



Figure 5.1: Beaver Brook in the original reservation, 2005 (Pressley Associates).

Chapter 5

Capital Improvements Implementation Strategy

Introduction

Based on the narrative recommendations outlined in the previous chapter, which address necessary improvements to protect natural habitats, restore historic character, and enhance visitor experience, this chapter presents a focused list of specific improvements based on urgency and priority, reflecting an analysis of existing site conditions, DCR management requirements and capabilities, and public input. The tasks are categorized into two levels of management and services with associated costs, reiterating the goals and objectives of the RMP. Recommendations associated park operations and management are included in Chapter 6.

Basic Level Services represent the most fundamental needs for maintaining the expanded reservation, which if left neglected, would lead to a permanent loss of an important cultural or natural resource, adversely affect the safety of the public, or result in the further decline of the property's infrastructure. The continuation of compatible recreation that connects visitors with the reservation landscape is also considered a basic level of management and service, as are the prevention of impacts to significant habitats and the restoration of the visual and historic character of the reservation. These tasks demand foremost attention and require that public funds be allocated for implementation. Some of these basic level services can be

planned as Early Action Projects or projects that could be completed by DCR personnel or volunteers supervised by DCR based on expendable resources and time limitations.

Enhanced Level Services represent an increased level of management necessary to improve the condition of existing resources, enhance programming and public access, and which achieve cosmetic improvements that are not urgently related to public safety or resources protection.

In summary, the basic level of service optimizes existing activities or facilities while the enhanced level expands existing activities or facilities. Recommendations are evaluated to determine if they are associated with the basic or enhanced level of management and services. Factors used to determine which recommendations meet the basic management level include:

- Maintaining or securing public and visitor health and safety
- Maintaining essential property infrastructure
- Providing protection and stewardship for significant or critical cultural or natural resources, and
- Ensuring sustainable public access and recreational activities.

Capital Improvement Tasks

The RMP process identified the priority recommendations in conjunction with DCR management review and community input at public meetings (see Appendix D). These tasks are prioritized into the two categories mentioned above, based on their impact on protecting the prime natural resources of the reservation, restoring the integrity of historic resources, resolving the public safety issues, and enhancing visitor experience. In addition, issues concerning natural systems sustainability, public accessibility enhancement, and maintenance requirements are addressed within these priorities. The categories and recommendations may be considered preliminary in nature and subject to change based upon DCR, city and state agency, and public input in the future. Many of these items could be

considered flexible, since priorities could change if funding becomes available for certain types of projects immediately or in the future or if deterioration occurs sooner than anticipated.

The preliminary costs listed below reflect 2009 figures excluding contingencies. Unless specifically mentioned, they also exclude design, engineering, or compliance costs that may be needed to move individual projects into completion and which may add 10-25% of the overall project cost, depending on the technical complexity and permitting.

Basic Level

The following recommendations and associated costs represent the basic level of management and services for both Beaver Brook Reservation and Beaver Brook North Reservation.

Table 5.1: Basic Level of Management and Services

RECOMMENDATION	CONCEPTUAL COST	SOURCE	IMPLEMENTATION METHOD
GOAL: Natural and Cultural Resource Protection and Resolution of Public Safety			
Reservation-wide			
<ul style="list-style-type: none"> Establish a dog policy and open hours for the entire reservation. 	Operational	NA	DCR staff
Beaver Brook Reservation			
<i>Mill Pond and Duck Pond Dams*</i>			
<ul style="list-style-type: none"> Conduct detailed structural and rehabilitation evaluation of both dams. 	\$ 25,000	General estimate for study	DCR staff and/or contract
<i>Stearns Barn*</i>			
<ul style="list-style-type: none"> Conduct structural and rehabilitation evaluation. 	\$ 50,000	General estimate for study based on size and condition of barn	Contract
Beaver Brook North Reservation			
<i>MetFern Cemetery*</i>			
<ul style="list-style-type: none"> Preserve and maintenance existing site consistent with recent stabilization work and DCR Preservation and Maintenance Plan. 	Operational	NA	DCR staff
<i>Carriage road and DCR access/service road*</i>			
<ul style="list-style-type: none"> Implement curb cut and re-grade the entrance to the carriage road from the north segment of the parkway to allow for DCR maintenance vehicles and emergency access; add a gate to control vehicular access. 	\$ 5,000	Lump sum estimate	DCR staff and/or contract

RECOMMENDATION	CONCEPTUAL COST	SOURCE	IMPLEMENTATION METHOD
<i>Non-functional utility poles</i>			
<ul style="list-style-type: none"> Locate all remaining standing and fallen utility poles on site and on a site plan; prepare specifications for removal, including site protection, re-vegetation after removal, and road/path repairs. 	\$ 5,000	General estimate based 5 day work crew	DCR staff and/or contract
<i>Metropolitan Parkway</i>			
<ul style="list-style-type: none"> Implement entrance signage. 	\$ 5,000	Lump sum estimate	DCR staff
<ul style="list-style-type: none"> Work collaboratively with the City of Waltham to address visibility and vehicular safety issues at the south parkway entrance on Trapelo Road. 	Operational	NA	DCR staff
<i>Avalon Development</i>			
<ul style="list-style-type: none"> Survey DCR Reservation property line around Lot 3; install boundary markers; follow-up with DCAM and AvalonBay Communities Inc. regarding any visible intrusions. 	\$ 50,000	Lump sum estimate for survey contract	Survey contract, annual DCR staff monitoring
GOAL: Protection and Stabilization of Prime Natural and Historic Assets of the Reservation			
Beaver Brook Reservation			
<i>Stone walls*</i>			
<ul style="list-style-type: none"> Inspect and repair the deteriorated boundary stone wall along Waverley Oaks Road and Mill Street. 	\$ 22,000	Unit cost of wall restoration	Contract
<i>Pond areas* **</i>			
<ul style="list-style-type: none"> Rehabilitate compacted and eroded areas along Beaver Brook and ponds. 	\$ 34,000	Unit cost for soil rehabilitation	Contract
<ul style="list-style-type: none"> Improve/repair trail leading to the cascade and overlook. 	\$ 4,000	Unit cost for trail rehabilitation	DCR staff and volunteers or contract
<ul style="list-style-type: none"> Undertake vegetation management and additional planting where necessary. 	\$ 48,000	Lump sum estimate	Contract DCR staff and
<ul style="list-style-type: none"> Remove vegetation from the archaeological mill sites. 	\$ 10,000	Lump sum	volunteers or contract
Beaver Brook North Reservation			
<i>Site restoration and re-vegetation**</i>			
<ul style="list-style-type: none"> Replant areas cleared from demolition of historic buildings with native species and ensure that trail connections are re-established. 	\$ 322,000 ¹	Unit cost for native species planting	Contract and/or collaboration with AvalonBay Communities
<ul style="list-style-type: none"> Re-vegetate areas damaged by motorized vehicle use in the vicinity of the debris removal areas. 	\$ 50,000	Lump sum estimate	Contract
GOAL: Resource and Visitor Experience Improvement			
Beaver Brook Reservation			
<i>Trails**</i>			
<ul style="list-style-type: none"> Restore the designated trails lost to volunteer/invasive vegetation growth in the northern parcel. 	\$ 4,000	Lump sum estimate	Volunteers and staff or contract

RECOMMENDATION	CONCEPTUAL COST	SOURCE	IMPLEMENTATION METHOD
<i>Pond areas* **</i>			
<ul style="list-style-type: none"> Improve trail conditions and create a universally-accessible path from the Mill Street parking area to Mill Pond. 	\$ 14,000	Unit cost for accessible trail	Contract
<i>Site restoration**</i>			
<ul style="list-style-type: none"> Plant riparian vegetation along Beaver Brook adjacent to the open field in the southern parcel. 	\$ 82,000	Unit cost for planting	Contract, DCR staff, and/or supervised volunteers
Beaver Brook North Reservation			
<i>Trails**</i>			
<ul style="list-style-type: none"> Implement additional trail connection to Lot 1 with a boardwalk over the northern wetland and a new trail leading to Walnut Street; collaborate with the Friends of the Western Greenway and others to designate and construct this new greenway connector trail. 	\$ 9,000	Unit costs for boardwalk and dirt trails from Tahawus Trails	DCR staff, contract, and/or volunteers (e.g. NEMBA, Friends of the Western Greenway) -
<ul style="list-style-type: none"> Undertake improvements needed to establish critical trail connections, such as a bridge to connect the south parkway with the trail system near the Trapelo Road entrance; trail through the meadow and cleared areas leading to the north parkway; and connector trail from the Parkway south of the Avalon Development to the existing trail west of Avalon Development. 	\$ 25,000	Unit cost for dirt trails from Tahawus Trails	for all trail recommendations
<ul style="list-style-type: none"> Evaluate the Mackerel Hill trails to determine specific locations needing erosion control, and re-route trails where necessary. 	\$ 4,000	Lump sum estimate	
<i>Parking</i>			
<ul style="list-style-type: none"> Pending future developments regarding the City of Waltham's proposed golf course and reuse of the former MSH Administration Building, and in cooperation with the City, design and construct a re-configured DCR public parking area accessible from the emergency access road and near the former MSH Administration Building. 	\$ 83,000	Unit cost for bituminous concrete parking lot	Design: DCR or contract Construction: Contract
<ul style="list-style-type: none"> Implement site orientation signage/kiosk at parking area, as well as landscaping adjacent to the new parking area. 	\$ 50,000 ²	Lump sum estimate	Contract
<i>Site interpretation and education</i>			
<ul style="list-style-type: none"> Implement interpretive signage related to natural resources. 	\$ 20,000	Lump sum estimate for two interpretative stations	Research, design and construction: DCR or contract
<i>Site restoration</i>			
<ul style="list-style-type: none"> Implement native species planting along Metropolitan Parkway on the slope south of the AvalonBay development. 	\$ 83,000	Unit cost for native species planting	DCR in partnership with AvalonBay

RECOMMENDATION	CONCEPTUAL COST	SOURCE	IMPLEMENTATION METHOD
<i>City of Waltham land</i>			
<ul style="list-style-type: none"> Work collaboratively with the City of Waltham, DCAM, and the AvalonBay development to complete site restoration in the area of the female dormitory (demolished) and tennis courts (demolished). Minimally, remove bituminous concrete and other debris, add loam and seed with native grass mix. 	\$ 139,000	Unit costs for demolition, grading & seeding	DCR with City of Waltham, DCAM and AvalonBay Communities
<i>City of Waltham land continued</i>			
<ul style="list-style-type: none"> Coordinate with the City of Waltham to complete site restoration in the former entrance (Lot 4B). Remove bituminous concrete entry drive and other debris, add loam, and seed with native mix to restore meadow grassland. 	\$ 38,000	Unit costs for demolition, grading & seeding	DCR with City of Waltham

NOTES

- * Alterations to historic features will be consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
- ** Proposed physical work within the 100' setback of wetlands and certified or potential vernal pools will be coordinated with the Conservation Commissions in the appropriate municipality (Belmont, Lexington or Waltham).

Unit costs are based on RS Means - Site Work & Landscape Cost Data 2009 and figures updated from 2006 draft RMP.

Total Recommended Basic Services – Capital Improvements

Beaver Brook Reservation	\$ 293,000	
Beaver Brook North Reservation	\$ 888,000	This includes site remediation/restoration costs that should be shared with DCAM, City of Waltham and AvalonBay Communities, Inc.



Figure 5.2: Dam over Mill Pond in the Beaver Brook Reservation, 2006. This is an existing cultural resource for which a structural evaluation is recommended as a basic service (Pressley Associates).

Enhanced Level

The recommendations listed below are necessary to achieve an enhanced level of service for the Beaver Brook and Beaver Brook North Reservations. Implementation of these recommendations will result in expanded public access and

understanding, as well as increased resource protection. At present, current DCR staffing levels are insufficient to implement and manage these recommendations in addition to those associated with the basic level of management and service.

Table 5.2: Enhanced Level of Management and Services

RECOMMENDATION	CONCEPTUAL COST	SOURCE	IMPLEMENTATION METHOD
GOAL: Natural and Cultural Resource Protection and Resolution of Public Safety			
Beaver Brook Reservation			
<i>Mill Pond and Duck Pond Dams*</i>			
<ul style="list-style-type: none"> Implement needed structural improvements and address safety. 	\$ 100,000	Lump sum estimate pending DCR dam evaluation	DCR staff and/or contract
<i>Stearns Barn*</i>			
<ul style="list-style-type: none"> Implement emergency stabilization. 	\$ 200,000	Lump sum estimate based on 2006 condition	Contract
Beaver Brook North Reservation			
<i>Water tower</i>			
<ul style="list-style-type: none"> Evaluate the cost and feasibility of removing the water tower on Mackerel Hill and, based on the cost, evaluate alternatives for the water tower: 1.) removal, abatement and site restoration and 2.) retention and development of enhanced cell tower use. 	\$ 20,000	General estimate for study based on scope	DCR staff and/or contract
<ul style="list-style-type: none"> If determined to be feasible, remove the water tower. 	\$ 500,000	Conceptual estimate, see notes below	Contract
<i>MetFern Cemetery</i>			
<ul style="list-style-type: none"> Design and implement compatible interpretive signage at the MetFern Cemetery*. 	\$ 5,000	Lump sum estimate for signage	Contract
GOAL: Restoration and Enhancement of the Prime Natural and Historic Assets of the Reservation			
Reservation-wide			
<i>Conservation Restrictions</i>			
<ul style="list-style-type: none"> Continue voluntary program to acquire conservation easements along Beaver Brook, so that Beaver Brook North and Beaver Brook Reservations are connected by continuous protected habitat. 	\$ 500,000	DCR	DCR in collaboration with the Belmont Land Trust, Trustees of Reservations, Mass Audubon, or others

RECOMMENDATION	CONCEPTUAL COST	SOURCE	IMPLEMENTATION METHOD
Beaver Brook North Reservation			
<i>Wetland Restoration**</i>			
<ul style="list-style-type: none"> Re-vegetate areas associated with construction activity and debris removal at the former dump site, including establishing a new wetland. 	\$ 353,000	Unit cost for planting	Contract
GOAL: Resource and Visitor Experience Enhancement			
Beaver Brook Reservation			
<i>Site interpretation and education</i>			
<ul style="list-style-type: none"> Develop interpretive/educational information related to the history of the reservation. 	\$ 7,500	Lump sum estimate	Research, writing and design: DCR staff or contract; Exhibit/brochure production: contract
<i>Recreational facilities</i>			
<ul style="list-style-type: none"> Rehabilitate existing ball field 	\$15,000	Unit cost for infield and outfield rehabilitation	Contract
Beaver Brook North Reservation			
<i>Visitor Center*</i>			
<ul style="list-style-type: none"> Design and construct new Visitor Center in the former MSH Administration Building with exhibit space, office, restrooms, and storage; 	\$ 375,000 ³	Unit cost for architecture and exhibits based on est. size of facility	Contract; coordinate with the City of Waltham regarding overall rehabilitation
<i>Trails**</i>			
<ul style="list-style-type: none"> Designate and improve a shared use trail system for the existing historic carriage roads and on specific secondary [single track] trails that connect to Rock Meadow and the north and south segments of the Metropolitan Parkway and bikeway. 	\$ 364,000	Unit cost for multi-use trail construction	Contract

NOTES

* Alterations to historic features will be consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

** Proposed physical work within the 100' setback of wetlands and certified or potential vernal pools will be coordinated with the Conservation Commissions in the appropriate municipality (Belmont, Lexington or Waltham).

Unit costs are based on RS Means - Site Work & Landscape Cost Data 2009 and figures updated from 2006 draft RMP.

Total Recommended Enhanced Services – Capital Improvements

Reservation-wide	\$ 500,000	Acquisition of voluntary conservation restrictions along Beaver Brook.
Beaver Brook Reservation	\$ 322,500	
Beaver Brook North Reservation	\$ 1,617,000	Note that the estimate for removal and disposal of the water tower is a very conceptual cost (\$ 500,000) and should be evaluated in greater detail.



Figure 5.3: Site cleared from debris in the Beaver Brook North Reservation, 2006. This area is recommended for wetland re-vegetation as an expanded level of management and service (Pressley Associates).



Figure 5.4: Bituminous concrete paving west of the former MSH Administration Building, 2009. This paving and associated debris should be removed and the site restored as a basic service in collaboration with the City of Waltham, DCAM, and the Avalon development (Pressley Associates).

Priorities

In general, the basic service capital improvements listed above for the original Beaver Brook Reservation involve the repair of existing features, and work needed to ensure that the reservation can be effectively and safely used by the public. Of these, repair of the existing stone wall and work to address threats to the Stearns Barn are most urgent. Enhanced services at the Beaver Brook Reservation complete needed capital improvements to major features (Stearns Barn and Mill Pond dams), implement universally accessible trails, all of which are urgently needed.

At Beaver Brook North, basic service capital improvements complete the site restoration/remediation associated with the demolition or abandonment of the Metropolitan State Hospital features (buildings, roadways, tennis courts), which is still not fully implemented and which should be done collaboratively with DCAM, AvalonBay Communities Inc. and the City of Waltham. Failure to complete this work conveys a deteriorated and abandoned condition and fosters vandalism, and fails to meet the conditions set forth in the MSH Reuse Plan. The new Beaver Brook North Reservation is currently only accessible by bicycle or on foot from another location, so that construction of the proposed DCR/City of Waltham parking area is considered a basic level of service, as is providing a curb cut on the Metropolitan Parkway to facilitate maintenance vehicle access to the carriage roads. While changing the existing cobra-head light fixtures to a more appropriate acorn fixture is listed in the recommendations in the previous chapter, the high cost (e.g. \$350,000) of implementing this recommendation may not be prudent so this cost is not included in Table 5.2. Instead, DCR should focus on immediate health and safety issues, site remediation, and providing basic public access at Beaver Brook North.

The third priority for Beaver Brook North must be a solution for the former MSH Administration Building, which is a contributing [historic] resource and has been abandoned for some time. This was originally slated to be used by the City of Waltham as the golf clubhouse, with space for a DCR reservation visitor center. If the City does not move forward with plans to construct the 9-hole golf course, a new, appropriate use must be found for this building. In the meantime, the City should implement emergency stabilization to prevent further vandalism and repair any condition that threatens the structural and historic integrity of the building.



Figure 5.5: Rear of the former MSH Administration Building, 2009 (Pressley Associates).



Figure 5.6: Front portico of the former MSH Administration Building, 2009 showing graffiti, vandalism, and vegetative threats, which need urgent attention (Pressley Associates).

Endnotes

¹ Annual inspections of the Beaver Brook North Reservation should be done to revisit the re-vegetation recommendations, as the process of volunteer plant growth and natural succession may mean that some areas do not require re-vegetation, or that increased management of invasive species may be needed.

² This work should be coordinated with site remediation related to the demolition of the former MSH male and female dormitories.

³ Note that as of spring 2009, the MSH Administration Building continues to deteriorate, with vandalism evident. Without a current building program and use, nor detailed information regarding the structural integrity, systems, etc., true rehabilitation costs are unknown at this time. The figure listed in the RMP assumes the costs to retrofit existing finished space in a small portion of the building, and does not address broader issues related to improving the condition of the building, finding appropriate new uses, upgrading systems, and accommodating universal access, all of which should be done by the City of Waltham. For more detail on the agreements associated with MSH reuse and disposition, please see supplemental Appendix G, Volume 2.