



Master Plan Report

Millbrook Meadow and Mill Pond Restoration

January 2015

Rockport, Massachusetts

 MILONE & MACBROOM



Millbrook Meadow and Mill Pond Restoration

Prepared for
Department of Public Works
Town of Rockport, Massachusetts
34 Broadway Avenue
Rockport, MA 01996

Prepared By
Milone & MacBroom, Inc.
1350 Main Street
Springfield, MA 01103

January 2015
FINAL

Rockport Department of Public Works

Joseph Parisi Jr.
Tim Olson

Millbrook Meadow Advisory Committee

Charmaine Blanchard
John Campbell, AIA
Gunilla Caulfield
Samuel W. Coulbourn
Frank Hassler
Eric Hutchins
Marcia Lombardo
Shannon Mason
Barbara Sparks
John Sparks
Frederick H. Tarr III

Consultant Team

Mark Arigoni, PLA, Principal, Milone & MacBroom, Inc.
Jason Williams, PLA, Associate, Lead Landscape Architect
Matthew Sanford, M.S., Associate, Lead Environmental Scientist
Elsa Loehmann, P.E., Project Engineer
Kishor Patel, P.E., Associate, Manager Structural Engineering
David Gorden, CWS, CPSS, PEER Consultants, P.C.
Peter Wild, President, Boston Tree Preservation

Milone & MacBroom, Inc.
99 Realty Drive
(Headquarters) Cheshire, CT 06410
1350 Main Street
Springfield, MA 01103

PEER Consultants, P.C.
99 South Bedford Street, Suite 200
Burlington, MA 01803

Boston Tree Preservation
2 Draper Street
Woburn, MA 01801

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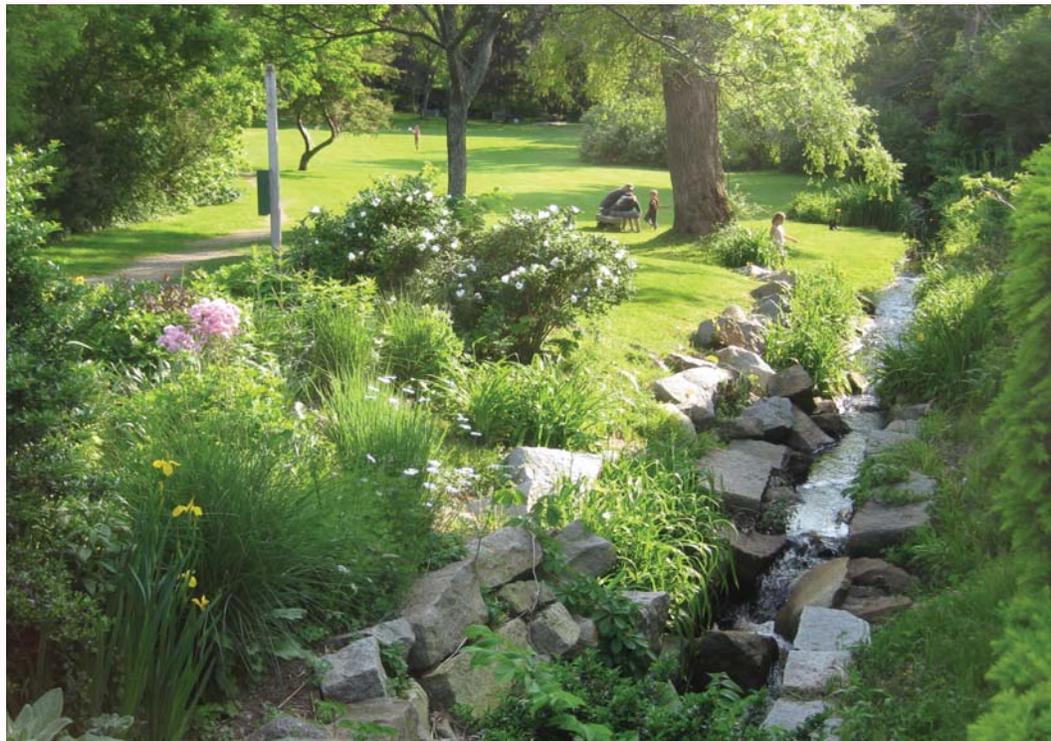
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Chapter 1

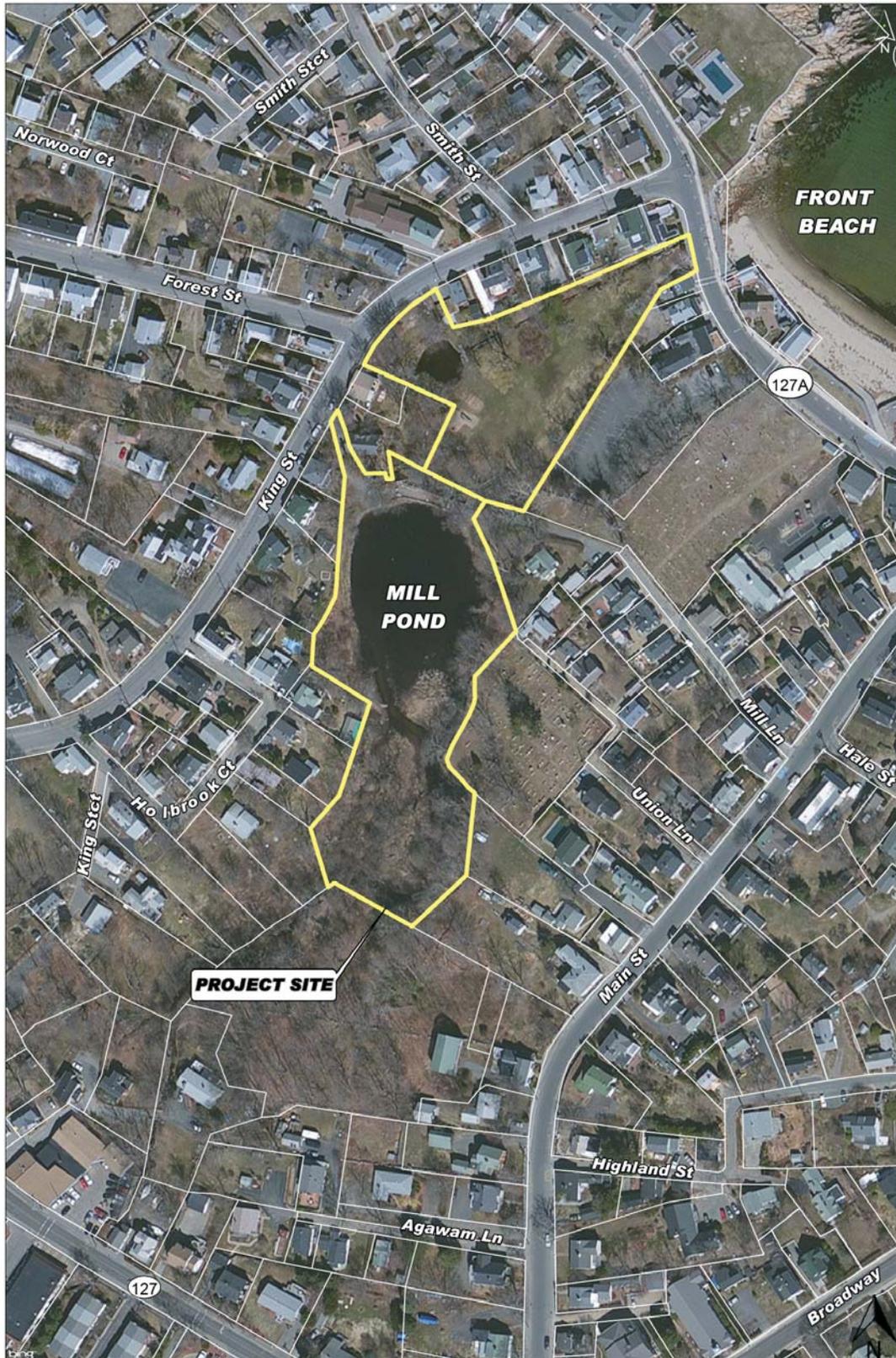
1.0 Introduction

Milone & MacBroom, Inc. (MMI) has been engaged by the Town of Rockport and the Millbrook Meadow Advisory Committee to evaluate restoration opportunities and develop a comprehensive living master plan for Millbrook Meadow and Mill Pond, a locally significant coastal Town Park located in Rockport, Massachusetts. The Millbrook Meadow was once a vibrant gathering spot for the community; however, over the past couple of decades, the park has begun to fall into disrepair. Revitalization of Millbrook Meadow has become a top priority for the community. The town and the Millbrook Meadow Advisory Committee established several critical goals for the development of a park master plan including assessing methods for reducing park flooding, ways of preserving the park's historical context, developing sustainable ecological stream and pond restoration opportunities, invasive plant species management, improving surface water quality, revitalizing park amenities, improving park accessibility and enhancing usability, lowering long-term maintenance requirements and costs, and improving and updating utilities such as water and electrical services.

MMI gathered a team of experts from a multitude of disciplines including landscape architecture, water resource engineering, structural engineering, and wetland ecology to create the living Master Plan for Millbrook Meadow and Mill Pond. The following document summarizes the historical context of the project, provides critical existing condition data and analyses, provides recommendations and alternatives for improving the park, and furnishes a comprehensive Master Plan for the Millbrook Meadow that can be implemented using a phased approach.



View of Millbrook Meadow from Beach Street culvert



Context Map

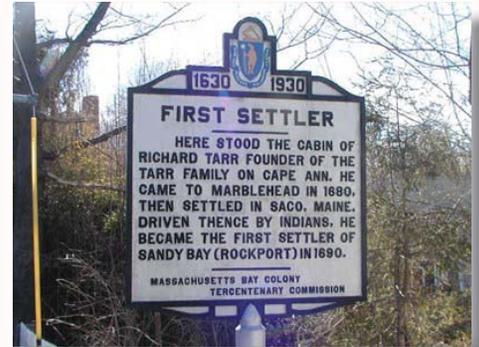
Chapter 2

HISTORY

2.0 History

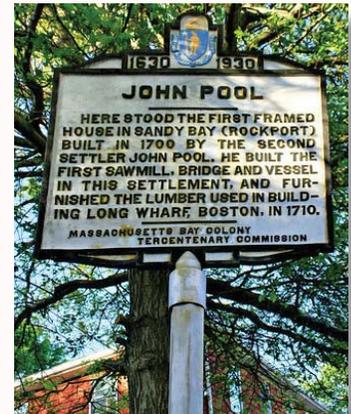
1690-2008

Human activity has impacted the Millbrook Meadow and Mill Pond site for hundreds of years. With its proximity to the ocean and availability of fresh water, early settlers identified the site as an important natural resource. Sixty seven years after Europeans settled in Gloucester, Massachusetts, Richard Tarr, believed to be Rockport's (then known as Sandy Bay) first settler, built his cabin to the south of the present day Mill Pond along Main Street in 1690. Not long after Richard Tarr established his homestead, John Pool (Rockport's 2nd settler) arrived at Sandy Bay and built his home in 1700.



Historical Signage

The two families established their property rights using the Mill Brook as the property dividing line-the Pool's acquiring the land to the north of the Millbrook and the Tarrs to the south. The Tarr's Mill Pond property at this point was known as Davisons Run. In 1701, the Mill Pond was granted to John Pool for the construction of a mill along with a Mr. Thomas Witham. It is clear through the deed record that at this time the Mill Pond and the lower meadow were two distinct legal parcels of land.



Historical Signage

Between 1709 and 1783, the Millbrook Meadow was transferred to the Pool family. John Pool had built a grist mill at the approximate location of the existing dam and began excavating the Mill Pond to construct a lumber mill and log crib dam. The lumber that was milled by John Pool was actually sent to Boston for the construction of Long Wharf Pier in 1710. As time passed, the Mill Pond was used to assist in milling lumber for ship building and dock construction while the lower meadow took on an agricultural role as a hay field. By 1798, historical deed references imply that the saw mill had been neglected and was likely abandoned.



Harvesting Ice on the Mill Pond



Norwood Ice House & Mill Pond (looking east)



Norwood Ice House (looking south)

Between 1822 and 1840, the Norwood family built two ice houses on each side of the Mill Pond.

In 1840, Rockport incorporated and detached from the Town of Gloucester. In 1850, James Manning sold the Mill Pond parcel to Caleb J. Norwood for the construction of mill houses, anchor factory, and small isinglass concerns.

In 1871, the meadow saw a change in land use from agricultural to industrial and the first factory, for the American Hide Seat Company, was built. Over the next few years, five manufacturing companies occupied the factory and, in 1874, the property was conveyed to the Manning Organ Company for the manufacturing of cabinets and organs, closing in 1876. Between 1877 and 1878, the factory was home to the manufacturing of bobbins and spools and later housed The Russian Cement Company.



Manning Organ Company Circular

In 1878, the factory and meadow were sold to the Haskins family and turned into the Haskins Isinglass Works, which manufactured isinglass. The isinglass operation (the only one in the United States) processed fish bladders for use in clarifying beer. In 1886 the mill gave way to flood waters, and the Haskins factory was inundated with water. Based on deed information, it is clear that by this time the factory energy came from a steam engine and not directly from water energy of the dam. The Haskins Isinglass factory continued to operate from approximately 1914-1920 and later burned down on July 1, 1932.



Haskins Isinglass Factory

After the removal of the factory buildings, a Mr. Elliot Grimes took ownership of the site and operated "The Fisherman's Golf Course" in the meadow. In 1936, the Town of Rockport acquired the Mill Pond parcel.

In 1937, the Junior Garden Club (later to become the Rockport Garden Club) purchased the 1.56-acre meadow parcel and, in 1939, it was gifted to the town, and a public park was born. Similar to this current Master Plan report and the impetus leading to it, the Garden Club recognized that the site needed rehabilitation, and a design was outlined in a 1939 plan by Allen Chamberlain (see appendices).

In 1951, a peculiar incident happened. Responding to citizen and business pressure the Town developed a plan to turn the meadow into an asphalt parking lot. Lura Hall Phillips, who lived nearby, heard the backhoes and ran down and stopped the work. She found a willing local lawyer, harangued the Selectmen, fought and argued. Finally the Selectmen saw the law was on Lura's side, and the hot top was stopped.

For over forty years Lura cared for that Meadow. She organized fairs, pet shows, auctions and contests. She raised funds to build a stone bridge across the Mill Brook, and a stone stairway into the Meadow. And when she died in 1994 she left money in trust that became the seed money for the current restoration.



Lura Hall Phillips, 1900-1994



Maypole Festival



Image from: "A Plan of the Old Mill Pond Property on Davidson's Brook", Rockport, Mass, Owned by C.J. Norwood

1951-Present

Throughout the 20th and 21st centuries, Rockport residents continued to enjoy the Mill Pond and Meadow, fishing in the summertime on the pond and picnicking in the meadow as well as ice skating in the winter. In 1975, the property was listed as a State Historic Site by the Massachusetts Historical Commission. Many residents and Garden Club members through the decades spent countless hours working and planning to improve and maintain the park. In 2006, the park encountered a major flooding event in which the dam failed. It was rebuilt in 2012.



Mill Pond Winter Activities

John Sparks, scientist, landscape architect, and thirty-year resident of Rockport, saw that the newly rebuilt dam that stabilized the land offered an opportunity to develop a Master Plan for restoration of the whole four-acre parcel.



Mill Pond Dam Failure 2006 (looking east)



Mill Pond Dam Failure 2006 (looking west)

After the Dam reconstruction, it became clear that further restoration of the site was necessary. With the sedimentation of the Mill Pond impoundment, decline in the health of historic trees, poor meadow drainage, the invasion of invasive exotic flora, and deteriorating structural elements, the Rockport Department of Public Works and the Millbrook Meadow Advisory Committee engaged Milone & MacBroom, Inc. in 2014 to listen, understand, analyze, and recommend options for park improvements - to assist the people of Rockport and visitors alike into rediscovering this green jewel. **This is where our story begins...**

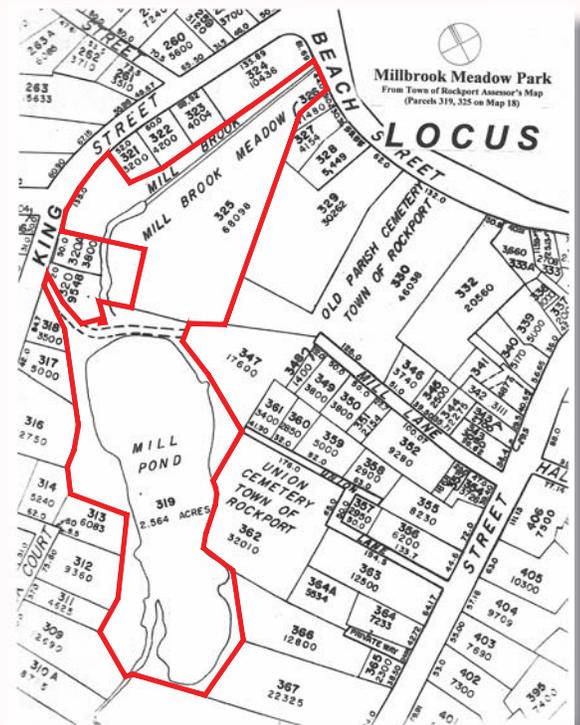


Summer activities within Millbrook Meadow

Chapter 3

3.0 Existing Conditions

The site is made up of two distinct parcels of land, per the Town of Rockport’s assessor’s mapping. The Millbrook Meadow (parcel #325) is 1.56 acres and sits to the west of Beach Street, bordered to the west and east by residential lots and the Old Parish Cemetery. South of the meadow sits the Mill Pond (parcel #319) and the Mill Pond Dam (approximately 2.56 acres). Mill Lane runs over the dam, connecting Main Street to King Street. To the east of the pond sits the Union Cemetery and residential lots. To the west of the meadow sit residential lots that are located along King Street. Of particular interest is lot #320 and #320A, which seems to encroach on the meadow parcel and shares special access to the Mill Brook as it winds through the site. This historic home site was home to an old grist mill owned by C.J. Norwood.



Assessor’s Map



Existing Conditions

The **Millbrook Meadow** includes a number of interesting features, some of which include:

- The Rockport Garden Club's flower garden, adjacent to the Beach Street entrance, is an attractive and well-liked feature at the main entrance to the park.
- The Frog Pond located on the western edge of the site is surrounded by granite walls and boulders that define its perimeter. Sediment has filled in the Frog Pond to a current water depth of 12 inches. Cattails and reed grass have taken over the open water. Large trees and invasive vegetation surround the northwestern edge of the Frog Pond. A granite staircase leads from the Frog Pond up to King Street.
- The Mill Brook Channel flows north from the dam spillway and travels northwest through a heavily stone-lined channel, then through the adjacent parcel (#320 and #320A) and discharges into the Frog Pond. From the Frog Pond, Mill Brook is conveyed within a straight granite block-lined channel, partially crumbling, northeast to Beach Street, passing below Beach Street via the Beach Street culvert and onto Front Beach. Three pedestrian bridges located adjacent to the Frog Pond cross over the Mill Brook channel.
- The Open Lawn makes up the majority of square footage in the lower meadow parcel and contains a stonedust pathway running northeast/southwest along a tree-lined edge adjacent to a large asphalt parking lot. A large Dogwood (*Cornus sericea*) and Arrowwood Viburnum (*Viburnum dentatum*) shrub thicket bisects the open lawn area and screens the Mill Brook. A bordering vegetated wetland (i.e. saturated lawn area) is found adjacent to the granite-lined Mill Brook channel in the northern section of the site.



Beach Street Entrance Garden



Frog Pond



Mill Brook Channel



Millbrook Meadow

- Stone walls of varying heights are found throughout the site and show signs deterioration. Some of these walls retain grades along King Street others are freestanding. Refer to the Preliminary Structures Inspection Report in the Appendix for additional information. Stone retaining walls, some of which show significant deterioration, retain grades along the western edge of the Mill Pond, and a significant wall collapse is occurring upstream of the Beach Street culvert.
- Three large Weeping Willows (*Salix babylonica*) are present in the meadow and are in poor health due to the age of the trees (i.e., 75 to 100 years).
- A slide and swing set sits on the eastern edge of the meadow, and benches are placed sporadically throughout the meadow.



Existing Stone Walls



Playground



Large Weeping Willow

The **Mill Pond** includes a number of interesting features some of which include:

- The Dam, which creates the Mill Pond impoundment, was reconstructed in 2010. The dam spillway is comprised of two box culverts on its southeastern end. The top of the dam is a mixture of a flat fieldstone/stone dust walkway with raised fieldstone columns with granite column caps. Steel pipe safety railings extend 42" above the dam and are located between the columns. Fieldstone vertical walls face the north side of the dam.



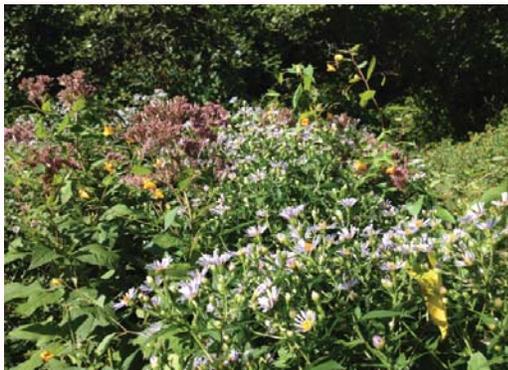
Mill Pond Dam

- The Mill Pond is a shallow open water body impoundment that currently has approximately $\frac{3}{4}$ of an acre of open water. The pond has been slowly filling with sediments from Mill Brook and reducing the open water areas. Open water depths range from a few feet at the edge to approximately 4 feet within the center portions of the pond. The open water areas have decreased significantly over the past 80 years (based on review of historical aerials and maps-see Appendix). The central portion of the pond has a sediment delta that has become heavily vegetated with broad leaved cattails. The east, west, and northern edges of the pond are lined with varying sizes of granite blocks that are beginning to buckle, most likely due to the freeze/thaw process. The eastern and western sides of the pond are a mix of lawn and non-native invasive vegetation, some of which has been recently removed. Invasive vegetation including multiflora rose (*Rosa multiflora*), wild grape (*Vipes sp.*), porcelain berry (*Ampelopsis brevipedunculata*), Japanese knotweed (*Fallopia japonica*), and oriental bittersweet (*Celastrus orbiculatus*) have become prevalent along the shoreline. Accessibility to the pond has become increasingly limited by shoreline/riparian vegetation overgrowth and deterioration of former granite access steps. A recent woodchip path has been installed by the Boy Scouts on the eastern edge of the pond that leads up the edge of the Union Cemetery.



Mill Pond

- **Palustrine scrub shrub/emergent marsh vegetated wetland.** This wetland system was once open water and part of the Mill Pond; however, as the pond has filled with sediment, the shallower water has promoted the formation of this new ecosystem. This wetland contains numerous native flora and small areas of non-native purple loosestrife. The wetland system is seasonally flooded due to stormwater events within the upstream watershed. No pedestrian access currently exists to this vegetated wetland.



Joe-Pye Weed & Asters in Emergent Marsh



Speckled Alder & Yellow Iris within Scrub Shrub Wetland



EXISTING CONDITIONS

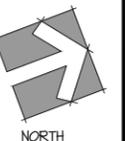
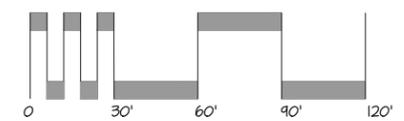
**MILLBROOK MEADOW AND
MILL POND RESTORATION**

ROCKPORT, MASSACHUSETTS

DECEMBER 2014



99 Reedy Drive
Cheshire, Connecticut 06410
(203) 271-1773 Fax (203) 272-9733
www.miloneandmacbroom.com



NORTH

Chapter 4

4.0 Community Visioning



Ponds & Forested Wetland Breakout Group



Meadow & Recreation Areas Breakout Group

“Learn from and engage the community - Vision”

The Town of Rockport and the Millbrook Meadow Advisory Committee recognize that public education and participation is an essential part of this project. With guidance from Milone & MacBroom, Inc., a detailed public visioning process was performed in an effort to gather important information and public opinion about the site.

The visioning sessions encouraged people to share their past memories of the site and identify specific areas that they would like enhanced and/or improved as well as those areas they wished to be left alone. Information gathered from the visioning sessions was used as the basis for creating the Recommendations and Concepts, to come in the following chapter.

The town and Millbrook Meadow Advisory Committee hosted two Visioning Sessions workshops. The first Visioning Session was held on Wednesday, March 20, 2013, in the Town Library. A summary of the Visioning Session notes can be found in the Appendix of this document. To structure this Visioning Session, specific site elements were broken into four groups: *Gardens and Plantings*, *Engineering and Architecture*, *Nature and Ecology*, and *Events and Usage*. Top priorities, which were identified as part of the first visioning session, included:

- Correcting the Beach Street culvert debris clogging that results from tidal backwash
- Restoring the playground and making it safer for children
- Preserving open space
- Removal of invasive exotic plants
- Preserving ice skating on the Mill Pond

Additionally, the overarching theme of the first visioning session was to keep any future design improvements “simple.”

On May 21, 2014, the second Visioning Session was held at the Town Library. The meeting was attended by 35 people. The first part of the Visioning Session included a review of site history and key site elements, as well as presenting the results of the sediment sampling completed within the Mill Pond and Frog Pond.

The second part of the Visioning Session, “The Break Out Sessions,” entailed breaking out into small groups (approximately 10 individuals per group) and rotating the groups every 20 minutes among three “stations” that discussed:

1. Ponds and Forested Wetlands
2. Meadow and Recreation Areas
3. Stream Channel and Culvert

Some of the concepts and ideas that were expressed during the breakout sessions include:

Ponds and Forested Wetlands

- Restore granite wall along cemetery
- Maintain open water
- Shoreline – granite hard edge to remain
- Improve access to Mill Pond and Frog Pond
- More trees/benches
- Eel passage adjustment
- Herbicides with some reservation
- Safety – private property (abutters) screening
- No lighting
- Invasive species management
- Educational opportunities
- Property boundaries – flagging
- Access to Holbrook Court
- Strike balance between pond and wetland

Meadow and Recreation Areas

- Integrate stream with play usage
- Alter stream and channel location
- Maintain picnic areas
- Add specific plaque to recognize Lura H. Phillips
- Replace trees/love the willows
- Festivals and activities offer knowledge of space
- Artist usage of meadow
- Keep the meadow’s character
- Support existing foundation aspects of meadow
- More trees – cooler temps and ocean breezes
- Better grass – compacted lawn currently
- Increase lawn space on either side of the pond
- Handicapped accessibility to pond and meadow



Breakout Sessions Site Stations



Ponds & Forested Wetlands



Meadow & Recreation Areas

Stream Channel and Culvert

- Road overtops every spring – drops debris and sand
- Lack of use of area adjacent to stream because it is soggy – better access
- Need access across channel for garden maintenance
- Alter hydrology upstream of Railroad Avenue
- Save the beach – control the channel to the north
- Potential impact of septic to water quality
- Low maintenance
- Public safety
- Access



Stream Channel & Culvert

Additional comments raised during the second Visioning Session can be found in the Appendix. At the end of the sessions, MMI handed out a form that resembled a newspaper article headline and asked the participants to express their thoughts for a newspaper article title specifically related to the Millbrook Meadow and Mill Pond project improvements.



Newspaper Article Headline

Suggested headlines included:

“Our New & Improved Millbrook Meadow”

“Community Gathers for Skating at Meadowbrook Picnic in the Park as Meadowbrook reopens”

“Rockport’s Hidden Jewel Regains its Sparkle”

“New Updated Park Brings Back Old Times in Meadow”

“Picnic in The Park as Meadowbrook Reopens”

To further spread the word throughout the community, the Millbrook Meadow Advisory Committee developed a Facebook page whereby people, not able to attend the informational sessions, could access to stay attune to the happenings of the project and be able to post comments on local activities.



Millbrook Meadow Advisory Committee Facebook Page

The Rockport Millbrook Meadow Conservancy was also established during the course of the project to identify restoration goals and support the restoration effort.



Rockport Millbrook Meadow Conservancy Webpage

Chapter 5

ANALYSIS

5.0 Analysis

The Mill Pond has been filling with fine sediment, reducing water quality, open water recreational area, and severely limiting usable pathways around the pond. Flooding within the lawn areas are not a frequently reoccurring problem but, as the groundwater rises, the banks of the stream become saturate and nonapproachable. Frog Pond exhibits similar loss of open water habitat and is now supporting a functional wetland system. Millbrook Meadow suffers from poor drainage and difficult maintenance that compromise public access in the park. The density of emergent vegetation on the Mill Pond delta is leading to sediment filtering/trapping allowing for the delta/emergent marsh wetland to migrate further north into the open water areas of the pond.

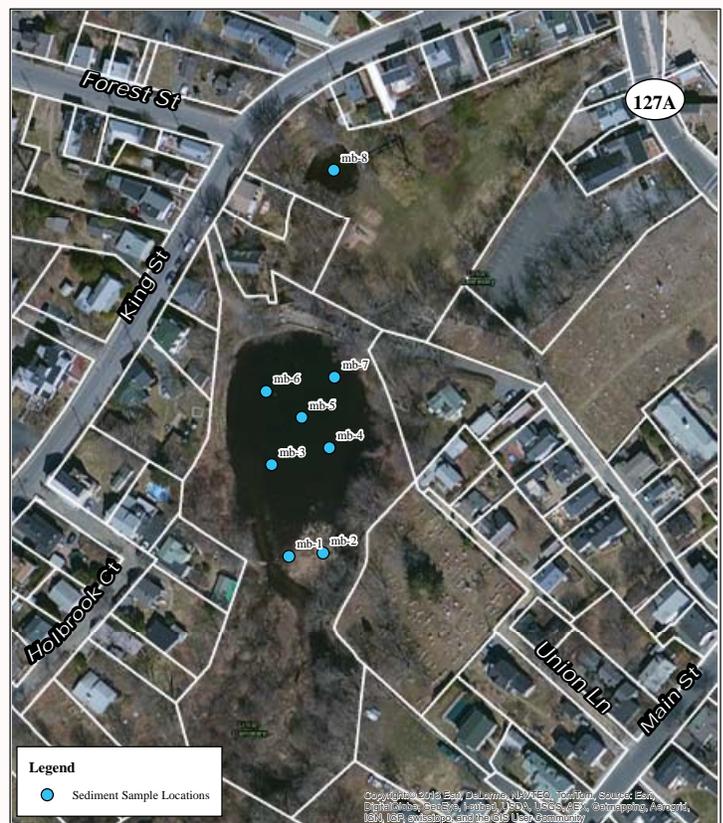
As part of the site analysis, MMI's project team completed several tasks including data collection and the review of recent environmental studies (Storm Water Outfall Study, Dam Reconstruction Studies, Needs Assessment Report), field investigations, sediment sampling and analysis, and a structural wall inventory. The following briefly describes these tasks and summarizes our findings. Additional information can be found within the Appendix of this report.

Data Collection

MMI gathered topographic mapping for this site from various sources including the Massachusetts Office of Geographic Information (MassGIS) and Town of Rockport GIS. In addition, MMI completed supplemental bathymetric and upland mapping within the Mill Pond and Frog Pond as well as surveying the Millpond Meadow channel geometry and the Beach Street Culvert hydraulic opening. PEER consultants completed inland wetland and coastal resource delineations within the project site. The regulated resource area limits were then field surveyed. The GIS and survey data was compiled into one comprehensive Existing Conditions map that is included within this document.

Environmental Site Assessment and Sediment Sampling

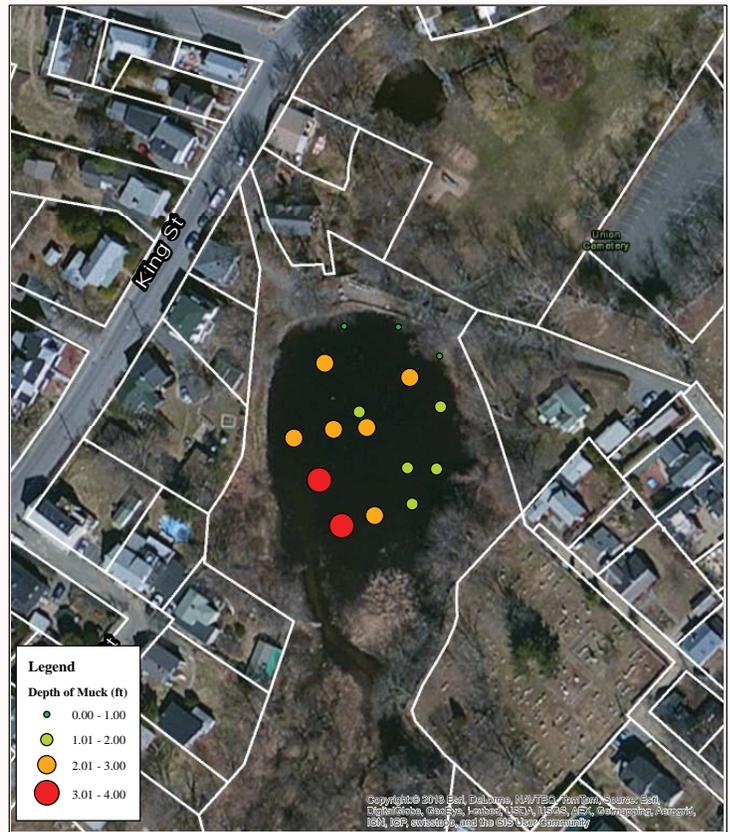
Prior to completing the sediment sampling, PEER consultants completed a Limited Environmental Site Assessment (ESA) for the project site. This site assessment involved the review of historical topographic maps, aerial photographs, fire insurance maps, available use information, and federal and state



Sediment Sampling Locations

tribal databases. PEER concluded that given the Millbrook Meadow and Mill Pond historical uses of the site, “the potential exists for the presence of oil and hazardous materials and areas of environmental concern on the property. In addition, the potential exists for the presence of oil and hazardous material in the surface water and sediment of Mill Pond and Frog Pond as a result of on and off-site sources of contaminants, transported by Mill Brook from off-site sources onto the property.” Holbrook Court catch basins were observed to accumulate sediments fairly rapidly and therefore are most likely discharging some overflow and resuspended sediments to the wetland area upstream of the Mill Pond, having a significant ecological impact on the Mill Pond.

Based on PEER’s findings within the ESA, PEER and MMI completed sediment sampling from within the Mill Pond and Frog Pond to assess the levels of contamination within the sediments. Understanding the contaminant levels within the underlying sediment is important for the future dredging design, special sediment handling, and disposal options. Specific grab sediment samples were collected from within Mill Pond and Frog Pond (MB-1 through MB-8 (see map previous page)). The sediment samples were analyzed for metals, PAHs, PCBs, EPHs, and grain size. The Mill Pond sediments consist primarily of silt sediments, and the Frog Pond consists primarily of sandy sediments.



Sediment Probe Depths

Based on the sediment sampling, the Mill Pond is made up of 80-90% silt, while the Frog Pond is made up of 75% sand. The sediments within both ponds contained concentrations of contaminants in the sediment that did not exceed MADEP Policy #COMM-97-001 for acceptance and use at a Massachusetts lined landfill. Of the analytes sampled within the eight sediment sample locations, only one contaminant, lead, was detected at a concentration above the MCP RCS-1 reporting concentration (200 mg/kg). Lead concentrations in sediment exceeded the RCS-1 standard in seven of eight sample locations and ranged in concentration from 255 mg/kg to 583 mg/kg at these seven locations.

TCLP lead concentration for MB-4 was 0.391 mg/L. This result is less than 5 mg/L and therefore does not exhibit the characteristic of toxicity and is not considered by EPA to be a hazardous waste.

Based on the results of the sediment sampling activities, it appears that any excavated sediment from the ponds may not be reused on site based on reporting category RCS-1 (within 500 feet of a residential dwelling, a residentially-zoned property, school, playground, recreational area, or park). It may be reused off site at a Massachusetts lined landfill. Characterization and volume of sediments within the ponds help to identify potential options for future dredging and restoration efforts.

Hydrology and Hydraulic Conditions

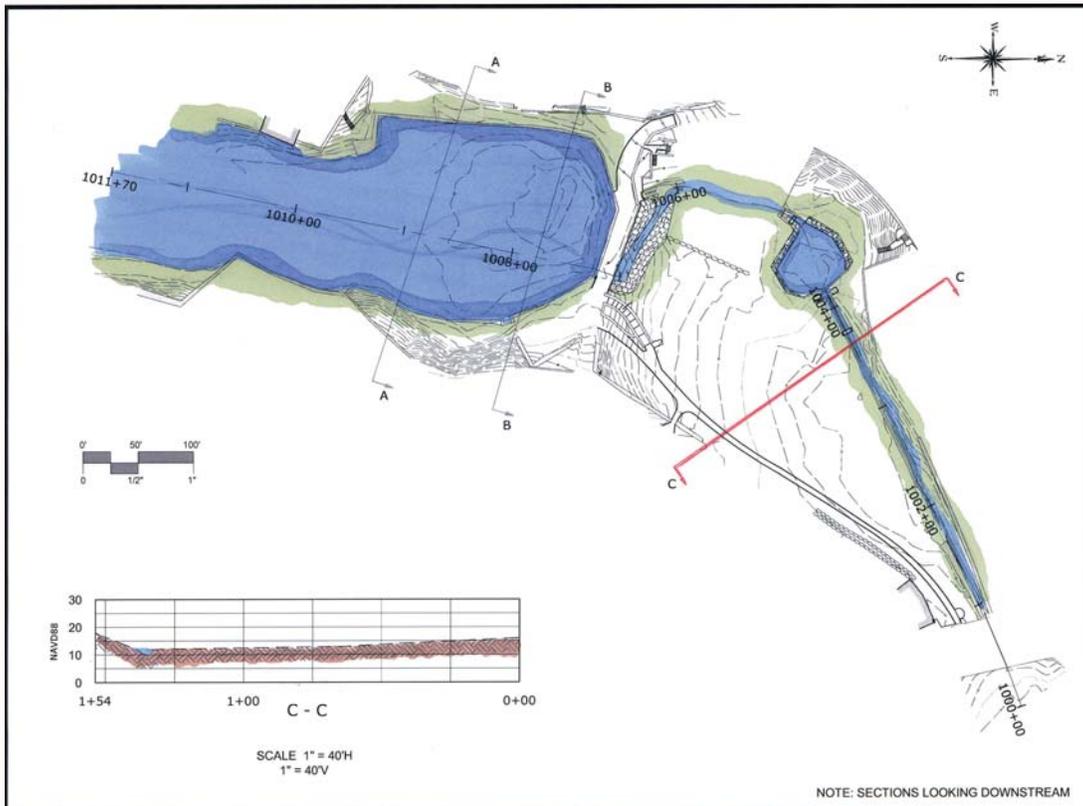
MMI's water resource engineers and ecologists prepared a preliminary hydrologic and hydraulic (H & H) analysis report for the Millbrook Meadow and Mill Pond site. The results of these efforts are appended. Existing data from previous reports completed by others (GEI Consultants) were reviewed and used as part of MMI's H & H study. The four primary focus locations for our study included Mill Pond, Frog Pond, granite-lined Mill Brook channel, and the Beach Street culvert. Existing conditions hydraulics were analyzed to determine the existing hydraulic condition within the park. Hydraulic analysis of Mill Brook was completed using the U.S. Army Corps of Engineers (USACE) HEC-RAS (river analysis software) program (version 4.1). A HEC-RAS model was developed based on topography and bathymetry collected for this project. Our HEC-RAS model extended from the base of the Mill Pond Dam to Front Beach.



Existing Utilities & Debris Clogging within Beach Street Culvert



Debris Clogging from Flooding within Mill Brook Channel Upstream of Beach Street Culvert



Existing Cross Section of Mill Brook Channel

Our preliminary findings indicate that increasing the width of the Mill Brook channel between the Frog Pond and Beach Street culvert decreases nuisance flooding within the park. Increasing channel width will also allow for creation of increased habitat structures, including pools and riffles. Widening the span of the Beach Street culvert to 10 feet can alleviate frequent flooding but will not significantly impact larger storm events. A culvert span of 15 feet is required to achieve the Massachusetts recommended design guidelines for culverts based on the 25-year storm event predicted by GEI. Reducing debris clogging of the culvert does have a significant impact on nuisance flooding within the park. The culvert is undersized for its recommended design storm of 15 years. The small span also exacerbates debris clogging. The Frog Pond weir/footbridge has a capacity of 70 cfs. During flows greater than this, the park will flood from around the Frog Pond and not as a result of culvert capacity. Above 200 cfs, the park will flood from both Frog Pond as well as the culvert.

It should be noted that in reviewing the previously (GEI) developed hydrology models, the storage for Briar Swamp was not well accounted for (rapid time of concentration through the swamp, does not account for residence time). Although the final 100-year flow results are high (approximately double the expected values), without reviewing the actual TR-20 model, we can't know if (or where) they made some sort of mistake. MMI will want to either review the GEI model and/or redevelop hydrology during next design phase.

Structural Wall Inventory and Evaluation

A visual-only investigation of the various retaining walls and structures at Mill Pond and Frog Pond was performed by an MMI structural engineer. The purpose of this investigation was to comment on the general condition and stability of the existing structures. A detailed structural analysis of the walls was not performed. The results of the investigation are summarized in Table 1. Photographs of the various structures can be found within the Appendix.

A total of 21 structures were investigated: (16) stone walls, a stone walkway and wall system, (2) timber bridges, a stone bridge, and a stone culvert. The majority of the stone walls were found to be dry-stacked; however, some were found to be mortared as well. Additionally, the stone bridge was constructed of cast-in-place (CIP) concrete with mortared stone abutments and parapet walls. The Beach Street culvert was found to be constructed of dry-stacked and mortared stone. With regard to the overall condition of the structures, most were found to be in fair to satisfactory condition; however, some were found to be in poor to serious condition (see Table 1 for condition rating description). Referring to Table 1, the general recommendation for all dry-stacked stone walls described as being in Fair, Satisfactory, or Good condition is for stones to be adjusted or restacked as necessary. Repointing of joints may be required on the mortared stone walls in similar conditions. In a few instances, sinkholes found in the vicinity or voids within the walls should be repaired or filled in.



Loose Stone Condition within Beach Street Culvert

Table 1
Summary of Existing Structures at Mill Pond and Frog Pond
Rockport, Massachusetts

Structure	Type/Material	Photo No.	Condition	Recommendations
Wall 1A	Mortared Stone Wall	1 - 5	Good Condition	None
Wall 1B	Mortared Stone Wall	2 - 5	Satisfactory Condition	None
Wall 2	Dry Stacked Stone Wall	6	Poor to Serious Condition	Wall is collapsing - remove and rebuild stone way
Wall 3	Dry Stacked Stone Wall	6	Fair Condition	Adjust stones as necessary add additional stones as necessary
Wall 4	Dry Stacked Stone Wall	7 - 9, 11, 13	Fair Condition	Restack stones as necessary
Wall 5	Dry Stacked Stone Wall	7 - 15	Fair Condition	Restack stones as necessary. Repair existing sink hole
Wall 6	Dry Stacked Stone Wall	16 - 21	Poor to Fair Condition	Wall is overturning in locations. Re-lay stones has necessary
Wall 7	Mortared Stone Wall	24, 25	Fair Condition	None
Wall 8	Dry Stacked Stone Wall	24	Fair Condition	None
Wall 9	Dry Stacked Stone Wall	27, 31 - 34	Poor Condition	Wall is overturning in locations. Re-lay stones and repair existing sinkhole as necessary.
Wall 10	Mortared Stone Wall	28	Fair Condition	Repoint as necessary
Wall 11	Dry Stacked Stone Wall	38, 39	Satisfactory Condition	Fill in voids
Wall 12	Dry Stacked Stone Wall	41 - 43	Fair Condition	None
Wall 13	Dry Stacked Stone Wall	36, 37	Fair Condition	None
Wall 14	Dry Stacked Stone Wall	40	Fair Condition	Re-lay stones as necessary
Wall 15	Dry Stacked Stone Wall	45	Fair Condition	Re-lay stones as necessary
Timber Bridge 1	Timber	22, 23	Fair Condition	Stones beneath structure shall be re-laid as necessary
Timber Bridge 2	Timber	35 - 37	Fair Condition	Stones beneath structure shall be re-laid as necessary
Stone Bridge	CIP Concrete and Mortared Stone	25 - 27, 29, 30	Fair Condition	Repoint as necessary
Beach Street Culvert	Stone	46 - 57	Poor to Serious Condition	Culvert requires an in-depth inspection for rehabilitation options
Stone Walkway/Walls	Stone	44	Satisfactory Condition	None

Legend:

Excellent Condition - No maintenance or rehabilitation concerns

Very Good Condition - No maintenance or rehabilitation concerns

Good Condition - Potential exists for minor maintenance

Satisfactory Condition - Potential exists for major maintenance

Fair Condition - Potential exists for minor rehabilitation

Poor Condition - Potential exists for major rehabilitation

Serious Condition - Rehabilitation or repair required immediately

Critical Condition - Need for immediate repairs or rehabilitation is urgent

"Imminent" Failure Condition - Concrete deck is in danger of failing

Failed Condition - Concrete deck has failed

Of the stone wall structures investigated, dry-stacked stone walls 2, 6 and 9 were identified as being in the poorest of conditions. Wall 2 is located just upstream of the Beach Street culvert and is falling into the Mill Brook and impeding flows into the culvert by constricting the upstream invert of the culvert. Wall 6 ranges in height from +/-6'-0" to +/-10'-0" and was found to be overgrown with vegetation, missing various stones, and leaning/overturning in multiple locations. Stones should be replaced and re-laid as necessary. Wall 9 is +/- 3'-0" in height and was found to be overturning with visible signs of a sinkhole. Stones should be replaced and re-laid and the sinkhole repaired as necessary.

Of the additional structures that were investigated, both timber bridges and the stone bridge were found to be in fair condition. It is recommended that stones beneath the timber bridges be re-laid and the joints of the stone bridge be repointed as necessary. The Beach Street culvert was found to be in poor to serious condition and it highly recommended that an in-depth inspection be done for this particular structure in order to determine the appropriate rehabilitation methods that will be required.

Existing Wetlands Communities

The freshwater wetland communities including open water and vegetated habitats were evaluated during May 2014. The following technical memorandum provides an overview of the various freshwater wetland classifications found on site, identifies and describes the existing vegetation, and provides the functions and values of each wetland community. Prior to completing our field investigations, MMI reviewed the United States Fish and Wildlife Service National Wetland Inventory (NWI) Maps to determine whether the wetlands and open water features on site have been federally classified. According to the NWI maps, the Frog Pond and Mill Pond belong to the Palustrine Open Water system, and the wetland system upstream of the Mill

Pond is classified as Palustrine Forested/Scrub Shrub (see attached map). For the purposes of this report, the freshwater wetland systems have been divided into the following subtypes Mill Brook channel, Frog Pond, Mill Pond, and the Palustrine Scrub Shrub/Emergent Wetland.

Mill Brook Channel

The Mill Brook channel varies in substrate conditions from its most upstream project limit (west of Mill Pond) downstream to its outlet at Beach Street culvert. As Mill Brook flows onto the Mill Brook Meadow property the watercourse has a width of approximately 12 feet and a substrate consisting of medium to coarse sands. The channel meanders as it discharges onto the Millbrook Meadow property and eventually flows north into Mill Pond. Large woody debris is present within the upper reaches of the brook within the project site. Small shallow pools are present. The brook has vegetated banks consisting of upland riparian zone vegetation and emergent marsh vegetation.



Typical Mill Brook Upstream Reach Condition

Between the Mill Pond dam and Frog Pond the channel changes in substrate types, slope and width. The channel width ranges from 8 to 10 feet wide with the substrate consisting of stones, cobbles, and coarse sand. The section of channel directly downstream of the dam face consists of stones and boulders with little vegetation present. The downstream section of channel was reconstructed as part of the dam rehabilitation project. The section of watercourse on the abutting private property has several trees located along its banks.



Typical Mill Brook Channel Condition Downstream of Frog Pond

Downstream of the Frog Pond, the Mill Brook channel width and substrate change significantly with the average watercourse width being approximately 4 feet wide, with granite lined banks, and a substrate consisting of stones and coarse sand. Vegetation along the banks includes Babylon willow, silky dogwood, Japanese knotweed, Common reed, and other herbaceous vegetation.

A functional evaluation of the Mill Brook channel based on MMI field observations is summarized in Table 2. The first column lists the functions generally ascribed to wetlands; the second column summarizes the rationale used to determine whether these functions are being performed within the subject wetland and/or watercourse.

**Table 2
Functions and Values Assessment – Mill Brook Channel**

	Functions and Values	Comments
	Ground Water Recharge / Discharge	No
	Flood flow Alteration (Storage & Desynchronization)	Yes – The watercourse is not mapped by FEMA; however, the channel does provide localized flood flow alteration.
	Fish & Shellfish Habitat	Yes – This perennial watercourse provides eel run habitat and rainbow smelt spawning habitat.
	Sediment / Toxicant Retention	Yes – Sediment deposition was observed within the pools of watercourse, and deposits are found within the ponds.
	Nutrient Removal / Retention / Transformation	No – The watercourse does not provide opportunities for nutrient removal/retention.
	Production Export (Nutrient)	Yes – Bordering shrubs and trees deposit allochthonous material that is transported to downstream habitats.
	Sediment / Shoreline / Stream Bank Stabilization	Yes – The brook is bordered by vegetation that keeps banks stable. Approximately 90 percent of the banks are armored with granite blocks.
	Wildlife Habitat	Yes – The watercourse does provide wildlife habitat.
	Recreation (Consumptive & Non-Consumptive)	Yes – Mill Brook is too small and shallow for boating and/or canoeing but does have ability to provide wading and other recreational functions within the park (i.e., rubber duck races, etc.).
	Educational Scientific Value	Yes – The Mill Brook channel is currently used to assess eel runs within Rockport and has the potential to provide additional educational opportunities through restoration.
	Uniqueness / Heritage	Yes – Mill Brook, with the granite walls, provides historical significance to the park.
	Visual Quality / Aesthetics	Yes – Mill Brook is located within a public park and is a strong focal element of the park.
ES	Endangered Species	No

The principal functions and values of the wetland system at this location include the following:

- Floodflow Alteration
- Local Wildlife and Fish Habitat
- Recreation
- Bank Stabilization

Frog Pond

The Frog Pond is a small, shallow open water pond that is transitioning into a palustrine emergent marsh system. The pond was restored approximately 10 years ago through minor dredging and restoration plantings. The pond supports broad leaved cattail, pickerelweed, wild rice grass, and other emergent vegetation. The shoreline of the pond is stable and has shrubs present including speckled alder, common winterberry, and silky dogwood. Besides vegetation, the banks are armored with granite blocks and stones.

A functional evaluation of the Frog Pond based on MMI field observations is summarized in Table 3.



Frog Pond

Table 3
Functions and Values Assessment – Frog Pond

	Functions and Values	Comments
	Ground Water Recharge / Discharge	No
	Flood flow Alteration (Storage & Desynchronization)	No – The pond is too small to provide any significant flood storage and/ desynchronization.
	Fish & Shellfish Habitat	Yes – Open water is present and allows eels to migrate to upstream habitats. The pond is relatively shallow and small to provide high quality warm-water fishery habitat.
	Sediment / Toxicant Retention	Yes – Sediment deposition was observed within the pond consisting primarily of sand.
	Nutrient Removal / Retention / Transformation	Yes – The pond has dense stand (i.e., high stem density) of emergent vegetation that can filter out nutrients.
	Production Export (Nutrient)	Yes – Bordering shrubs deposit allochthonous material that is transported to downstream habitats.
	Sediment / Shoreline / Stream Bank Stabilization	Yes – The pond is bordered by granite blocks and vegetation that keeps banks stable.
	Wildlife Habitat	Yes – The small pond provides refuge for green frogs, bullfrogs, turtles, and wildlife.
	Recreation (Consumptive & Non-Consumptive)	Yes – The pond is located in the park and is used as a place to view frogs and other aquatic wildlife and/or insects.
	Educational Scientific Value	Yes – The pond has the potential to provide educational opportunities given its location and accessibility.
	Uniqueness / Heritage	No
	Visual Quality / Aesthetics	Yes – Frog Pond is located within a public park and is a strong focal element of the park.
ES	Endangered Species	No

The principal functions and values of the wetland system at this location include the following:

- Local Wildlife Habitat

Mill Pond

Mill Pond is a ¾-acre open water pond that has a maximum water depth of approximately 4 feet. The pond provides warm-water fishery habitat with a mucky/sandy bottom. The shoreline of the pond consists of granite blocks, overgrown invasive shrub species, lawn, and an emergent marsh. The pond has been steadily filling in with sediment over the last 70+ years. The sediment has become colonized with emergent wetland vegetation over time, and the open water area has begun to shrink. The shallow water depths allow for both submerged and floating aquatic vegetation to colonize the pond. Vegetation surrounding the pond include grey birch, willow, silky dogwood, multiflora rose, grape vines, Japanese knotweed, morrow’s honeysuckle, sensitive fern, and grasses.



Mill Pond

A functional evaluation of the Frog Pond based on MMI field observations is summarized in Table 4.

Table 4
Functions and Values Assessment – Mill Pond

	Functions and Values	Comments
	Ground Water Recharge / Discharge	Yes – Groundwater seeps are present along northern limits of the wetland.
	Flood flow Alteration (Storage & Desynchronization)	Yes – Mill Pond has ability to store a small volume of water during smaller floodflow events.
	Fish & Shellfish Habitat	Yes – Open water is present and allows eels to migrate to upstream habitats. Pond is relatively shallow to provide high quality warm-water fishery habitat.
	Sediment / Toxicant Retention	Yes – Sediment deposition was observed within the pond consisting primarily of organic muck, silts, and sand.
	Nutrient Removal / Retention / Transformation	Yes – The pond has submerged and floating aquatic vegetation that have the ability to absorb and filter nutrients.
	Production Export (Nutrient)	Yes – Bordering shrubs deposit allochthonous material within the pond that can be utilized by various trophic levels within pond.
	Sediment / Shoreline / Stream Bank Stabilization	Yes – The pond is bordered by granite blocks and vegetation that keeps banks stable. Shoreline is in need of some additional restoration.
	Wildlife Habitat	Yes – The pond provides refuge for green frogs, bullfrogs, turtles, waterfowl, passerine birds, insects, muskrats, and other wildlife.
	Recreation (Consumptive & Non-Consumptive)	Yes – The pond is located in the park and is used as a place to view frogs and other aquatic wildlife and/or insects. Pond is used for fishing during the summer and skating during the winter months.
	Educational Scientific Value	Yes – The pond has the potential to provide educational opportunities given its location and accessibility.
	Uniqueness / Heritage	Yes – Locally historic pond that is a key feature for the town and Mill Meadow Park.
	Visual Quality / Aesthetics	Yes – Mill Pond is located within a public park and is a strong focal element of the park.
ES	Endangered Species	No

The principal functions and values of the wetland system at this location include the following:

- Local Fish and Wildlife Habitat
- Recreation
- Visual Quality
- Sediment Retention
- Floodflow Alteration

Scrub Shrub/Emergent Wetland

The palustrine scrub shrub/emergent marsh wetland is located upstream of Mill Pond. This wetland was formerly part of the Mill Pond open water system but formed as sediments deposited within the pond. The emergent wetlands consist predominantly of broad leaved cattail with intermixing of common reed, purple loosestrife, and soft rush. A small band of wet meadow wetlands was observed along the southwestern portion of the pond with vegetation



Palustrine Scrub Shrub/Emergent Wetland Marsh

consisting of soft rush, twig rush, grasses, sedges, spotted joe pye weed, and purple loosestrife. The scrub shrub wetland consists of willow, speckled alder, red maple, soft rush, tall meadow rue, water parsnip, sensitive fern, creeping buttercup, creeping jenny, goldenrod, and other herbaceous plants. This wetland system is seasonally flooded primarily during spring floodflows and/or large stormwater runoff producing events.

A functional evaluation of the Frog Pond based on MMI field observations is summarized in Table 5.

**Table 5
Functions and Values Assessment – Palustrine Scrub Shrub/Emergent Marsh Wetland**

	Functions and Values	Comments
	Ground Water Recharge / Discharge	Yes – Groundwater seep was observed along the southern shoreline along a recently constructed boy scout nature trail.
	Flood flow Alteration (Storage & Desynchronization)	Yes – Scrub shrub/emergent marsh wetland area is part of the Mill Pond dam and has the ability to store small volume of water during smaller floodflow events.
	Fish & Shellfish Habitat	No – Wetlands do not provide fish or shellfish habitat.
	Sediment / Toxicant Retention	Yes – Recent sediment deposition observed within wetlands consisting primarily of silts and sand. The wetland has formed as a result of sediment deposition filling in former open water areas within Mill Pond.
	Nutrient Removal / Retention / Transformation	Yes – High stem density of emergent and shrubby plant material that can filter and absorb nutrients.
	Production Export (Nutrient)	Yes – Wetland borders Mill Brook and has shrubs and herbaceous plants that can contribute allochthonous material to downstream habitats.
	Sediment / Shoreline / Stream Bank Stabilization	Yes – Emergent vegetation colonizes sediment deposits and provides stability for the brooks banks and pond shoreline.
	Wildlife Habitat	Yes – Wetland provides refuge for green frogs, bullfrogs, turtles, water snakes, passerine birds, insects, muskrats, and other wildlife.
	Recreation (Consumptive & Non-Consumptive)	Yes – Wetland is currently being used by the public to provide recreational opportunities such as bird watching and wildlife observations.
	Educational Scientific Value	Yes – Has the potential to provide educational opportunities given its location and accessibility.
	Uniqueness / Heritage	Yes – Locally important freshwater system because of its size, plant diversity, habitat, and proximity to downtown (i.e., accessibility) and the coastal wetland systems.
	Visual Quality / Aesthetics	Yes – Wetland is located within a public park and has ability to become a strong focal element of the park.
ES	Endangered Species	No

The principal functions and values of the wetland system at this location include the following:

- Groundwater Discharge
- Local Wildlife Habitat
- Sediment Retention
- Nutrient Removal
- Floodflow Alteration

Invasive Plant Management

The Millbrook Meadow Advisory Committee has been actively managing invasive plant species within the meadow and around the Mill Pond for a number of years. These efforts have included removal of invasive vegetation by hand and prescribed burning. Invasive species that have been targeted by the committee include multiflora rose, Japanese knotweed, dodder, and oriental bittersweet. Some of the efforts have been successful while others have not. In order to help manage and eradicate invasive plants from the meadow, a cost effective and long-term invasive management plan is required. The following narrative provides a management plan that will help begin the invasive species management for this site.



Japanese Knotweed along Mill Brook Channel

There are a number of methods for controlling and managing invasive species; however, management techniques and time of year restrictions vary between plant species. The following invasive plant species were observed by MMI during our site investigations:

- Japanese knotweed
- Purple loosestrife
- Common reed (*Phragmites australis*)
- Oriental bittersweet
- Dodder
- Climbing euonymus
- Porcelain berry
- Poison ivy
- Garlic mustard

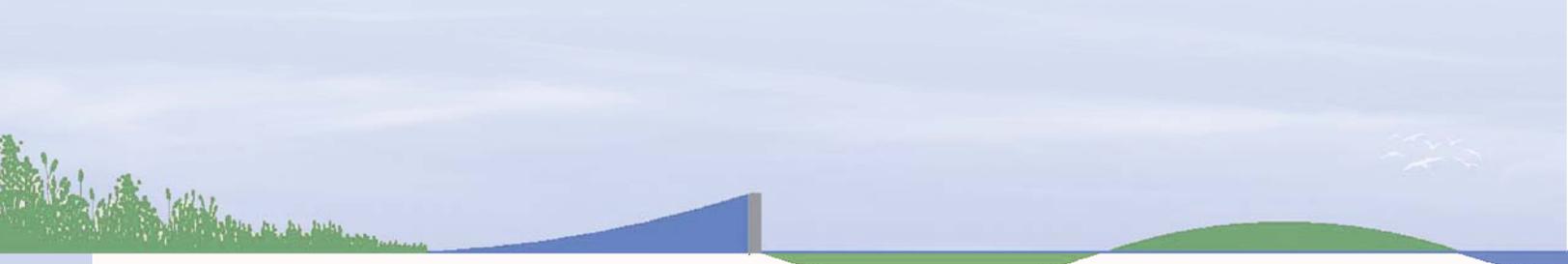
The following table provides a management strategy for each of the plant species noted above.

Invasive Plant Management



Types of Invasive Plant Species	Recommended Treatment and Management
Japanese Knotweed	Multi-Year Herbicide Treatment (Habitat)
Common Reed (<i>Phragmites</i>)	Multi-Year Herbicide Treatment (Habitat)
Purple Loosestrife	Loosestrife Beetle and/or Multi-Year Herbicide Treatment (Habitat)
Multiflora Rose	Mechanical Excavation and/or Multi-Year Herbicide Treatment (Habitat)
Oriental Bittersweet	Mechanical Removal and/or Multi-Year Herbicide Treatment (Habitat)
Climbing Euonymus / Porcelain Berry	Mechanical Removal and/or Multi-Year Herbicide Treatment (Habitat)
Poison Ivy	Multi-Year Herbicide Treatment (Habitat)
Dodder	Hand Removal, Pre-Emergent and/or Multi-Year Herbicide Treatment (Habitat)
Garlic Mustard	Hand Removal and/or Multi-Year Herbicide Treatment (Habitat)

Herbaceous plants such as Japanese knotweed, purple loosestrife, common reed, dodder, and garlic mustard must be actively managed during the growing season (early April through September). Mechanical removal of plants including purple loosestrife, dodder, and garlic mustard can be effective if the targeted species are caught early during the growing season. The other herbaceous plants, Japanese knotweed and common reed, cannot be effectively and efficiently controlled through mechanical methods. For these species, herbicide application is the most cost effective means for managing these species. Habitat and/or Polaris are the common herbicides used to manage these species. Both herbicides are approved for use in Massachusetts and must be applied by a professionally licensed herbicide applicator. Japanese knotweed can be treated in early May and/or in July and August. Common reed is typically treated in August and September with follow up treatments occurring during the following spring. Multiyear treatments are typically required to eradicate these species from a given site.



The woody species such as oriental bittersweet, climbing euonymus, porcelain berry, and poison ivy can be treated during the growing season as well as the dormant season (winter). Most of the woody plant species can be managed through mechanical removal means which includes the removal of both aboveground vegetation (leaves and stems) and belowground vegetation parts (crown and roots). If mechanical means are not desired, these woody species can be effectively managed through a herbicide application program. Two herbicides that are effective at suffocating woody growth include Habitat and Garlon 4. Habitat foliar application is typically used during the growing season while Garlon 4, a bark application herbicide, is applied during the winter and/or early spring. Both herbicides are approved for use in Massachusetts and must be applied by a professionally licensed herbicide applicator.

To present a general overview of some of our sight reconnaissance findings, the graphic below was developed and presented at our Community Visioning session. Numbered call out references have been keyed into the Analysis Plan.

Analysis Plan Call out References

1. No direct access from railroad station
2. No exotic invasive species in the rear wetland area
3. No access to wetland area
4. Overgrown vegetation limits viewing access of pond
5. Invasive plant management throughout the site (without the use of herbicides) will become a maintenance task
6. Lack of littoral shelf around the pond limits perch habitat by amphibians and reptiles
7. Lack of accessible access around the pond limits users experience
8. Granite block pond edging is not structurally sound and potentially unsafe
9. Existing site benches accommodate one person and may not be placed in the best locations
10. Access points into site are not ADA accessible
11. Lack of signage at entrances (both sides) limit visitors' understanding of the site's history
12. Rock armorment is unnatural looking and looks over engineered
13. The frog pond is shallow. Habitat potential will continue to decrease as cattail growth continues to expand.
14. Existing playground is dated, uninteresting, and rusting although it is scaled properly for the site
15. Stone walls are in deteriorating shape from structural visual inspection.
16. Existing willow trees are approximately just under 100 years old. They have thrived due to the proximity of the water table as most weeping willows normally live about 50 years. Decay has advanced in both willow trees and will not last the next 10 years.
17. Large outcrop of red twig dogwood and viburnum are located within a delineated wetland and may not be able to be removed to increase lawn space.
18. Semi level meadow area has been mapped by FEMA as a floodplain as of 7/16/14 making any future filling (to alleviate flooding) very difficult.
19. Area of lawn is within a delineated wetland containing hydric soils limiting drainage. On May 5, 2012, the water table in this area was identified as being 18" below grade.
20. Granite channel is narrow and straight limiting nooks and crannies for wildlife cover habitat. Granite blocks are falling into stream channel.
21. Commercial and residential facades of structures surrounding the park detract from this urban oasis and are unsightly.



9. Existing Site Bench(s)



14. Existing Playground



15. Deteriorating Stone Walls



20. Granite Channel

22. Existing perennial gardens are high maintenance, and this type of garden is only found in this location.
23. No formal park gateway
24. Utility pipes within culvert and rough irregular granite blocks increase debris clogging, reduce hydraulic capacity, and increase DPW maintenance
25. Existing pathway is too narrow to accommodate multiple parties from walking by one another without stepping onto lawn
26. Sections of existing fieldstone wall are in disrepair and falling down
27. Impervious parking lot and lack of drainage may be contributing to flooding in meadow
28. Poor soil conditions and periodic stormwater sheet flows through the meadow limit healthy grass establishment
29. Lack of signage at Mill Street entrance
30. Masonry stairs do not meet code and are difficult to walk due to irregular tread and riser dimensions. In 2010, stairs acted as the emergency spillway.
31. Lack of accessibility between the Mill Pond and the meadow
32. No existing access points to the pond
33. Existing boardwalk and mulched pathway identifies the potential for new circulation pathways – but currently leads to nowhere
34. Pond will continue to silt in – decreasing pond depth and creating poor fish habitat
35. Monoculture of cattails lowers biodiversity



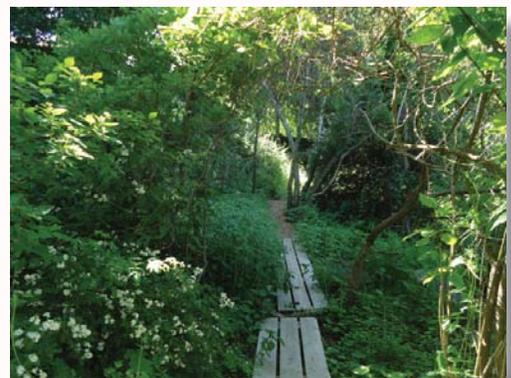
25. Existing Pathway



30. Existing Masonry Stairs



35. Cattails



33. Existing Boardwalk & Mulched Pathway

Chapter 6

6.0 Recommendations and Concepts

Using what was heard during the community Visioning Sessions and what we learned during the analysis phase, the project team investigated ways in which to improve the environmental and cultural elements within the park through design recommendations. Identifying that the concepts need to explore ways in which to reduce flooding and restore/enhance the site ecology as well as improve accessibility and usability of park elements to guide, attract, and hopefully educate visitors became the basis for the presented recommendations. Two conceptual master plans were created to identify potential site improvements. *Concept 'A' Ecology of Site* looks at the site through the eyes of an ecologist. Park improvements in this concept are guided by environmental principles and natural forms such as winding boardwalks and habitat creation areas. *Concept 'B' History of Place* looks at the site through culturally tinted lenses and expresses the need to introduce visitors to bygone elements that include architectural forms reminiscent of the built landscape and historical educational signage.

Mill Pond

Meadow



Concept 'A' Ecology of Site

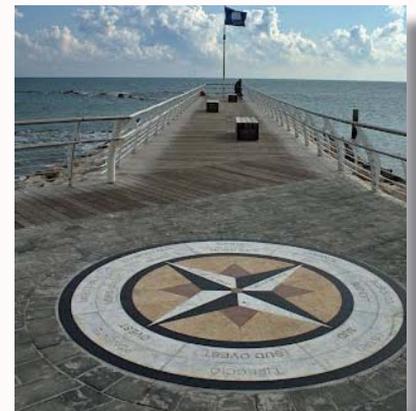
Concept – 'A' Ecology of Site - Meadow

1. Create a littoral shelf planted with native obligate plantings and placed boulders around the Frog Pond
2. Nature-based play area



2. Examples of Nature-based Play Areas

3. Raised granite cobble stage with nautical 'compass rose' inlay
4. Electric supply to stage area
5. Interplant existing boulder armorment with native vegetation
6. Remove Norway maples and dead/dying tree(s) and plant new native flowering or weeping willows in semi-circle
7. Large boulders line a new emergency spillway that is directed back into the stream channel
8. Granite blocks on hillside lawn creates amphitheater seating for performance viewing



3. Nautical Compass



8. Granite Block Seating Area

9. Concrete handicap accessible ramp climbs through birch grove underplanted with low bush blueberry sod
10. Boardwalk path through dogwood thicket
11. Clean and repoint existing fieldstone wall
12. Native plant contemplative shade garden
13. Site lighting
14. Moveable Adirondack chairs signage devoted to “champions of the park” – (“Lura Phillips Garden”)
15. Birdboxes in trees
16. Evergreen trees and shrubs screen adjacent property
17. Signage placed under the existing one willow tree illustrates the history of the once standing willows
18. Native flowering trees provide songbird perch habitat
19. Stormwater infiltrating gardens resemble the shape of a mollusk and catch and filter stormwater overflow from adjacent parking lot
20. Colorized concrete plaza benches
21. Remove existing trees around Frog Pond
22. New location for “seagull” swings
23. Add lighting inside of dogwood thicket
24. Boulder armourment at outside of stream channel
25. Hidden destination space with steel powder-coated insect sculpture for kids



9. Handicap Accessible Ramp Garden



20. Natural Form Concrete Benches



25. Example of Sculpture Seating Element for Kids

26. Compacted shell pathway

27. Reconfigured channel with wide pools and narrow riffles (for smelt spawning and pedestrian crossing)

28. Informational signage discusses riverine habitat



27. Riffle



28. Information Signage

29. Native plants and river birch grove surround boulders and destination areas along stream edge

30. Colorized concrete or granite steps seating into water



30. Example of Seating into Water

31. Architectural façade improvements on existing building improve aesthetics when viewed from inside the park – additionally marketing the business at the same time

32. Signage at plaza illustrates tidal backwater

33. Perennial garden to be relocated

- 34. Remove existing white fence and open up park entrance – install a steel silhouette entry sign with Millbrook logo
- 35. Nature-based sculptural element at entrance to park
- 36. Evergreen screening at entrance
- 37. Dredge the Frog Pond to 4'-0" depth
- 38. Permeable concrete walkway and granite pavers



35. Nature-based Sculptural Element



38. Example of Concrete Walkway



38. Example of Granite Pavers

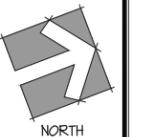
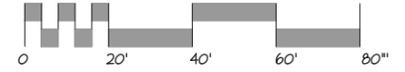
- 39. Open lawn to remain
- 40. 12' ht. pole-mounted lighting



CONCEPT - 'A' (MEADOW)

**MILLBROOK MEADOW AND
MILL POND RESTORATION**
ROCKPORT, MASSACHUSETTS OCTOBER 2014

MILONE & MACBROOM
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773 Fax (203) 272-9733
www.miloneandmacbroom.com



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Concept – 'A' Ecology of Site – Mill Pond

1. Granite paver picnic area/overlook with granite pavers and Adirondack chairs
2. Evergreen screening
3. On-water fishing platform
4. Signage on boardwalk discusses the importance of cattails
5. Gathering spaces along boardwalk contain informational signage that discusses pond ecology and the benefits of dredging and wetland restoration
6. Habitat restoration features:
 - Depressional pockets with obligate species
 - Boulders
 - Sunning logs
7. New shade-tolerant wetland shrub plantings
8. Place bat boxes in existing Norway maple trees



1. Granite Paver Picnic Area



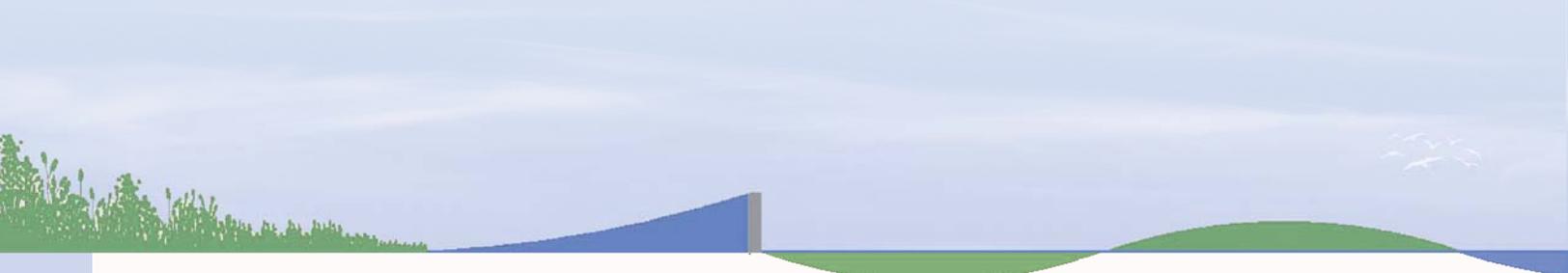
9. Example of Sculptural Elements



9. Sculptural element placed in sandbank
10. Dredging of the Mill Pond eliminates 50% of the cattail population
11. Boardwalk follows watercourse
12. Spring ephemerals planted along trail (typ.)
13. Overlook area



11. Watercourse along Boardwalk



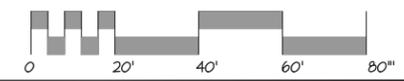
14. Birch grove
15. Dredge Mill Pond to 8'-0" depth
16. Lawn or stone dust pathway (ADA accessible)
17. Perennial plantings along lawn walking path
18. Created littoral zone with granite blocks for stepping and seating
19. Granite block steps into water providing seating for ice skating
20. Mulched pathway
21. Open lawn to remain
22. Wood boardwalk and overlook area



CONCEPT - 'A' (MILL POND)

**MILLBROOK MEADOW AND
MILL POND RESTORATION**
ROCKPORT, MASSACHUSETTS OCTOBER 2014

MILONE & MACBROOM®
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773 Fax (203) 272-9733
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Concept – ‘B’ History of Place - Meadow

1. Granite block “amphitheater”-style seating creates level picnic and viewing areas



1. Granite Block Amphitheater-Style Seating

2. Dry steam bed with anchor boulders planted with native sedges and ferns



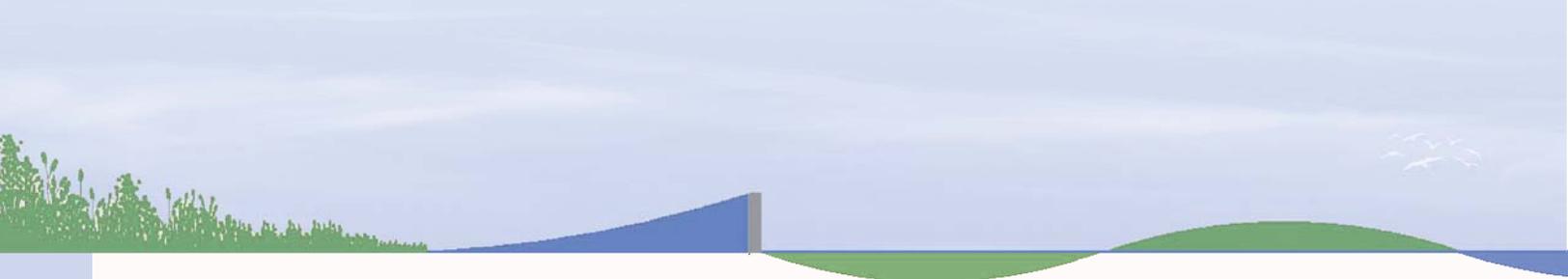
2. Example of Dry Steam Bed

3. Informational signage about dam reconstruction
4. Granite blocks seating placed along trail. Backless seating affords viewing of the spillway and meadow
5. Consider pumping water down created stream channel during special events
6. Overlook plaza:
 - New electric and water utilities
 - Historical signage re: Haskins Isinglass Factory
 - Bike rack
 - Trash/recycling
7. Cleanup existing woodland area and plant ferns and flowering perennials
8. Large industrial sculpture from Rockport’s history

9. Child leaning playscape:
 - Performance stage
 - Low seating wall
 - “Bird house” tree fort
 - Instruments that make noises (bird calls)
10. ADA accessible pathway incorporate:
 - Wayfinding triangles throughout park
 - Granite chip or stone dust walk
11. Continuation of garden club plantings
12. Low-level bollard lighting
13. Sign discusses the site floodplain and its historical importance
14. Invasive plant removal and woodland shade garden – signs identify plant species
15. Boardwalk overlook
16. Granite chip path through flowering perennial garden
17. Linear play area
18. New pedestrian bridge
19. Large raised stepping stones through dogwood thicket
20. Stream channel plantings (typ.)
21. “Small pond restoration”:
 - Dredge pond
 - Create littoral shelves for granite plinths and plantings
 - Granite steps into water
22. Historical signage identifies how granite blocks were cut and lifted into place to build walls
23. Flowering dogwoods create aesthetic edge treatment along Frog Pond
24. Granite blocks to remain – provide signage illustrating history of straight channel
25. Granite block steps and seating to access stream channel



25. Granite Block Steps and Seating



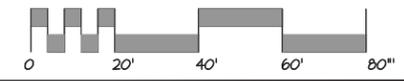
26. Destination location across stream channel with seating
27. Proposed granite blocks resemble pilings:
 - Engrave blocks with donor names
28. Lawn seating area
29. Compacted shell entry place
30. Garden club plantings to remain and expanded
31. Historic “Victorian” arch entry feature
32. Weeping willow tree allee along pathway. Willows uptake a lot of water – drying lawn area quicker
33. Lawn perches with lounge seating
34. Granite chip walkway or shell/concrete walk



CONCEPT- 'B' (MEADOW)

**MILLBROOK MEADOW AND
MILL POND RESTORATION**
ROCKPORT, MASSACHUSETTS OCTOBER 2014

MILONE & MACBROOM®
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773 Fax (203) 272-9733
www.miloneandmacbroom.com





Concept – ‘B’ History of Place – Mill Pond

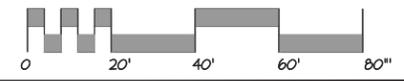
1. Explore possible options to improve access to the Mill Pond for pedestrian walking from the train station – add signage at train station and incorporate triangles
2. Wetland shade pavilion creates a destination point and focal element at back of pond
3. Signage illustrates how a riparian wetland succeeds into a scrub shrub wetland into a forest
4. Whimsical bird boxes placed within wetland area
5. Restoration plantings
6. Remove all of the cattails
7. Repair section of wall and add low guardrail
8. Maintain historic stairs
9. Boardwalk system
10. Boardwalk signage teaches about siltation
11. Repoint stones and restore existing wall
12. New retaining wall establishes an overlook area
13. Granite edge to remain – repair as necessary
14. Icehouse pavilion and plaza space
15. Granite block steps/seating into pond
16. Evergreen screening
17. Rebuild granite block pond edge to accommodate seating
18. Granite chip walkway
19. Historical signage identifies prior site use
20. New trees and garden club plantings welcome visitors from King Street
21. Modify grades to accommodate temporary tent space. Granite cobble pavers with signage that illustrates this space’s historic use as an icehouse
22. Architecturally designed, open-aired pavilions should meld the coastal vernacular with the visual scale of post and beam barn



CONCEPT- 'B' (MILL POND)

**MILLBROOK MEADOW AND
MILL POND RESTORATION**
ROCKPORT, MASSACHUSETTS OCTOBER 2014

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99 Realty Drive
Chester, Connecticut 06410
(203) 271-1773 Fax (203) 272-9733
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Chapter 7

7.0 Master Plan

After presenting the two conceptual plans, Milone & MacBroom, Inc., with the help of the Millbrook Meadow Advisory Committee, anonymously collected questions and comments through email, to better gauge the community's view of the proposed concepts. While many comments celebrated the potential improvements to the site, many comments reflected a concern that the improvements would change the character of the park and that "simple" is better. Taking this sentiment into account and the long history that people have had with the site, MMI working with the town and Millbrook Meadow Advisory Committee have compiled those elements that seemed to be favored by the majority of the public and have developed them into the Conceptual Master Plan.



*See 11x17 fold out on page 72

A. Culvert

Falling stones, utility pipes (some of which may be abandoned), and a curved longitudinal profile contribute to debris clogging inside and upstream of the culvert. As a Phase I approach, investigate cutting and capping any utilities and resetting/repointing stones within the culvert. If clogging is still an issue, consider investigation of full culvert replacement.

B. Culvert Wingwall

Replace the existing failing retaining wall with a new cast in place concrete wingwall with granite veneer, to alleviate the existing pinch point, and allow for greater water volume and velocities to enter the culvert.

C. Gateway Feature

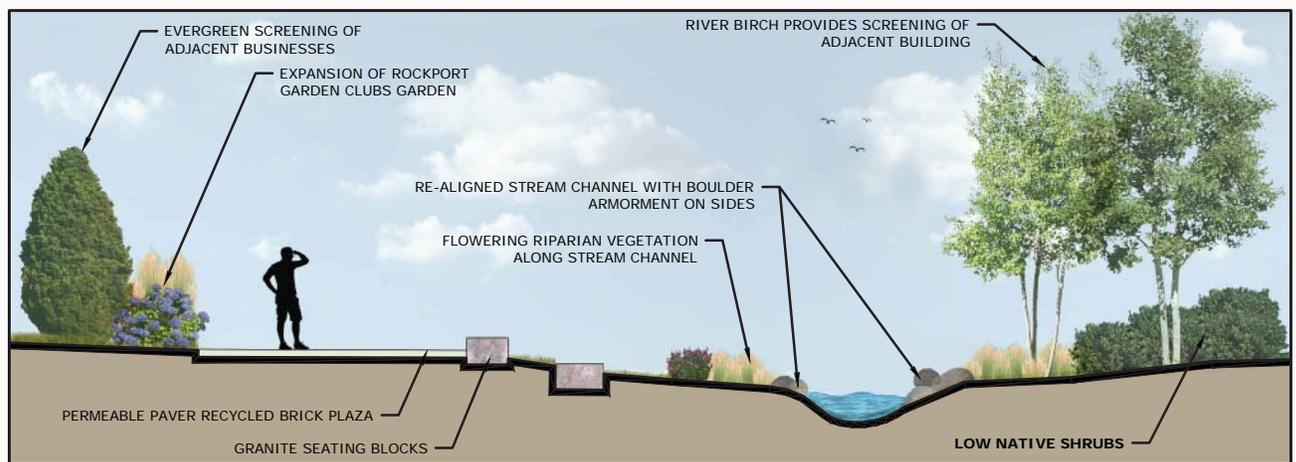
As a community event, have a juried competition to allow local artists to design a decorative powder-coated steel or wrought iron archway extending from the existing granite posts to create a visual gateway into the meadow. Identify the potential to put a handicap parking space at the gateway/ entrance to the meadow.

D. Rockport Garden Club Garden

Allow the Rockport Garden Club's garden to remain in its present location and enlarge it to encompass the other side of the path entrance. Plant a tall shade-tolerant evergreen hedge to conceal an adjacent business southeast of the entrance.

E. Granite Terrace Seating

Expanding off of the Culvert Wing Wall (Item B.), place granite blocks on the slope to provide access to the stream channel. Granite blocks provide a great place for adults to sit and for children to gather and listen to stories in a small amphitheater-like setting. Coordinate with Town DPW to identify sources for local granite.



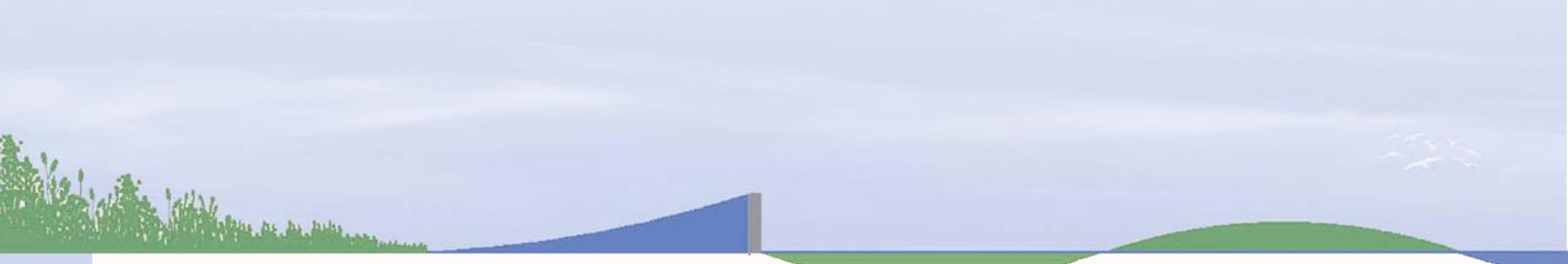
CROSS SECTION A - A1



PLAN

F. Entry Plaza

Create a recycled/reused clay brick entry plaza for an improved gathering space experience. Place comfortable benches in the plaza for relaxed views up into the meadow.



G. Rejoice the Willows

Plant three large weeping willows in a triangle along the stream channel. The newly planted willows will grow quickly (being in proximity to the channel and groundwater) and provide desired shade while allowing uninterrupted views of the ocean from the dam.

H. Water Access

Provide water spigots along the walkway entrances and near the Beach Street entry plaza.

I. Infiltration Gardens

To alleviate direct flooding of the meadow from the adjacent parking lot, install two stormwater infiltration gardens to catch and filter stormwater overflow. The depressional infiltration/rain gardens are to be planted with native flowering perennials and grasses. Place artist designed colorful bird boxes on posts in the garden. Excavation and permitting of the infiltration gardens will require soil sampling to understand infiltration rates, groundwater elevation, and potential contamination issues. If presence of groundwater is discovered at an elevation that inhibits to construction of the infiltration gardens, consider constructing lawn seating mounds that screen the adjacent parking lot and provide a seating element to relax and view the meadow.

J. Access into Meadow

Provide designated handicap access into the meadow from the adjacent parking lot.

K. The Sinuous Walkway

Improve accessibility through all four seasons by installing a curving 6-foot-wide pervious concrete paved walkway along the southwestern portion of the meadow. Allow the walkway to curve in to pick up new access points from the parking lot and bow out to accommodate the infiltration gardens/lawn seating mounds. Place comfortable benches along the sidewalk for contemplative views out into the meadow.

L. Electrical Service

Provide electrical service within the meadow to accommodate outdoor events. Place an electrical service at the “stage” location and consider providing outlets at designated light pole/bollard locations.

M. Reconfigured Channel Improvements/Floodplain Shelves and Boulder Armourment

Create a gently winding 5-foot-wide stream channel with areas that widen to create pools and floodplain shelves and areas that slightly narrow to stone cobble riffles that encourage rearing and foraging habitat for diadromous American eel and rainbow smelt. Side slopes of the channel vary to improve access into the water for wading. Educational signage along the stream channel illustrates eel riverine habitat. Boulders placed along the outside banks of the stream channel improve the structural characteristics of the stream while creating additional locations for children’s play. Depressed side pools along the stream channel provide areas for additional minor flood storage and emergent vegetation growth. These areas also provide ideal habitat for amphibians and insects, the ecology and aesthetics of the stream by creating colorful vegetated interruptions along the channel. Reuse some of the existing granite blocks to create a channel edge flush with the adjacent lawn. Due to its close proximity to the existing stone bridge and the new horizontal layout of the stream channel that curves into the existing dogwood thicket, removal the existing wood pedestrian bridge is necessary.

N. Dogwood Thicket

The existing Dogwood/Viburnum thicket visually and physically dissects the open lawn. Remove the existing vegetative thicket to open up views through the meadow and increase open lawn space. Note that the proposed stream channel configuration bends into this area.

O. Open Lawn

Create a uniform grade across the lawn landscape by filling in slumps and excavating high spots in the lawn. Provide 6" topdressing of humus-rich topsoil (min. 6% organic content) and reseed. Prior to grading, install piezometers to identify the location of groundwater and investigate the possibility of additional fill to raise the grade and alleviate turf saturation. In areas of extreme saturation, it may be necessary to investigate the installation of a gravel blanket below the topsoil.

P. Fieldstone Wall Reconstruction

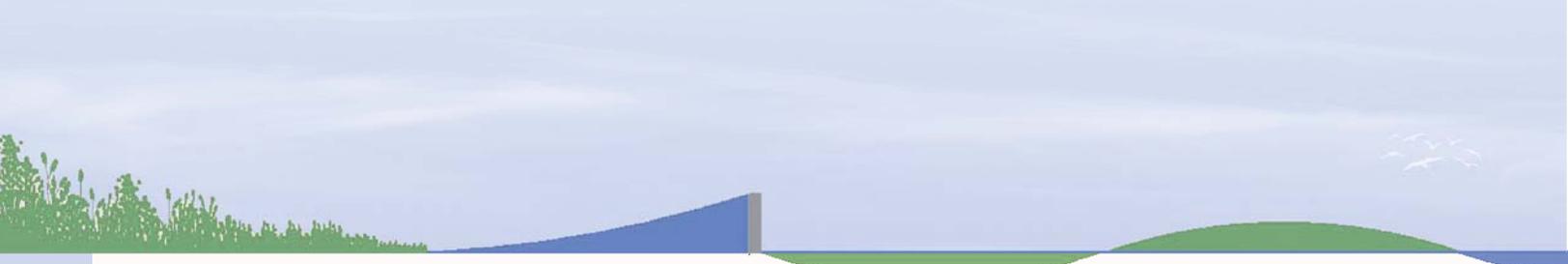
Consider rebuilding the existing fieldstone wall along the southeastern edge of the site. Import additional fieldstones to raise the wall to 4 feet to help screen the adjacent asphalt parking lot. Columns on the ends of the walls help to delineate the entrances.



CROSS SECTION B - B1



PLAN



Q. Site Lighting

Provide low-level, full cutoff dark skies compliant, lighting so that users can stroll through the park in the evening. Lighting can consist of pedestrian-scale pole-mounted lights and a mix of bollard lighting. Lighting styles should correspond to styles found in the downtown area or consider creating a new “nautical” lighting palette specifically for the Meadow and Mill Pond.

R. Columnar Specimens

Columnar trees provide a structured, symmetrical vegetative statement at the entrances into the meadow and flank the infiltration gardens.

S. Frog Pond Revitalized

Restore accessibility, open water, and enhance aesthetic value of the pond. Frog Pond is being choked by aggressive emergent wetland vegetation due to sedimentation and shallow water depths within the pond. By the end of summer, the pond does not have much open water present and is dominated by broad leaved cattail. Public accessibility to open water is limited. In order to restore the open water to the pond, it is recommended that the pond be dredged by mechanical methods (i.e., conventional excavation equipment) to an approximate open water depth of 4 feet. Removal of the emergent wetland vegetation is required. The granite blocks that help stabilize the shoreline of the pond shall remain in place and shall be reset as necessary. Construction of granite steps should be installed along the bank to allow for better accessibility to the pond and allow for seating during the low-flow periods of the year. In addition, it is recommended that natural boulders be added to the shoreline to provide a more natural feel and provide frog and turtle sunning areas. Shrubby and tree sapling vegetation that surrounds the pond should be removed to allow for a new riparian zone planting area with a mix of native woodland shrubs and perennials. The planting of a limited number of low-growing emergent wetland vegetation is recommended for the immediate pond edge including species such as duck potato, soft stem bulrush, and/or pickerelweed.

T. Screening

Native evergreen trees help to screen abutting properties to provide a sense of being in a secluded natural setting when inside the open meadow.

U. Granite Block Seating

Locally sourced granite blocks set within the existing hillside provide seating opportunities for semi-disabled persons during events as well as a destination location for sitting and looking across the meadow and on to the ocean. On no-event days, the granite seating blocks provide a fun destination for family picnics and children’s play.

V. Encourage Native Trees

Remove the existing purple Norway maples and replant the slope in a more symmetrical layout with native flowering trees.

W. Downstream Habitat Creation

Improve the overall aesthetic and improve the dry, open landscape by interplanting the existing rock

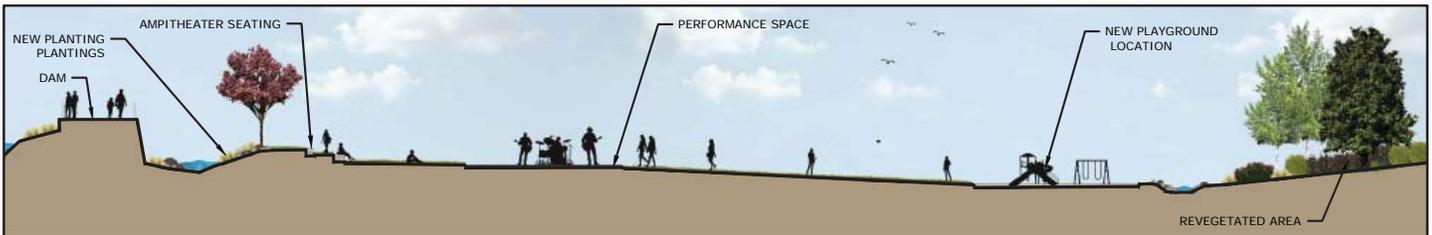
armourment just downstream of the dam with topsoil and small shrubs and native herbaceous plantings. Vegetation will assist in providing temporary eel habitat upon entering the eel passage as well as attracting beneficial insects.

X. West Bank Revegetation

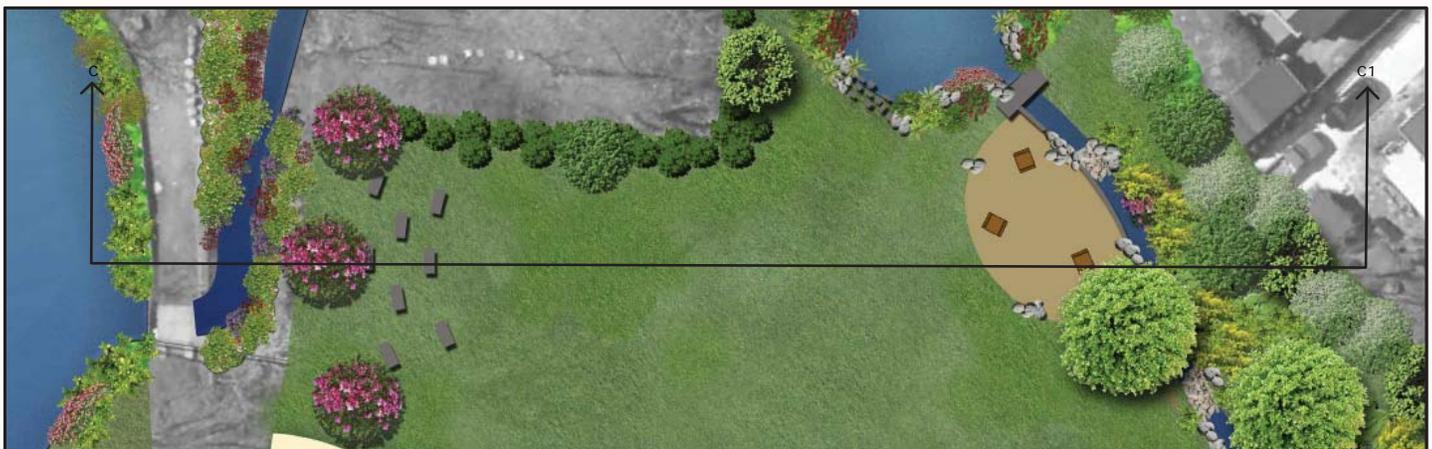
Remove existing invasive plants west of the stream channel and lessen the severity of the steep slope. Invasive plant material along the bank must be eliminated prior to construction of the stream channel. Plant new native understory trees, shrubs, and herbaceous material. Maintain a mown lawn pathway between the Shade Garden and Lawn Picnic Area.

Y. Children's Playscape

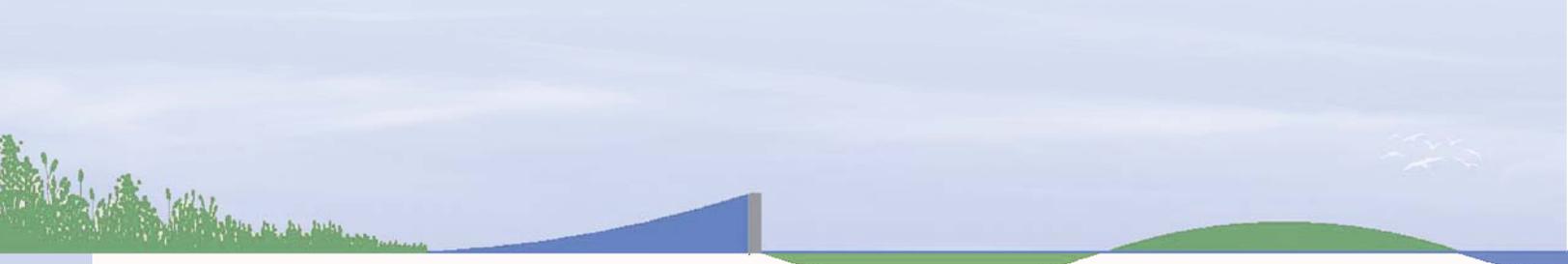
The swings and slide are not in compliance with current playground safety standards. The existing play equipment is dated, discolored, and lacks any aesthetic qualities. Relocate the play area to increase usable open lawn space in the meadow and install new a slide and swingset that meets current playground safety standards. Provide a vegetative barrier between the play area and the stream channel. Provide picnic tables adjacent to the playground and add baby swings to the swing set(s).



CROSS SECTION C - C1



PLAN



Z. Birch Screening

Plant a grove of birch trees to assist in softening the bold architectural mass of the adjacent building.

AA. Reclined Bench Seating

Comfortable bench seating at the east side of Frog Pond offers views over the water's edge on to the open lawn and play area.

BB. Bench Seating at River's Edge

Backless benches under the shade of the newly planted weeping willow trees along the river's edge offer views of the riffle pools and open lawn area.

CC. Doggie Refuse Station

Provide one doggie refuse station at the interface of the sidewalks.

DD. Native Shade Garden

Create a winding bed line to add interest and form to the space and underplant the large existing trees on the slope with flowering native perennials. Consider signage that educates visitors as to the plant palette and designate one of the spaces to signage in remembrance of John Sparks and another space in remembrance of Lura Phillips. Place moveable high quality recycled plastic Adirondack chairs in the spaces.

EE. Large Stone Wall

Remove invasive vegetation along the large stone wall and discreetly place educational signage that highlights the history of granite quarrying and stone setting in Rockport. How was a wall built like this without machinery?

FF. Skating Plaza

Construct a small stone plaza gathering space for easy access to the pond during winter skating or summer fishing. Place comfortable benches toward the back of the space for relaxing and viewing the pond.

GG. Native Riparian Screening

Consider eliminating the existing pathway that leads up to the cemetery and plant a native buffer to screen adjacent residences and further enhance the pedestrian's feeling of seclusion. Plant the area with overstory and understory trees, evergreen, shrubs, and groundcover.

HH. Winding Boardwalk Exploration

Boardwalks allow people to enter and learn about environments they normally wouldn't have access to. The Mill Pond Winding Boardwalk takes pedestrians along the water's edge and over it to explore views of the rear wetland ecology as well as providing views north across the pond, a view probably never seen before by many Rockporters. The boardwalk also creates a loop around the Mill Pond for uninterrupted walking access on the upper portion of the site.



II. What do these signs say Dad?

Signage affixed to the boardwalk explains the different aquatic ecosystems of the Mill Pond, including areas of emergent vegetation, open water, and scrub shrub wetlands to the west.

JJ. Granite Pond Edge

Maintain the historic characteristic of the pond edge by reusing/ resetting the existing granite blocks at designated locations around the Mill Pond. Provide an easily mowable lawn edge to the granite. Areas not to receive the granite will be graded as micro-littoral shelves and will be planted with emergent sedges and rushes.

KK. The Wetland Ecosystem

Supplement plantings of taller native flowering perennials in the rear wetland system to increase diversity of plant and insect species while creating a seasonal color variation when viewed from the boardwalk. The wetland plantings should include New York ironweed, joe-pye weed, boneset, and New England aster, all of which provide vibrant color during the late summer and fall.

LL. Fishing and Garden Viewing Areas

Using large granite or fieldstone irregular pavers, create a walking surface and seating area destination for fishing and relaxation at the entrance/exit to the boardwalk.

MM. Littoral Shelf Gardens

Consider creating two distinct facultative wet and obligate planting shelves to be planted with native flowering perennials, sedges, rushes, and aquatic vegetation, in large masses. Due to the water requirements of the plants, it will be noticeable what type of plants thrive in each shelf location.

NN. Open Lawn Strolling

Clear and maintain a wide lawn pathway on the western edge of the pond. Place benches along the western edge under the proposed birch grove.

OO. Wall Deterioration

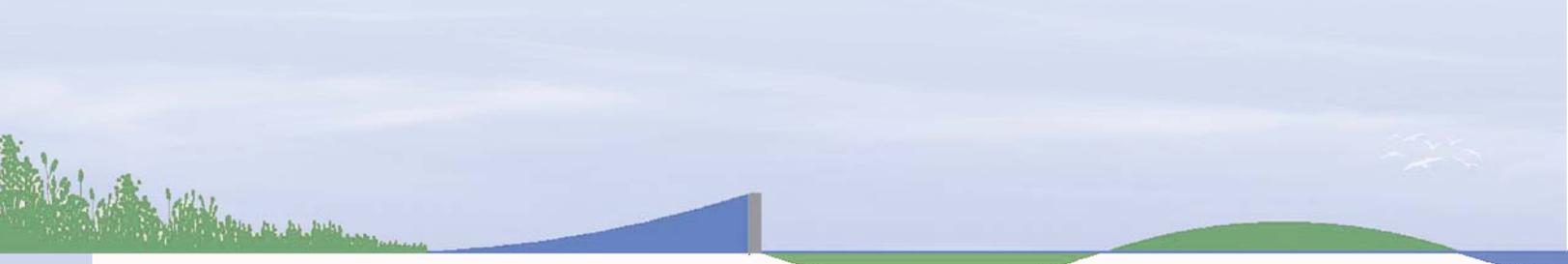
Rampant vines and the freeze/thaw cycle have caused some site walls the buckle - the first stages of collapse. Address these walls and consider rebuilding and repointing necessary sections.

PP Granite Seating and Water Access

Reuse the existing granite blocks on site to create a stacked seating/stair system that creates access right up to the pond's edge. Perfect for getting your feet wet on hot summer days or resting while ice skating in the winter. If necessary supplement existing granite with locally sourced granite blocks.

QQ. Safety Bollards

Set granite posts to provide a safety precaution for potential future handicap parking or emergency vehicles.



RR. Vegetated Background to Open Lawn

Provide screening of adjacent lots along the western edge of the lawn area and create a backdrop when viewing the pond from the dam by planting native shrubs and small understory trees below the existing overstory trees.

SS. Birch Grove

Tightly spaced river birch plantings screen neighboring properties while creating a continued tree canopy from north to south along the lawn edge.

TT. Handicap/Emergency Parking

If constructing the handicap-accessible switch back ramp is not applicable, consider installing a small handicap parking area to allow people with mobility issues the ability to experience everything the Mill Pond has to offer.

UU. Vegetated Pond Edge

Vegetation planted along the pond helps to visually soften the pond edge and creates needed amphibian habitat. Much of the riparian vegetation along the northern portion of the pond should be removed by mechanical methods, and new riparian zone vegetation should be replanted within strategic locations along the shoreline. Littoral fringe shelves should be established along portions of the pond edge with emergent marsh vegetation that includes duck potato, pickerelweed, and soft stem bulrush.

VV. Mill Pond

Dredge Mill Pond to restore open water for fishery habitat and recreational use, enhance aesthetic values of the pond, stabilize shoreline and enhance littoral habitats, and manage invasive riparian zone vegetation. In order to restore and enlarge the open water areas within the pond to more historic conditions, it is recommended that the pond be dredged by either mechanical and/or hydraulic methods. The cattail-dominated delta should be removed to provide more open water habitat to fish and more recreational area for fishing and ice skating. The pond's depth should be lowered to approximately 8 to 9 feet, which would help decrease water temperatures and increase dissolved oxygen levels within the pond to better support a warm-water fishery resource. In addition, the deeper water depths would help limit the growth of submerged aquatic and floating aquatic vegetation within the pond. Grading along the northern edges of the boardwalk feature will be designed to create shallow littoral planting shelves to assist in screening views of the boardwalk when viewed from the dam.

WW. Upstream Water Quality

Identify areas upstream of the site that potentially require proprietary water quality treatment devices to control sedimentation outfall into the millbrook channel.

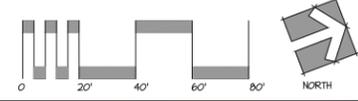
XX. Cattail Removal

Area of existing cattail vegetation to be removed during dredging operation.



CONCEPTUAL MASTERPLAN
**MILLBROOK MEADOW AND
MILL POND RESTORATION**
ROCKPORT, MASSACHUSETTS DECEMBER 2014

MILONE & MACBROOM
100 South Street
Chelsea, Massachusetts 02156
(617) 271-2710 Fax (617) 271-2713
www.miloneandmacbroom.com



CONCEPTUAL PROBABLE CONSTRUCTION COST ESTIMATION

Chapter 8

**Millbrook Meadow and Mill Pond Restoration Project
Conceptual Probable Construction Cost Estimation**

MASTER PLAN IDENTIFICATION KEY	ITEM	PROBABLE CONSTRUCTION COST ESTIMATE
A	CULVERT	\$25,000
B	CULVERT WINGWALL	\$50,000
C	GATEWAY FEATURE	\$8,000
D	RGC GARDEN	\$500
E	GRANITE TERRACE SEATING	\$35,000
F	ENTRY PLAZA	\$20,000
G	REJOICE THE WILLOWS	\$3,000
H	WATER ACCESS	\$20,000
I	INFILTRATION GARDENS	\$30,000
J	ACCESS INTO MEADOW	\$1,500
K	SINUOUS WALKWAY	\$50,000
L	ELECTRICAL SERVICE	\$20,000
M	RECONFIGURE CHANNEL IMPROVEMENTS	\$125,000
N	DOGWOOD THICKET	\$3,000
O	OPEN LAWN	\$50,000
P	FIELDSTONE WALL RECONSTRUCTION	\$75,000
Q	SITE LIGHTING	\$50,000
R	COLUMNAR SPECIMENS	\$5,000
S	FROG POND REVITALIZED	\$48,000
T	SCREENING	\$10,000
U	GRANITE BLOCK SEATING	\$40,000
V	ENCOURAGE NATIVE TREES	\$3,000
W	DOWNSTREAM HABITAT CREATION	\$10,000
X	WEST BANK REVEGETATION	\$25,000
Y	CHILDREN'S PLAYSCAPE	\$45,000
Z	BIRCH SCREENING	\$7,000
AA	RECLINED BENCH SEATING	\$5,000
BB	BENCH SEATING AT RIVER'S EDGE	\$4,000
CC	DOGGIE REFUSE STATION	\$1,000
DD	NATIVE SHADE GARDEN	\$30,000
EE	LARGE STONE WALL	\$7,000
FF	SKATING PLAZA	\$35,000
GG	NATIVE RIPARIAN SCREENING	\$30,000

MASTER PLAN IDENTIFICATION KEY	ITEM	PROBABLE CONSTRUCTION COST ESTIMATE
HH	WINDING BOARDWALK EXPLORATION	\$300,000
II	SIGNS	\$6,000
JJ	GRANITE POND EDGE	\$15,000
KK	WETLAND ECOSYSTEM	\$15,000
LL	FISHING AND GARDEN VIEWING AREAS	\$40,000
MM	LITTORAL SHELF GARDENS	\$20,000
NN	OPEN LAWN STROLLING	\$10,000
OO	WALL DETERIORATION	\$25,000
PP	GRANITE SEATING AND WATER ACCESS	\$40,000
QQ	SAFETY BOLLARDS	\$7,000
RR	VEGETATED BACKGROUND TO OPEN LAWN	\$25,000
SS	BIRCH GROVE	\$7,000
TT	HANDICAP, EMERGENCY PARKING	\$5,000
UU	VEGETATED POND EDGE	\$10,000
VV	DREDGE MILL POND	\$300,000
WW	UPSTREAM WATER QUALITY	T.B.D.
XX	CATTAIL REMOVAL	incl in Element "VV"

SUBTOTAL*	\$1,696,000
10% Contingency	\$169,600
TOTAL	\$1,865,600
ROUNDED TOTAL	\$1,865,000

Note* Construction cost does not include design, permitting, construction inspection, and/or construction administration fees and does not account for encounters with soil and/or sediment contamination issues during construction (i.e., handling and disposal).

Chapter 9

9.0 Future Actions

The town and Millbrook Meadow Advisory Committee are eager to move the Millbrook Meadow and Mill Pond Restoration project forward. In order to advance this project, the town will need to retain an engineering and landscape architectural consultant to provide design development, regulatory permitting, and construction document services. Additional information will need to be gathered as part of the future actions including utility information gathering at the Beach Street culvert, property line survey, and environmental screening of soils within Millbrook Meadow. Regulatory permits from several agencies will be required. The level of permitting will be refined as the design development phases of the project move forward.

Based on the master plan, the following permits may be required:

- Massachusetts Environmental Policy Act (MEPA) Project Environmental Notification Form
- United States Army Corps of Engineers Category 2
- Massachusetts Department of Environmental Protection Chapter 91 Waterways
- Massachusetts Department of Environmental Protection 401 Water Quality Certificate
- Massachusetts Office of Coastal Zone Management – Federal Consistency Concurrence
- Town of Rockport Conservation Commission – Notice of Intent

The following table presents the regulated resource impact areas based on the proposed master plan.

Regulated Resource	Impact Area	Likely Permit Needs
Bordering Vegetated Wetland	24,639 SF	USACE Cat II
		MADEP 401 WQC
		ConCom NOI
Inland Bank	1,772 LF	Chapter 91 Waterways
		USACE Cat II
		MADEP 401 WQC
Land Underwater	29,365 SF	ConCom NOI
		Chapter 91 Waterways
		USACE Cat II
Land Subject to Flooding	35,725 SF	MADEP 401 WQC
		ConCom NOI
		Chapter 91 Waterways
Riverfront Area	76,000 SF	ConCom NOI

In addition, it will be important that the town and Millbrook Meadow Advisory Committee continue to seek funding through both public and private sectors.

Mill Pond

Meadow



REGULATED RESOURCE AREA IMPACTS LEGEND

±24,639 SQ. FT.		BORDERING VEGETATED WETLAND (BVW)
±29,365 SQ.FT.		LAND UNDERWATER
±1,772 L.F.		INLAND BANK
±35,725 SQ.FT.		LAND SUBJECT TO FLOODING



Engineering | Planning | Landscape Architecture | Environmental Science