

Burncoat Park / Holland Rink 2016 Master Plan Report

City of Worcester Department of Public Works & Parks
Parks, Recreation & Cemetery Division
February 23, 2016



 The
Berkshire
Design
Group, Inc.
Landscape Architecture
Civil Engineering
Planning
Land Surveying

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Anthony J. Economou

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Konstantina B. Lukes

Philip P. Palmieri

Sarai Rivera

Gary Rosen

Frederick C. Russell

George J. Russell

Kathleen M. Toomey

Worcester Parks & Recreation Commission:

William T. Daring, Chairman

Eric Goldstein

Lisa Markarian Labossiere

Meg Mulhern

Steven Sabacinski

George Sedares

Jared Swerzenski

City Administration

Edward M. Augustus, Jr., City Manager

Paul J. Moosey, P.E., *Commissioner of Public Works & Parks*

Robert C. Antonelli, Jr., CPRP, *Assistant Commissioner of Public Works & Parks*

Worcester Historical Museum

Robyn Conroy, *Librarian*

This master Plan was prepared by:

The Berkshire Design Group Inc.

Landscape Architects, Civil Engineers & Surveyors

Peter H Wells, *Principal-in-Charge*

Carlos E. Nieto-Mattei, *Landscape Architect*

Paul R. Lussier, *Land Surveyor*

Completion of this report required over 6 months of investigation, evaluation and analysis. Throughout this period the City of Worcester Department of Public Works & Parks; Parks, Recreation & Cemetery Division organized 3 community meetings with residents from the North Street Neighborhood, Burncoat Neighborhood and individuals who had a special interest or concern for, all or parts of Burncoat Park and Holland Rink. Much information and valuable insights were gathered this way; there is no doubt that the plan is much stronger because of the many people who were involved.

The assigned staff of the Department of Public Works & Parks; Parks, Recreation & Cemetery Division provided guidance and gave meaningful response and advice during the planning process. The staff did its job extremely well. Its reaction to proposals and ideas helped shape final recommendations and give the plan a strong sense of realism. The community and interested citizens were a constant source of insightful information and meaningful advice.

In years to come, the thousands of park users who will find enjoyment in a visit to Burncoat Park & Holland Rink will owe a debt of gratitude to all those who contributed to this plan.

INTRODUCTION

For the past 9 months, numerous interested and devoted people have invested hundreds of hours on a complex and exciting task: creation of a Master Plan for Burncoat Park / Holland Rink. This report documents their findings and offer recommendations for improving the park's 29 acres in North Worcester, Massachusetts.

A great deal of information was collected for this plan over the past months, creating a valuable base of data, historic material and inventory. A synthesis of our findings is included along with recommendations in the form of plans, renderings and computer animation.

Starting Point for Improvements

This master plan is intended to be a dynamic document that will preserve the site's current character as well as anticipate tomorrow's needs. The plan outlines the issues discovered during the planning process and suggests ways to address each one. Some proposals are modest, others are ambitious. Priorities must be set by the Worcester Department of Public Works & Parks in conjunction with park users, neighbors and according to need and budgets.

There are a number of recommendations presented for site improvements. However, this plan should not be considered a detailed or final design for any particular aspect or element of the site, more as a guidebook. Additional design work will be required for most of the proposed modifications prior to their implementation. This master plan does contain enough detail to give a clear indication of what is intended by the various proposals and the effect to be accomplished.

It is hoped that the results of this work will support a renewed and systematic commitment to restore and maintain a valuable and beautiful public resource.

EXECUTIVE SUMMARY

The Worcester Department of Public Works & Parks - Parks, Recreation & Cemetery Division, in consultation with The Berkshire Design Group and after neighborhood forums, has developed master plans for Burncoat Park & Holland Rink that establishes a vision for the parks as a pair of neighborhood parks that incorporate active and passive recreation in a harmonious environment that respects the “urban wild” nature of Burncoat’s Park ponds, wetlands and stands of trees.

Several goals were established to guide the development of this master plan:

- *Enhance public access & circulation*
- *Design for local and city wide users*
- *Make park safe and secure for its users*
- *Provide opportunities for both active and passive recreation*
- *Preserve natural resources (Burncoat Park)*
- *Improve pond health (Burncoat Park)*
- *Promote historical and environmental awareness/education (Burncoat Park)*
- *Improve access within & throughout the facility.*

In addition to the goals outlined above, the neighbors offered their thoughts concerning the development of this plan:

- *Maintain the park main promenade (Burncoat Park)*
- *Provide a plan that will promote security and a sense of safety to park goers*
- *Maintain the “natural feel” around the main pond (Burncoat Park)*
- *Enhance views to the pond (Burncoat Park)*
- *Keep new parking to a minimum*
- *Preserve name of basketball court that honors Marut J. “Marty” O’Malley (Holland Rink)*
- *Maintain and enhance the existing sledding hill (Burncoat Park)*
- *Support existing vegetation to preserve wild life habitat (Burncoat Park)*
- *Improve & maintain ponds (Burncoat Park)*
- *Improve outdated playground (Holland Rink)*
- *New skate park (Burncoat Park)*
- *Control street parking in surrounding neighborhood streets.*
- *Create a pedestrian loop around the shore of the Burncoat Park Pond (Burncoat Park)*
- *Negotiate a parking arrangement with abutting insurance corporation campus*

The plans are comprised of the following design elements:

- ***Improved Access:***

Burncoat Park: All entrances to the park will be improved. The access to the park located on the corner of North Parkway Drive and Davidson Road (north east corner) will become the main vehicular and pedestrian entrance. A 10 to 20 car parking area will be located here and will include ADA accessible spaces. To the west the three secondary accesses to the park located on Parkview Drive, Belvidere Avenue and Wawecus Road will be enhanced with new bollards and wood guardrails. The two entrances to the south on Service Road will have a new stair and ramp to handle the 6 foot grade change. All entrances to the park will include kiosks with photographs and historical information of the park.

Holland Rink: The Park will feature three new entrances. The main pedestrian entrance will be located on the corner of Lincoln Street and Bates Avenue. It will feature an entrance plaza with benches and new paving. The second entrance will be off of Lincoln Avenue and provide a more direct way to access the Park from Burncoat. The third entrance will be from Bates Avenue and will serve a new 17 space parking area. At the end of Bates Avenue a service gate is planned to allow maintenance vehicles into the park.

- ***Walkway and Trail Improvement/Development:***

Burncoat Park: The old discontinued road currently used as the main walkway will be reduced in size from approx. 22 feet wide to 10 feet to bring it down to a scale more consistent to pedestrian use. A new 10 ft wide walkway will create a 1/3 of a mile exercise loop around the proposed sport fields. Additional secondary 6 foot wide paved walkways will be established to provide an overlook to the park. A 5 foot wide raised board walk path is planned around the edge of the Burncoat Park pond. Both the 10 foot wide main walkway and 6 foot wide secondary walkway will feature pedestrian lighting to help secure the site at night.

Holland Rink: The new 6 foot wide walkway will create an exercise loop path a little over 1/4 mile around the park. Two 6 foot wide walkways will divide the space into three main areas: playground, multiuse fields and basketball/handball courts.

- ***Park Edge Improvements***

Burncoat Park: The plan proposes that guardrail be installed along the east, north and west edges of the park. The south edge of the park adjacent to Service road will have a six foot high chain link fence separating the park from the road.

Holland Rink: The existing five foot high chain link fence along the Interstate 290 exit ramp to the south will remain as it is now and will only need maintenance. That same fence currently wraps around the west corner and follows Lincoln Street for approx. another 300 feet. Only a new gate is proposed on the fence. An existing concrete and stone retaining wall continues along Lincoln Street as the grade in the park changes up to four feet higher than the road. The corner of Lincoln and Bates Avenue will see a new entrance plaza. New wood guardrail is planned for the edge along bates avenue and the new parking area.

- ***Opportunities for Passive Recreation***

Burncoat Park: The park plan includes a pedestrian circulation system (wide walkways, narrow walkways, woodland trails and wetland/pond boardwalk) that provide opportunities for passive recreation while minimizing conflicts with active users. Natural woodlands, wetlands and pond areas will be preserved and managed to allow for wildlife observation, fishing and passive enjoyment. Open lawn, seating and picnic areas adjacent to the walkways and ponds enable visitors to sit, bask and enjoy the views.

Holland Rink: Even though Holland Rink's program is mostly active, the plan provides for walkways, benches and picnic areas for park goers to enjoy.

- ***Programmed Active Recreation***

Burncoat Park: Two (300' X 180') lighted multiuse fields will be the center of the active recreation component at the park. The park will also include a new softball field, playground, street style skate park and exercise stations along the main walkways. Both playground and skate park have been located away from residential neighbors and closer to the elementary school

Holland Rink: Structured and non-structured sport opportunities have been provided by the plan: formal spaces for basketball and handball; and more open play options on the smaller multi use playfields and playground area. Four exercise stations along the walkway complete the active recreation program for the park.

- ***Pond Maintenance and Improvements***

Water quality will be improved at both of Burncoat Park ponds by providing better aeration, cleaning out dead vegetation around the ponds and with the installation of a well to stabilize water levels.

BURNCOAT PARK & HOLLAND RINK

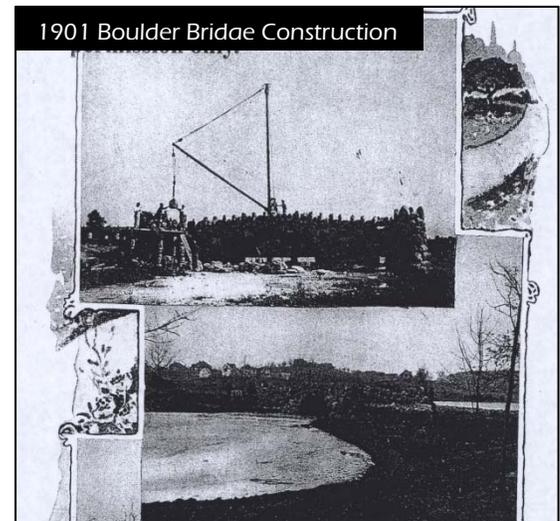
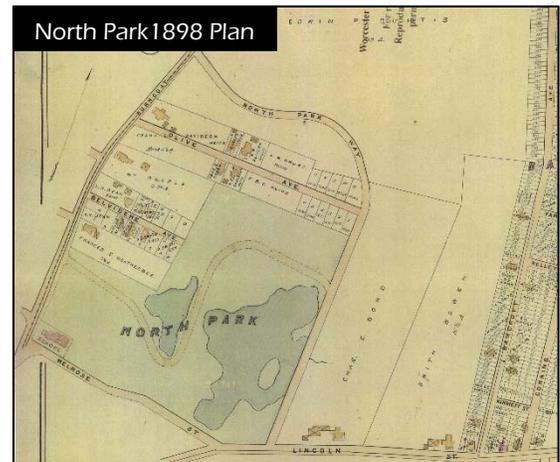
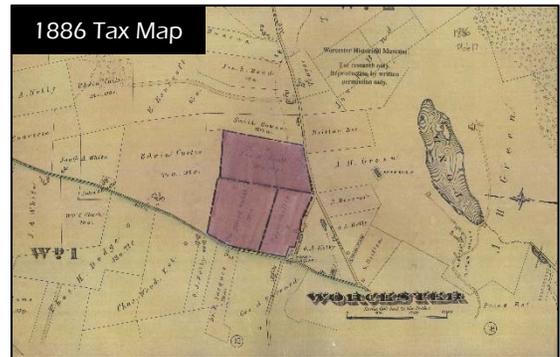
YESTERDAY

History

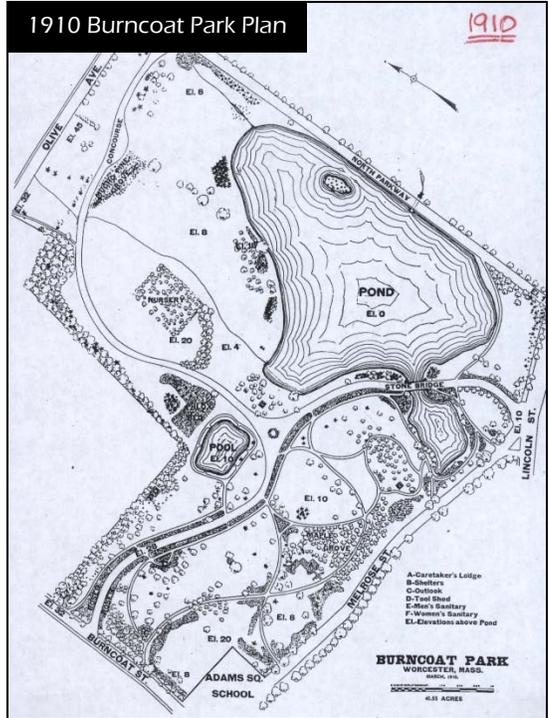
The history of Burncoat Park and Holland Rink is not unlike that of many other parks that were established in the late nineteenth century America. It went through the critical years of establishment, followed by a period of development to completion, then another period of modification, followed by various improvements and additions to respond to the public's needs and desires.

Historical Timeline

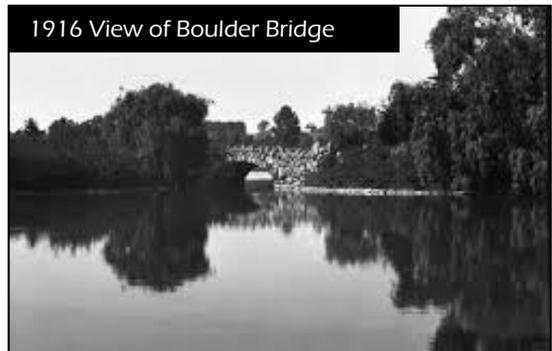
Date	Event Description
1889	39.42 acres purchased from John D. Curtis, Joseph E Bond, Jane Harris, Alfred Smith & Francis Weatherbee for \$28,265
1894	City acquired North Parkway as a gift from Edwin P, Harriet B. Curtis & Joseph E. Bond. This land purchase defined the boundary of the park.
1898	Western Pond was created.
1901	Boulder Bridge was built.



1910
 North Park changes name to
 Burncoat Park



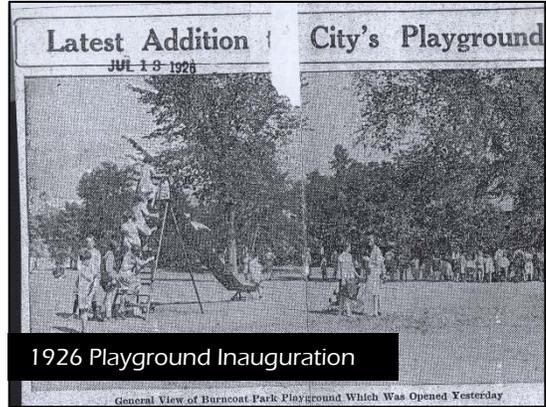
1916
 15 year anivesary of Boulder Bridge



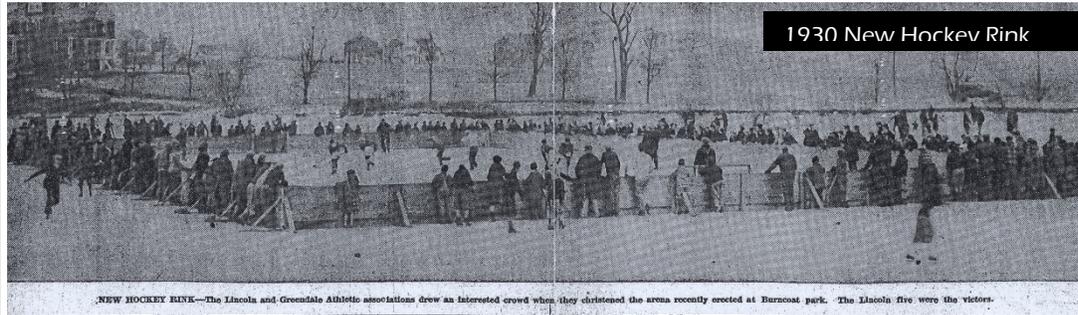
1923
 Western pond used as skating rink



1926
Burncoat Playground is inaugurated



1930
New hockey rink inaugurated



1954
Article published about Boulder Bridge on a local newspaper reminding of a "by gone era"



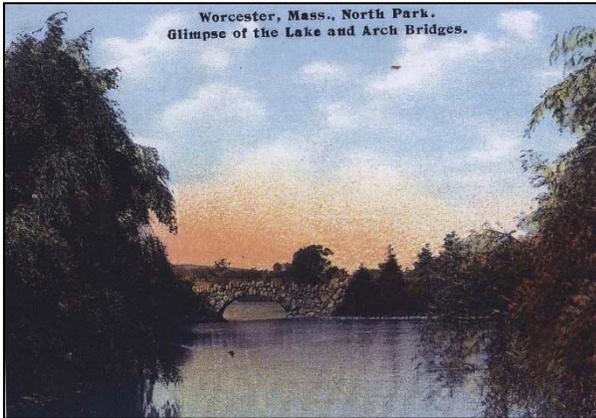
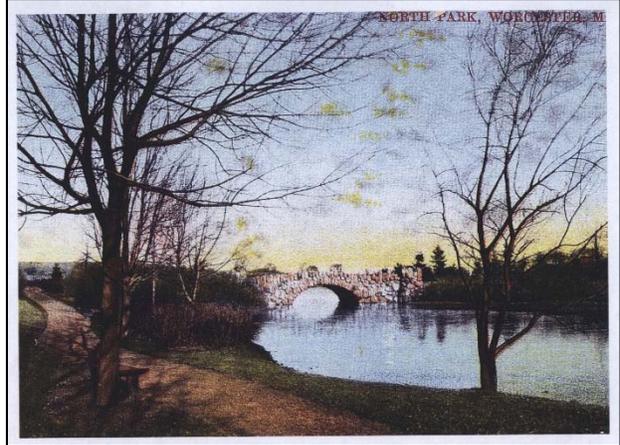
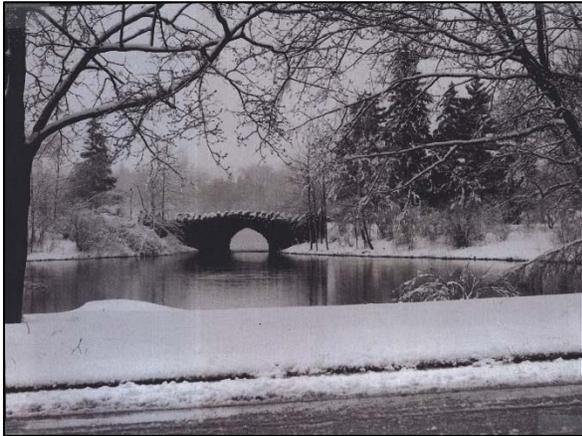
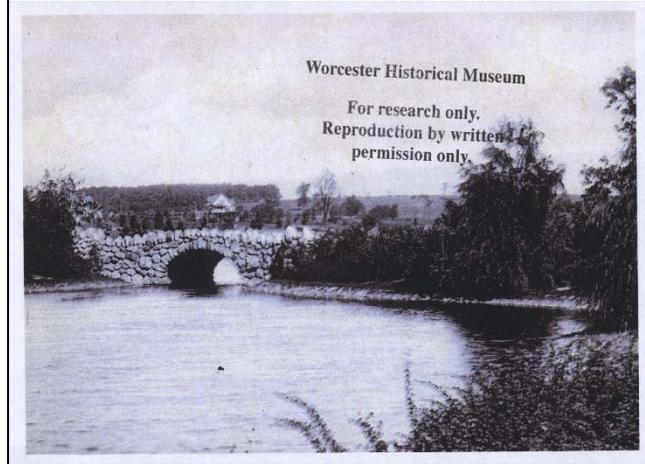
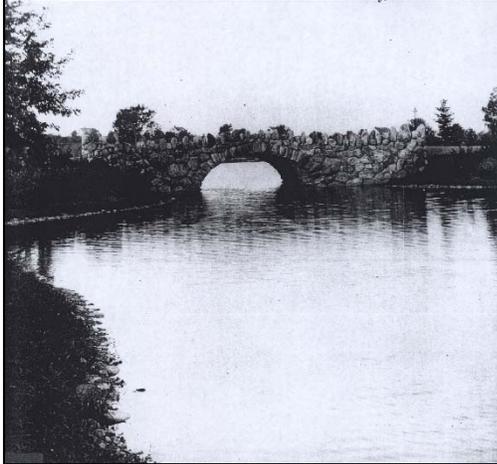
1962
8.2 acres were taken by the Commonwealth of Massachusetts for the construction of the I-290 expressway. The program elements lost to the Park included a basketball court, tennis court and gardens. An additional 4.2 Ac of land was offered to the Worcester Public Schools for the construction of Wawecus Elementary School

August 17, 1988
Worcester Gazette article called for this:
"Burncoat Park waits like a sleeping giant, it wants for people to stroll through its 27 acres of rolling fields and skate its ponds. It waits for children's laughter and the cheers of crowds watching games on its athletic fields. And it waits for the beautification that was promised more than a decade ago, but has yet to be delivered"



*All historical images provided by the Worcester Historical Museum Library and are used with their permission

Burncoat Bridge (Boulder Bridge), dating from 1901 is a symbol of another age when people walked more and loved to pause on bridges, staring around at the quite water where the carp frolicked.



*All historical images provided by the Worcester Historical Museum Library and are used with their permission

Community Participation

In the interest of creating a plan that fulfilled the needs of the surrounding neighborhood the Worcester Department of Public Works & Parks; Parks, Recreation & Cemetery Division and The Berkshire Design Group organized several community meetings to discuss the design process, address concerns, present conceptual plans and receive feedback for the proposed plans. The meetings were highly educational to the design team and provided a basis on which to “ground” the design process. All three meetings took place at the conference room of the Dodge Park Rest Home on the following dates.

Meeting Subject	Date of Meeting
Hearing 1 – Design Process, Existing Conditions & Public Input	October 17, 2013
Hearing 2 – Preliminary Concepts & Public Input	November 18, 2013
Hearing 3 – Preferred Concept & Public Input	February 24, 2014
Hearing 4 – Parks & Recreation Commission Hearing	May 5, 2014

Each meeting was attended by between 15 and 30 people of diverse age groups and backgrounds. The meetings also included the presence of Mr. Philip P. Palmieri, *District 2 Councilor*. It is important to say that even though the attendees had strong opinions and ideas of what they wanted to see at the parks, the meeting took place in an environment of utmost respect and order. Differences of opinion to the ideas of other participants and the proposals from the designer were laid out with consideration to all present.

Attendees had a variety of opinions on what elements they considered important to the parks, but there was a consensus that the natural features of Burncoat Park; its ponds, woodlands, wetlands and sledding hill had to remain as close as possible to existing and that lack of overall maintenance of the park were their main concerns. Other issues that kept repeating in our meetings was a lack of security, preserving the historical features, a dislike for a large parking area, improvement and additions to the existing walkways, the need for better lighting, maintain basketball courts at Holland Rink and provide a walkway around the bigger pond at Burncoat.

One main disagreement among the public meeting participants was the desire of some residents to include a skate park while others were very critical of this addition quoting issues with vandalism, security and attracting residents from other neighborhoods.

All things considered we believe that the public participation process positively influence the designs and master plans for the parks, and were an invaluable tool for the consultants, Worcester DPW, Parks & Recreation Commission and the residents themselves.



Public meetings

Site Inventory and Analysis

The next step involved an extensive process of scrutiny of the site's current conditions. This process of inventory and analysis is an important step because it clarifies how the site functions in its present condition and illuminates needs. Designers draw on this information to develop alternatives that reflect the goals and objectives of the master plan.

A large number of maps, plans, photographs, and background information concerning the site were combined. The Berkshire Design Group also undertook a comprehensive site survey that included property lines, topography, utilities, trees, hydrological resources (ponds and wetlands) and contextual information for both parks. Natural features and the built environment were also documented through onsite inspection.

Natural Features –

- ***Vegetation:***

Burncoat Park: The vegetation at Burncoat can generally be classified into two main categories, a little over half the park land has some level of tree cover and the other half is turf/lawn. Considering the entire perimeter of the main pond, the vegetation diversity is relatively high, with numerous species of deciduous trees, shrubs, vines and herbaceous ground cover. However only with the exception of a thicker stand of trees to the north, much of the vegetation is limited to a narrow perimeter, especially along the east and south portion of the pond closer to North Parkway and Route 290 Service Road. The majority of trees and shrubs around the pond show little to no signs of maintenance and seem to be "naturally" occurring. Herbaceous plants are dominant along the margins of the pond and the tree understory. It is important to point out the existence of a large patch of Japanese knotweed (*Polygonum* spp) along the North Parkway entrance. *Polygonum* is a highly invasive plant species in New England and thrives on the bank of rivers and ponds. Invasive species tend to outgrow and outcompete native species lowering biodiversity, limiting habitat and food to native birds and animals.

Outside of the main pond edge, the park has approximately 200 trees ranging from large hard wood specimen to small flowering trees. Most of them are located bordering Davidson Road to the north and the abutting residential buildings to the west, providing a natural buffer to the houses. The rest are scattered along the walkways of the park and close to the elementary school on the south west. These are mostly large mature specimen trees ranging from large red oaks, European beech and large mature maples. Even though deciduous trees dominate, there is a small patch of mature evergreen trees located on the north east corner near the North Parkway entrance consisting of mature spruces and hemlocks. The rest of the park's vegetation consists of lawn and play field turf in varying degrees of disrepair.

The general health of the vegetation at Burncoat Park is fair. Throughout the park, areas have been allowed to evolve naturally, thus creating many overgrown areas and obstructing views and vistas. In some instances, this growth is desirable as it provides screening of undesirable elements or neighboring properties. However, a thinning program as well as a program to prune and remove rotten trees and invasive species is needed to improve the appearance and health of the vegetation in the park.



Overgrown vegetation around pond



Lawn/turf in varying degrees of disrepair

Holland Rink: The vegetation at Holland rink consists of lawn/turf and approximately 40 trees located along the edges of the park. The lawn is in poor health and seems to only be mowed, with little to no other maintenance. Trees range from newly planted hardwood trees to mature maples.

Starting at the corner of the 290 exit ramp and Lincoln Street there are seven newly planted hardwood trees 2" DBH. This trees are there replacing vegetation that was impacted by the highway exit expansion and are in good condition. Following along Lincoln Street, there is a row of four mature maples form 18" to 34" DBH, and another four mature maples between 22" to 34" DBH along Bates Avenue. All mature trees are in good health and would only require pruning of dead branches. Outside the Holland Rink property line along Interstate 290, there is a row of overgrown vegetation, mostly small trees and high shrubs. Even though this vegetation is not the most attractive, it does create a convenient buffer from the highway.



Mature tree next to retaining wall along Lincoln Street



Newly planted tree along Lincoln Street



Mature tree in playground area along Bates Avenue



Lawn/turf in varying degrees of disrepair

- *Slopes:*
Both parks landforms were initially surveyed and contours plotted to reveal the physical pattern of both sites topography. Slopes, like soils, determine, to a large extent, areas which are suitable for designated use.

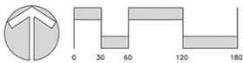
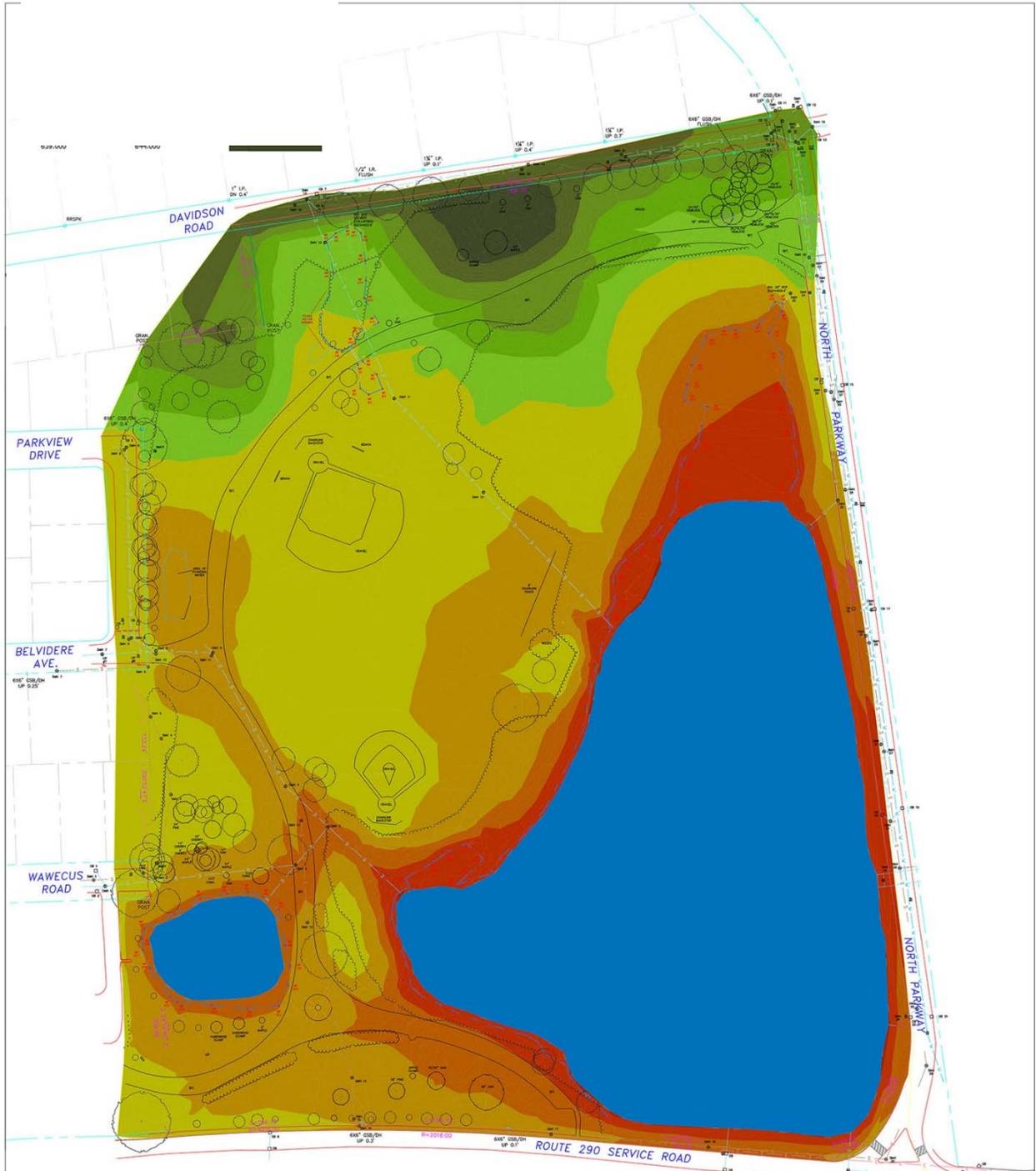
Burncoat Park: In general the park is lower in elevation than the surrounding roads and neighborhood. As expected from the larger of the two parks with two ponds, the topography at Burncoat is more varied than at Holland Rink. There is a change in grade of 47 feet within the park, being the highest point to the north edge, along Davidson road. This area is used as the sledding hill and has great views of the park. The lowest points are at the two ponds were all surface runoff drains to. The smaller pond is slightly higher and drains into the bigger pond. No bathymetric (underwater topography) information was surveyed or available for the ponds. In the same way that topography is very important to understand a sites uses, drainage, and sense of place; bathymetry would help better assess the health of the ponds and should be something to be considered for the future development of the park.

Slopes in the park are also varied ranging from less than 5% on the playing fields and on the main walkways to over 30% around the perimeter of the larger pond and along the outside edge of the park. One advantage of the parks topography is that the majority of its surface has manageable slopes between 0%-5% which makes it easier to develop park amenities, but at the same time has enough topographical variety, which makes a walk along the parks paths a more enjoyable experience and provides opportunities for views.

Holland Rink: Changes in grade at Holland Rink are less dramatic than at Burncoat Park. Elevation change within the park is around 15 feet, being the south east corner the highest point and the north east the lowest point. The real dramatic grade change happens on the edge of the park that borders Lincoln Street, along the existing stone retaining wall. The park is 4 to 5 feet higher than the sidewalk below which will pose a challenge when thinking of access into the park.

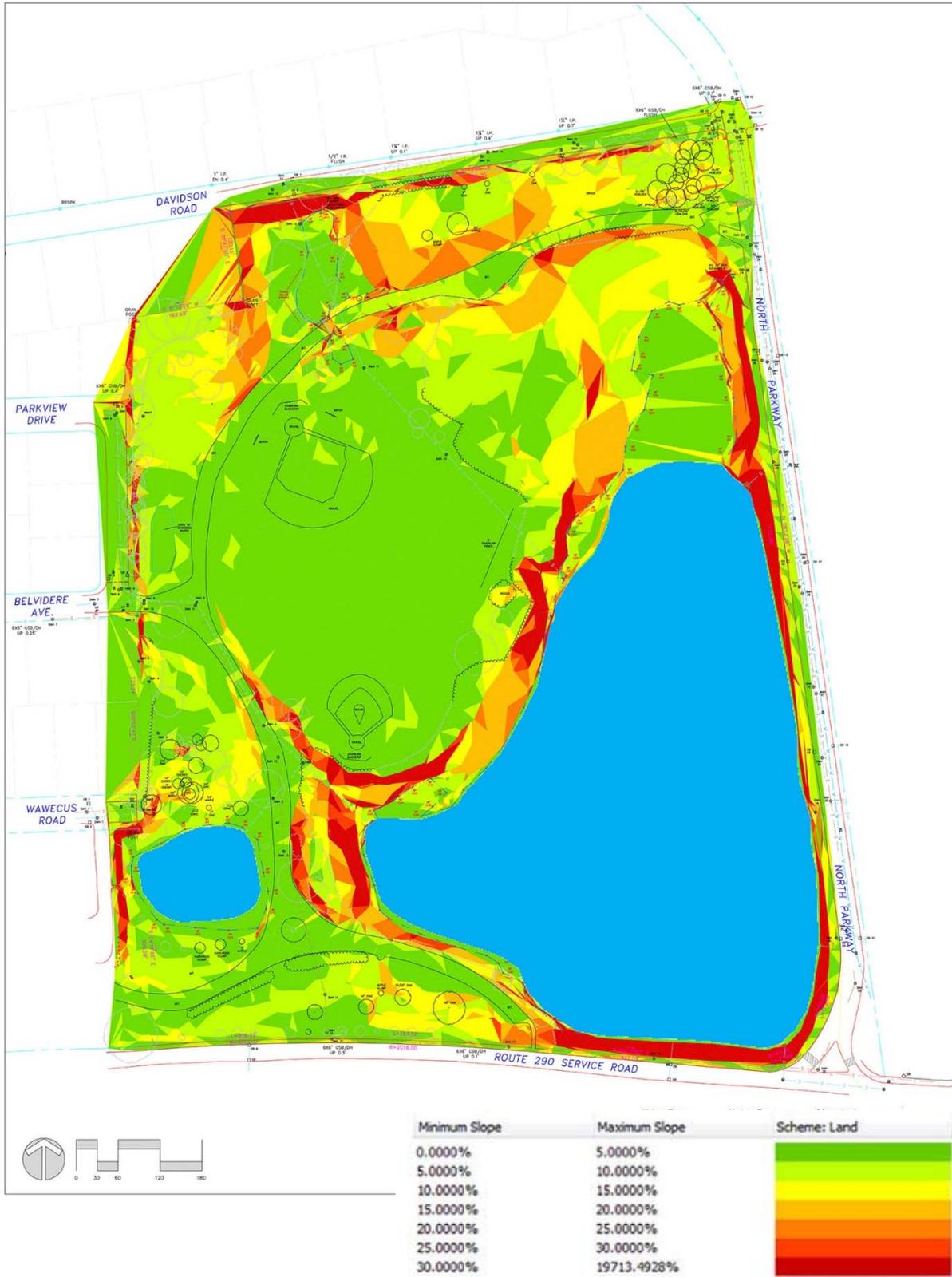
The majority of the site has slopes of less than 10%, which makes it ideal for park amenities, like walkways & sport courts. The only steep slopes on the site are to the north, along the retaining wall and to the east along the edge with Bates Ave. The existing basketball was graded slightly higher than its surroundings to allow for easy surface drainage.

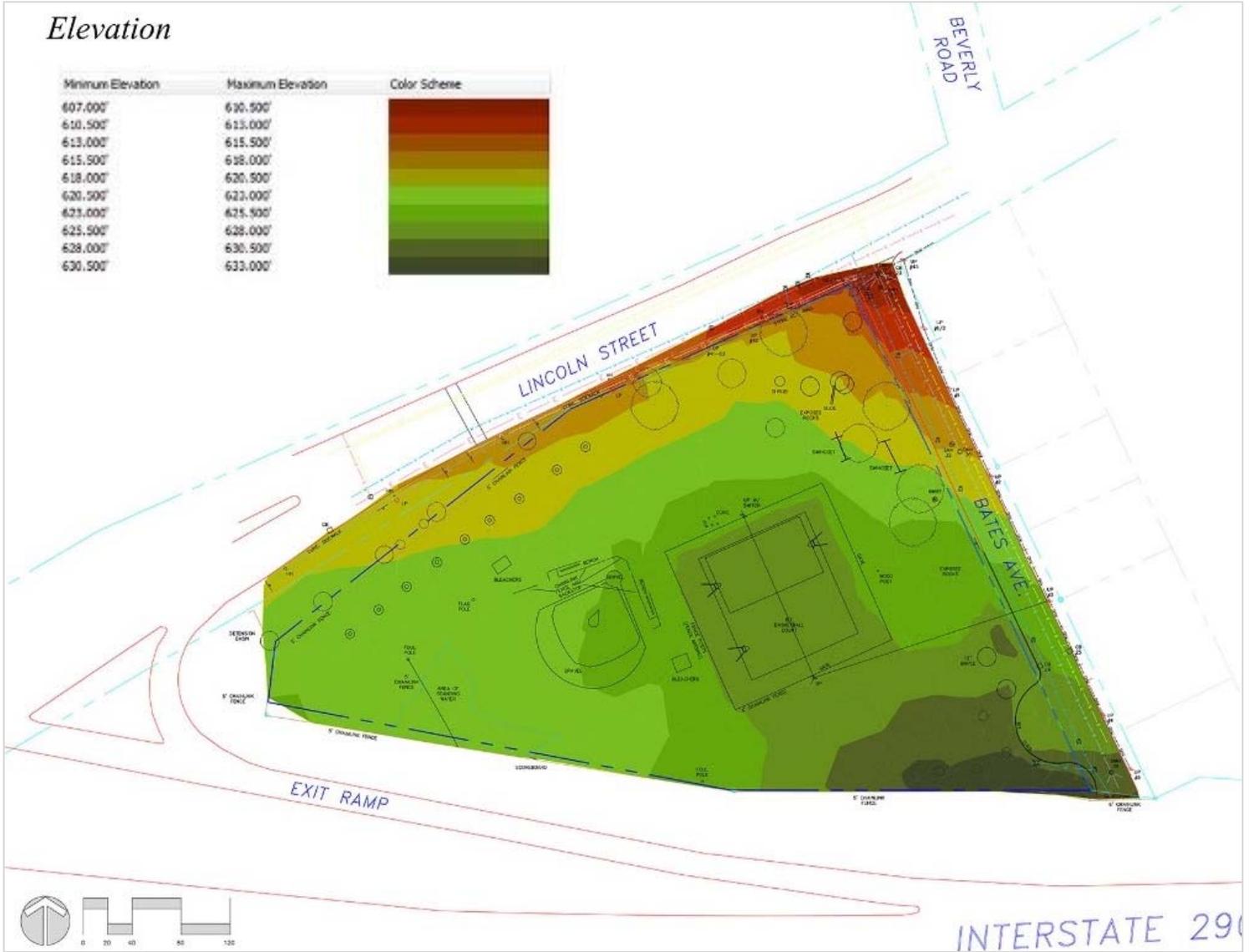
Elevation



Minimum Elevation	Maximum Elevation	Color Scheme
597.000'	599.000'	
599.000'	604.000'	
604.000'	609.000'	
609.000'	614.000'	
614.000'	619.000'	
619.000'	624.000'	
624.000'	629.000'	
629.000'	634.000'	
634.000'	639.000'	
639.000'	644.000'	

Slope







- **Soils:** Consistent with the urban history of both parks the majority of soils present are considered altered in origin. This means areas that were altered by filling or grading for buildings, parking lots, or other urban use in the past so that soil material has been excavated or deposited from nearby areas. Soils in this group found on the parks are:

1. Urban Land
2. Paxton-Urban land complex
3. Udorthents, smoothed

A little over 20% of the parks land area is made of non-altered soils. This soils are:

4. Woodbridge fine sandy loam
5. Paxton fine sandy loam
6. Chatfield-Hollis-Rock outcrop complex.

Both sandy loams are described as deep, well drained and are present at the tops of drumlins and in areas of glacial till uplands. The last of the soils, Chatfield Hollis Rock outcrop complex, is as the name says a soil characterized by being rocky, with stones that are 2 to 5 feet apart and cover 15% of the surface. The last three soils are of glacial origin and are consistent to soils found in central Massachusetts as a result of four major continental glaciers known to have occurred in this area.

Altered urban soils are very inconsistent and their characteristics are dependent on the materials used as fill. In this case soil map information is of little use as the conditions underground are not natural and do not depend on the sites geology. Any work proposed for these sites will have to include a more detail on site soil survey that can better inform the construction of park facilities.

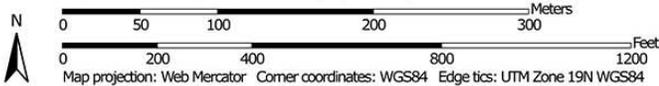
Soil Map—Worcester County, Massachusetts, Northeastern Part

Map Unit Legend

Worcester County, Massachusetts, Northeastern Part (MA613)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	8.2	19.0%
102C	Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes	2.2	5.0%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	3.0	7.0%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	4.4	10.2%
602	Urban land	0.1	0.2%
622C	Paxton-Urban land complex, 8 to 15 percent slopes	11.9	27.5%
651	Udorthents, smoothed	13.4	31.1%
Totals for Area of Interest		43.3	100.0%



Map Scale: 1:4,150 if printed on A landscape (11" x 8.5") sheet.



- **Hydrology:** Water is a vital component of many biological and physical processes that directly or indirectly support the lives of people, plants and wildlife. Water that comes from precipitation can be classified as either ground water or surface water. These exist in a delicate relationship with one another. The disruption of any part of the system such as modification of drainage patterns, can result in pollution through erosion and subsequent sedimentation or addition of polluted surface run off into water bodies which subsequently can pollute ground water systems.

The main physical features of Burncoat Park are its 6 ac pond and half acre skate pond. Both are manmade. The larger pond was dug at the time the park land was acquired and developed in the late 1880's, many years before a large portion of the park was taken for the construction of Route 290. The original pond was built on the marsh land surrounding the channel of Cole Mine Brook, a small stream that ultimately drained into Lake Quinsgamond. Only a small remnant of the original brook still exist south of Route 290. The rest of the brook got buried and disconnected with the construction of the interstate in the late 1960's. The smaller pond to the west, the skating pond as it is known by park users was dug after the main pond in 1898. At the time the pond was dug on marsh land that had a natural occurring spring that fed it. After construction the smaller pond was connected underground to the larger pond as means of controlling water level.

Like any other reservoir, the quality of its water is directly related to the source of the water that feeds it. The ponds at Burncoat Park have gone through major changes since their construction. These changes have resulted in the gradual deterioration of their water quality. The larger pond was first fed by Cole Mine Brook. As conditions changed it was later fed by the smaller skate pond and its natural occurring spring. As the city grew around the park, the ponds were connected to the cities storm water system to drain the roads and surrounding neighborhood. It seems that as underground water conditions changed the spring ran dry and both ponds were dependent on rain from drainage for its water supply. After the construction of I-290 during the 1960's, storm drains from the highway were also connected to the pond. As both ponds became solely dependent on rain water from the storm drain system the city in efforts to improve water quality installed a valve that diverted potable water to the ponds to control the water level and turbidity. We now know that using drinking water in this manner is a waste of a valuable resource and very costly. For these reasons the city has stopped the practice of adding clean drinking water to the pond.

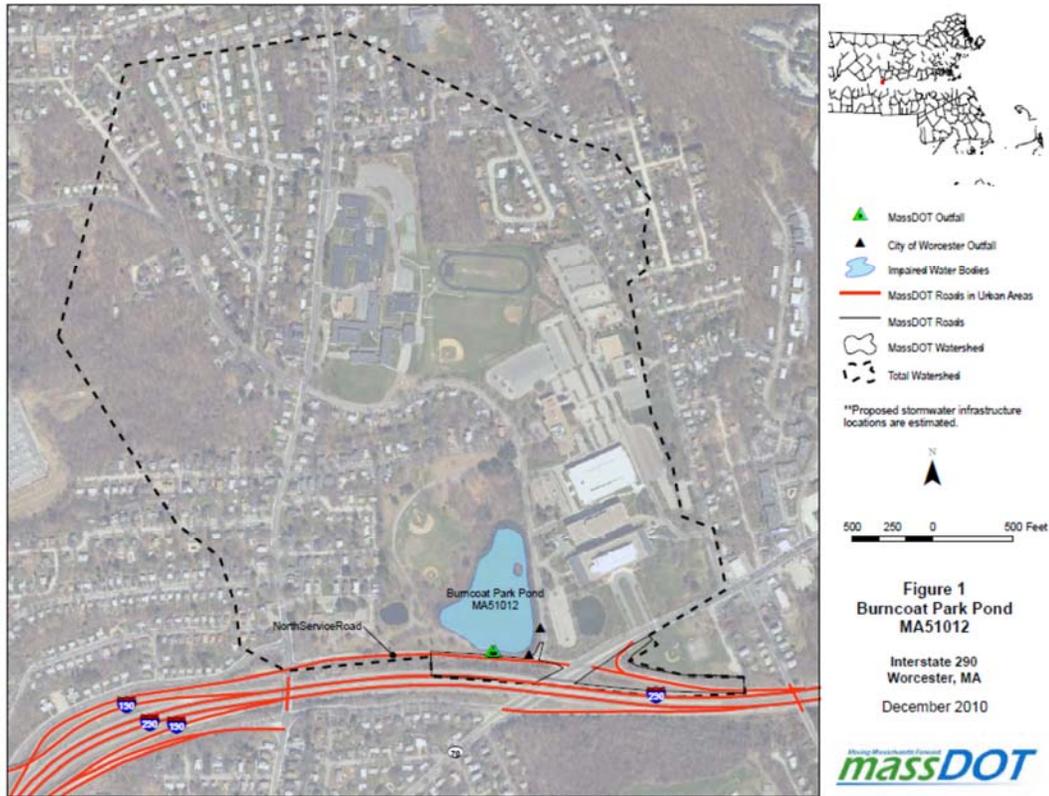
The water quality and levels of the pond have deteriorated quite drastically. Since 1996 the EPA and Massachusetts DEP, through its water quality assessment program has classified Burncoat Park pond as an Impaired Waterbody because of aquatic plants (macrophytes) and turbidity. DEP believes that this is caused by high levels of phosphorus and sediment in the storm water from road structures that drain into the pond. The objective of the program is to identify bodies of water that show signs of pollution, assess their conditions and give recommendations of ways to improve water quality. Burncoat Pond is listed as category 5, "Waters Requiring a TMDL (total maximum daily load)¹ Plan" on MassDEP's final Massachusetts Year 2012 Integrated

¹ A TMDL is the greatest amount of a pollutant that a waterbody can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, swimming, recreation, and fishing. A TMDL is implemented by specifying how much of that

List of Waters (Mass DEP). As of the date of this report, no TMDL plan has been established.

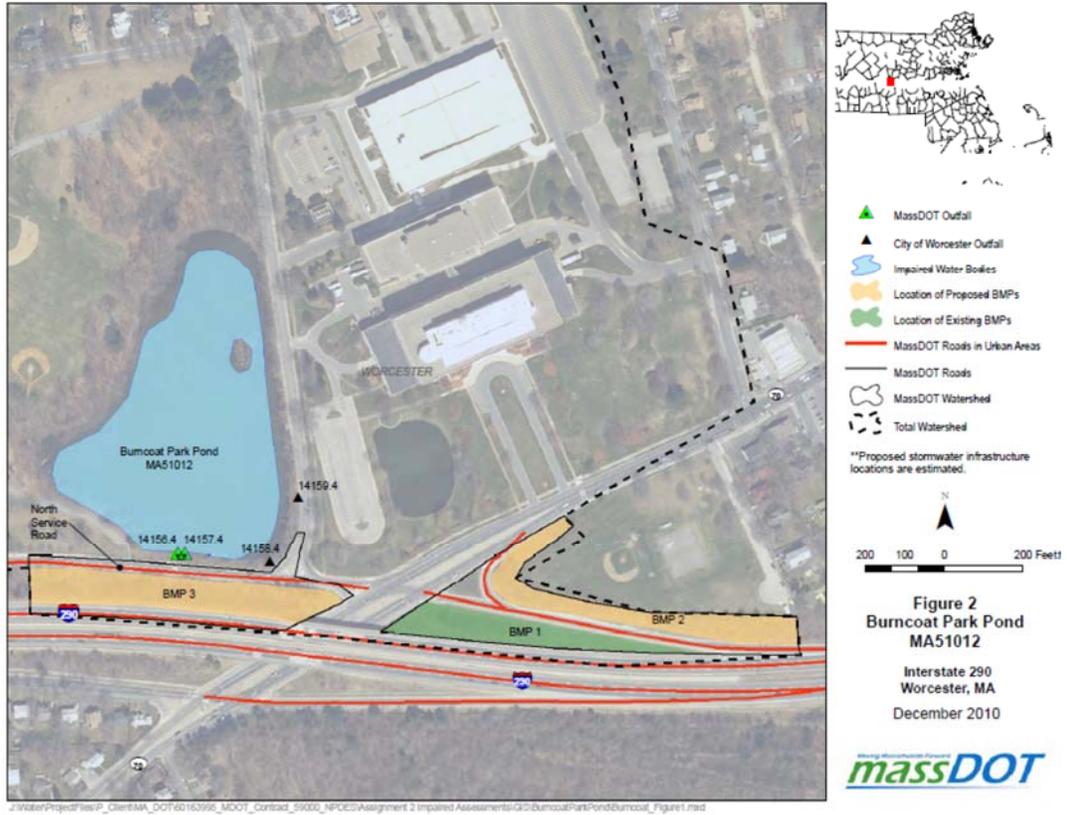
One of the objectives of the DEP Impaired Waters Program is to share the list of waters with Mass DOT for review under EPA’s NPDES MS4 General Permit Compliance. Any sources of pollution belonging to Mass DOT requires an assessment and implementation of best management practices (BMP) to achieve the required reduction of water pollution. Although the pond lacks a TMDL plan, Mass DOT has assessed their 2 outfalls from I-290 Service Road that drain to the pond, and developed a plan to reduce pollution in 2010. The resulting plan was put in place and a Progress to Final Report document published in 2013. The report concluded that Mass DOT had met its target to reduce impervious cover runoff to the pond through the implementation of BMPs recommended by the assessment (Mass DOT, 2013).

The assessment found that in addition to the two Mass DOT outfalls there are two other outfalls from North Parkway belonging to the City of Worcester. As part of this master plan a more thorough field survey was done by The Berkshire Design Group in 2013 that identified at least five other outfalls belonging to the City of Worcester, for a total of 7 structures draining into the ponds. In order to effectively implement a pond restoration program for Burncoat Park a complete TMDL assessment and a BMP plan has to be implanted that includes all sources of runoff that drain into the ponds.



Extents of watershed that drain to Burncoat Park Pond

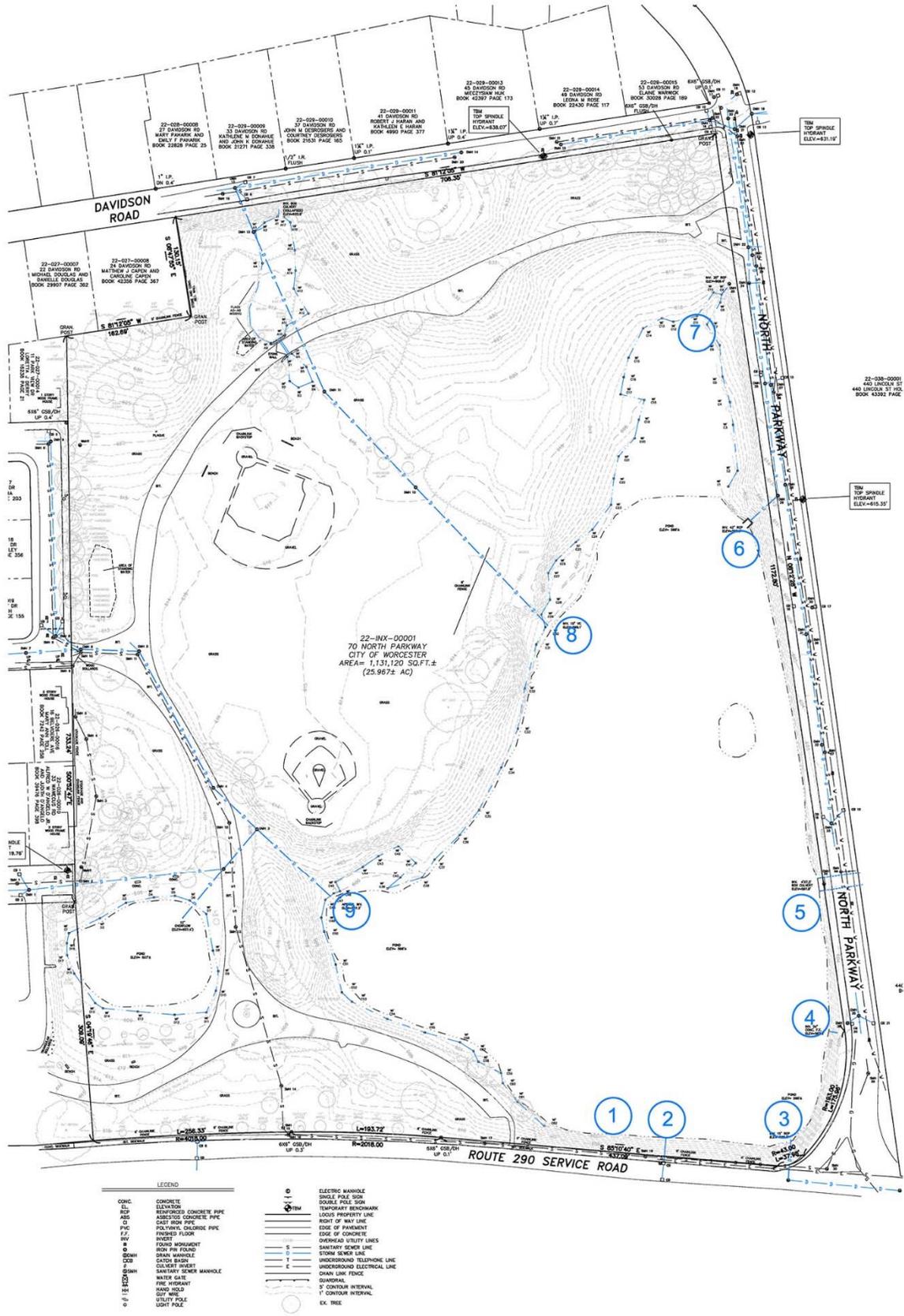
pollutant can come from point, nonpoint, and natural sources. The TMDL provisions require states to identify and list waterbodies that are threatened or not meeting water quality standards despite controls on point source discharges. (Mass DEP, n.d.)



Location of MassDOT and Worcester drainage outfall structures on Burncoat pond researched by MassDOT



Example of outfall structure and pond pollution



Location of MassDOT and Worcester drainage outfall structures on Burncoat pond as researched by BDG survey



Burncoat Park main pond turbid water



Burncoat Park small pond turbid water



Burncoat Park main pond

Cultural Features –

- **Park Context & Edges:** As important as the parks interior features are to its design, it is its context and edges which dictate its shape and users.

Burncoat Park: The Park lies within North Worcester’s North Lincoln Street Neighborhood and is bordered to the north by Davidson Road to the south by I-290 Service Road, to the east North Parkway Road and to the west by Parkview Drive, Belvidere Avenue, Wawecus Road and Wawecus Elementary School. Across from North Parkway is the corporate campus for Hanover Insurance. The surrounding residential streets give the park a neighborhood park feel. Trees separate the park from the road to the north, east and west. To the south the situation is different as only chain-link fence and a 6 ft. sidewalk separate the park to the I-290 Service Road.

Holland Rink: Even though Holland Rink shows up in US Census data as part of East Worcester’s Biotech neighborhood, geographically it is more connected to the Booth Apartments Area neighborhood because it is separated from the Biotech Neighborhood by I-290. The other edges of the park are non-residential with Lincoln Street and Hanover Insurance to the north and the I-290 exit ramp to both south and west. Chain link fence encloses the park on the south, west and north, while the east edge is open.



Worcester neighborhood map showing locations of both Burncoat Park & Holland Rink



Tree buffer towards Park Lane



Fence and sidewalk along I-290 Service Road



View of Wawecus Elementary School from Park



Overgrown vegetation along North Parkway



Old Burncoat Park Road curb cut opposite to Hanover Insurance corporate campus. Main entrance to Park. A clump of invasive Knot Weed can be seen on the left of the picture.



There are few views from North Parkway to the main pond



Bates Avenue dead end turnaround



Lincoln Street edge of the park



Looking out towards I-290 exit ramp from Holland Rink

- **Access, Parking & Circulation:** Pedestrian circulation and parking are major issues which strongly affects the master planning of Burncoat Park & Holland Rink. Neither park has a marked main entrance or formalized parking area.

Burncoat Park: There are numerous ways to enter Burncoat Park as a pedestrian, but none of this could be considered a “main entrance” with a distinctive landmark to identify it. This is confusing and makes pedestrians feel unsafe. The official entrance to the park is on the north corner of North Parkway, across from the entrance to Hanover Insurances multistory car park. Until the 1950’s this was the entrance to Burncoat Park Road, which bisected the park and connected the north to the south to vehicular traffic. After the taking of land from the southern portion of the park to build I-290, Burncoat Park road was discontinued but its paving never removed. Vehicular traffic is no longer allowed on the road and to this day the 22 ft wide paving has been used as an improvised promenade where park users walk and exercise. Originally intended for vehicular circulation, the paved road is not scaled to pedestrian use. There are three other smaller entrances to the park: One off of Route 290 Service Road to the south, one off of Belvidere Ave. and one off of Wawecus Road. The last two were originally built to connect the dead end streets to Burncoat Park Road. Today both entrances are blocked with concrete bollards to prevent cars from entering the park. Pedestrian circulation in the park is limited to the old discontinued Davidson Road, and a series of improvised dirt trails that follow the western edge of the main pond. There is no official parking area to the park. Most drivers park illegally along the surrounding neighborhood roads or on the discontinued Burn Coat Park Road entrance on North Parkway.

Holland Rink: Access, circulation and parking are virtually nonexistent on Holland Rink. The park does not count with any official entrance, however because of the grade change and chain-link fencing between Lincoln Street and the park, the only way of accessing the park is along Bates Avenue. There are no walkways or paths in the park, so that pedestrians enter by walking straight from the road to the parks turf. Similar to Burncoat, Holland Rink does not have any parking area, and users only option is to park illegally on Bates Ave.



Main entrance into Burncoat Park. Looking into park on left, looking out from the park on the right



22 ft wide Old Burncoat Park Road is used as pedestrian a walkway



Improvised trails on wooded areas of Burncoat Park



Parking is illegal along Bates Avenue, even though it's the only place to park to visit the park.



Corner of Bates Ave. and Lincoln St. looking west showing retaining wall and grade change



Corner of Lincoln St. and I-290 exit ramp looking towards east



Looking towards Holland Rink from I-290. Exit ramp in the front and Hanover Insurance building in the background

- **Inventory of Site Amenities & Recreational Uses:** Both Burncoat Park and Holland Rink offer active recreation opportunities to Worcester residents, but the site furnishings, sport equipment and playground feature, are showing signs of deterioration that limit their use and enjoyment.

Burncoat Park: The main recreational features are two baseball fields, one 60 foot and one 90 foot, located in the center of the park. Both fields have backstops that are rusted and need maintenance or replacement. Similar to the backstops, the turf on the fields is in bad shape with many bald and dead patches, weeds and uneven grading. In addition to baseball, the turf area is also used as soccer field for pickup games. Other ways people use the park for active recreation is by running/walking both on paved and dirt walkways. In winter, the neighborhood children make use of the steep slope grass area to the north for sledding.

As far as we could tell, the only site furnishings left are several benches located around the small pond. The concrete frames as well as the wood backs and seats are much deteriorated and need replacement

The amenities in Burncoat Park lack accessibility for people with disabilities. For example, no accessible parking spaces are provided at the park. Many of the entrances and sidewalks have slopes that are greater than allowed by the Americans with Disabilities Act. Paved surfaces have cracks that pose a tripping hazard. Sitting areas don't provide space for people on wheelchairs.

Holland Rink: Even though Holland Rink is smaller than Burncoat Park, it includes as many or more active recreation opportunities than its larger neighbor. While approaching the park from Bates Avenue we first enter the playground, which consists of two swing sets and a metal slide located amongst four mature maple trees. The equipment is outdated, rusted and does not meet current safety and accessibility guidelines. Beyond the playground, in the center of the park, there are two basketball courts surrounded by chain-link fence and lit by two light poles. Half of the pavement has been repaired, while the other half has large cracks and weeds growing. There are only 3 BB goals, two on the newly paved court and only one on the remaining court. Beyond the basketball court, lies a very small 60' baseball field. The distance from home plate to the edge of the park fence is only 150', making it too small for even minor league play.

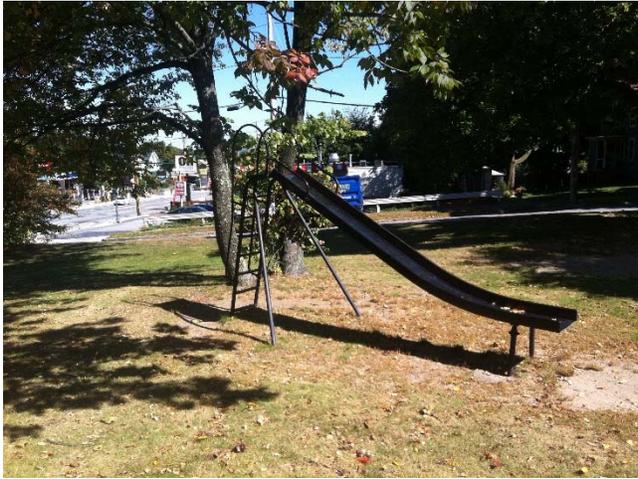
Like Burncoat Park the amenities at Holland Rink lack accessibility for people with disabilities. For example, no accessible parking spaces are provided at the park. Many of the entrances and sidewalks have slopes that are greater than allowed by the Americans with Disabilities Act. Paved surfaces have cracks that pose a tripping hazard. Sitting areas don't provide space for people on wheelchairs.



Burncoat Park baseball field in state of disrepair from poor turf conditions



Burncoat Park deteriorated baseball backstop



Holland Rink outdated metal slide, no safety surface



Holland Rink outdated swing set, no safety surface



Holland Rink deteriorated basketball court



Holland Rink small baseball field

Composite Analysis –

The composite analysis represents the culmination of research for this project. After reviewing the site inventory, value judgments were made to identify the physical problems of the site and potential improvements.

- ***Burncoat Park***
 - Dead trees and branches, especially around large pond, need to be removed and disposed of. A tree management plan needs to be put in action.
 - An invasive species management plan should be implemented
 - Further assess pond conditions and create a pond restoration plan
 - Improve visual and physical access to the ponds
 - Provide a formal woodland trail system that respects the natural flora and fauna
 - Walkway system needs renovation and re-design
 - Edges and entrances of the park need better definition
 - ADA accessible parking area needs to be provided
 - Park lacks signage of any kind
 - Missing opportunities for connecting park to rich historical context
 - Improve safety by attracting more park users and addressing the lack of pedestrian lighting
 - Playing fields and park amenities need to better fulfill current active recreation trends
 - Lawn/Turf areas need to be improved and a facilities maintenance plan implemented
 - General improvement of site amenities like benches, trash receptacles, etc.
 - Improve accessibility to the park by providing accessible parking spaces, accessible routes and accessible amenities.

- ***Holland Rink***
 - More park trees should be planted and turf/lawn areas improved
 - Edges and entrances of the park need better definition
 - ADA accessible parking area needs to be provided
 - There are no walkways to access or walk in the park
 - Park lacks signage of any kind
 - Improve safety by attracting more park users and addressing the lack of pedestrian lighting
 - Playground needs to be brought up to date with safe and accessible play structures and surfacing
 - Ball field does not fit in the park. Other active recreational uses should be explored that better fit the size of the park.
 - Basketball courts need to be replaced and adequate lighting provided
 - General improvement of site amenities like benches, trash receptacles, etc.
 - Improve accessibility to the park by providing accessible parking spaces, accessible routes and accessible amenities.

BURNCOAT PARK & HOLLAND RINK

TOMORROW

Master Plan Recommendations

The Master Plan covers a broad range of issues that affect the use, character, operation and care of Burncoat Park & Holland Rink. The recommendations put forward in the Master Plan allow for incremental improvements which can be undertaken on the basis of priority and available budget. The recommendations are a reflection of the goals and objectives identified earlier.

Visual Image –

The site's visual image consists of a montage of many elements, including quality and character of the site, overall appearance, signage, level of maintenance, transition areas between the exterior and interior of the park, and the visual appearance of active recreation facilities and the ponds (in the case of Burncoat Park). These are only a few of the major factors that contribute to a visitor's overall impression.

The site's visual impact creates a sense of place. To this end, efforts should be made to combine unity with variety in the design of all site improvements. Adoption of guidelines and standards for design continuity will help ensure that desired overall compatibility between site elements is maintained.

Goals and Objectives –

After three public meetings with neighbors, the district councilor and Worcester Department of Public Works representatives, several goals were established to guide the development of this master plan:

- Enhance public access & circulation
- Design for regional and local users
- Make park safe & secure for its users
- Provide opportunities for both active and passive recreation
- Protect natural resources (Burncoat Park)
- Improve pond health (Burncoat Park)
- Promote historical and environmental awareness/education (Burncoat Park)
- Improve overall access into and within the facilities

These goals reflect the desire to enhance public use of the parks while protecting its resources and maintaining the neighborhood park feel that both parks have. In addition to the goals outlined above, the neighbors offered their thoughts concerning the development of this plan:

- Maintain park main promenade (Burncoat Park)
- Provide a plan that will promote security and a sense of safety to park goers
- Maintain the "natural feel" around the main pond (Burncoat Park)
- Enhance views to the pond (Burncoat Park)
- Keep new parking to a minimum
- Preserve honorary name given to the basketball court(Holland Rink)
- Maintain and enhance the existing sledding hill (Burncoat Park)

- Support existing vegetation to preserve wild life habitat (Burncoat Park)
- Improve & maintain ponds (Burncoat Park)
- Improve outdated playground (Holland Rink)
- New skate park (Burncoat Park)
- Control street parking in surrounding neighborhood streets.
- Create a pedestrian loop around the shore of the Burncoat Park Pond (Burncoat Park)
- Negotiate a parking arrangement with neighbor insurance corporation campus

While it is not feasible within the constraints of this project to address all of the issues affecting Burncoat Park and Holland Rink, these items were kept in mind in order to shape a plan that could adapt to future changes.

Program Elements –

The establishment of project goals enabled the project team to develop a list of design elements for the master plan. These items include:

- **Improved Access:**
Burncoat Park: All entrances to the park will be improved. The access to the park located on the corner of North Parkway Drive and Davidson Road (north east corner) will become the main vehicular and pedestrian entrance. A 10 to 20 car parking area will be located here and will include ADA accessible spaces. To the west the three secondary accesses to the park located on Parkview Drive, Belvidere Avenue and Wawecus Road will be enhanced with new bollards and wood guardrails. The two entrances to the south on Service Road will have a new stair and ramp to handle the 6 foot grade change. All entrances to the park will include kiosks with photographs and historical information of the park.



3D Model - Burncoat Park new entrance and parking area North Parkway



3D Model - Burncoat Park new access to I-290 service road

Holland Rink: The Park will feature three new entrances. The main pedestrian entrance will be located on the corner of Lincoln Street and Bates Avenue. It will feature an entrance plaza with benches and new paving. The second entrance will be off of Lincoln Street and provide a more direct way to access the Park from Burncoat. The third entrance will be from Bates Avenue and will serve a new 15 to 25 space parking area. At the end of Bates Avenue a service gate is planned to allow maintenance vehicles into the park.

- **Walkway and Trail Improvement/Development:**
Burncoat Park: The old discontinued road currently used as the main walkway will be reduced in size from approx. 22 feet wide to 10 feet to bring it down to a scale more consistent to pedestrian use. A new 10 ft wide walkway will create a 1/3 of a mile exercise loop around the proposed sport fields. Additional secondary 6 foot wide paved walkways will be established to provide an overlook over the park. A 5 foot wide raised board walk path is planned around the edge of the Burncoat Park Pond. Both 10 foot wide main walkway and 6 foot wide secondary walkway will feature pedestrian lighting to help secure the site at night.



3D Model - Burncoat Park narrowed main walkway with exercise stations & benches



3D Model - Burncoat Park narrowed main walkway with pedestrian lighting



3D Model - Burncoat Park narrowed main walkway, pedestrian access to Park View Drive on the left and picnic area along multi-use playing fields



3D Model - Burncoat Park entrance to woodland trail next to main entrance



3D Model - Burncoat Park boardwalk along pond edge



3D Model - Burncoat Park board walk along pond edge at eye level



3D Model - Burncoat Park pond overlook next to playing fields

Holland Rink: The new 6 foot wide walkway will create an exercise loop path a little over 1/4 mile around the park. Two 6 foot wide walkways will divide the space into three main areas: playground, multiuse fields and basketball/handball courts.

- **Park Edge Improvements**

Burncoat Park: The plan proposes that guardrail be installed along the east, north and west edges of the park. The south edge of the park adjacent to Service road will have a six foot high chain link fence separating the park from the road.



3D Model - Burncoat Park chain link fence along I-290 Service Road

Holland Rink: The existing five foot high chain link fence along Interstate 290 exit ramp to the south will remain as it is now and will only need maintenance. That same fence currently wraps around the west corner and follows Lincoln Street for approx. another 300 feet. Only a new gate is proposed on the fence. An existing concrete and stone retaining wall continues along Lincoln Street as the grade in the park changes up to four feet higher than the road. The corner of Lincoln and Bates Avenue will see a new entrance plaza. New wood guardrail is planned for the edge along Bates Avenue and the new parking area.

- ***Opportunities for Passive Recreation***

Burncoat Park: The park plan includes a pedestrian circulation system (wide walkways, narrow walkways, woodland trails and wetland/pond boardwalk) that provide opportunities for passive recreation while minimizing conflicts with active users. Natural woodlands, wetlands and pond areas will be preserved and managed to allow for wildlife observation, fishing and passive enjoyment. Open lawn, bench

seating and picnic areas adjacent to the walkways and ponds enable visitors to sit, bask and enjoy the views.



3D Model - Burncoat Park accessible fishing pier with skate park in the background

Holland Rink: Even though Holland Rink's program is mostly active, the plan provides for walkways, benches and picnic areas for park goers to enjoy.

- ***Programmed Active Recreation***

Burncoat Park: Two (300' X 180') lighted multiuse fields will be the center of the active recreation component at the park. The park will also include a new lighted softball field, playground, street style skate park and exercise stations along the main walkways. Both playground and skate park have been located away from residential neighbors and closer to the elementary school.



3D Model - Burncoat Park detail of playing field, pond lookout in the background



3D Model - Burncoat Park playing fields with sport lighting



3D Model - Burncoat Park new softball field, fencing & retainingwall



3D Model - Burncoat Park playground, small pond and I-290 service road buffer planting in background



3D Model - Burncoat Park street style skate park overview



3D Model - Burncoat Park street style skate park detail with main pond in the background

Holland Rink: Structured and non-structured sport opportunities have been provided by the plan: formal spaces for basketball and handball; and more open play options on the smaller multi use playfields and playground area. Four exercise stations along the walkway complete the active recreation program for the park.



Example of handball courts for Holland Rink



Example of multiuse goal for basketball courts Holland Rink



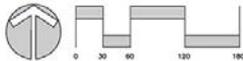
- ***Pond Maintenance and Improvements***

Water quality will be improved at both of Burncoat Park ponds by providing better aeration, cleaning out dead vegetation around the ponds and with the installation of a well to stabilize water levels. A pond maintenance plan will be implemented that addresses the runoff pollution from the City of Worcester storm drain outfalls.

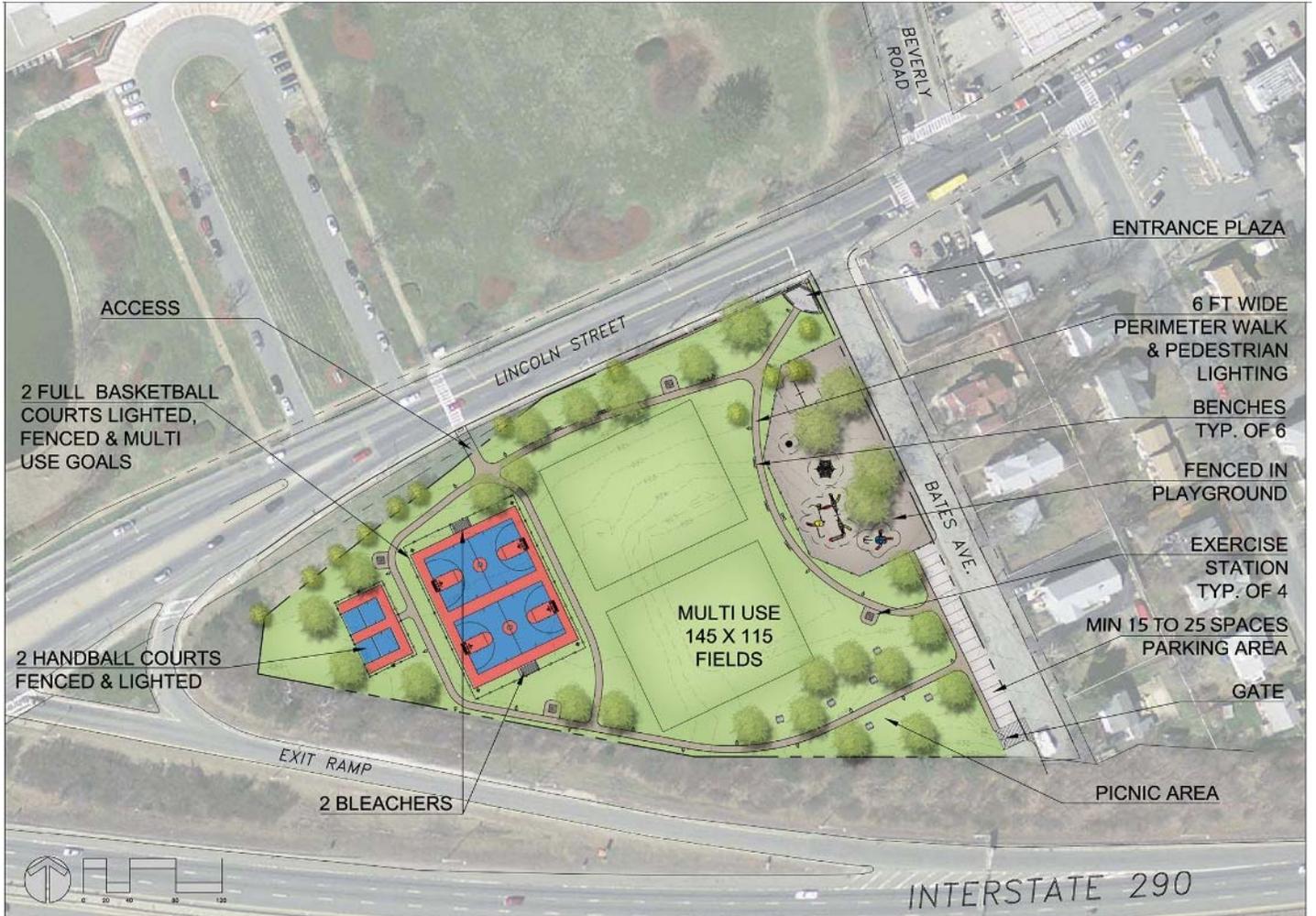


3D Model - Burncoat Park main pond showing example of aeration (fountain)

FINAL MASTER PLAN BURNCOAT PARK



FINAL MASTER PLAN HOLLAND RINK



BURNCOAT PARK & HOLLAND RINK

IMPLEMENTATION

Implementation

The first major achievement in the development process will be accomplished – the development of a Master Plan. The next step will be to secure the future of the document with the adoption by the Worcester Parks & Recreation Commission and the City Council. With this in hand, the second major part of the process can begin: implementation of the Master Plan proposals.

Some proposals made by the Master Plan are modest, others are ambitious and far-reaching. Their implementation cannot be accomplished immediately, nor should they be. Initial improvements will help to build consensus and momentum for further, more complex and costly projects.

Initial funding will begin to realize the Master Plan’s visions by demonstrating a commitment to the parks and signaling the beginning of an era of systematic development.

Two important components of the Master Plan’s intent are to provide a blueprint for phased development and stimulate further public investment. It is critical that the process of investment in Burncoat Park and Holland Rink be long-term and ongoing, and both the Plan and initial implementation can set the direction and provide the inspiration for that. These are large issues and major proposals on which the future of the park rests.

Maintaining each element of the park landscape and structures after its construction becomes a continual process. Provided a park is well designed and constructed, it should have an extended working life. If properly maintained and repaired, it should function for many generations. Optimum standards of maintenance are those that enable the facilities to reach the end of their working life functioning properly.

Implementation Costs –

The itemized costs shown in this estimate include the unit costs, total costs, and unit of measure as shown below:

AC	Acre	CY	Cubic Yard
EA	Each	SF	Square Foot
LS	Lump Sum	SY	Square Yard

Costs shown in the following estimate include contractor’s 10% overhead and profit and a 10% contingency allowance and are computed based on 2014 dollars. Estimate is conceptual and will require adjustment once detailed design for each area is completed.

The grand total of the Burncoat Park and Holland Rink Master Plan proposals is \$9.57 million dollars and is broken down on the following pages.

Burncoat Park

Worcester, Massachusetts

Opinion of Probable Cost

Prepared by: *The Berkshire Design Group, Inc.*

4/18/2014

REV 5/30/2014

<i>Item</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total</i>
Demolition				
1. Mobilization	LS	1	\$10,000.00	\$10,000.00
2. Temporary Signage & Traffic Control	LS	1	\$5,000.00	\$5,000.00
3. Remove Backstop	EA	2	\$1,050.00	\$2,100.00
4. Remove CL Fence Service Road	LF	1100	\$16.00	\$17,600.00
5. Manhole / CB	EA	7	\$525.00	\$3,675.00
6. Erosion Control	LF	3000	\$7.00	\$21,000.00
7. Clear and Grub Vegetation	AC	3	\$3,500.00	\$10,500.00
8. Remove Bit. Conc. Road	SY	6600	\$4.00	\$26,400.00
9. Selective Pruning and Cleaning Around Pond	LS	1	\$20,000.00	\$20,000.00
10. Remove Bit Conc Curb	LF	100	\$6.50	\$650.00
			Subtotal	\$116,925.00
Earthwork/Site Preparation				
1. Earthwork/Grading (331,370 x 6" ave)	CY	6140	\$4.00	\$24,560.00
2. Strip Topsoil and screen (252,000 x 6")	CY	4700	\$7.00	\$32,900.00
			Subtotal	\$57,460.00
Site Drainage				
1. Catch Basin	EA	4	\$2,800.00	\$11,200.00
2. 12" Drain Pipe	LF	1030	\$25.00	\$25,750.00
3. Rain Garden	LS	1	\$9,300.00	\$9,300.00
4. Adjust Existing Catch Basin	EA	7	\$450.00	\$3,150.00
			Subtotal	\$49,400.00
Paving & Curbing				
1. 3.5" Bit. Conc. Parking Pavement	SF	4,110	\$5.00	\$20,550.00
2. Bit Conc. Curb	LF	340	\$5.00	\$1,700.00
3. 3" Bit. Conc. Walk Pavement (80420 sf)	SF	80,420	\$4.25	\$341,785.00
4. Crosswalk Painting	EA	3	\$450.00	\$1,350.00
5. Cantilevered Boardwalk (if allowed)	LF	1570	\$390.00	\$612,300.00
6. Wetland Boardwalk	LF	1,150	\$390.00	\$448,500.00
			Subtotal	\$1,426,185.00
Site Furnishings				
1. HC Picnic Table - Metal Permanent	EA	11	\$2,500.00	\$27,500.00
2. Park Bench	EA	20	\$2,600.00	\$52,000.00
3. Litter Receptacle	EA	10	\$700.00	\$7,000.00
4. Bike Rack	EA	2	\$1,000.00	\$2,000.00
5. Wood Guard Rail	LF	4000	\$40.00	\$160,000.00
6. 6' C.L. Fencing	LF	600	\$55.00	\$33,000.00
7. Park Directional Sign	EA	1	\$400.00	\$400.00
8. Security Gate	EA	2	\$10,000.00	\$20,000.00
9. Exercise Station	EA	6	\$7,000.00	\$42,000.00
10. Wetland Educational Sign	EA	1	\$2,500.00	\$2,500.00
11. Park Sign/Kiosk	LS	6	\$4,000.00	\$24,000.00
12. Pedestrian Lighting	EA	45	\$7,000.00	\$315,000.00
13. Accessible Fishing Pier	LS	1	\$60,000.00	\$60,000.00
			Subtotal	\$745,400.00

Skate Park - Street Style				
1. Concrete Street Style Skate park	LS	1	\$350,000.00	\$350,000.00
2. Cl Fencing 6ft	LF	550	\$55.00	\$30,250.00
			Subtotal	\$380,250.00
Playground				
1. New Playground	LS	1	\$500,000.00	\$500,000.00
			Subtotal	\$500,000.00
Multi Use Fields				
1. Lighting	EA	2	\$250,000.00	\$500,000.00
			Subtotal	\$500,000.00
Softball Field				
1. New Softball Field	LS	1	\$150,000.00	\$150,000.00
2. Retaining Wall & Fencing	LS	1	\$90,000.00	\$90,000.00
2. Lighting	LS	1	\$100,000.00	\$100,000.00
			Subtotal	\$340,000.00
Planting & Seeding				
1. Hydro seed & Fertilize	SY	23700	\$1.50	\$35,550.00
2. Large/Shade Tree	EA	30	\$700.00	\$21,000.00
			Subtotal	\$56,550.00
Pond Restoration				
1. Pond Aeration	LS	1	\$20,000.00	\$20,000.00
2. Well to Stabilize Water Level	LS	1	\$250,000.00	\$250,000.00
			Subtotal	\$270,000.00
			TOTAL	\$4,442,170.00
			Contractor O&P (20%)	\$888,434.00
			Contingency (15%)	\$666,325.50
			TOTAL CONSTRUCTION	\$5,996,929.50
			20% Soft Cost	\$888,434.00
			<u>TOTAL PROJECT</u>	<u>\$6,885,363.50</u>

Note: This opinion of probable cost is NOT a guaranteed amount, and may vary due to uncontrollable fluctuations in labor prices and material prices. The amount shown is based on our professional judgment, and current-year pricing for similar work in the region of the project.

Holland Rink Worcester, Massachusetts

Opinion of Probable Cost

Prepared by: *The Berkshire Design Group, Inc.*

4/18/2014

<i>Item</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total</i>
<i>Demolition</i>				
1. Mobilization	LS	1	\$5,000.00	\$5,000.00
2. Temporary Signage & Traffic Control	LS	1	\$2,500.00	\$2,500.00
3. Remove Backstop	EA	1	\$1,050.00	\$1,050.00
4. Remove CL Fence	LF	840	\$16.00	\$13,440.00
5. Manhole / CB	EA	2	\$525.00	\$1,050.00
6. Erosion Control	LF	1700	\$7.00	\$11,900.00
7. Remove Tree	EA	15	\$350.00	\$5,250.00
8. Remove Bit. Conc. Basketball Court	SY	1200	\$4.00	\$4,800.00
9. Remove Play Equipment	LS	1	\$3,000.00	\$3,000.00
10. Remove Secc. Retaining Wall	LS	1	\$2,000.00	\$2,000.00
11. Remove Bit Conc Curb	LF	260	\$6.50	\$1,690.00
			<i>Subtotal</i>	\$51,680.00
<i>Earthwork/Site Preparation</i>				
1. Earthwork/Grading (117,000 x 6" ave)	CY	2200	\$4.00	\$8,800.00
2. Strip Topsoil and screen (86,000 x 6")	CY	1600	\$7.00	\$11,200.00
			<i>Subtotal</i>	\$20,000.00
<i>Site Drainage</i>				
1. Catch Basin	EA	1	\$2,800.00	\$2,800.00
2. 12" Drain Pipe	LF	250	\$25.00	\$6,250.00
4. Adjust Existing Catch Basin	EA	1	\$450.00	\$450.00
			<i>Subtotal</i>	\$9,500.00
<i>Paving & Curbing</i>				
1. 3.5" Bit. Conc. Parking Pavement	SF	4,500	\$5.00	\$22,500.00
2. Bit Conc. Curb	LF	180	\$5.00	\$900.00
3. 3" Bit. Conc. Walk Pavement (10750 sf)	SF	10,750	\$4.50	\$48,375.00
4. Crosswalk Painting	EA	1	\$450.00	\$450.00
5. Plaza Paving	LS	1	\$15,000.00	\$15,000.00
6. Bench & Exercise Sta. Pad	SF	930	\$4.50	\$4,185.00
			<i>Subtotal</i>	\$91,410.00
<i>Site Furnishings</i>				
1. HC Picnic Table - Metal Permanent	EA	6	\$2,500.00	\$15,000.00
2. Park Bench	EA	6	\$2,600.00	\$15,600.00
3. Litter Receptacle	EA	3	\$700.00	\$2,100.00
4. Bike Rack	EA	1	\$1,000.00	\$1,000.00
5. Wood Guard Rail (new parking)	LF	175	\$40.00	\$7,000.00
6. 4' C.L. Fencing (along Franklin Road)	LF	70	\$45.00	\$3,150.00
8. Security Gate	EA	1	\$10,000.00	\$10,000.00
9. Exercise Station	EA	4	\$7,000.00	\$28,000.00
11. Park Sign/Kiosk	LS	1	\$4,000.00	\$4,000.00
12. Pedestrian Lighting	EA	23	\$7,000.00	\$161,000.00
			<i>Subtotal</i>	\$246,850.00

Basketball Court

1. Bit. Conc. Court Paving	SF	13110	\$12.00	\$157,320.00
2. Court Color Seal & Line Painting	SY	1430	\$40.00	\$57,200.00
3. Cl Fencing 6ft	LF	525	\$55.00	\$28,875.00
4. Basketball Goals Free Game Multi Sport	PR	2	\$40,000.00	\$80,000.00
5. Court Lighting	LS	1	\$180,000.00	\$180,000.00
			Subtotal	\$503,395.00

Handball Court

1. Conc. Court Paving	SF	2800	\$35.00	\$98,000.00
4. Conc. Wall & Footing	LS	1	\$85,000.00	\$85,000.00
2. Line Painting	SY	155	\$30.00	\$4,650.00
3. Cl Fencing 6ft	LF	255	\$55.00	\$14,025.00
5. Court Lighting	LS	1	\$180,000.00	\$180,000.00
			Subtotal	\$381,675.00

Playground

1. New Playground	LS	1	\$380,000.00	\$380,000.00
2. CL Fencing 4ft	LF	545	\$35.00	\$19,075.00
			Subtotal	\$399,075.00

Planting & Seeding

1. Hydro seed & Fertilize	SY	9700	\$1.50	\$14,550.00
2. Large/Shade Tree	EA	20	\$700.00	\$14,000.00
			Subtotal	\$28,550.00

TOTAL **\$1,732,135.00**

Contractor O&P (20%) **\$346,427.00**

Contingency (15%) **\$259,820.25**

TOTAL CONSTRUCTION **\$2,338,382.25**

20% Soft Cost **\$346,427.00**

TOTAL PROJECT **\$2,684,809.25**

Note: This opinion of probable cost is NOT a guaranteed amount, and may vary due to uncontrollable fluctuations in labor prices and material prices. The amount shown is based on our professional judgment, and current-year pricing for similar work in the region of the project.

BURNCOAT PARK & HOLLAND RINK

EPILOGUE

The Master Plan for the future improvement of Burncoat Park and Holland Rink represents a major new stage of the parks development. It builds on the exciting activities and events from the past. It recognizes the needs of the present and expresses high hopes for the future. Through this plan, a long term commitment is being made by the City of Worcester to preserve, protect and nurture this important asset to the City and its Neighborhoods. As the recommendations presented in this plan are implemented, the parks will become places where all residents of Worcester will be able to come to relax, partake in active recreation, enjoy and respect the natural environment and each other.

BURNCOAT PARK & HOLLAND RINK

APPENDIX

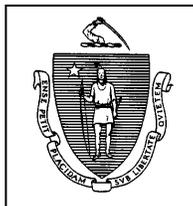
Department of Environmental Protection
Blackstone River Watershed
2003-2007 Water Quality Assessment Report
Page 99 Burncoat Park Pond

BLACKSTONE RIVER WATERSHED 2003 - 2007 WATER QUALITY ASSESSMENT REPORT



The Blackstone River, Millville, MA

**COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
IAN BOWLES, SECRETARY
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
LAURIE BURT, COMMISSIONER
BUREAU OF RESOURCE PROTECTION
GLENN HAAS, ACTING ASSISTANT COMMISSIONER
DIVISION OF WATERSHED MANAGEMENT
GLENN HAAS, DIRECTOR**



BURNCOAT PARK POND (MA51012)

Location: Worcester
Size: 6 Acres
Classification: B
2008 303(d) List: Category 5

This segment is on the 2008 Integrated List of Waters in Category 5 - Waters Requiring a TMDL (Noxious aquatic plants, Turbidity) (MassDEP 2008a).

NPDES (APPENDIX H):
Worcester (MAS010002)

DESIGNATED USE ASSESSMENT

No recent quality assured data are available so all uses are not assessed.

Burncoat Park Pond (MA51012) Use Summary Table

Designated Uses		Status
Aquatic Life		NOT ASSESSED
Fish Consumption		NOT ASSESSED
Primary Contact		NOT ASSESSED
Secondary Contact		NOT ASSESSED
Aesthetics		NOT ASSESSED

MASS DOT HIGHWAY DIVISION

National Pollutant Discharge Elimination System (NPDES)

Storm Water Management Plan

BMP 7U – Water Quality Impaired Waters Assessment and
Mitigation Plan Process

BMP 7U: Water Quality Impaired Waters Assessment and Mitigation Plan

MassDOT has created a dedicated program to assess 303(d) listed impaired waters ("303(d) waters") and to implement mitigation measures, including retrofits and other structural BMPs where necessary, to control discharges of pollutants of concern in 303(d) waters and ensure that stormwater discharges from MassDOT's urbanized roadways will not cause instream exceedances of water quality standards. This program (hereinafter the "Impaired Waters Program") covers both 303(d) waters for which MassDEP has finalized Total Maximum Daily Load ("TMDL") reports for all impairments ("Category 4a" waters), and those for which TMDL reports either have not been finalized or do not cover all impairments affecting the 303(d) water ("Category 5" waters). MassDOT will assess its compliance with TMDL reports under the procedures outlined in BMP 7R/TMDL Watershed Review.

The Impaired Waters Program will cover a total of 684 impaired waters, which includes all 303(d) waters whose sub-basins contain some portion of MassDOT's urbanized area roadways. In order to compile this list, MassDOT analyzed the water bodies listed in Appendix A of its Stormwater Management Plan ("SWMP") with new watershed data prepared by the United States Geological Survey ("USGS"). The new watershed layers permitted mapping of more detailed sub-basin watersheds and, in turn, allowed for more accurate identification of the water bodies that have a potential to receive stormwater discharges from MassDOT's urbanized roadways. The analysis used to develop the original Appendix A used larger watersheds that often included multiple water bodies, some of which were not impaired. As Appendix A listed all waters where such larger watersheds included some portion of MassDOT's urbanized roadways, it represented an over-inclusive listing of 303(d) waters with potential discharges from MassDOT roads.

MassDOT will prioritize its review of the 303(d) waters described above by geographical factors to identify those waters on which MassDOT's urbanized roadways may have the highest impact. Specifically, MassDOT will place highest priority on those waters that lie within 500 feet of at least one stormwater outfall from an urbanized roadway, and will prioritize this group by the total number of outfalls within this 500-foot area. MassDOT's review of the remaining water bodies will be prioritized by the number of urbanized roadway lane miles existing within the sub-basins of such waters. A comprehensive list of the 303(d) waters to be assessed under the Impaired Waters Program, prioritized by the geographical factors above, appears in Appendix L-1.

The specific steps that MassDOT will use to assess 303(d) waters are as follows:

Step 1. Identify Impairments Related to Highway Stormwater Runoff

As an initial step, MassDOT will review the underlying impairments affecting the 303(d) waters to identify those that may be impaired by pollutants contained in highway stormwater runoff. In completing this step, MassDOT will rely on existing data (such as USGS data provided to MassDOT in 2009, which surveyed pollutants in highway runoff from Massachusetts highways) to assess whether highway runoff may be causing the impairment in question. If existing data support a potential link between the impairment and highway runoff, MassDOT will proceed with step 2. If not, MassDOT will document the basis for this conclusion and will conduct no further assessment of the water body at issue.

Step 2. Map Locations of MassDOT Outfalls Relative to 303(d) Waters

MassDOT will perform a desktop review of the sub-basin of the 303(d) water body to determine the specific locations of MassDOT outfalls and their receiving waters. This procedure will help determine whether MassDOT's outfalls in fact are potentially discharging into the water body at issue, and will identify the number of outfalls that may need to be addressed through a mitigation plan. If MassDOT concludes based on its mapping that MassDOT's outfalls clearly are not discharging to the 303(d) water, it will document the basis for this conclusion and will conduct no further assessment of the water body at issue. However, if

MassDOT concludes that MassDOT outfalls are potentially discharging to a 303(d) water body, then it will proceed to Step 3.

Step 3. Conduct Site Survey of Discharge Points and Drainage Infrastructure

If a 303(d) water is identified under Step 2 as potentially receiving discharges from MassDOT's urbanized roadways, MassDOT will conduct a site visit to survey the discharge points to the water body and the surrounding drainage infrastructure. This survey will identify water flows to the water body, confirm the existence of mapped outfalls, identify any additional outfalls, and identify any existing BMPs or other structures at the site that may have the effect of removing or treating pollutants before they reach the receiving water. Where appropriate, MassDOT will combine this site visit with its illicit discharge detection program (BMP 3D), which will identify non-stormwater pollutants that may be causing the impairment at issue.

Step 4. Identify Control Measures and BMPs to Ensure that Stormwater Discharges Will Not Cause Exceedances in Water Quality Standards

Once the site visit in Step 3 is completed, MassDOT will assess whether additional control measures and other BMPs may be needed to ensure that stormwater discharges from MassDOT's urbanized roadways will not cause exceedances of water quality standards.

"EPA's policy recognizes that because stormwater discharges are due to storm events that are highly variable in frequency and duration and are not easily characterized, only in rare cases will it be feasible or appropriate to establish numeric limits for . . . stormwater discharges." EPA Memorandum, "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Stormwater Sources and NPDES Permit Requirements Based on Those WLAs" (Nov. 22, 2002) (the "2002 Memorandum"). As stated in the 2002 Memorandum: "The variability in the [National Pollutant Discharge Elimination] [S]ystem and minimal data generally available make it difficult to determine with precision or certainty actual and projected loadings for individual dischargers or groups of dischargers. Therefore, EPA believes that in these situations, permit limits typically can be expressed as BMPs, and that numeric limits will be used only in rare cases."

In light of the EPA's guidance on the "rare" use of numeric standards, MassDOT will rely on an iterative adaptive approach to identify and implement additional control measures or BMPs at particular sites. As part of this approach, MassDOT will consider currently available data on pollutants in highway stormwater runoff, including USGS data and any applicable numeric water quality standards, to assess whether stormwater runoff from MassDOT's urbanized roadways has a reasonable potential to cause an exceedance of water quality standards. MassDOT will place priority in its assessment and mitigation plan on those pollutants where the existing data suggest that the concentration of the constituent of concern in highway stormwater may exceed the applicable numeric water quality standard. MassDOT also will consider any available information, including guidance issued by the EPA and MassDEP, and where obtainable, specific input from the EPA, regarding the types of BMPs that are considered effective for addressing the impairment at issue (including where the impairment is governed by non-numeric, narrative water quality standards). Where appropriate, MassDOT will consider recommendations in TMDL reports that relate to the same or similar impairments. MassDOT will seek to complete its assessments as efficiently as possible, so that any required control measures or other BMPs can be implemented without undue delay.

In assessing the need for additional BMPs at particular sites, MassDOT will consider the pollutant removal efficiencies of any existing BMPs or other structures that may have the effect of removing or treating pollutants before they reach the receiving water. MassDOT will also consider additional factors, including site constraints and the magnitude of any potential exceedance of water quality standards, in assessing the precise scope and extent of additional BMPs. MassDOT will document the basis for its recommendations,

and will describe how such recommendations will ensure that stormwater discharges from MassDOT's urbanized roadways will not cause exceedances of water quality standards. Where the potential impact on 303(d) waters from MassDOT's urbanized roadways is greater and site conditions allow for more construction in surrounding areas, MassDOT is committed to devoting substantial resources to implement effective BMPs, including retrofits or other structural BMPs, to mitigate stormwater effects at those locations.¹

Step 5. Design and Implement BMPs

For those 303(d) waters that require additional BMPs, MassDOT will create conceptual designs of any required structural BMPs and develop protocols for the implementation of non-structural BMPs. MassDOT plans to implement BMPs, including structural BMPs, on a rolling basis as the need is identified and funding is secured.²

In selecting the specific structural BMPs to be implemented at particular sites, MassDOT will rely on its BMP Summary Matrix and related tables, attached as L-2 to L-4. These tables list a variety of structural BMPs that MassDOT will consider for particular sites, along with estimated pollutant removal rates for each BMP as applied to particular pollutants and types of site conditions. The tables also prioritize the menu of BMPs in order of preference for the listed pollutants and site conditions. As reflected in the BMP Summary Matrix and related tables, MassDOT will rely on standard pollutant removal efficiencies set forth in EPA and MassDEP guidance to measure the effectiveness of existing and additional BMPs. MassDOT will conduct training for its external designers and contractors to encourage the use of the most effective and site-appropriate BMPs.

Step 6. Documentation

MassDOT will include in each annual report an update on its progress in assessing and mitigating 303(d) waters, and will provide a semi-annual report to the EPA during the first year of the Impaired Waters Program (by December 8, 2010). MassDOT will document its progress in a standardized format, which includes the name of the 303(d) water body, the underlying impairment(s), the applicable numeric or narrative water quality standard(s), a summary of MassDOT's assessment and mitigation plan, and a report on the status of any planned implementation of additional control measures or BMPs. These reports will clearly document the basis of any conclusions reached by MassDOT regarding the need or lack of need for BMPs at specific sites.

Measurable Goals: 1) Assess all water listed in Appendix L-1 using the process described in this BMP including assessment of at least 25 water bodies within the first quarter of the Impaired Waters Program 2) Submit quarterly progress reports to EPA during the first year of the Impaired

¹ For instance, interstate roads represent one example of a location where the potential impact on neighboring water bodies is greater and site conditions generally allow for more construction. By contrast, the existence of a bridge over a 303(d) water places difficult space constraints on any BMP design, and will likely warrant a more comprehensive redevelopment project. MassDOT intends to aggressively seek opportunities in pending construction projects to implement structural BMPs that would be impracticable as stand-alone projects.

² MassDOT will later include in this BMP a more detailed schedule for the implementation of structural BMPs and a plan for securing new funding. However, even before new funding is secured, MassDOT is prepared to begin design and construction, using its existing contracts, of any additional BMPs that are proposed in the first quarter of the Impaired Waters Program. MassDOT also has begun the process of securing two additional contracts of \$1 million each for dedicated design consultants who will be responsible for designing retrofits and other structural BMPs as soon as the need is identified through the assessment procedures described above.

Waters Program and semi-annually thereafter.3) Provide documentation described in step 6 in annual reports to the EPA.

MASS DOT HIGHWAY DIVISION

MassDOT Quarter 2 Submittal (September 8 – December 7, 2010)

NPDES MS4 General Permit Compliance Water Quality Impaired Waters
Assessment and Mitigation Plan

Pages 1-7 Burncoat Park Pond



MassDOT Quarter 2 Submittal
(September 8 – December 7, 2010)

**NPDES MS4 General Permit Compliance
Water Quality Impaired Waters Assessment and
Mitigation Plan**

December 8, 2010

Impaired Waters Assessment for Burncoat Park Pond (MA51012)

Impaired Waterbody

Burncoat Park Pond (Segment MA51012)

Impairments

Mass DEP 2008 303d List: noxious aquatic plants, turbidity

Mass DEP 2010 Draft 303d List Changes: none

Relevant Water Quality Standards – Water Body Class: B

- 314 CMR 4.05 (3)(b) 6 Color and Turbidity. These waters shall be free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to this class.
- 314 CMR 4.05 (5)(a) Aesthetics. All surface waters shall be free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum or other matter to form nuisances; produce objectionable odor, color, taste or turbidity; or produce undesirable or nuisance species of aquatic life.

Site Description

Burncoat Park Pond (MA51012) is a 6.3 acre pond located in Worcester just north of Interstate 290 (I-290) with a 271-acre contributing watershed (Figure 1). MassDOT owns I-290 and North Service Road, both of which are within the Burncoat Park Pond watershed. North Service Road is adjacent to Burncoat Park Pond on the southern side of the pond. I-290 parallels the North Service Road to the south. I-290 is elevated and its abutment slopes steeply down to the North Service Road.

Based on an automated review of GIS data and MassDOT's Appendix L-1 of Impaired Waterbodies included in BMP 7U (dated July 22, 2010), it was originally determined that MassDOT has one outfall within 500 feet of Burncoat Park Pond. A field investigation on November 3, 2010 found that MassDOT roadways drain to Burncoat Park Pond through four outfalls, two of which are MassDOT outfalls (AECOM ID 14156.4 and 14157.4), while the other two (AECOM ID 14159.4 and 14158.4) are City of Worcester outfalls (Figure 2).

Outfall 14156.4 collects storm water runoff from North Service Road between the intersection of North Parkway and the North Service Road (at the east) and the high point on North Service Road approximately 250 feet to the west. North Service Road is bounded by curbing which directs all storm water to two catch basins that discharge through Outfall 14156.4 directly into the pond. MassDOT's contributing area to this outfall is approximately 0.55 acres of paved roadway.

Outfall 14157.4 collects storm water from the elevated portion of I-290 (0.45 acres of MassDOT roadway) and the vegetated area between I-290 and the North Service Road (1.5 acres vegetated) through a catch basin located within the vegetated area. Runoff from the paved roadway and shoulder drains to a catch basin on I-290 that discharges to a headwall structure within the vegetated area. The headwall structure provides detention control which results in sediment removal. Runoff that reaches the vegetated area via the headwall structure flows overland for a

minimum of 100 feet before reaching the catch basin that connects directly to Outfall 14157.4. For this flow path, which drains 0.45 acres of MassDOT property, the vegetated area serves as a filter strip that traps sediment and allows for infiltration.

Outfall 14159.4 is a City of Worcester structure that collects storm water from the ramp between North Parkway and North Service Road. Approximately 0.1 acre of paved Mass DOT roadway drains directly to a Worcester catch basin on Route 70 that discharges through Outfall 14159.4 directly to Burncoat Park Pond.

Outfall 14158.4 is a City of Worcester structure that collects storm water from Worcester's Route 70 and from MassDOT's exit ramp (Exit 20) from I-290 West. Approximately 0.7 acres of MassDOT paved roadway and 1.4 acres of MassDOT vegetated shoulder/median drain to this outfall. The paved exit ramp is bounded by curbing and runoff is discharged directly to a catch basin on the exit ramp, which flows via City of Worcester infrastructure directly to Burncoat Park Pond at Outfall 14158.4.

The vegetated median south of the exit ramp (located between I-290 and the exit ramp) contains vegetated swales and filter strips, however it does not receive much (if any) runoff from paved portions of I-290 or the exit ramp.

Assessment under BMP 7U for Noxious Aquatic Plants and Turbidity

The impairments for noxious aquatic plants and turbidity have not been addressed by a TMDL. Therefore, MassDOT assessed these impairments using the approach described in BMP 7U of MassDOT's Storm Water Management Plan (Water Quality Impaired Waters Assessment and Mitigation Plan).

The impairment for noxious aquatic plants in Burncoat Park Pond is potentially related to excess nutrients (phosphorous). The pond's impairment for turbidity likely originates from either suspended sediments or phytoplankton growth in the pond associated with excessive phosphorus loading. Storm water runoff is a likely source of both sediments and phosphorus to Burncoat Park Pond.

For this water body, MassDOT used EPA Region I's Impervious Cover (IC) Method, described in EPA's Stormwater TMDL Implementation Support Manual (ENSR 2006), to assess potential storm water impacts on the impaired water and evaluate the level of impervious cover reduction required to ensure that storm water is not the cause of the impairments. MassDOT has adopted its method for addressing impaired waters without a TMDL based on USEPA's recent memorandum regarding the appropriateness of the Impervious Cover approach to assessing the impacts of storm water and identifying quantifiable targets for mitigating the impacts of storm water (EPA 2010a). Consistent with findings of EPA and others, when a watershed had less than 9% impervious cover, MassDOT concluded that storm water was not the likely cause of impairment.

Impervious Cover Analysis

The impervious cover model (ICM) relates an aquatic system's health (i.e., state of impairment) to the percentage of impervious cover in its contributing watershed. This method is largely based on the work of the Center for Watershed Protection, which has compiled and evaluated extensive data relating watershed impervious cover to the hydrologic, physical, water quality, and biological conditions of aquatic systems (Schueler, 2003). Water quality in tributary streams, rivers, lakes and ponds is a direct reflection of loading from the watershed (Wetzel 2001); therefore the IC method can be used as a surrogate for pollutant loading when evaluating water quality impairments and their causes.

The relative portion of a watershed's impervious cover can be used as an effective means of determining aquatic system health. Urbanization, primarily through the construction of impervious cover, causes progressive hydrologic, physical, water quality and biological impacts to aquatic health. Agricultural and other land-modifying activities can also contribute significantly to aquatic health degradation. Increasing impervious cover reduces the amount of infiltration/recharge and increases the amount of runoff. As a result, the stream experiences more extreme and variable flows including lower low flows, due to reduced baseflow, and higher high flows, due to large stormwater runoff volumes.

Physical impacts associated with IC are directly related to modification in stream hydrology. For example, flooding causes channel enlargement and incision, while low flows can result in warmer in-stream temperatures. Water quality impacts are due primarily to direct conveyance of additional materials into the stream with stormwater runoff. Lastly, biological impacts are the result of degradation of hydrology, physical, and water quality conditions in the stream ecosystem. Impervious cover serves as an excellent surrogate for many types of stormwater-related impairments because it relates primary causal factors to specific impairments.

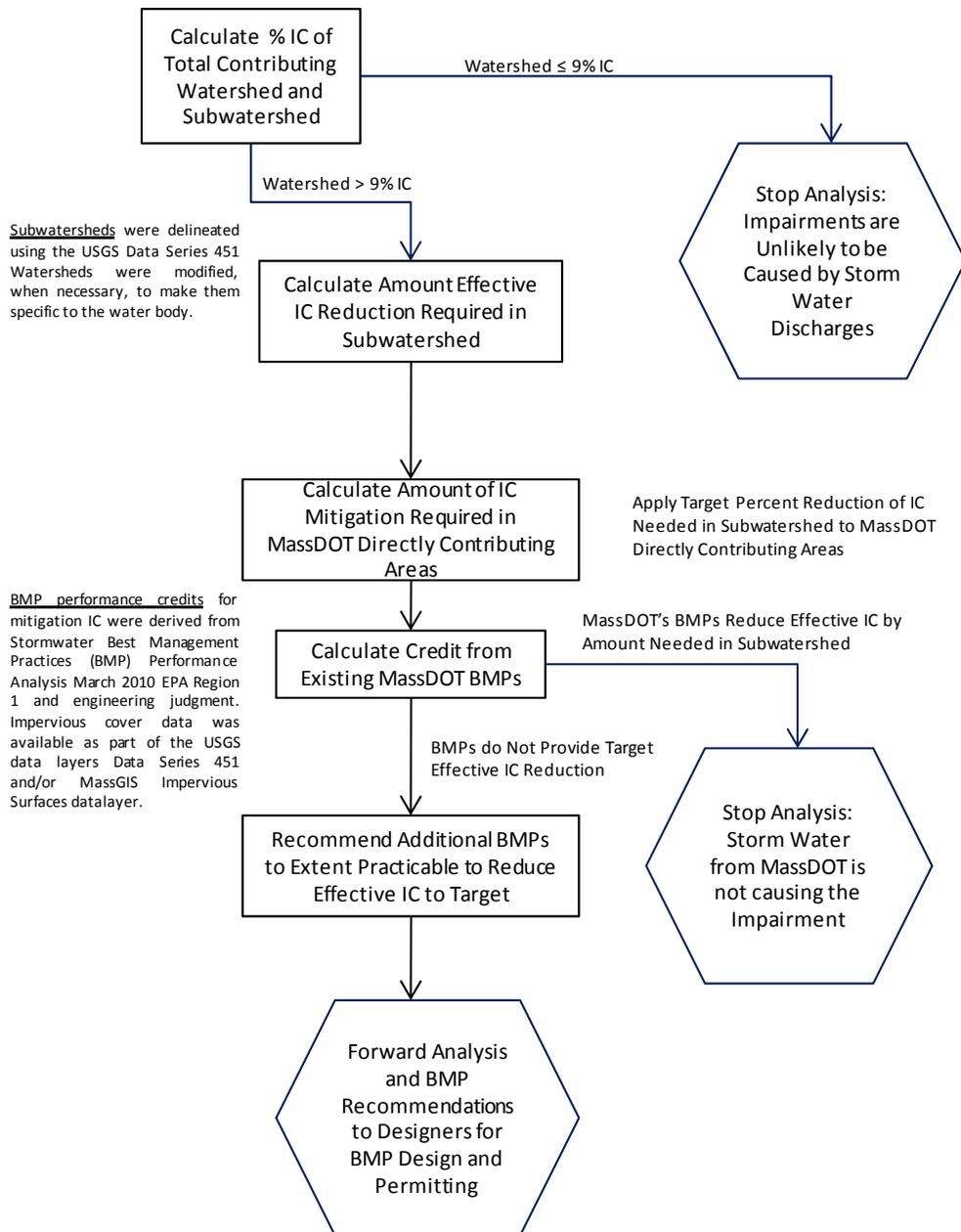
Research indicates that a decline in stream quality occurs when impervious cover (IC) for a watershed exceeds 10% and that severe impairment can be expected when the IC exceeds 25%. A pilot study performed applying the IC method for several impaired waters in New England (ENSR 2005) found that "Based on extensive data and the best information available, it appears that if the IC target is met (by reducing actual IC, reducing directly connected IC, and/or other measures), stormwater-impaired waters will be brought back into compliance with water quality standards (WQSS)".

The appropriateness of this approach to assessing the impacts of storm water and identifying quantifiable targets for mitigating the impacts of storm water has recently been affirmed by USEPA (EPA 2010a).

EPA recommends a target of 9% impervious cover in a watershed (ENSR, 2006). When more than 9% of the watershed is impervious cover, storm water is likely to be a significant contributor to water quality concerns. When less than 9% of the watershed is impervious cover, water quality impairments are likely to be caused by other factors. Based on this principle, MassDOT assessed whether storm water from their roadways/properties has the potential to cause the impairment of the receiving water body. The approach MassDOT used to perform the assessment is outlined in the flowchart below.

MassDOT's Application of the Impervious Cover Method

First, MassDOT calculated the percent IC of the water body's entire contributing watershed (total watershed upstream of downstream end of impaired segment) and that of the local watershed contributing directly to the impaired segmented (referred to as the subwatershed in this analysis) to determine whether storm water has a potential to cause the impairments of the receiving water body. The total watershed and subwatershed to the impaired water body were delineated using the USGS Data Series 451. The USGS Data Series watersheds were modified, when necessary, to make them specific to the water body. Impervious cover data was available as part of the USGS data layers Data Series 451 and MassGIS's impervious surfaces datalayer. In cases where it was determined that storm water was a potential cause of the impairment, MassDOT calculated the degree to which impervious cover would need to be reduced in the subwatershed to meet the 9% IC target. This reduction was then applied proportionally to the area of MassDOT roadways/properties directly discharging to the water body segment to identify MassDOT's target IC reduction.



MassDOT then calculated the effective impervious cover reduction afforded by the existing structural BMPs currently incorporated into the storm water infrastructure of MassDOT's properties. This effective IC reduction was calculated by applying effective impervious cover reduction rates to existing BMPs based on their size, function, and contributing watershed. BMP performances were derived from EPA Region 1's Stormwater Best Management Practices (BMP) Performance Analysis report (EPA 2010b) and engineering judgment. When the reduction in effective impervious cover achieved by the existing BMPs was equal to or greater than the target reduction, no further measures were proposed. When this was not the case, MassDOT considered additional BMPs in order to meet the targeted reduction.

Using this approach, MassDOT derived the following site parameters for the total contributing watershed of the impaired water:

Watershed	
Watershed Area	271 acres
Impervious Cover (IC) Area	93.4 acres
Percent Impervious	34.5%
IC Area at 9% Goal	24.4 acres
Necessary Reduction % in IC	74%

Reductions Applied to DOT Direct Watershed	
MassDOT's IC Area Directly Contributing to Impaired Segment	1.8 acres
MassDOT's Required Reduction in Effective IC (74% of DOT Directly Contributing IC)	1.3 acres

The watershed is greater than 9% impervious which indicates that the storm water is likely contributing to the impairment. The watershed needs to reduce its effective IC by 74% to reach the 9% goal. Therefore, MassDOT's target reduction is to reduce its effective IC by the 74%. MassDOT has 1.8 acres of IC directly contributing to the impaired water. MassDOT needs to remove the effect of 1.3 acres of IC.

MassDOT has existing BMPs that mitigate potential storm water quality impacts prior to discharge to Burncoat Park Pond. The filter strip, which functions similarly to a dry pond and is located between I-290 and the North Service Road (BMP 1), currently provides infiltration and vegetative uptake of pollutants to mitigate storm water impacts from 0.45 acres of MassDOT impervious cover; thereby reducing the effective impervious cover by 0.43 acres. The other existing vegetated swales and filter strips treat runoff from the grassed area between I-290 and the exit ramp. While these structures reduce the overall storm water runoff and associated pollutant load, they do not reduce the effective impervious cover in the watershed as currently configured. Therefore, the total mitigation of impervious surface achieved by MassDOT's BMPs (0.43 acres) is less than the target of 1.3 acres.

		Existing BMPs		
BMP Name	BMP Type	IC Area Treated (acres)	Percent Reduction of Effective IC*	Reduction of Effective IC (acres)
BMP 1	Filter Strip/ Dry Pond	0.45	94%	0.43
Total		0.45		0.43

* The percent reduction of effective IC is dependent on BMP type, size relative to the IC that they process, and local soil conditions. BMP performances were derived from EPA Region 1's Stormwater Best Management Practices (BMP) Performance Analysis report (EPA 2010b) and engineering judgment.

Recommendations

Since the total mitigation of impervious surface achieved by MassDOT's BMPs is less than the target of 1.3 acres, MassDOT considered locations for additional BMPs. The vegetated area located to the north of the exit ramp (and bounded on the north by Holland Rink Playground) could be modified to act as an infiltration basin. The modifications would include re-routing runoff from the

exit ramp and providing treatment through the proposed infiltration basin for storm water from the exit ramp prior to discharging to the City of Worcester catch basin which discharges to Outfall 14158.4 (BMP 2; Figure 2). In addition, MassDOT could modify the vegetated slope between I-290 and the North Service Road to act as a dry pond and collect, pre-treat, and convey storm water from I-290 prior to discharging to Outfall 14157.4 (BMP 3; Figure 2).

Installing BMPs in these locations, in conjunction with the existing filter strip, will reduce the overall effective impervious cover by 1.1 acres. While the proposed BMPs do not meet the target IC reduction of 1.3 acres, the BMPs represent the maximum treatment practicable given the existing site constraints.

BMP Name	BMP Type	Proposed BMPs		
		IC Area Treated (acres)	Percent Reduction of Effective IC*	Reduction of Effective IC (acres)
BMP 2	Infiltration Basin	0.36	94%	0.34
BMP 3	Filter Strip/ Dry Pond	0.68	47%	0.32
Proposed BMPs		1.04		0.66
Existing BMPs		0.45		0.43
Total		1.49		1.09

* The percent reduction of effective IC is dependent on BMP type, size relative to the IC that they process, and local soil conditions. BMP performances were derived from EPA Region 1's Stormwater Best Management Practices (BMP) Performance Analysis report (EPA 2010b) and engineering judgment.

In addition to these proposed structural BMPs, MassDOT implements non-structural BMP programs in accordance with its existing Storm Water Management Plan (SWMP).

In summary, the proposed and existing BMPs include:

- MassDOT proposes to re-route runoff from the exit ramp through the existing swales and filter strips BMPs which would reduce the effective impervious cover by 0.32 acres.
- MassDOT proposes to install an infiltration basin in the vegetated area located to the north of the exit ramp to treat the runoff from the exit ramp in series with the existing swales and filter strips. This will reduce effective impervious cover by an additional 0.34 acres.
- Existing BMPs located in between I-290 and North Service Road effectively reduce the existing impervious cover by 0.43 acres.

MassDOT will relay the recommendation for proposed BMPs and data collected as part of this assessment immediately to their designers for BMP design and construction.

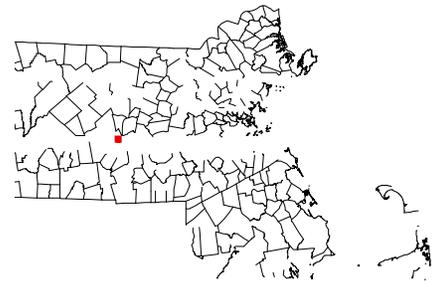
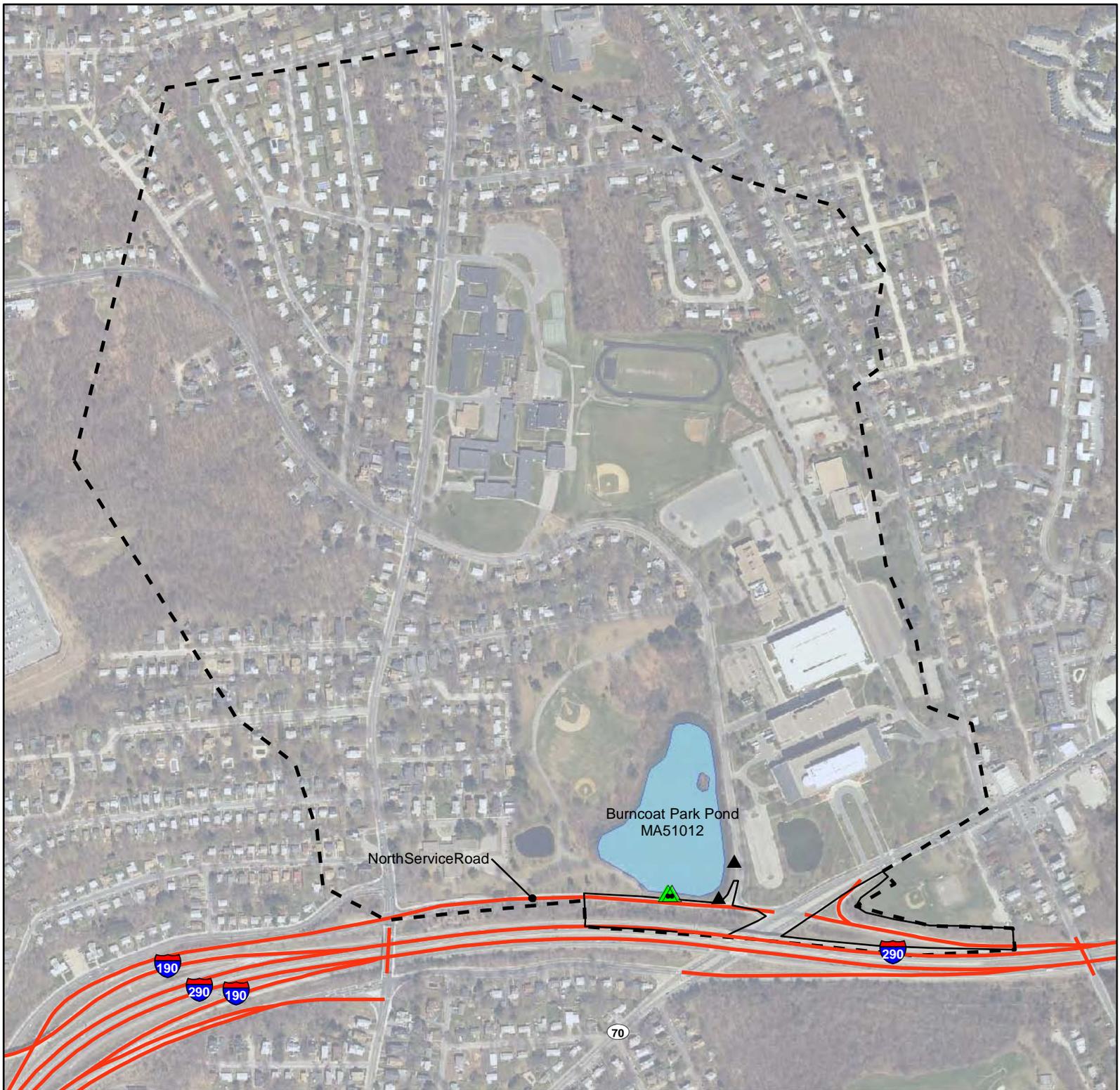
Conclusions

Approximately 1.8 acres of MassDOT impervious cover contributes storm water directly to Burncoat Park Pond. An existing filter strip reduces the effective impervious cover by 0.43 acres. In order to further reduce MassDOT's contribution to the effective impervious cover within the Burncoat Park Pond watershed, MassDOT is proposing modification of existing vegetated swales and filter strips, as well as installation of a new infiltration basins, to reduce the effective impervious cover contribution from MassDOT by more than 60% (1.1 acres). The proposed BMPs represent the maximum treatment practicable given the existing site constraints. Coupled with existing non-structural BMP practices, storm water contributions of pollutants from MassDOT property will be reduced to the maximum extent practicable.

Furthermore, MassDOT commits that if the City of Worcester (through MassDOT contracts) or MassDOT conduct future work along Interstate 290 or the North Service Road, MassDOT will determine whether additional structural BMPs to address the impairments are practicable.

References

- ENSR 2005. *Pilot TMDL Applications using the Impervious Cover Method*. ENSR International & EPA Region 1, Boston, MA. Available at: <http://www.epa.gov/region1/eco/tmdl/regionalpgrfs.html>
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- USGS Data Series 451 Local and Cumulative Impervious Cover of Massachusetts Stream Basins Available at: <http://pubs.usgs.gov/ds/451/>
- Wetzel, R. G. 2001. *Limnology: Lake and River Ecosystems*. Academic Press. Boston.



-  MassDOT Outfall
-  City of Worcester Outfall
-  Impaired Water Bodies
-  MassDOT Roads in Urban Areas
-  MassDOT Roads
-  MassDOT Watershed
-  Total Watershed

**Proposed stormwater infrastructure locations are estimated.

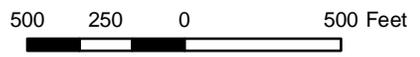
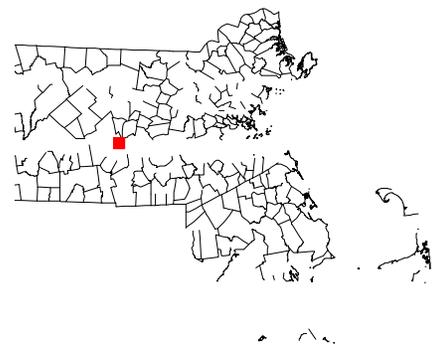
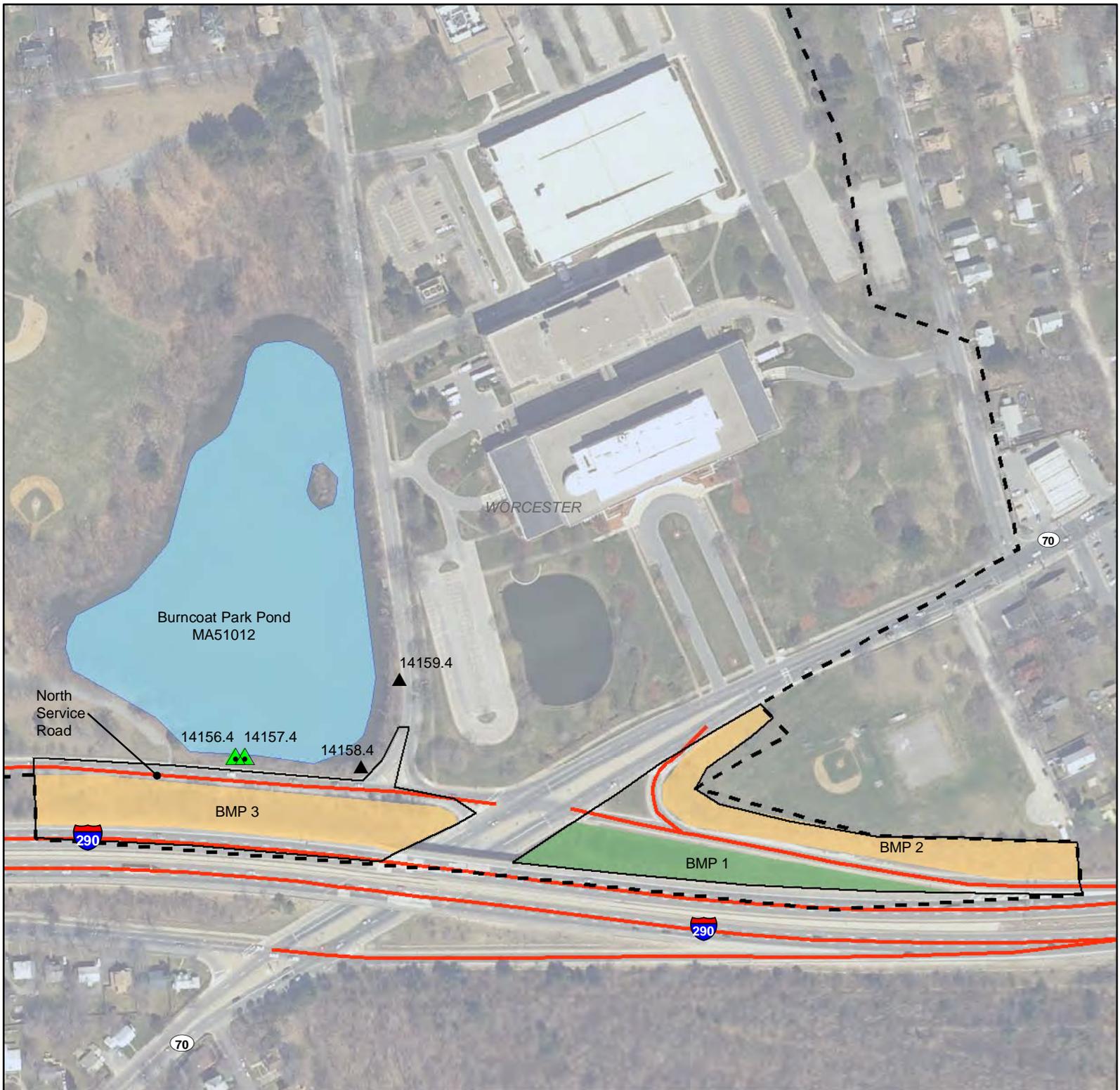


Figure 1
Burncoat Park Pond
MA51012

Interstate 290
Worcester, MA

December 2010





-  MassDOT Outfall
-  City of Worcester Outfall
-  Impaired Water Bodies
-  Location of Proposed BMPs
-  Location of Existing BMPs
-  MassDOT Roads in Urban Areas
-  MassDOT Roads
-  MassDOT Watershed
-  Total Watershed

**Proposed stormwater infrastructure locations are estimated.



Figure 2
Burncoat Park Pond
MA51012

Interstate 290
Worcester, MA

December 2010



MASS DOT HIGHWAY DIVISION

Semi Annual Submittal under MassDOT's Impaired Water Program (June 8, 2013)

Attachment 3: Impaired Waters Assessments, Progress to Final Reports

Pages 1-5 Burncoat Park Pond

Massachusetts Department of Transportation
Semi Annual Submittal under MassDOT's Impaired Water Program

Attachment 3: Impaired Waters Assessments, Progress to Final Reports

MA51012 Burncoat Park Pond

MA51-03 Blackstone River

MA71040 Spy Pond

MA71-03 Mystic River

MA84B-02 Beaver Brook

Impaired Waters Assessment for Burncoat Park Pond (MA51012) – Final Report

Introduction

Burncoat Park Pond (MA51012) was previously assessed in a progress report titled, *Impaired Waters Assessment for Burncoat Park Pond (MA51012) – Progress Report*, submitted on 12/8/2010. The progress report included suggestions for additional BMPs and stated that MassDOT would work with designers to implement BMPs in order to meet its target reduction of impervious cover (IC). MassDOT has since initiated the design of BMPs to address its contribution of stormwater to Burncoat Park Pond. This report presents a summary of the findings of the progress report as well as a final assessment which includes the reduction provided by existing BMPs and the final target IC reduction determined during the Designer's comprehensive investigation and the BMPs in design and their estimated resulting IC removals.

Summary of Progress Report

Impaired Water Body

Name: Burncoat Park Pond

Location: Worcester, MA

Water Body ID: MA51012

Impairments

Burncoat Park Pond (MA51012) is listed under Category 5, "Waters Requiring a TMDL", on MassDEP's final *Massachusetts Year 2012 Integrated List of Waters*, (MassDEP 2013). According to MassDEP's *Blackstone River Watershed 2003-2007 Water Quality Assessment Report* (MassDEP, 2010), none of the designated uses have been assessed because there is no recent quality assured data available. This segment is impaired for the following:

- aquatic plants (macrophytes)
- turbidity

Site Description

Burncoat Park Pond (MA51012) is a 6.3 acre pond located in Worcester just north of Interstate 290 (I-290) with a 271-acre contributing watershed. MassDOT owns I-290 and North Service Road, both of which are within the Burncoat Park Pond watershed. North Service Road is adjacent to Burncoat Park Pond on the southern side of the pond. I-290 parallels the North Service Road to the south. I-290 is elevated and its abutment slopes steeply down to the North Service Road.

Based on an automated review of GIS data and MassDOT's Appendix L-1 of Impaired Waterbodies included in BMP 7U (dated July 22, 2010), it was originally determined that MassDOT has one outfall within 500 feet of Burncoat Park Pond. A field investigation on November 3, 2010 found that MassDOT roadways drain to Burncoat Park Pond through four outfalls, two of which are MassDOT outfalls (AECOM ID 14156.4 and 14157.4), while the other two (AECOM ID 14159.4 and 14158.4) are City of Worcester outfalls.

Outfall 14156.4 collects storm water runoff from North Service Road between the intersection of

North Parkway and the North Service Road (at the east) and the high point on North Service Road approximately 250 feet to the west. North Service Road is bounded by curbing which directs all storm water to two catch basins that discharge through Outfall 14156.4 directly into the pond. MassDOT's contributing area to this outfall is approximately 0.55 acres of paved roadway.

Outfall 14157.4 collects storm water from the elevated portion of I-290 (0.45 acres of MassDOT roadway) and the vegetated area between I-290 and the North Service Road (1.5 acres vegetated) through a catch basin located within the vegetated area. Runoff from the paved roadway and shoulder drains to a catch basin on I-290 that discharges to a headwall structure within the vegetated area. The headwall structure provides detention control which results in sediment removal. Runoff that reaches the vegetated area via the headwall structure flows overland for a minimum of 100 feet before reaching the catch basin that connects directly to Outfall 14157.4. For this flow path, which drains 0.45 acres of MassDOT property, the vegetated area serves as a filter strip that traps sediment and allows for infiltration.

Outfall 14159.4 is a City of Worcester structure that collects storm water from the ramp between North Parkway and North Service Road. Approximately 0.1 acre of paved Mass DOT roadway drains directly to a Worcester catch basin on Route 70 that discharges through Outfall 14159.4 directly to Burncoat Park Pond.

Outfall 14158.4 is a City of Worcester structure that collects storm water from Worcester's Route 70 and from MassDOT's exit ramp (Exit 20) from I-290 West. Approximately 0.7 acres of MassDOT paved roadway and 1.4 acres of MassDOT vegetated shoulder/median drain to this outfall. The paved exit ramp is bounded by curbing and runoff is discharged directly to a catch basin on the exit ramp, which flows via City of Worcester infrastructure directly to Burncoat Park Pond at Outfall 14158.4.

The vegetated median south of the exit ramp (located between I-290 and the exit ramp) contains vegetated swales and filter strips, however it does not receive much (if any) runoff from paved portions of I-290 or the exit ramp.

Assessment under BMP 7U

For this water body, MassDOT used the IC method to assess the following impairments:

- aquatic plants (macrophytes)
- turbidity

Existing BMPs

The progress report listed one existing BMP which was identified in the Burncoat Park Pond subwatershed as mitigating potential stormwater quality impacts prior to discharge to the pond. A summary of the existing BMP information reported is shown in Table 1.

Table 1. Summary of Existing BMPs

BMP Name	BMP Type	Soil Type	Depth of Runoff Treated (inches)	IC Area Treated (acres)	Reduction of Effective IC* (%)	Reduction of Effective IC (acres)
BMP-1	Filter Strip	C – Silt Loam – 0.27 in/hr	2.0	0.5	94	0.4

*Description of MassDOT's Application of Impervious Cover Method in BMP 7U (MassDOT 2011)

Target Reduction

In the progress report, MassDOT derived the following site parameters and target reduction for DOT's directly contributing watershed draining to the Burncoat Park Pond (MA51012) using the IC Method:

Table 2. Site Parameters and Target IC Reduction

IC in DOT's Directly Contributing Watershed	1.8	acres
Target Percent Reduction in Effective IC	74	%
Target Reduction in Effective IC to meet 9% IC target	1.3	acres
IC Effectively Reduced by Existing BMPs	0.5	acres
IC Remaining to Mitigate with Proposed BMPs	0.9*	acres

*Rounding accounts for differences in summation.

Final Assessment

Designer Investigation of Existing BMPs

After the submittal of the progress report, further investigation of the existing BMP found more precise values of storage volume, IC area treated, and percent reduction of effective IC. The filter strip included as an existing BMP in the progress report was further investigated and it was determined that it does not directly discharge to Burncoat Park Pond. Therefore, there are no existing BMPs to mitigate stormwater discharge to the pond.

Updated Target Reduction

After the submittal of the progress report, further investigation of MassDOT's directly contributing IC area was performed by the designers. Based on this investigation, the MassDOT Directly Contributing IC Watershed was updated from 1.8 acres to 1.1 acres. Thus, the target reduction of impervious cover, 74% of this IC watershed, was also updated by the designers from 1.3 acres to 0.8 acres based on these more in-depth field evaluations. After taking into account that there is no reduction provided by any existing BMPs, the remaining target reduction of effective IC is 0.8 acres. See Table 3 below.

Table 3. Designer Investigation Site Parameters and Target IC Reduction

IC in DOT's Directly Contributing Watershed	1.1	acres
Target Percent Reduction in Effective IC	74	%
Target Reduction in Effective IC to meet 9% IC target	0.8	acres
IC Effectively Reduced by Existing BMPs	0	acres
IC Remaining to Mitigate with Proposed BMPs	0.8	acres

BMPs in Design

MassDOT has constructed BMPs to address the target IC reduction of 0.8 acres as part of MassDOT's Impaired Waters Retrofit Initiative. MassDOT designed, permitted and constructed 1 infiltration basin and 1 dry detention basin to treat stormwater runoff from 0.96 acres of impervious cover of MassDOT roadways prior to discharge to Burncoat Park Pond. Table 4 below lists the

impervious stormwater catchment area for each BMP as well as the estimated post-construction IC reduction that will be provided by each BMP.

Table 4. Summary of BMPs in Design

BMP Name	BMP Type	IC Area Treated (ac)	Reduction of Effective IC (ac)
BMP-1	Infiltration Basin	0.7	0.7
BMP-2	Dry Detention Basin	0.3	0.1
Total		1.0	0.8

Conclusions

Table 5 summarizes IC reductions within MassDOT's directly contributing watershed under the design BMP conditions.

Table 5. Design BMP Effective IC Reductions

MassDOT Target Reduction in Effective IC to Meet with Design BMPs	0.8 acres
Effective IC Reduction under Design BMPs	0.8 acres
Remaining Target	0 acres

These two stormwater BMPs will achieve an estimated effective impervious cover reduction of 0.8 acres, thus meeting the 9% impervious cover target.

MassDOT will continue to identify opportunities to implement additional structural BMPs to address pollutant loading when road work is conducted under MassDOT's Programmed Projects Initiative. Work on Programmed Projects often includes broader scale road layout changes that may provide additional opportunities for construction of new treatment BMPs. This is consistent with an iterative adaptive management approach to addressing impairments. MassDOT will include an update in annual reports and biannual submittals to EPA regarding progress made towards meeting target IC reductions, plans for construction of proposed BMPs, and finalized assessments including reductions achieved by finalized BMP designs. Furthermore, MassDOT will continue to implement non-structural BMPs that reduce the impacts of stormwater.

References

- Massachusetts Department of Environmental Protection (MassDEP). (2013). Massachusetts Year 2012 Integrated List of Waters - Final Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act. Retrieved from: <http://www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf>
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Public Meeting Sign Up Sheets



DPW & Parks - Parks, Recreation and Cemetery Division

Burncoat Park/Holland Rink Public Hearing Number One

Dodge Park Rest Home, 101 Randolph Road, Worcester, MA 01605

Robert C. Antonelli Jr., Assistant Commissioner

October 17, 2013 @ 6:00 PM

	Name (PLEASE PRINT)	Address	Phone No.	E-Mail Address
1	Nancy A. STANFORD			
2	Lee O'Leary			
3	Maureen O'Malley Tupper			
4	William D. O'Leary Tupper			
5	Talbot D. Baskin			
6	Martha Baskin			
7	Mike Amy Nymann			
8	Mike Nymann			
9	Magnusson			
10	C. MARRISON			
11	ED KRUPINSKI			
12	ROBERT REIDY			
13	ALP G. HANCOCK JR			
14	Jeff Lombardi			
15	Michael Douglas			
16	Danielle Douglas			
17	Fred Daniels Jr			
18	Judith Daniels			
19	JAMES FEANESSCH			
20	PHILIP X SANDPRA			

JAMES MARRISON
4 WOOD ST BUSINESS ASSOC

No.	Name	Address	Phone No.	E-Mail Address
21				
22	CAROLE MANNON			
23	David Gates			
24	TERRA VIM			
25	Liam Madsen-Troby			
26	ANTHONY MORTIMER			
27	Amiel Westensor			
28	Carlton Watson			
29	DAVID REARDON			
30	GEORGE BOSCO			
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DPW & Parks - Parks, Recreation and Cemetery Division

Burncoat Park/Holland Rink Public Hearing Number Two

Dodge Park Rest Home, 101 Randolph Road, Worcester, MA01605

Robert C. Antonelli Jr., Assistant Commissioner

November 18, 2013 @ 6:00 PM



	Name (PLEASE PRINT)	Address	Phone No.	E-Mail Address
1	KATHY PALMIERI			
2	Barbara Tully			
3	George Boscio			
4	Mureen D'Valley Jasper			
5	Chy Brown			
6	ED KRUPINSKI			
7	Mary Hertzberg			
8	Kathlene Donahue			
9	William Donahue			
10	Robert Plam			
11	Caroline Caper			
12	Maude & Fred D'Angelo			
13	Mike & Amy Myman			
14	Amaury M. Mather			
15	Martha F. Powers			
16	Clara Spontacki			
17	St m Spontacki			
18	Stacy Spontacki			
19	Tom Cassey / Robyn Cassey			
20	Matthew Capon			

We had to leave early - will have proposed plans be available online for viewing + comment? Thanks



DPW & Parks - Parks, Recreation and Cemetery Division

Burncoat Park/Holland Rink Public Hearing Number Three

Dodge Park Rest Home, 101 Randolph Road, Worcester, MA01605

Robert C. Antonelli Jr., Assistant Commissioner

February 24, 2014 @ 6:00 PM

Name (PLEASE PRINT)	Address	Phone No.	E-Mail Address
1 KAREN GOULET			
2 KAREN GOULET			
3 DAVID BORELLI			
4 Andrew Mette			
5 Bob Janan			
6 JOHN DUNAYEV			
7 William Penahue			
8 Tom Conway/Robin Conway			
9 Tammy Woodard			
10 Michael Douglas			
11 Matthew Powell			
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DPW & Parks - Parks, Recreation and Cemetery Division

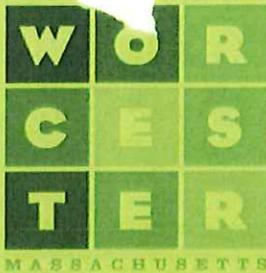
Burncoat Park/Holland Rink Public Hearing Number Three

Dodge Park Rest Home, 101 Randolph Road, Worcester, MA01605

Robert C. Antonelli Jr., Assistant Commissioner

February 24, 2014 @ 6:00 PM

Name (PLEASE PRINT)	Address	Phone No.	E-Mail Address
1 KAREN GOULET			
2 KAREN GOULET			
3 DAWN BORELLI			
4 ANDREW HATTEI			
5 GUY JANAN			
6 JOHN DUNAYVE			
7 WILLIAM PENNINE			
8 TOM CONROY/ROBYN CONROY			
9 TANNY WOODARD			
10 MICHAEL DOUGLAS			
11 MATHIE POWERS			
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City of Worcester

DPW and Parks - Parks, Recreation and Cemetery Division

Date: May 1, 2014 Time: 6:30 PM

Place: Parks and Recreation Commission Meeting***
Meeting Room A - 50 Skyline Drive, Worcester, MA 01605

A Master Plan for Burncoat Park/ Holland Rink Park Facilities Public Hearing #4

This hearing will be the first item on the Parks and Recreation Commission meeting agenda and will complete the discussion of existing conditions, site constraints and alternative designs. The Department will display updated concept plans incorporating all information gathered during the past public hearings. These revised plans are designed to meet the needs, wants & desires of the neighbors, citizens, and organizations that currently use the facility. The Parks and Recreation Commission will allow an open public discussion / question and comment period on the information presented. All information will result in a community endorsed "guidebook" that would include a synthesized plan of phased improvements to each facility.

*** REMINDER ***

All are Invited and Encouraged to Attend.

Phone: (508) 799-1190

Fax: (508) 799-1293

E-Mail: parks@worcesterma.gov

Call (508) 799-1294 in the event of severe weather, for up-to-date meeting status.

The City of Worcester does not discriminate on the basis of disability. The Parks, Recreation and Cemetery Division will provide auxiliary aids and services, written materials in alternative formats, and reasonable modifications in policies and procedures to persons with disabilities upon advance request.

Please contact the Parks Division at parks@worcesterma.gov, or Phone (508) 799-1190, or The City ADA Coordinator at disabilities@worcesterma.gov.

CITY OF WORCESTER

DEPARTMENT OF PUBLIC WORKS AND PARKS

Parks, Recreation and Cemetery Division 50 Skyline Drive Worcester, MA 01605-2898

Paul J. Moosey, P.E.
Commissioner



Robert C. Antonelli, Jr., CPRP
Assistant Commissioner

(508) 799-1190
(508) 799-1293 FAX

Edward M. Augustus, Jr., City Manager

Parks & Recreation Commission Sign-in Sheet May 1, 2014

Name

Address

Item of Interest

Mesfin Beshir

Juneteenth petition.

Tony Cashman

Rockwood Park
Coghlin Field Lights

William Belcher

Juneteenth petition

Bob Seddoh

Juneteenth

Christopher Dufresne

Park permit

Matthew Capen

Burncoat Park/North

John DeRosier

Burncoat Park

Paul O'Neill

Burncoat
(North) Park

CITY OF WORCESTER

DEPARTMENT OF PUBLIC WORKS AND PARKS

Parks, Recreation and Cemetery Division 50 Skyline Drive Worcester, MA 01605-2898

Paul J. Moosey, P.E.
Commissioner



Robert C. Antonelli, Jr., CPRP
Assistant Commissioner

(508) 799-1190
(508) 799-1293 FAX

Edward M. Augustus, Jr., City Manager

Parks & Recreation Commission Sign-in Sheet May 1, 2014

<u>Name</u>	<u>Address</u>	<u>Item of Interest</u>
Tammie Allen	(Quintessential
Ebenezer Afanthanmah		Juneteenth
Jen Dorrone Schiaavone		Barkett CC
BRIAN Mc CARTHY		
Jacqueline Harris		
FRED + JUDE D'ANGELO		
CAROL		

CITY OF WORCESTER

DEPARTMENT OF PUBLIC WORKS AND PARKS

Parks, Recreation and Cemetery Division 50 Skyline Drive Worcester, MA 01605-2898

Paul J. Moosey, P.E.
Commissioner



Robert C. Antonelli, Jr., CPRP
Assistant Commissioner

(508) 799-1190
(508) 799-1293 FAX

Edward M. Augustus, Jr., City Manager

Parks & Recreation Commission Sign-in Sheet May 1, 2014

<u>Name</u>	<u>Address</u>	<u>Item of Interest</u>
Todd Williams		EDC
TED + MAUREEN COGHLIN		
GARY ROSEN		JESSE BURKETT
Joe Pagano		JBU
Kipko Johnson		
Jack Dondore		EDC Burrhead (Randy) Pkr
Murphy O'Malley, Jr.		Basketball courts / Holland Park

Neighborhood Census Data

Worcester Community Indicators

[Home](#) | [Data Compare](#) | [Login](#)

[Worcester Home](#) >> [North Worcester](#) >> North Lincoln Street (7304.01)

North Lincoln Street - Main Page

[Compare data to other tracts, regions, or zones](#)

Click heading for more info	North Lincoln Street				North Worcester			
	1990	2000	2006- -10	2010	1990	2000	2006- -10	2010
Population								
% change	x	4.7%		3.7	x	3.6%		
size	5013	5249		5,444	23412	24296		25,044
% white	91.3%	73.2%		56.6	94.9%	84.6%		70.8
% black	3.9%	15.9%		17.4	2.2%	7.5%		11.3
% African American								
% asian	1.2%	2.3%		1.8	1.1%	2.2%		3.3
% hispanic	5.8%	14.3%		21.4	3.0%	7.5%		11.7
Immigration								
% foreign born	6.0%	14.4%	16.1		5.5%	10.3%	15.7	
% immigrated in last 10 years	x	6.1%	3.0		x	4.5%	5.4	
Linguistically Isolated Households	85	132	501		310	283	1,389	
% Households linguistically isolated	3.7%	5.6%	20.5		3.2%	2.7%	12.1	
School age linguistically isolated	7	47	206		67	150	676	
Number of persons born in X								
Top 5 Immigrant Groups								
Housing								
total units	2,469	2,428		2,453	9,848	10,607		11,204
% renter occupied (of all occupied)	70.5%	68.8%		69.6	44.1%	45.2%		42.1
% owner occupied	29.5%	29.0%		30.4	55.9%	47.8%		57.9
% Vacant	2.8%	4.1%		2.7	5.0%	3.3%		5.9
% housing built before 1960	27.0%	38.5%	43.4		64.5%	62.2%		59.3
% housing built after 1980	10.6%	9.1%	14.2		10.8%	12.9%		19.5
housing units: % single family homes	32.1%	36.5%	21.7		54.4%	53.8%		46.8



Tract Notes:
There are no current notes.



number single family	789	894	576		5,356	5,706	5,511
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Income and Poverty

	1990	2000	2006- -10	2010	1990	2000	2006- -10	2010
poverty rate: % people poor	9.0%	12.1%	20.6		7.2%	8.6%	11.7	
median family income	\$36,504	\$47,132	44,964		\$41,180	\$49,970	65,671	
median household income			32,397				52,758	
% Households where housing costs are >30% of income	37.4%	34.2%	42.9		33.3%	30.3%	40.0	
% Children poor	24.2%	27.5%	7.4		22.1%	24.4%	4.4	
% Families Below 50% Metro Family Median Income	25.1%	28.2%	47.3		19.0%	22.7%	29.0	
Est.2006 Median Family Income	x	\$57,840			x	\$61,323		
2005 Median Family Income	x	\$56,792			x	\$53,303		
2005 % Poor	x	x			x	x		

Education

	1990	2000	2006- -10	2010	1990	2000	2006- -10	2010
Population 25 years and over	3,704	3,842	3,957		16,620	17,211	18,513	
% less than 9th grade	6.5%	9.1%	7.1		5.2%	5.5%	3.6	
% 9th to 12th grade, no diploma	16.5%	17.9%	12.7		15.6%	11.9%	7.9	
% high school graduate or higher	77.0%	73.0%	80.2		80.8%	82.6%	88.4	
% Some college, no degree	19.8%	16.1%	14.1		18.7%	20.5%	17.6	
% Associate degree	6.6%	5.2%	10.3		8.9%	8.3%	10.7	
% bachelor's degree or higher	20.5%	22.1%	21.4		22.3%	24.7%	30.6	
% Graduate or professional degree	8.6%	8.0%	4.0		8.2%	9.6%	11.4	

Employment

	1990	2000	2006- -10	2010	1990	2000	2006- -10	2010
Employment/population ratio	51.8%	51.5%	53.0		59.9%	62.2%	64.5	

rate

Unemployment rate	3.5%	0.6%	4.0		5.4%	2.0%	4.6
Occupation: Percent managerial/professional	x	32.7%	31.9		x	36.8%	35.6
Occupation: % prod., transport, material moving	x	18.5%	19.0		x	13.7%	11.5

Aging	1990	2000	2006- -10	2010	1990	2000	2006- -10	2010
% under 5 years		6.1		6.0				6.8
% 5-17 years		16.0		16.6				15.1
% 65 years and over		24.2		19.0				13.9

Family Structure	1990	2000	2006- -10	2010	1990	2000	2006- -10	2010
% single-parent family (w/ children under 18)		14.0		20.0				16.1
% married-couple family (w/ children under 18)		34.5		23.7				30.7
% female-headed family (w/ children under 18)		12.3		16.8				14.2
% all parents in family in labor force								NA

MASTER PLAN APPROVED BY WORCESTER PARKS COMMISSION

May 1, 2014

MASTER PLAN APPROVED BY WORCESTER CITY COUNCIL

February 23, 2016