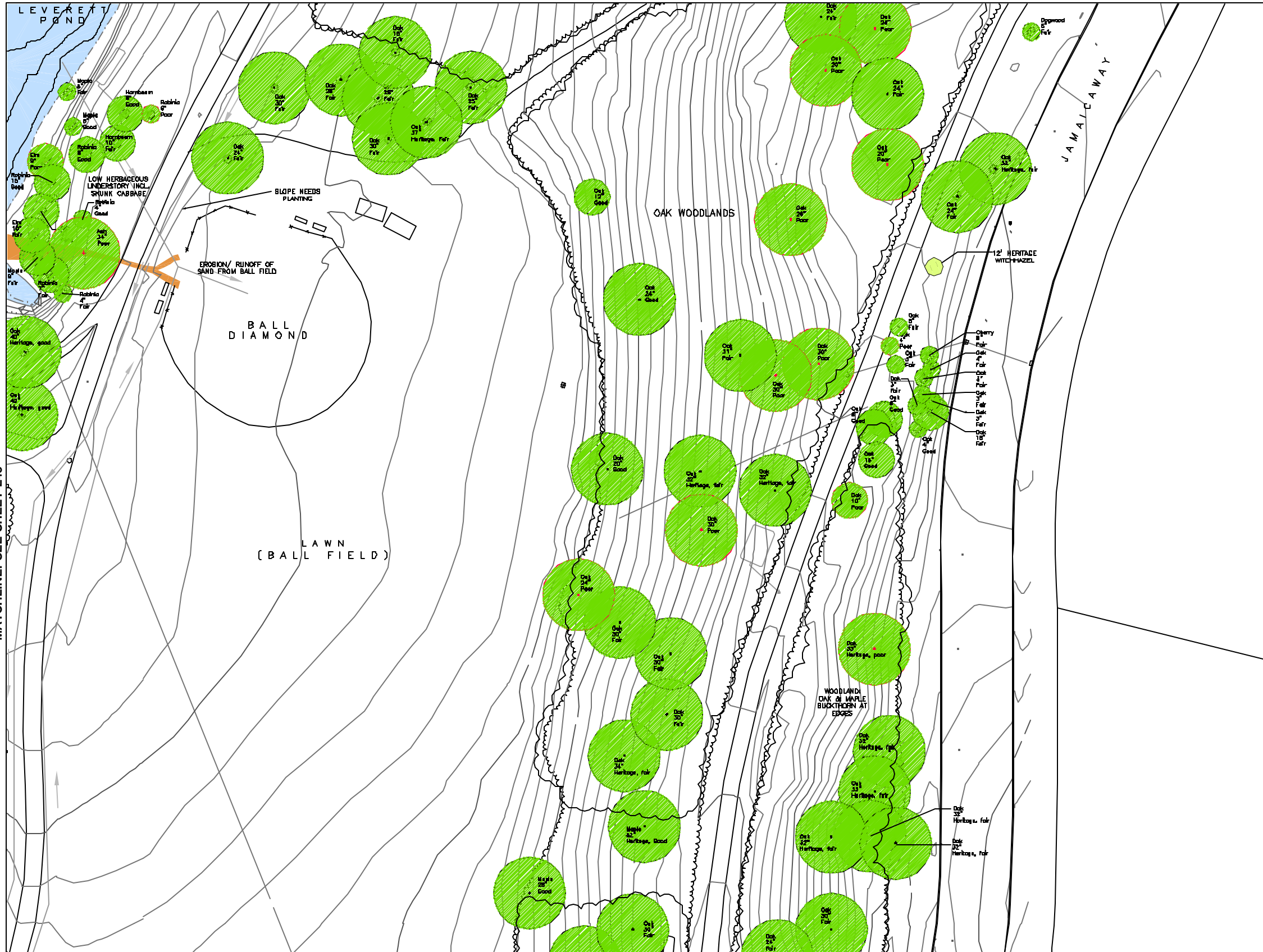


DRAWN BY: M.C. MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L41

MATCHLINE: SEE SHEET L43

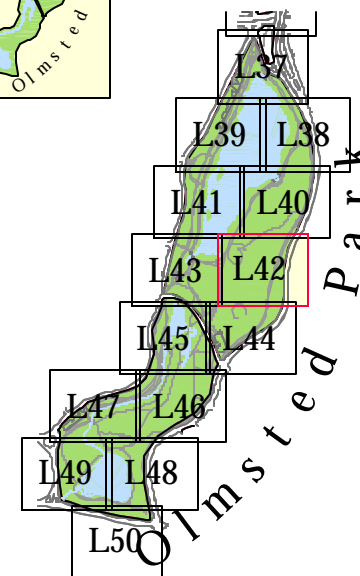
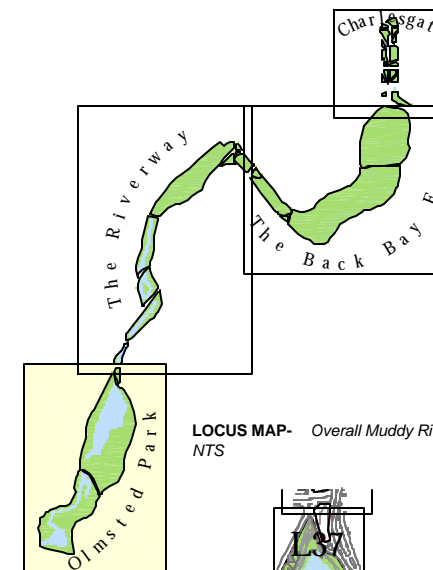
MATCHLINE: SEE SHEET L41

MATCHLINE: SEE SHEET L40



MATCHLINE: SEE SHEET L44

LEGEND	
INVENTORY AND ANALYSIS	
VEGETATION	
TREES	
DECIDUOUS TREE	
EVERGREEN TREE	
TREE MASS	
SHRUBS	
MASS OF RESTORED PLANTING	
MASS OF SHRUBS	
INVASIVE PLANT COLONY	
EROSION	
BARE LAWN	
EROSION AREA	



LOCUS MAP-
NTS

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FAX: (617) 491-7502
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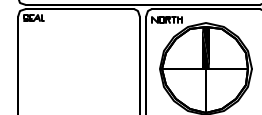
The Muddy River Restoration Project

Boston and Brookline, Massachusetts

REVISIONS		
NO.	DATE	REMARKS
A	3/1/01	

DRAWING TITLE
Inventory and Analysis
VEGETATION /
EROSION

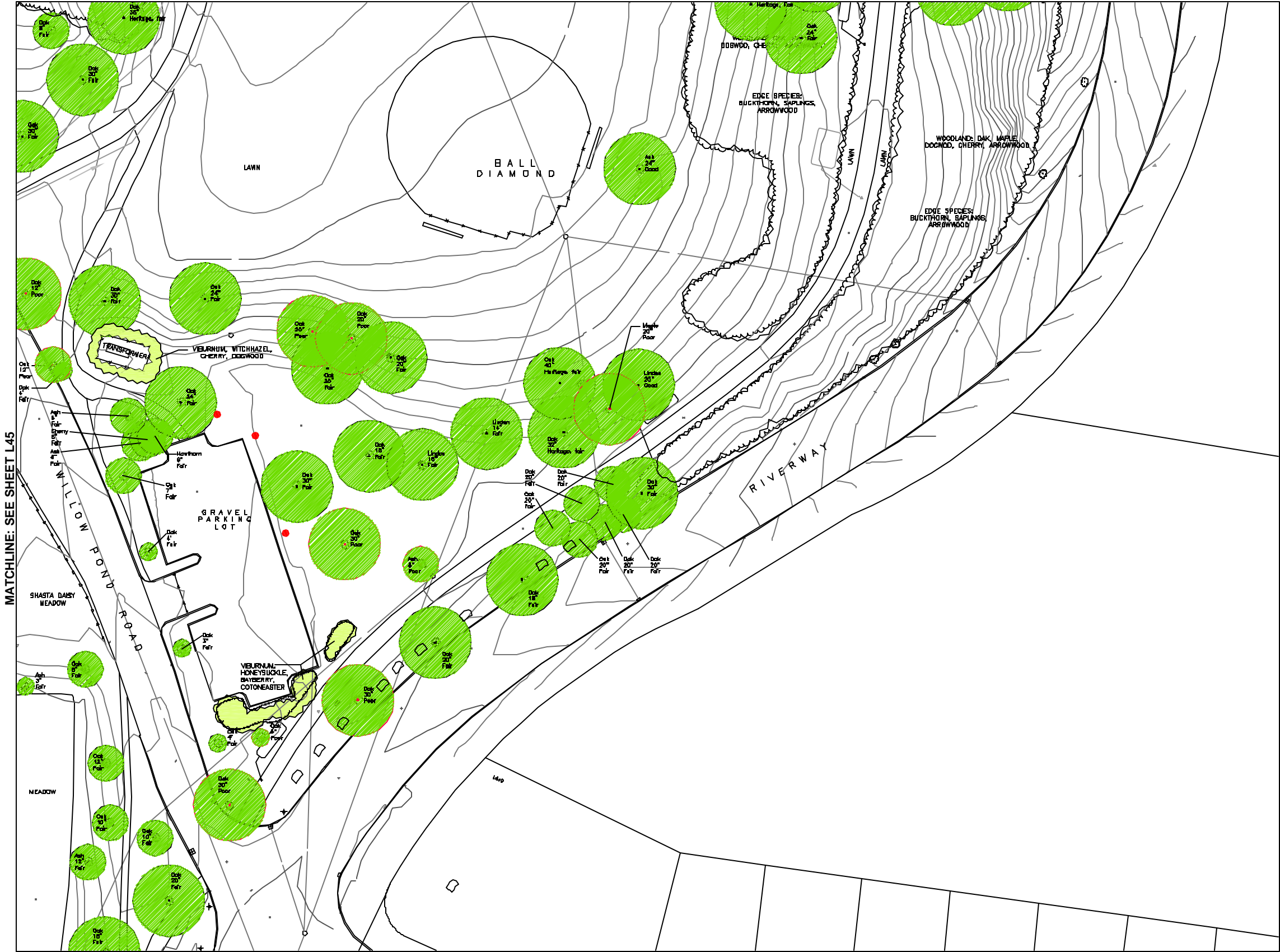
GRAPHIC SCALE



DRAWN BY: MC, MM
CHECKED BY: MP
DATE: 11/21/00
SCALE: 1"=60'
DRAWING NO.
L42

MATCHLINE: SEE SHEET L43

MATCHLINE: SEE SHEET L42



MATCHLINE: SEE SHEET L46

LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

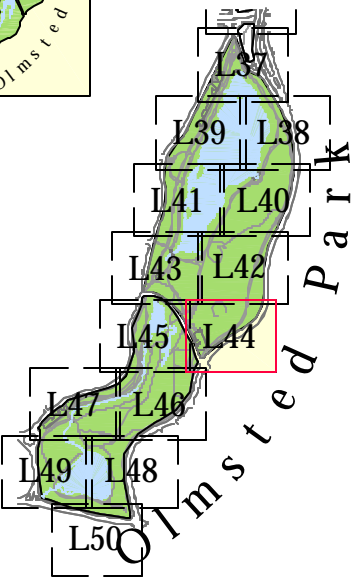
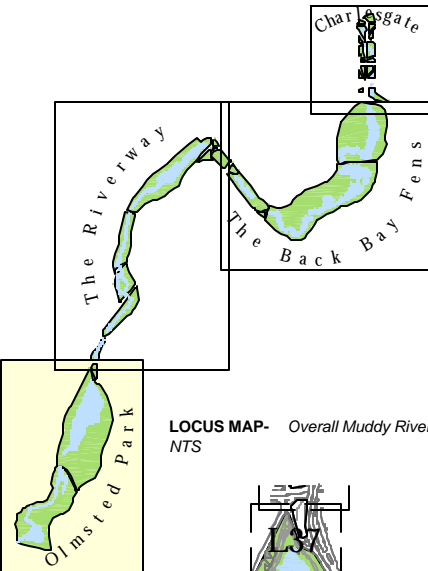
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



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435 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
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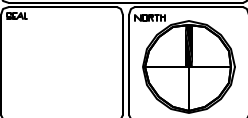
The Muddy River Restoration Project

Boston and Brookline, Massachusetts

NO.	DATE	REVISIONS
A	3/1/01	

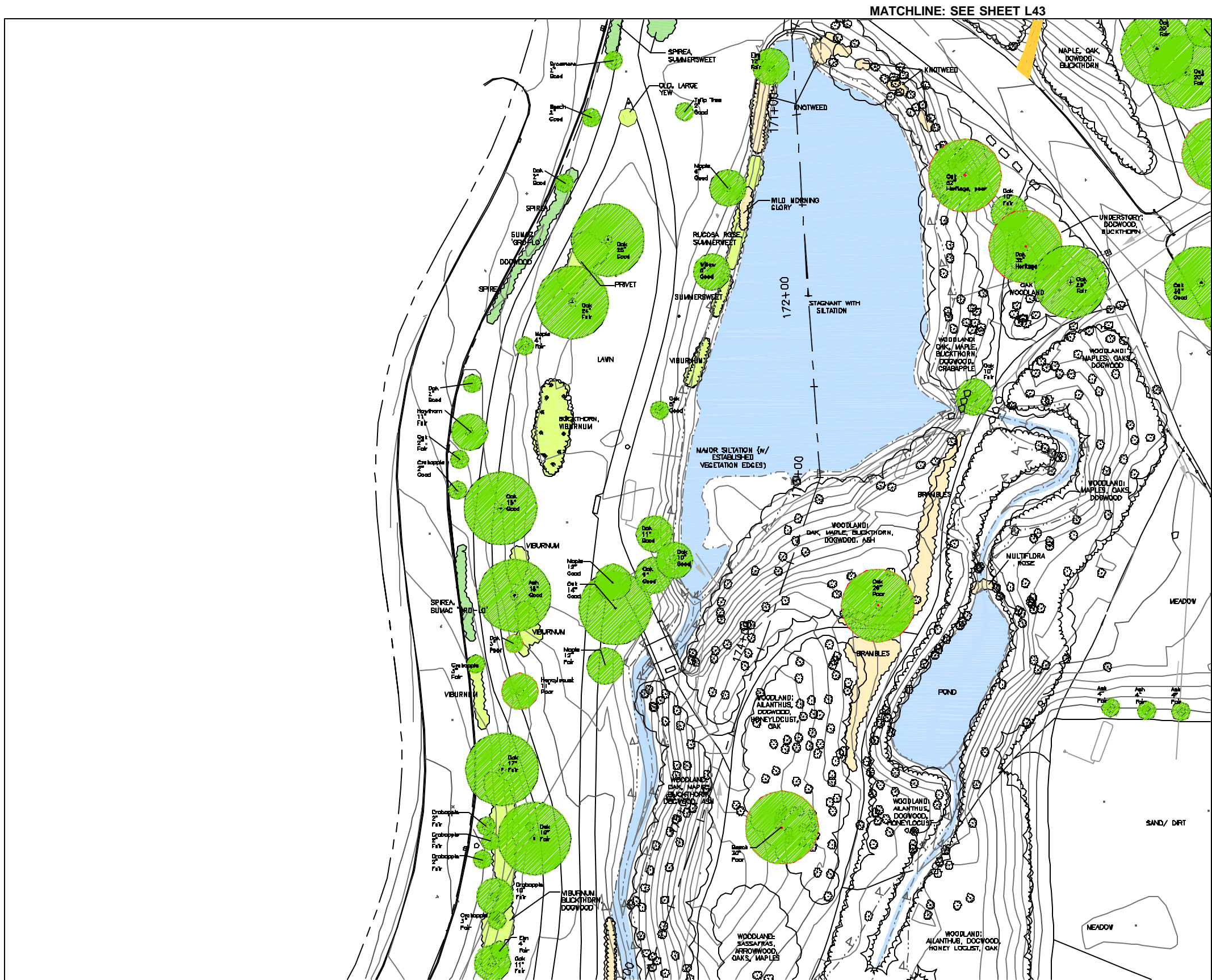
DRAWING TITLE

Inventory and Analysis
VEGETATION /
EROSION

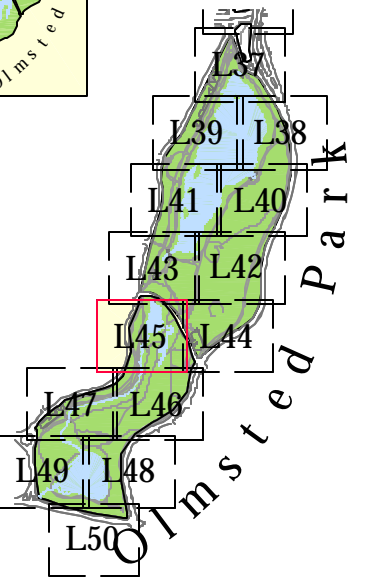
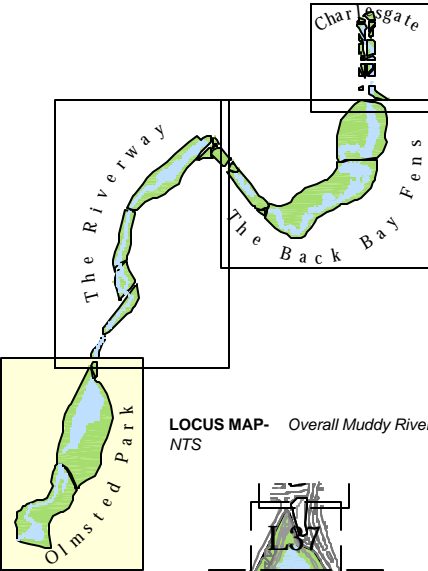


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LEGEND	
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VEGETATION	
<u>TREES</u>	
DECIDUOUS TREE	
EVERGREEN TREE	
TREE MASS	
<u>SHRUBS</u>	
MASS OF RESTORED PLANTING	
MASS OF SHRUBS	
INVASIVE PLANT COLONY	
<u>EROSION</u>	
BARE LAWN	
EROSION AREA	



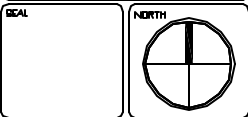
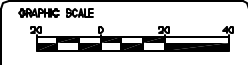
Pressley
Associates, Inc.
435 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

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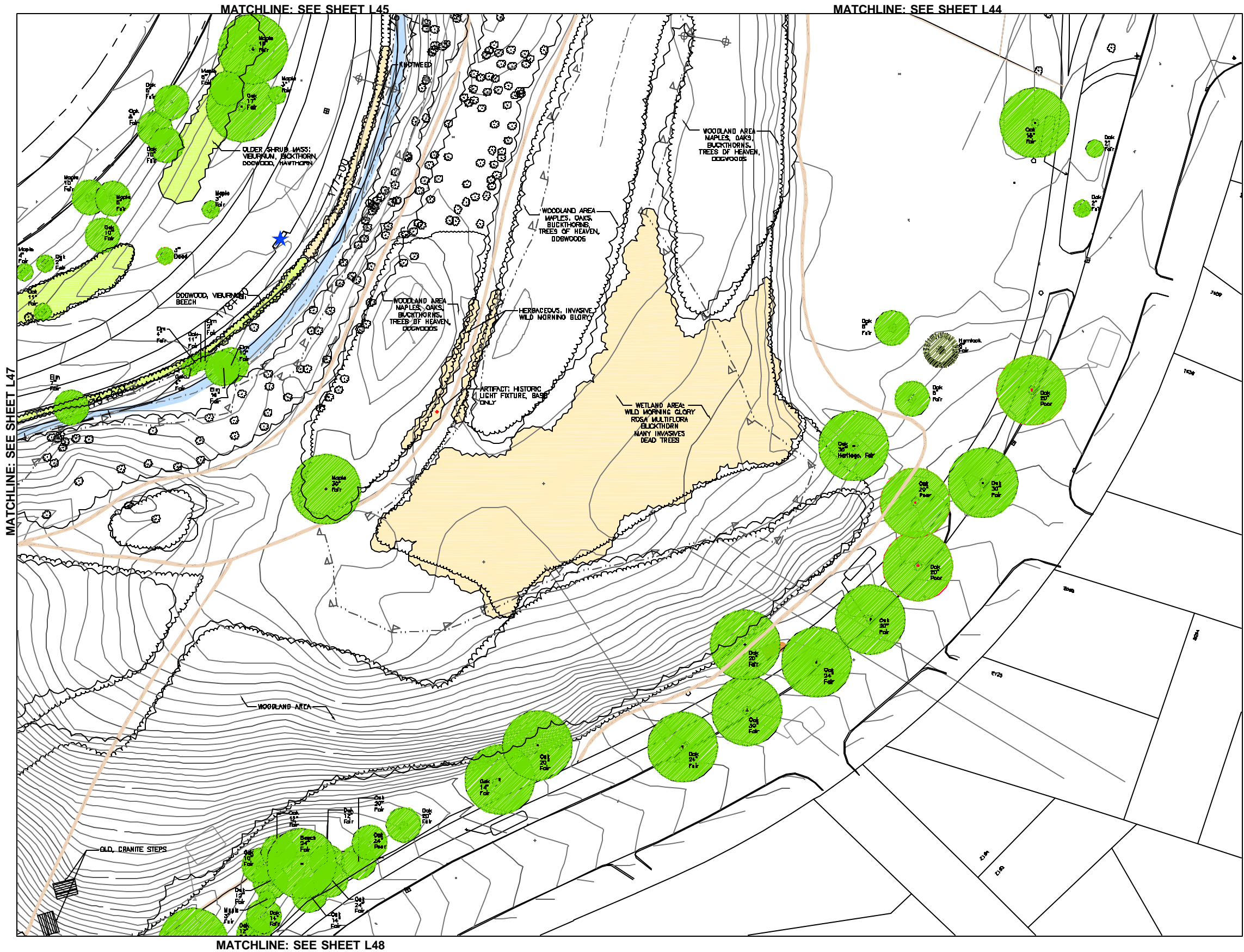
Boston and Brookline, Massachusetts

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Inventory and Analysis
VEGETATION /
EROSION



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L45



LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

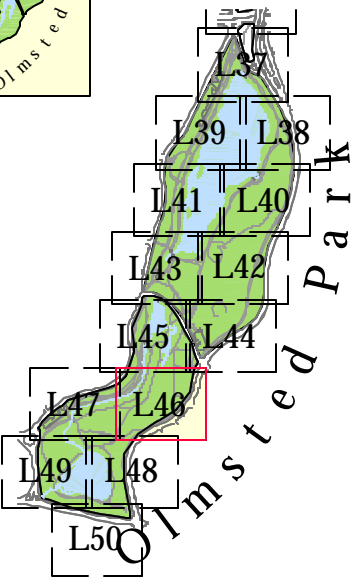
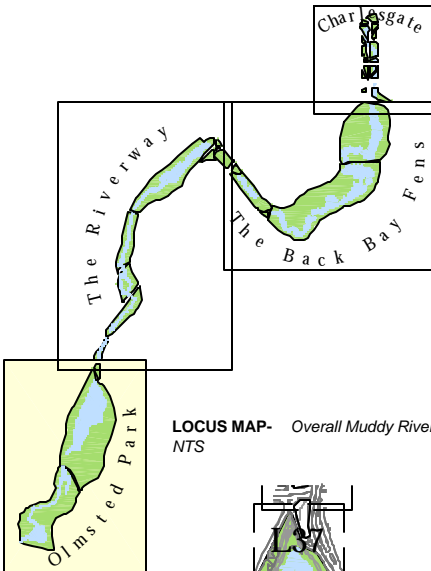
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



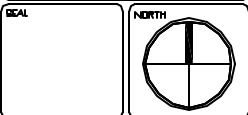
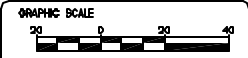
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425 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

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VEGETATION /
EROSION



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L46

MATCHLINE: SEE SHEET L45



MATCHLINE: SEE SHEET L49

MATCHLINE: SEE SHEET L48

LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

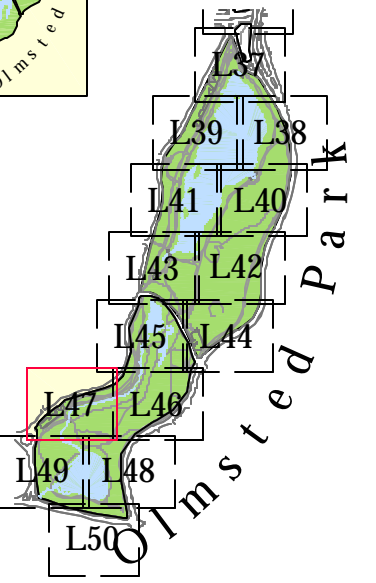
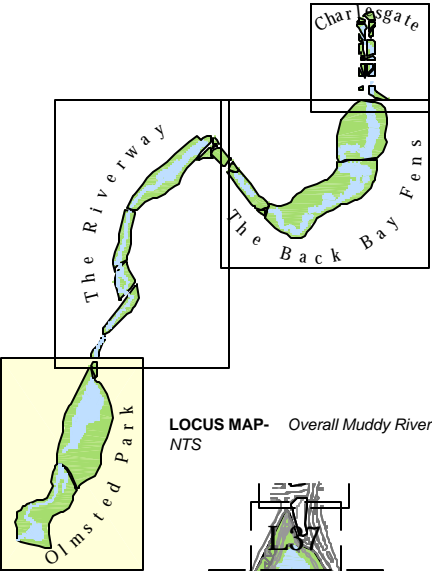
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INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



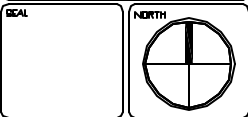
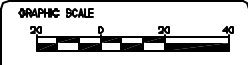
Pressley Associates, Inc.
432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

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DATE: 11/21/00
SCALE: 1"=60'
L47

MATCHLINE: SEE SHEET L49

MATCHLINE: SEE SHEET L47

MATCHLINE: SEE SHEET L46



MATCHLINE: SEE SHEET L50

LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

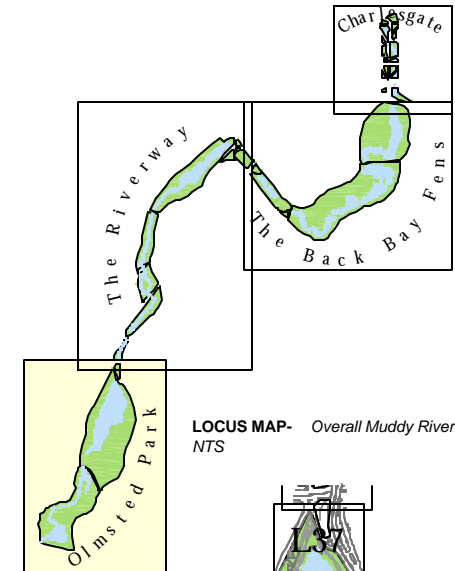
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INVASIVE PLANT COLONY

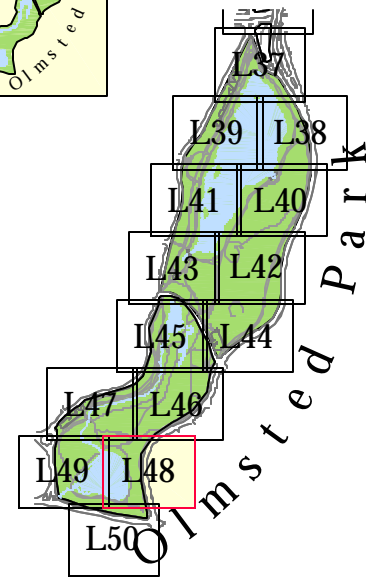
EROSION

BARE LAWN

EROSION AREA



LOCUS MAP- NTS Overall Muddy River



LOCUS MAP- NTS Olmsted Park

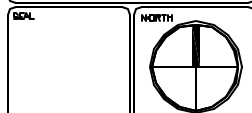
Pressley Associates, Inc.
Landscape Architects
432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

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DATE: 11/21/00
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LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

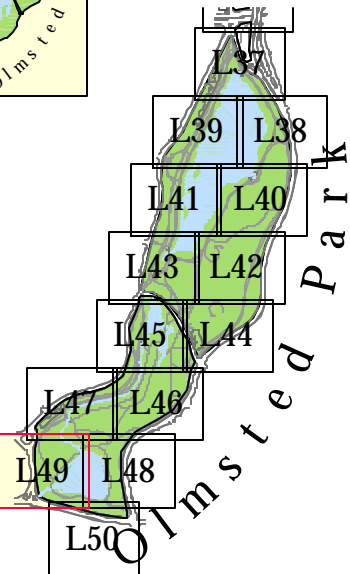
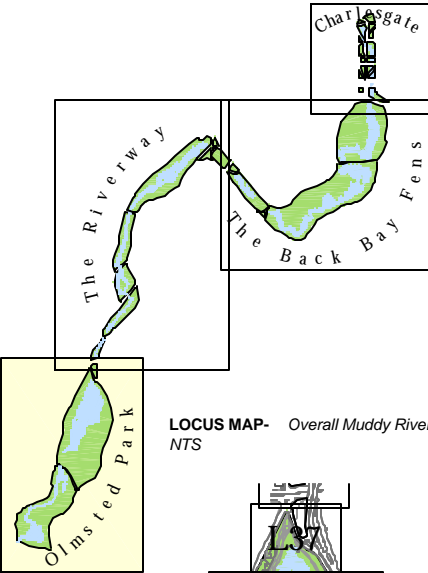
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EROSION AREA



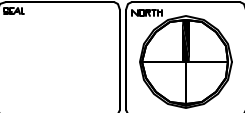
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Associates, Inc.
432 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

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VEGETATION /
EROSION



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L49



LEGEND
INVENTORY AND ANALYSIS

VEGETATION

TREES

DECIDUOUS TREE

EVERGREEN TREE

TREE MASS

SHRUBS

MASS OF RESTORED PLANTING

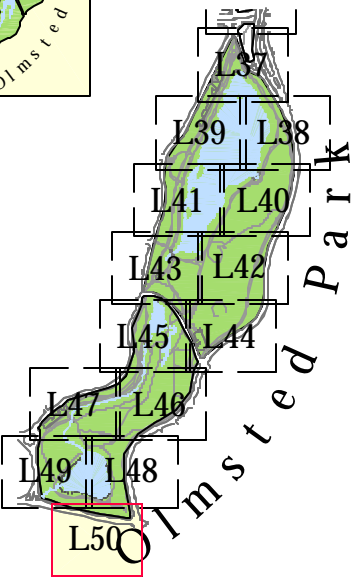
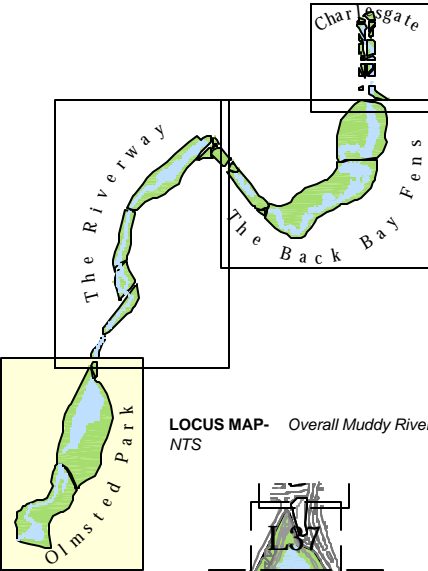
MASS OF SHRUBS

INVASIVE PLANT COLONY

EROSION

BARE LAWN

EROSION AREA



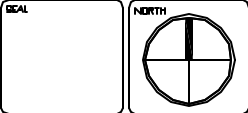
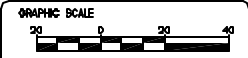
Pressley Associates, Inc.
425 Columbia Street
Cambridge, MA 02141
Phone: (617) 491-5300
FAX: (617) 491-7502
Email: pressley@pressleyinc.com

The Muddy River Restoration Project

Boston and Brookline, Massachusetts

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**Appendix H: Wildlife Habitat Evaluation and Vegetation
Assessment for the Emerald Necklace,
Boston, Massachusetts**

Wildlife Habitat Evaluation and Vegetation Assessment

March 1, 2001

Emerald Necklace Boston, Massachusetts

Camp Dresser & McKee, Inc.
One Cambridge Place
50 Hampshire Street
Cambridge, Massachusetts 02139

LEC Environmental Consultants, Inc.

3 Otis Park Drive
Bourne, MA 02532
(508) 759-0050
(508) 759-0013 Fax

7 Kimball Lane, Building D
Lynnfield, MA 01940
(781) 245-2500
(781) 245-6677 Fax



AN ENVIRONMENTAL SYSTEMS COLLABORATIVE



December 13, 2000

Express Mail

Bruce Conklin
Camp Dresser & McKee, Inc.
One Cambridge Street
50 Hampshire Street
Cambridge, Massachusetts 02139

**Re: Wildlife Habitat Evaluation
Emerald Necklace
Boston, Massachusetts**

[LEC File: CDM/9213.01]

Dear Mr. Conklin:

LEC Environmental Consultants, Inc. (LEC) is pleased to provide you with the following report detailing our findings of current habitat conditions and species utilization along the Emerald Necklace in Boston, Massachusetts. The habitat evaluation was conducted in accordance with the *Massachusetts Wetlands Protection Act* Regulations (310 CMR 10.54 (4) (a) and 10.60) and DEP's Wetland Program Policy Guidelines (DEP Wetlands Program Policy 88-1 and Wetlands Wildlife Advisory #2, 1988), as well as floral and faunal inventory. The study site comprised the three primary links of the Emerald Necklace; Olmsted Park, the Riverway and Back Bay Fens.

LEC conducted a baseline survey of species, i.e. avian, mammals, aquatic and terrestrial invertebrates/vertebrates, fish, amphibians, and reptiles, to ascertain population diversity and densities. In addition, LEC mapped vegetation cover types and noted habitat potential throughout the study site. Given the limited temporal scale of this particular study, projecting habitat potential through established vegetative communities is an effective methodology from which to infer species utilization.

The Emerald Necklace is an intensely utilized urban park affording the city resident access to the watercourse as well as continuous green space for human and domestic animal recreation. Given the intense development surrounding the park system, the Emerald Necklace is proof positive of the resiliency of nature. However, decades of neglect have left their scar on the area, the most visible of which is a 5-acre stand of common reed (*Phragmites australis*) constricting the flow through the Back Bay Fens, as well as reducing the diversity of species utilization of this area. Other exotics are present in abundance throughout the Emerald Necklace, both floral and faunal; Canadian geese, Japanese knotweed (*Polygonum cuspidatum*), Yellow-flag iris (*Iris pseudacorus*), English sparrows, Glossy buckthorn (*Rhamnus frangula*) and European buckthorn (*Rhamnus cathartica*), to name but a few. As aggressive exotic monocultures invade this or any ecosystem, diversity of species utilization will decline. The decline in the diversity of species utilization is due to a lack of structural heterogeneity, or variability in height and width of vegetation, of an ecosystem, and either the inability to adapt or intensive energy requirements of adaptation to introduced vegetation. Accordingly, to preserve or enhance diversity of species utilization, one must take a "bottom-up" approach, specifically by establishing a diversity of vegetative species throughout the ecosystem, which will in turn presume species diversity and utilization.

The following report documents the existing conditions of wildlife habitat throughout the three primary links of the Emerald Necklace. LEC has included the baseline data of species observed throughout the study period. Potential species utilization has been extrapolated from existing vegetation cover types. Vegetation management techniques and restoration suggestions for each of the three segments of the Necklace are proposed. The landscape of the Emerald Necklace transitions from a more natural system (Olmsted Park) to a man-made environment (Riverway, Back Bay Fens) as one moves downstream. The following report describes the links of the Emerald Necklace in that fashion, from the natural to the sculpted landscape.



Thank you for the opportunity to provide these services. Should you have any questions or require additional information, please do not hesitate to call LEC (508) 759-0050.

Sincerely,

LEC Environmental Consultants, Inc.

Paul R. Lelito The signature of Paul R. Lelito is written in cursive. To the right of the signature is a circular stamp containing the word "Dac" in a stylized font.

Paul R. Lelito
Executive Director of Ecological Services

Megan Raymond
Ecologist

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1. Introduction

The following report documents the findings of a wildlife habitat evaluation of the Emerald Necklace in Boston, Massachusetts. The wildlife habitat evaluation was performed by LEC Environmental Consultants, Inc. (LEC) as part of the Muddy River restoration project sponsored by the City of Boston Parks and Recreation Department. The habitat evaluation was conducted in accordance with the *Massachusetts Wetlands Protection Act Regulations* (310 CMR 10.54 (4) (a) and 10.60) and DEP's Wetland Program Policy Guidelines (DEP Wetlands Program Policy 88-1 and Wetlands Wildlife Advisory #2, 1988). This report describes existing habitat conditions and species utilization throughout the three primary links of the Emerald Necklace (Olmsted Park, the Riverway, and Back Bay Fens). Given the limited temporal scale of this habitat evaluation, species utilization was inferred through established vegetation cover types in addition to direct observations. Vegetation management techniques and restoration strategies for the entire Emerald Necklace ecosystem are proposed.

2. Study Site

The Muddy River originates at the outlet of Jamaica Pond and flows 3.5 miles in a northeasterly direction to its confluence with the Charles River. The watershed is 5.6 mi² in area, and limited gravity driven pressure gradient; over the course of the 3.5-mile length of the Muddy River, the river drops 58-feet. However, a 57-foot drop is incurred within the first 100 feet of the river between the outlet of Jamaica Pond and the inlet to Wards Pond. The gradient over the remaining 3-miles is minimal to non-existent.

The site has changed significantly since Fredrick Law Olmsted first designed and implemented the park for the City of Boston in the late 19th century. The watercourse at that time was tidally driven. While the park is highly degraded in areas, with dense colonies exotic vegetation and active erosion, the overall palette for restoration is clean, as the 3.5 miles of contiguous open space is largely intact.

3. Methodology

LEC traversed each habitat type in its entirety and the surrounding periphery on foot. Data were collected on the vegetative communities and landforms, with emphasis given to wildlife habitat value. Identification of vegetation included assessing the structural heterogeneity of the plant communities, i.e. the canopy, shrub, and groundcover layers, with special consideration given to the presence of snags, cavities, burrows, basking sites, and other outstanding features. Actively eroding areas and intensively disturbed areas were noted. The Emerald Necklace ecosystem was assessed according to habitat cover type, including forested upland, manicured landscaping, riparian shrub and emergent wetland vegetation. Habitat value was assessed using the above criteria, creating the framework for this report.

Adjacent to the watercourse, the abundance and diversity of all animals observed (by sight and/or sound) during the assessment were recorded along with any other evidence of habitat use including tracks, scat, feathers, bone fragments, and browse marks. Wind speed, temperature, cloud cover, wildlife vocalization, and general habitat structure and composition were noted. LEC utilized a Coffelt Manufacturing Mark-10 electroshocking apparatus and a 20' by 5' seine to sample the aquatic environment. The aquatic environment was sampled extensively throughout the Back Bay Fens and Olmsted Park; however the nature of the sediments (i.e. soft) within the Riverway proper

precluded aquatic biota sampling. Temporarily stunned by the electroshock apparatus, fish were identified, measured and returned to the aquatic environment with no mortality.

4. Existing Conditions

The following sections document existing conditions of wildlife habitat of the Emerald Necklace. Wildlife species observed throughout the survey are listed in Appendix B, Species observations. General habitat structure, composition and potential are discussed below.

4.1 Olmsted Park

Olmsted Park is comprised of Wards Pond, Spring Pond, the Babbling brook, Willow Pond, and Leverett Pond, in addition to a bordering vegetated wetland (BVW) area that feeds Spring Pond through surface flow. Spring Pond was created by Fredrick Law Olmsted as one of three proposed Natural History Pools. Currently, this area may be considered one of the more desirable areas for wildlife along the Emerald Necklace, specifically because of the diversity of habitats present and the isolated and protected nature of the BVW feeding Spring Pond. In contrast to the majority of the Emerald Necklace, minimal manicured lawn exists in Olmsted Park and the landscape is more natural and self-sustaining.

The Massachusetts Division of Fisheries and Wildlife Natural Heritage Endangered Species Program maps Olmsted Park to contain two species of rare wildlife (Boston South quadrangle, WH 186) (Appendix A, Figure 2). The rare state-listed species that occur in the vicinity of the park are the Pied-billed Grebe (*Podilymbus podiceps*) and the Threespine Stickleback (*Gasterosteus aculeatus*). The presence of the Threespine Stickleback was corroborated with positive identifications in three locations in Olmsted Park. However, neither direct observations of the Pied-billed Grebe, nor nesting sites of the animal were confirmed. The Pied-billed Grebes travel north in the spring and summer to breed. However, nesting occurs erratically, as a pair may breed in a suitable area one year and never return. Accordingly, it is likely that the Pied-billed Grebe is an occasional visitor to the area.

4.1.1 Wards Pond

Wards Pond, situated at the southern most section of the Emerald Necklace, is naturally protected from urban noise by the geologic knob and kettle formation in which it lies, i.e. steep embankments. The Wards Pond area is not a heavily used pedestrian corridor compared to other areas along the Necklace, and the majority of people who frequent the area do so for recreational purposes. These factors in concert with a healthy assemblage of vegetation lend to the area's wildlife habitat value, as evidenced by the diversity of species observed in numerous visits to the pond.

Wards Pond is fed by an overflow from Jamaica Pond, as well as groundwater discharge. Vegetation associated in the periphery of this pond is on the whole in a natural state, and may be characterized as structurally heterogeneous, with aquatic submergents and emergent, groundcover, shrub, sapling, and canopy vegetation. A nearly complete band of swamp loosestrife (*Decodon verticillatus*) (emergent vegetation) encircles the pond with a variety of shrubs on the periphery including glossy buckthorn (*Rhamnus frangula*), weeping willow (*Salix babylonica*), river birch (*Betula nigra*), gray birch (*Betula populifolia*), paper birch (*Betula papyrifera*), arrowwood (*Viburnum dentatum*), and tulip tree. There are significant clusters of jewelweed (*Impatiens capensis*) in patches with small patches of Japanese knotweed (*Polygonum cuspidatum*) invading and some multiflora rose (*Rosa multiflora*), as well as narrow-leaved cattail (*Typha angustifolia*) on the southwestern bank. Other species such as silky dogwood (*Cornus amomum*), blue-flag iris (*Iris versicolor*), sensitive fern (*Onoclea sensibilis*) and scattered patches of purple loosestrife (*Lythrum salicaria*), and buttercup are also present.

Groundwater discharge along the southern perimeter of the pond, adjacent to and beneath the boardwalk, is creating an elevated wetland system. Individuals of arrowwood are also found in this area with red maple (*Acer rubrum*) saplings, and scattered individuals of common elderberry (*Sambucus canadensis*). On the embankment at the

southern section of Wards Pond, a significant stand of tartarian honeysuckle (*Lonicera tatarica*) exists with staghorn sumac. Glossy buckthorn and Japanese knotweed form thick stands of vegetation along the southern embankment, and along with tree-of-heaven (*Ailanthus altissima*) are the predominant exotics in this area. A canopy of mature trees exists on the northern and western portions of the pond, dominated by black oak (*Quercus velutina*).

The water clarity within the pond is the highest compared to other areas of the Necklace. Factors that help to maintain the high water quality levels in Wards Pond are the lack of direct discharge from storm drains, the depth of the pond, and the established vegetation surrounding the pond. Only one area on the northwestern shoreline of Wards Pond is denuded of vegetation. In addition, the Canada Goose (*Branta canadensis*) population resident to Leverett Pond and areas downstream has not descended upon Wards Pond. The goose absence decreases the potential for the system to become eutrophic, as a resident population of geese leads to an abundance of fecal material and detritus from public feeding of the animals and negatively impacts the water quality in affected/infested areas. This scenario is documented downstream in Leverett Pond, where public feeding of the resident goose population has created a positive feedback mechanism that negatively affects water quality. The mechanism breaks down as follows:

1. Residents feed geese from pond shoreline,
2. Feeding areas become denuded of vegetation with continued and increased public access,
3. Goose population increases with continued and increased public feeding,
4. Water quality decreases with direct discharge of goose fecal material and sediment (active erosion with non-existent vegetative cover),
5. Breakdown of fecal material by bacteria reduces the free oxygen in the watercolumn available to aquatic species,
6. Nutrients released through fecal material decomposition supports algal blooms, which increases turbidity and the biological oxygen demand, and disturbs the production/respiration balance in the ecosystem.

This type of mechanism can be broken by actively planting shrub vegetation adjacent to the shoreline, which limits pedestrian access and discourages shoreline access by geese. Detailed suggestions follow in Section 6.1.4.

Species observed in Wards Pond include a variety of avian, insects, amphibians, and freshwater fishes, as tabulated in Appendix B, Species Observations. As mentioned above, the relative isolation of this area alongside a diverse vegetative community supports a diversity of wildlife habitat.

4.1.2 Nickerson Hill/ Babbling Brook/ Spring Pond

A steep drumlin, Nickerson Hill, between Wards Pond and Willow Pond provides high quality wildlife habitat to an array of mammals, birds and insects. The tree canopy is predominantly complete with open areas at the higher reaches of the hill. Vegetation on the north-facing slope is comprised of a well-developed sapling layer dominated by yellow birch (*Betula alleghaniensis*) and a diminished shrub layer. The shrub species are present where canopy gaps exist, and are dominated by glossy buckthorn (*Rhamnus frangula*) with scattered individuals of small Solomon's Seal (*Polygonatum biflorum*). Canopy species consist of northern red oak (*Quercus rubra*), black oak (*Quercus velutina*), American beech (*Fagus grandifolia*), and river birch (*Betula nigra*). Saplings from the well-developed canopy are also present.

At the upper reaches of Nickerson Hill, gaps in the canopy give way to an assemblage of meadow species consisting of various grasses (Family POACEAE), fescues, path rush, orchard grass, asters, in addition scattered patches of bittersweet and staghorn sumac. Vegetation on the southern slope consists of a mature canopy of black oak (*Quercus velutina*), northern red oak (*Quercus rubra*) and white oak (*Quercus alba*), and a shrub layer of glossy buckthorn (*Rhamnus frangula*).

The relative isolation of Nickerson Hill provides wildlife habitat, in addition its intrinsic features support species utilization. The exposed soils on the pathways weaving through Nickerson Hill provide a source of sediment to seed eating birds, such as the Field Sparrow (*Spizella pusilla*), Song Sparrow (*Spizella melodia*) and the Chipping Sparrow

(*Spizella passerina*), as well as dusting sites for a variety of avian species. The well-developed canopy provides a mast crop for a variety of avian and mammals, including American Crow (*Corvus brachyrhynchos*), Blue Jay (*Cyanocitta cristata*), Eastern grey squirrel (*Sciurus carolinensis*), meadow voles (*Microtus pennsylvanicus*), and Eastern chipmunk (*Tamias striatus*). The open-meadow type ecosystem provides habitat for meadow voles (*Microtus pennsylvanicus*) and moles, deer mice, Eastern cottontail (*Sylvilagus floridanus*), and insects, such as the field cricket (*Gryllus pennsylvanicus*), butterflies (Lepidoptera spp.) and ants (Hymenoptera spp.).

The babbling brook, upon exiting Wards Pond, is confined by moderately steep topography and flows adjacent to Pond Avenue and ultimately discharging into Willow Pond. The stream is shaded by a densely vegetated shrub community comprised of red maple saplings, arrowwood, silky dogwood, buckthorn, gooseberry (*Ribes hirtellum*), as well as herbaceous species jewelweed and skunk cabbage (*Symplocarpus foetidus*). A significant colony of Japanese knotweed lines the brook on the western side and provides a thick screen to adjacent Pond Avenue traffic. The dense vegetation provides a temperature control of the stream allowing higher dissolved oxygen concentrations with cooler temperatures. One area on the western side of Babbling brook, proximal to the confluence with Willow Pond, is completely denuded of vegetation, and actively contributing sediment to the stream. Water in the stream is approximately 4 – 6 inches deep and 2 – 3 feet wide on average.

A bordering vegetated wetland system exists adjacent to Jamaica Way in the vicinity of the previous location of MDC ice rink. This wetland system feeds into Spring Pond, the sole remainder of the 5 proposed natural history pools created by Olmsted in the late 1800's. This wetland system is a very dense entanglement of shrub swamp, dominated by purple loosestrife, narrow-leaved cattail (*Typha angustifolia*), climbing nightshade (*Solanum dulcamara*), jewelweed, and arrowwood. The removal of equipment upon the ice-rink closure increased the amount of standing water in the wetland for a period of time significant enough to result in a die-back of vegetation, specifically box elder (*Acer negundo*), black cherry (*Prunus serotina*), and red maple (*Acer rubrum*) trees, within the wetland. The increase in water contributed to high-energy flows and eroded a small channel between the wetland and Spring Pond exposing tree roots and depositing sand and gravel within this area. The channel transports water from the wetland to Spring Pond in times of overflow from episodic events or engineering failure (as with the MDC ice rink), and does not occur on a seasonal basis.

Spring Pond, a small, linear-shaped, shaded pond just upstream from Willow Pond, is habitat to the three-spine stickleback (*Gasterosteus aculeatus*), a small (maximum length = 10 cm) fish currently listed as a threatened species by the Massachusetts Division of Fish and Wildlife Natural Heritage and Endangered Species Program. The sticklebacks in Olmsted Park are considered to be the southern-most completely freshwater population of sticklebacks in the country. Sticklebacks were observed within Spring Pond, in the channel connecting Spring and Willow Ponds, and in Willow Pond at the outfall from Spring Pond.

Spring Pond contains water approximately 2 feet deep, and is fringed by glossy buckthorn, with red maple saplings and pin oak (*Quercus palustris*) on the periphery. While the pond does receive overflow discharge from the upstream wetland, the primary water source is groundwater, hence its name. Due to its source, the water in Spring Pond is clear and of high quality. Water exiting Spring Pond flows through a meandering two-foot wide channel and discharges directly into Willow Pond via a stone box culvert.

4.1.3 **Willow Pond**

Willow Pond, situated between Wards Pond and Leverett Pond, receives discharge from two sources, the babbling brook and Spring Pond. Vegetation surrounding Willow Pond is comprised of mature oaks with a sapling understory on the eastern side and a variety of shrubs, saplings and herbaceous species on the western side, including red-osier dogwood (*Cornus stolonifera*), sweet pepperbush (*Clethra alnifolia*), American bittersweet (*Celastrus scandens*) weeping willow (*Salix babylonica*) barberry, Japanese knotweed and Virginia rose (*Rosa virginiana*). A dense colony of herbaceous vegetation exists at the outfall from Babbling brook. The vegetation is confined to two small island

areas and is comprised of broadleaf arrowhead (*Sagittaria latifolia*), pickerelweed (*Pontederia cordata*), barnyard grass (*Echinochloa crusgalli*), jewelweed (*Impatiens capensis*), purple loosestrife (*Lythrum salicaria*), three-square bullrush (*Scirpus americanus*) and mannagrass (*Glyceria canadensis*). The western shoreline of Willow Pond is bounded manicured lawn with a shrub fringe, while the east is forested. Willow Pond exhibits evidence of environmental stresses from oil contamination. LEC was unable to sample aquatic species due to the thick organic material and soft sediments on the subsurface of Willow Pond.

4.1.4 Leverett Pond

Leverett Pond, the largest pond within Olmsted Park, is a long, linear shaped pond located at the northern end of Olmsted Park. The babbling brook discharges into Leverett Pond, although the brook is not day-lighted along its length from Willow Pond. A culvert on the southeastern side of the pond, in the vicinity of Daisy Field, also feeds into the pond. The areas surrounding the pond are vegetated by manicured lawn with a mature tree canopy. In the majority of areas, manicured lawn extends to the pond shoreline, although active planting of shrubs in the past few years along the western shoreline of the pond has replaced the lawn cover in some areas. The tree canopy is comprised of sugar maple (*Acer saccharum*), pin oak (*Quercus palustris*), sweet gum (*Liquidambar styraciflua*), black cherry (*Prunus serotina*), black oak (*Quercus velutina*), northern red oak (*Quercus rubra*) and box elder (*Acer negundo*). Shrub vegetation along the western bank dominated by purple loosestrife by scattered individuals of sweet pepperbush (*Clethra alnifolia*) and arrowwood (*Viburnum dentatum*).

A feature unique to Leverett Pond that provides excellent wildlife habitat is the three vegetated islands located on the western boundary of the pond. An Olmsted creation, the islands are vegetated by river birch (*Betula nigra*), Eastern poplar (*Populus deltoides*), paper birch (*Betula papyrifera*) white ash (*Fraxinus americana*), and tupelo (*Nyssa sylvatica*). The narrow channels between the shoreline of the pond and of the islands lend to the diversity of habitats available in Leverett Pond for aquatic species. Further, the islands provide excellent shade, as well as numerous overhangs, created by bank and vegetation, and cavities, providing excellent habitat for reptiles, amphibians and avian species. This habitat diversity leads to species diversity, which was evidenced by the variety of aquatic species found in Leverett Pond. Intraspecies comparison revealed a spectrum of sizes indicative of functional breeding and recruitment amongst the species observed (Appendix B). The preferred habitat for aquatic species within Leverett Pond was hard-bottomed areas adjacent to steep banks. The steep banks are conducive to micro-scale upwelling areas, which bolster atmospheric exchange and transport inorganic nutrients to the euphotic zone for production. The recent improvement of wire-mesh covered rocks along portions of the banks on the western bank of Leverett Pond supports aquatic habitat by increasing the surface area of the banks, which stimulates oxygen exchange, and promoting algal growth.

There are several areas in Leverett Pond that require immediate attention to improve the water quality. The most visible of these is a large island at the northern end of the pond that consists of sediment, primarily road sand, deposited by the Village Brook culvert. Discharge of sediments, including road sand, from the Village Brook drainage area negatively impacts water quality. Best management Practices should be improved in the watershed if restoration efforts are to have long-term positive benefits. Cobble swales that direct discharge to Leverett Pond also are an active sediment source to the pond. In addition, sediment from Daisy Field is being actively deposited in Leverett Pond. Numerous areas are completely denuded of vegetation are contributing sediment to pond when overland flow occurs following a storm event. The erosion of these areas will increase the turbidity of Leverett Pond, inhibiting primary production and negatively impact the food web from its inception. One of the denuded areas on the western edge of the pond is frequently used for duck and goose feeding. As mentioned in Section 4.1.1, this activity is negatively affects the water quality in Leverett Pond.

4.2 Riverway

The Riverway area extends from Route 9 to the Back Bay Yard. A continuous footpath parallels the river along the eastern and western side of the river south of Route 9. The areas landward of the footpath are vegetated by a mature trees canopy and manicured lawn areas that occupy the groundcover to the river's banks in most areas. On the riverside of the footpath, the vegetation consists manicured lawn, with occasional ornamental shrubs. Aggressive monocultures, common reed (*Phragmites australis*) and knotweed, comprise the primary bank vegetation. *Phragmites* is an emergent plant growing within the watercourse, while Japanese knotweed require the dryer embankment conditions. The invasion of *Phragmites* has constricted the river's channel substantially in numerous areas along this portion of the Necklace, i.e. between Brookline Avenue and Jamaicaaway, the eastern channel through the Island Bridges area, and the eastern side of the Muddy River between the Chapel Street Bridge Area and Back Bay Yard. Colonization of *Phragmites* increases sediment deposition in affected areas through sediment trapping (Section 6). Sediment deposition will further impede the ability of the river to carry its flow downgradient through coincident decreases in the water column and channel width. The existing condition descriptions of the Riverway are divided into two sections, south and north of Longwood Avenue. Species observations of the Riverway are listed in Appendix B.

4.2.1 Route 9 to Longwood Avenue

A mature tree canopy comprised of northern red oak (*Quercus rubra*), American elm (*Ulmus americana*), and white ash (*Fraxinus americana*) exists adjacent to the eastern bank of the river, and provides habitat to avian species and squirrels. However, wildlife habitat is variable south of Brookline Avenue (Riverway South), as a segment of this stretch is culverted. The river daylight's north of Washington Street, where the channel is lined with rip-rap.

The rip-rapped section of the river, while narrow, provides significant wildlife habitat because of the diversity of vegetation present and the high degree of channel entrenchment, i.e. steep banks, that provide shelter and isolation from the dense urban environment surrounding this area. The river is completely shaded by a mature canopy of American elm (*Ulmus americana*), white ash (*Fraxinus americana*), and red maple (*Acer rubrum*). Shrub species present along the banks include glossy buckthorn (*Rhamnus frangula*) and arrowwood (*Viburnum dentatum*), with some Japanese knotweed (*Polygonum cuspidatum*) and tree-of-heaven (*Ailanthus altissima*). A sole red mulberry (*Morus Rubra*) provides a nectar source for nectar feeders such as hummingbirds, butterflies and bees, as well as an abundant mid to late summer fruit source. Downstream from this section, as the river parallels Brookline Avenue, the channel is completely constricted by *Phragmites*.

North of Brookline Avenue, the river bifurcates and rejoins at the pedestrian bridge just south of Netherlands Road. The eastern branch of the channel is choked by *Phragmites*, while the western channel is clear. *Phragmites* colonization and growth can be inhibited by shade, and the mature canopy cover along the western channel provides adequate shade to impede growth. *Phragmites* also tends to colonize areas with shallow banks. This is evidenced by the growth on shallow banks of the eastern channel of the river, compared to no growth adjacent to the steep bank of the western channel. The mature tree canopy of black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), and pin oak (*Quercus palustris*) on the Riverway Island provides habitat to avian species and small mammals. Though the groundcover consists primarily of manicured lawn, the seed source of the oak trees provides a food source for these animals.

Downstream of the island bridges area, the channel is linear (man-made) and the vegetative cover types consist of a mature oak canopy, with manicured lawn groundcover. The shrub layer consists of Japanese knotweed, with scattered individuals of gray birch (*Betula populifolia*). The mature tree canopy shades the watercourse and prevents the colonization of *Phragmites*. Cobble swales contribute sediment to the river in this area decreasing the water quality. The raceways primarily transport stone dust from the walkway paralleling the river.

4.2.2 Longwood Avenue to Old Sears Tower

Vegetation along this segment of the river is comprised of a mature oak canopy landward of the footpath. *Phragmites*, river birch (*Betula nigra*), glossy buckthorn and gray birch (*Betula populifolia*) dominate the bank vegetation, and provide a thick screen in areas. In addition to *Phragmites* and Japanese knotweed, yellow iris (*Iris pseudacorus*), a non-native invasive species, is present in the northern section of the Riverway. Similar to Leverett Pond, public waterfowl feeding areas are completely denuded of vegetation and contributing sediment and fecal material directly into the watercourse.

Two densely vegetated islands located on the eastern side of the Riverway. Canopy vegetation consists of red maple (*Acer rubrum*), river birch, paper birch, pin oak (*Quercus palustris*) and weeping willow (*Salix babylonica*). The islands increase habitat diversity for aquatic and land animals. In addition, the islands provide a significant refuge for species within this segment of the Necklace due to the minimal amount of open space and heavy vehicular traffic at this location.

Standing tree boles in the northern portion of the Riverway provide excellent habitat to avian cavity nesters, such as the Northern Flicker (*Colaptes auratus*). The overhangs and snags from the island provide basking and perching sites for reptiles and waterfowl species. Three bur oak trees (*Quercus macrocarpa*) are also present in this area.

Phragmites may provides limited wildlife habitat. For instance, thick stands of the reed creates a thick screen along the banks of the river. Screening is important in urban areas to dampen the constant noise. A wall of *Phragmites* also provides escape cover. However, the negative effects of *Phragmites* far outweigh the positives. The common reed does not provide essential wildlife habitat functions, i.e. food source, nesting or breeding habitat. Non-native aggressive exotics reduce the overall species diversity in affected areas, because only highly adaptable or urban species can adjust. The problems associated with urban wildlife species parallel the invasive vegetation as these species breed quickly and establish large populations that are without natural predators. The large populations degrade habitat with an abundance of waste material, and because the volume of waste outweighs the natural capacity of the system, much of the material is not decomposed. An ecosystem can quickly become out of balance through the introduction of non-native exotics.

While the Emerald Necklace flows northeast from Wards Pond to its confluence with the Charles River, the river meanders at a 90° angle at the Old Sears Tower and flows southeast for 0.5 mi. The river returns to a northeast trend with a 90° bend at Clemente Field. At the Back Bay Yard, the river flows through 2-six foot diameter culverts. The configuration of the channel, i.e. the inadequately designed culverts are responsible for upstream flooding problems.

4.3 Back Bay Fens

The Back Bay Fens extends from Old Sears Tower to Charlesgate. The Back Bay Fens is used intensively by the public due to the wide flanks of parkland adjacent to the river. This area is intensely manicured and landscaped and contains a war memorial, a ball-field and playground, a rose garden and an expansive community garden, the Victory Gardens. The dominant vegetation within this area is common reed (*Phragmites australis*), which occupies in excess of 5-acres of the watercourse. The extent and density of *Phragmites* screens park vistas from footbridges and road bridges. The *Phragmites* is in excess of 20-feet tall in areas, and the width of the stands range from 5 to 25 feet. By creating a thick screen between the river and the park, the presence of *Phragmites* fosters illicit activity and degrades overall park quality with the increases in rubbish and human odors associated with this type of behavior.

Additionally, the public safety issue and rubbish reduces the aesthetic experience for the city resident. The Back Bay Fens will be described in two sections, Old Sears Tower to Clemente Field and Clemente Field to Charlesgate. Species observations for this area are described in Appendix B.

4.3.1 Old Sears Tower to Clemente Field

As discussed in Section 4.2.2, the river flows southeast to Clemente Field. At the Back Bay Yard the river is directed through 2 culverts. The river daylight is approximately 0.13 mi. southeast of the Old Sears Tower. Upon daylight, the river appears like a linear pond, as flow is directed through culverts just a short distance downstream (0.06 mi.) at Avenue Louis Pasteur. Though small, this area provided ample wildlife habitat with mature canopy vegetation and numerous basking and perching sites within the watercourse. Further, the entrenched channel provides seclusion for wildlife and provides a buffer from the noise of heavy vehicular traffic that parallels the river on either side.

The mature canopy consists of river birch (*Betula nigra*), paper birch (*Betula papyrifera*), northern red oak (*Quercus rubra*), pin oak (*Quercus palustris*), black oak (*Quercus velutina*), silver maple (*Acer saccharinum*), and norway maple (*Acer platanoides*). Shrub community is dominated by glossy buckthorn (*Rhamnus frangula*) with scattered individuals of arrowwood (*Viburnum dentatum*), honeysuckle and saplings from the canopy. Due to the shade cover and relatively steep banks, no *Phragmites* is present. Minimal Japanese knotweed is present.

The river daylight is southeast of Louis Pasteur, and two patches of *Phragmites* are present where gaps in the canopy exist. Canopy vegetation is similar to the upstream assemblage. Sediments are "soft" with a high amount of silt and organic material.

4.3.2 Clemente Field to Charlesgate

At Clemente Field, the river bends 90° to flow northeast towards the Charles River. Canopy vegetation is comprised of pin oak (*Quercus palustris*), black oak (*Quercus velutina*), northern red oak (*Quercus rubra*) and weeping willow (*Salix babylonica*). Hackberry (*Celtis occidentalis*), arrowwood (*Viburnum dentatum*), and glossy buckthorn (*Rhamnus frangula*). Blue flag (*Iris versicolor*) and tartarian honeysuckle (*Lonicera tatarica*) are also present. Small patches of *Phragmites* exist coincident with canopy gaps. Northeast of Clemente Field, the channel meanders through the Back Bay Fens proper. Approaching the Museum of Arts, the canopy vegetation transitions to aggressive sapling along the banks, and no mature trees are present. Shrub vegetation consists of arrowwood (*Viburnum dentatum*), buttonbush (*Cephalanthus occidentalis*), with climbing nightshade (*Solanum dulcamara*) throughout. The submerged aquatic species, millfoil, is present throughout the watercourse.

The lagoon directly opposite the Museum of Fine Arts is the one of the few hard-bottomed areas within the Back Bay Fens. The hard bottom and steep banks provide wildlife habitat for fish species, such as the common carp (*Cyprinus carpio*), some in excess of 2-feet, pumpkinseed sunfish (*Lepomis gibbosus*) and bluegill sunfish (*Lepomis macrochirus*). The majority of fish activity observed was sessile, with little active swimming, most likely to conserve oxygen. Vegetation surrounding the lagoon is dominated by purple loosestrife (*Lythrum salicaria*), false indigo (*Amorpha fruticosa*), and hawthorn (*Crataegus spp.*). The hawthorns provide an excellent nectar source for nectar feeders. The tree canopy is comprised of pin oak (*Quercus palustris*), northern red oak (*Quercus rubra*), gray birch (*Betula populifolia*) and ornamental cherries.

Downstream of the lagoon area, the river flows northeast. The vegetation on either side of the river is weeping willow (*Salix babylonica*), pin oak (*Quercus palustris*), northern red oak (*Quercus rubra*), false indigo (*Amorpha fruticosa*), tupelo (*Nyssa sylvatica*), box elder (*Acer negundo*) and honey locust. Manicured lawn is the primary groundcover throughout the Back Bay Fens. Adjacent to the Stony Brook Gatehouse is a large island of road sand deposited from the adjacent culvert. The deposit is the result of road sanding and decreases the channel capacity of the river thereby restricting flow. The deposit eliminates Land Under Waterbodies and habitat for aquatic species, though it does provide perching sites for water birds, such as Herring Gulls (*Larus argentatus*), Mallards (*Anas platyrhynchos*) and the Canada Goose (*Branta canadensis*).

The meandering river is flanked by dense colonies of *Phragmites* from the Stony Brook Gatehouse north to Charlesgate. The only exception to the thick stands of *Phragmites* is an equally dense patch of narrow-leaved cattail (*Typha angustifolia*) interspersed with purple loosestrife (*Lythrum salicaria*) on the western bank of the river south of the Agassiz Bridge. The stands of *Phragmites* range in width from 5 to 25 feet and reeds are in excess of 20-feet tall. These thick colonies of *Phragmites* create an almost impenetrable barrier along the banks of the river, eliminating historic vistas, reducing wildlife species utilization, increasing the potential for deviant behavior and decreasing the aesthetic experience of the park for city residents.

One area adjacent to Mother's Rest demonstrates that *Phragmites* may be outcompeted by other vegetation if enough shade exists. In this area, *Phragmites* reeds are stunted by the shade of a silver maple (*Acer saccharinum*). The silver maple's preferred habitat is riparian zones. This rapid growing species establishes itself along the river banks, and grows to significant heights in a relatively short amount of time. This portion of the Back Bay Fens, approximately 40-linear feet, is the only spot north of Stony Brook gatehouse where *Phragmites* is absent.

The wildlife habitat of the Back Bay Fens is diminished due to the presence of *Phragmites*. As discussed above, the presence of *Phragmites* reduces overall species utilization for a number of reasons: the absence of diversity, absence of structural heterogeneity, and most importantly lack of viable habitat. *Phragmites* does not provide a food source, or nesting habitat for the majority of avian species known to frequent the area. *Phragmites* was observed to provide perching sites for Red Winged Blackbirds and English Sparrows, as well as limited escape cover for English sparrows and Blue Jays (*Cyanocitta cristata*). Perching will occur regardless of vegetation type, as the activity is morphology dependent rather than nutrient dependent. As habitat characteristics diminish, the diversity of species will decline because the ecosystem can not provide essential services.

4.4 Charlesgate

Charlesgate extends north from the Back Bay Fens to the river's confluence with the Charles River. The Charlesgate area is fragmented from Back Bay Fens by the Massachusetts Turnpike, which trends in an east/west direction. Charlesgate is not frequently visited by the public, due to the sinuous configuration of roads, highways and bridges that weave through the 0.25-mile stretch of the river. The banks of the river, i.e. from mean high water to mean low water, are stabilized with rip-rap. The banks of the river are vegetated with mature trees, including red pine (*Pinus resinosa*) and American elm (*Ulmus americana*). Stumps along the flanks of the river remain from felled American elm trees afflicted with American elm disease. While the Muddy River is daylighted through the majority of the Charlesgate area, the northern-most section flows through a culvert, for a distance less than 0.5 miles, to the river's confluence with the Charles River. Due to intensity of road infrastructure and minimal vegetation, the capability of this area to provide basic wildlife habitat is impaired.

5. Ecosystem Functions and Values

The shifts in ecosystems from natural and diverse assemblages of vegetation or fauna to ecosystems dominated by one species, either native or exotic, have been documented for some time and may be linked to human disturbances. These ecosystem shifts are documented to occur with changes in vegetation through changes in hydrologic regime of an ecosystem, e.g. saltmarsh cordgrass (*Spartina patens*) to common reed (*Phragmites australis*) with changes in salinity, but they may also occur with increases in nutrient loading or the introduction of exotic faunal species, i.e. zebra mussels or European Starlings (*Sturnus vulgaris*). Perturbations in ecosystem balance can rapidly deteriorate the quality of natural systems for two reasons, lack of predators for exotic fauna and the inability of native species to utilize the monotypic and/or non-native invasive vegetation for primal requirements.

The intensity of development surrounding the Emerald Necklace, the numerous culverts within the Muddy River watershed and associated sediment and nutrients, and the low gradient of the river flow, combined with the absence of

routine maintenance of the historic landscape allowed for the introduction of non-native exotics, Japanese knotweed and *Phragmites*. Glossy buckthorn (*Rhamnus frangula*) and tree-of-heaven (*Ailanthus altissima*) were formally introduced at the early part of the 20th century.

Phragmites expansion has been documented in freshwater, oligohaline and mesohaline tidal wetlands. Reproduction of *Phragmites* is controlled by rhizomes, which produce new shoots through nodal roots, rather than by seed germination (Chambers, 1999). Nutrient loading in wetland systems may be responsible for *Phragmites* expansion, as the reed appears to outcompete tidal wetland plants for other limiting resources, i.e. light, when nutrients are in excess (Levine, 1998). This scenario has been documented in the Florida Everglades with a shift from a *Cladium*-dominated wetland to one dominated by *Typha* with increases in phosphorus. *Phragmites* can be a fast-growing species, with rhizome growth up to 30-feet per annum in nutrient-rich sites; average growth rates are 2-3 feet per year.

The expansion of *Phragmites* into North American wetlands has been documented to decrease overall plant diversity. The capacity of *Phragmites* wetlands to provide resting, feeding, and breeding areas are greatly diminished compared to the pre-*Phragmites* ecosystem. Additionally, the coincident change in habitat structure and decrease in vegetation diversity excludes utilization by large wading birds, and marsh specialist species are replaced by generalists, leading to an overall reduction in species richness (Benoit & Askins, 1999).

Phragmites dominated wetlands are associated with high sedimentation rate (Harrison & Bloom, 1977). This feature may be appealing in marshes subject to sea-level rise. However, it is unattractive in areas with flooding problems, because *Phragmites* will impede the natural flow of the watercourse. This happens in two ways; thick stands of *Phragmites* occupy a percentage of the watercourse and narrow the channel, and the accelerated sedimentation rate caused by *Phragmites* reduces the watercolumn. Not only do these factors exacerbate flooding problems, but they also reduce access by aquatic species.

6. Proposed habitat improvements

The ecosystem of the Emerald Necklace will benefit from incremental changes in habitat structure, with the goal of rehabilitating the historical landscape in a manner that will allow nature to eventually take control of the rehabilitated ecosystem. Creation of a self-sustaining ecosystem is necessary to minimize the continual maintenance of the park. This is an ultimate goal that will not be realized until the majority of non-native invasive species have been eradicated. The removal of *Phragmites* will be greatly simplified if it can be done coincident with watercourse dredging.

When analyzing the potential for this urban ecosystem, realistic goals should be in place. This system will never be pristine; it is an area subject to a good deal of pedestrian traffic and is bounded by busy city streets for much of its fetch. Numerous culverts from densely developed urban areas discharge into the Muddy River. However, by implementing a habitat restoration protocol through vegetation management and in conjunction with implementation of Best Management Practices (BMP's), there is an excellent chance for the natural capacity of the ecosystem to improve.

Proposed habitat improvements are categorized into three units; *Phragmites* removal, habitat restoration and no-action. Few areas of the Emerald Necklace fall into the third category. The habitat improvements are organized by the three primary Necklace links, Olmsted Park, Riverway and Back Bay Fens.

6.1 Olmsted Park

Olmsted Park is the most natural region of the Emerald Necklace. However, improvements associated with BMP's are necessary to improve water quality. In addition, the removal of exotic vegetation, and stabilization of actively

eroding areas are necessary to improve the natural capacity of the resource area to provide wildlife habitat to a diverse assemblage of animals.

6.1.1 Wards Pond

Wards Pond is one of the more desirable ecosystems within the Emerald Necklace, and is in little need of restoration, with the exception of exotic vegetation removal. The removal of Japanese knotweed, Tree-of-Heaven, Glossy buckthorn, and Tartarian honeysuckle (*Lonicera tatarica*) in the southeastern portion of the pond and replacement with indigenous species will increase vegetative diversity in this ecosystem. The planted species can satisfy the wildlife requirements and the historic nature of the landscape by selecting compatible species from Olmsted's historic list. The denuded area on the northwestern shoreline negatively impacts water quality and could be reintroduced with indigenous species likely to survive the existing conditions, further stabilizing the area while providing valuable habitat.

6.1.2 Nickerson Hill/ Babbling Brook/ Spring Pond

These areas would benefit from the removal of exotic vegetation, namely Japanese knotweed along the banks of Babbling brook and the removal of Glossy buckthorn throughout Nickerson Hill and surrounding Spring Pond. Pathways throughout Nickerson Hill can be modified to retard erosion.

6.1.3 Willow Pond

The Willow Pond ecosystem has the highest potential for responding to an enhancement program. Two sources of clean water from Spring Pond and Babbling brook are the perfect ingredients to create a desirable ecosystem. The high-oxygen demand bottom sediments of Willow Pond degrade the aquatic habitat by increasing the biological oxygen demand and decreases oxygen concentration within the pond. Additionally, the bottom sediments contain high concentration of polyaromatic hydrocarbons (PAH's) and metals. Enhancement of the aquatic habitat through dredging will create a desirable habitat for fish populations and create another viable area for recreational fishing, in addition to the currently used Ward's Pond and Jamaica Pond.

The western shoreline of the pond can be enhanced by planting shrub vegetation, and removing the Purple loosestrife and American bittersweet (*Celastrus scandens*). The Japanese knotweed at the northern end of the pond detracts from wildlife habitat quality. Planted species should be selected based on habitat value, microhabitat requirements for specific species growth, and historic significance.

6.1.4 Leverett Pond

The shoreline of Leverett Pond could be enhanced by fostering a dense shrub layer along the banks of the pond. The removal of exotic vegetation, namely purple loosestrife (*Lythrum salicaria*) and glossy buckthorn (*Rhamnus frangula*) and replacement with indigenous vegetation will increase habitat diversity. In addition, the stabilization of actively eroding areas surrounding Leverett Pond, i.e. adjacent to Daisy Field and on the eastern bank of the pond, will improve water quality.

The planting of shrubs around the waterfowl feeding area on the western bank of the pond will discourage public access. The introduction of a dense shrub layer will discourage shoreline access from Canada Goose (*Branta canadensis*). In conjunction, public awareness placards might be placed along the walkway to discourage public feeding of the birds as well.

The removal of the large island created by road sand in the northern portion of the pond will increase the water quality and improve aquatic habitat within Leverett Pond. While this island provides perching sites for birds, the birds that frequent the island are large droves of Herring Gulls (*Laurs argentatus*), Canada Goose (*Branta canadensis*) and Mallard (*Anas platyrhynchos*). The removal of this island will not reduce the desirability of this area

species, but instead will increase habitat for aquatic species. In conjunction, the routine maintenance of storm drains with regular street sweeping will also improve water quality.

6.2 Riverway

The Riverway section of the Emerald Necklace will benefit from complete *Phragmites* removal. The sections most in need of *Phragmites* removal are areas where the channel is completely constricted by the reed, specifically between Brookline Avenue and Jamaica Way, the eastern channel in the Island Bridges area, and at the Back Bay Yard area. Between Longwood Avenue and the Old Scars Tower, dense stands of *Phragmites* eliminate the historic vistas from pedestrian footbridges, road bridges and along the shoreline of the river. While some of these areas are relatively short in length, the existing *Phragmites* is a seed source for the establishment of other colonies. Dredging of the *Phragmites* rootstock will provide immediate results. However, without follow-up maintenance, these efforts will surely be futile.

The soft-bottom sediments of the Riverway contain a significant amount of silt and organic material and their removal would reduce the oxygen demand on the aquatic ecosystem. This goal can be achieved by dredging the watercourse. At the same time, the dredged channel should be shelved to provide areas for planting emergent vegetation. Planting emergent aquatic vegetation will increase the structural heterogeneity of the ecosystem, which is greatly lacking in this section of the river, and create habitat for reptiles, amphibians and avian species. The lack of shrub vegetation precludes the settlement of certain avian species, because the habitat requirements are not present. For instance, species such as the Gray Catbird (*Dumetella carolinensis*) and Yellow Warbler (*Dendroica petechia*) prefer shrubs 4-6' tall for nesting, few of which are present in this section of the Necklace. As a result, the bird is forced to leave the Necklace to find suitable nesting sites. The continual narrowing of vegetative species diversity will, with time, eliminate habitat for a variety of animal species as well as foster the propagation of urban animal species.

The shrub zone vegetation along the shoreline of the Riverway is dominated by either *Phragmites* (as emergent vegetation within the watercourse) or Japanese knotweed (along the banks of the river), the removal of these species along with the planting of shrubs conducive to wildlife will increase the available habitat. The denuded banks are responsible for contributing sediment to the watercourse, and the stabilization of these areas will reduce the suspended solid inputs. Additionally, a habitat enhancement program can be adopted to include the introduction of wildlife for nectar feeders and aesthetic values, as well as installing and maintaining nesting boxes for certain target species. If nesting boxes were to be installed in any area of the Emerald Necklace, the boxes must be diligently maintained in the springtime to ensure success of designated occupants. Planted species may be selected from a list of compatible species from both the historic and wildlife perspective and include such species as swamp azalea (*Rhododendron viscosum*), tupelo (*Nyssa sylvatica*), silky dogwood (*Cornus amomum*), witch-hazel (*Hamamelis virginiana*), and winterberry (*Ilex verticillata*).

A considerable amount of the suspended solid inputs to the Riverway originate from the stone dust pathways that parallel both sides of the river. The stone dust is transported to the river with minor amounts of rainfall. To prevent this, a small berm could be placed on the riverside of the pathway. In addition, the cobble swales are conducive to direct discharge of suspended solids to the watercourse. This occurs in two ways. The obtrusive swales exacerbate erosion through their imperviousness, which creates rivulets and gullies between the sides of the swales and the earthen areas surrounding the structures. The eroded material is deposited within the watercourse. Also, the long, linear structures directly discharge turbid water, primarily the stone dust from the pathway. The removal of the cobble swales will prevent further degradation of water quality. The swales present in the Back Bay Fens have the same affect on water quality.

6.3 Back Bay Fens

The Back Bay Fens portion of the Emerald Necklace requires an aggressive approach to invasive vegetation management, as well as maintenance to its heavily accessed parks and pathways. The degree to which *Phragmites*

has established itself within this area of the park presents a higher level of difficulty for eradication than elsewhere in the Necklace. In addition to *Phragmites* removal, the Purple Loosestrife present in certain areas, such as the Lagoon area and within the narrow-leaved cattail (*Typha angustifolia*) colony just south of Agassiz bridge, requires removal.

The removal of established *Phragmites* colonies, including root mats, will maximize the efficiency of the restoration process. The shape of the dredged channel could be conducive to planting emergent vegetation, from both a wildlife habitat and historical standpoint. Plantings in this area may be comprised of species such winterberry (*Ilex verticillata*), silky dogwood (*Cornus amomum*), arrowwood (*Viburnum dentatum*), nannyberry (*Viburnum lentago*) and speckled alder (*Alnus rugosa*).

As with the areas upstream, the stabilization of actively eroding areas and removal of cobble swales will improve water quality within the Back Bay Fens. In areas where the natural topography necessitates the use of drains, French drains (i.e. crushed gravel) could be used in place of cobble swales to allow for natural seepage of surface runoff as opposed to channelized flow.

The prevention of active contributions of sediment to the watercourse is of greater importance given the area's history of flooding and the dense colonies of *Phragmites*. As discussed in Section 5, *Phragmites* dominated wetlands are effective entrappers of sediment and continually accrete. This may impede water discharge and contribute to bank overflow conditions. In conjunction with the stabilization of eroding areas, the removal of accumulated sediment deposited through culvert discharge, such as in the Stony Brook Gatehouse area, will improve water quality, in conjunction with BMP's implementation.

Upstream of the Agassiz Bridge, in areas absent of *Phragmites*, the shrub vegetation along the banks of the river is variable. These areas would benefit from indigenous plantings to bolster the area's wildlife habitat value. Similar to the Riverway, the Back Bay Fens suffers from a lack of structural heterogeneity, the result of which is incrementally eliminating species utilization through the colonization of monotypic vegetation. To reiterate the primary thesis of this report, the overall species richness in the ecosystem will continue to decline if this pattern goes unabated. An excellent proving ground for plant species introduction is the lagoon area across from the Museum of Fine Arts. Here the thin shrub layer is comprised of purple loosestrife (*Lythrum salicaria*), false indigo (*Amorpha fruticosa*), and jewelweed (*Impatiens capensis*) can be replaced by a more diverse assemblage of species that provide habitat for an equally diverse number of animals. Planted species can be selected from the Olmsted's historic list to ensure compatibility with the historical restoration of the landscape. In addition, a dense shrub zone in these areas will prevent access to the shoreline by geese.

7. Conclusion

A wildlife habitat evaluation and vegetation assessment of the Emerald Necklace in Boston, Massachusetts was performed by LEC Environmental Consultants, Inc. (LEC). The data were collected as part of the Muddy River restoration project sponsored by the City of Boston Parks and Recreation Department.

The Emerald Necklace offers limited wildlife habitat due to the density and extent of non-native invasive species such as common reed (*Phragmites australis*), Japanese knotweed (*Polygonum cuspidatum*), purple loosestrife (*Lythrum salicaria*) and glossy buckthorn (*Rhamnus frangula*). However, because the Emerald Necklace occupies 3.5 miles of almost continuous green space, species do utilize the area, though the quality of habitat is not high. The natural capacity of the resource areas will be substantially improved by increasing vegetative diversity and water quality. These improvements will create an environment conducive to a wide assemblage of aquatic, amphibian, reptilian, avian and mammalian species, with the ultimate goal to create a strong ecological foundation that leads to a sustainable landscape.

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8.

Appendix A

Species Observations

Species observed are listed by common and latin names. In parentheses following the name of the species is the number of observations over the course of the study period.

WARDS POND**Fish**

Bluegill (*Lepomis macrochirus*) (4)
Large mouth bass (*Micropterus salmoides*) (2)
Pumpkin seed (*Lepomis gibbosus*) (5)

Amphibians

Bull frogs (*Rana catesbeiana*) (6+)

Insects

Damsel fly larvae (6+)
Northern bluet (*Enallagma cyathigerum*) (1)

Spring Pond/Babbling Brook /Nickerson Hill**Fish**

Three-spine stickleback (*Gasterosteus aculeatus*) (2)

Amphibians

Bull frogs (*Rana catesbeiana*) (4)

Insects

Northern bluet (*Enallagma cyathigerum*) (1)

Mammals

Eastern chipmunk (*Tamias striatus*) (6+)
Eastern cottontail (*Sylvilagus floridanus*) (1)
Eastern grey squirrel (*Sciurus carolinensis*) (6+)

Birds

Least flycatcher (*Empidonax minimus*) (2)
Northern cardinal (*Cardinalis cardinalis*) (6)
Red-eyed vireo (*Vireo olivaceus*) (1)
Tufted titmouse (*Baeolophus bicolor*) (3)
Yellow warbler (*Dendroica petechia*) (3)

Willow Pond**Fish**

Three-spine stickleback (*Gasterosteus aculeatus*) (1)

Leverett Pond**Fish**

American eel (*Anguilla rostrata*) (3)
Bluegill (*Lepomis macrochirus*) (6+)
Goldfish (*Carassius spp.*) (5)
Large mouth bass (*Micropterus salmoides*) (2)
Golden shiner (*Notemigonus crysoleucas*) (6+)
Pickerel (*Esox spp.*) (4)
Pumpkin seed (*Lepomis gibbosus*) (6+)
Yellow perch (*Perca flavescens*) (4)

Reptiles

Painted turtle (*Chrysemys picta*) (6)
Snapping turtle (*Chelydra serepentina*) (1)

Birds

American Crow (*Corvus brachyrhynchos*) (6+)
American Goldfinch (*Carduelis tristis*) (3)
American Robin (*Turdus migratorius*) (3)

Baltimore Oriole (*Icterus galbula*) (1)
Canada Goose (*Branta canadensis*) (6+)
Cedar Waxwing (*Bombycilla cedrorum*) (3)
Common Grackle (*Quiscalus quiscula*) (4)
Double-crested cormorant (*Phalacrocorax auritus*) (3)
Eastern Kingbird (*Tyrannus tyrannus*) (3)
English Sparrow (*Passer domesticus*) (6+)
European Starling (*Sturnus vulgaris*) (6+)
Gray Catbird (*Dumetella carolinensis*) (5)
Herring Gull (*Laurs argentatus*) (6+)
Mallard (*Anas platyrhynchos*) (6+)
Mourning Dove (*Zenaida macroura*) (6)
Northern Cardinal (*Cardinalis cardinalis*) (5)
Northern Mockingbird (*Mimus polyglottos*) (5)
Pigeons (*Columba spp.*) (6+)
Red-winged Blackbird (*Agelaius phoeniceus*) (6+)
Tree Swallow (*Tachycineta bicolor*) (3)

RIVERWAY**Birds**

American Crow (*Corvus brachyrhynchos*) (6+)
American Robin (*Turdus migratorius*) (6+)
Black and White Warbler (*Mniotilta varia*) (1)
Blue Jay (*Cyanocitta cristata*) (3)
Canada Goose (*Branta canadensis*) (6+)
Common Grackle (*Quiscalus quiscula*) (6+)
Downy Woodpecker (*Picoides pubescens*) (2)
English Sparrow (*Passer domesticus*) (6+)
European Starling (*Sturnus vulgaris*) (6+)
Mallard (*Anas platyrhynchos*) (6+)
Mourning Dove (*Zenaida macroura*) (6+)
Red-winged Blackbird (*Agelaius phoeniceus*) (6+)
Northern Cardinal (*Cardinalis cardinalis*) (3)
Rock Dove (*Columba livia*) (6+)
Wood Duck (*Aix sponsa*) (1)

BACK BAY FENS**Fish**

American eel (*Anguilla rostrata*) (3)
Bluegill (*Lepomis macrochirus*) (6+)
Common carp (*Cyprinus carpio*) (6+)
Goldfish (*Carassius spp.*) (6+)
Large mouth bass (*Micropterus salmoides*) (2)
Golden shiner (*Notemigonus crysoleucas*) (6+)
Pumpkin seed (*Lepomis gibbosus*) (6+)
Yellow perch (*Perca falvescens*) (6+)

Reptiles

Painted Turtle (*Chrysemys picta*) (4)
Pond Slider (*Chrysemys scripta*) (2)

Birds

American Crow (*Corvus brachyrhynchos*) (6+)
American Robin (*Turdus migratorius*) (6+)
Black-capped Chickadee (*Parus atricapillus*) (6+)
Black and White Warbler (*Mniotilta varia*) (1)
Blue Jay (*Cyanocitta cristata*) (6+)
Common Grackle (*Quiscalus quiscula*) (6+)
European Starling (*Sturnus vulgaris*) (6+)
Gray Catbird (*Dumetella carolinensis*) (6+)
Great Blue Heron (*Ardea herodias*) (1)
Green Heron (*Butorides v. virescens*) (1)
Herring Gull (*Laurs argentatus*) (6+)
English Sparrow (*Passer domesticus*) (6+)
Mallard (*Anas platyrhynchos*) (6+)
Mourning Dove (*Zenaida macroura*) (6+)
Red-winged Blackbird (*Agelaius phoeniceus*) (6+)
Rock Dove (*Columba livia*) (6+)

Song Sparrow (*Melospiza melodia*) (3)
Tree Swallow (*Tachycineta bicolor*) (1)
Tufted Titmouse (*Parus bicolor*) (1)
Yellow Throated Warbler (*Dendroica dominica*) (1)