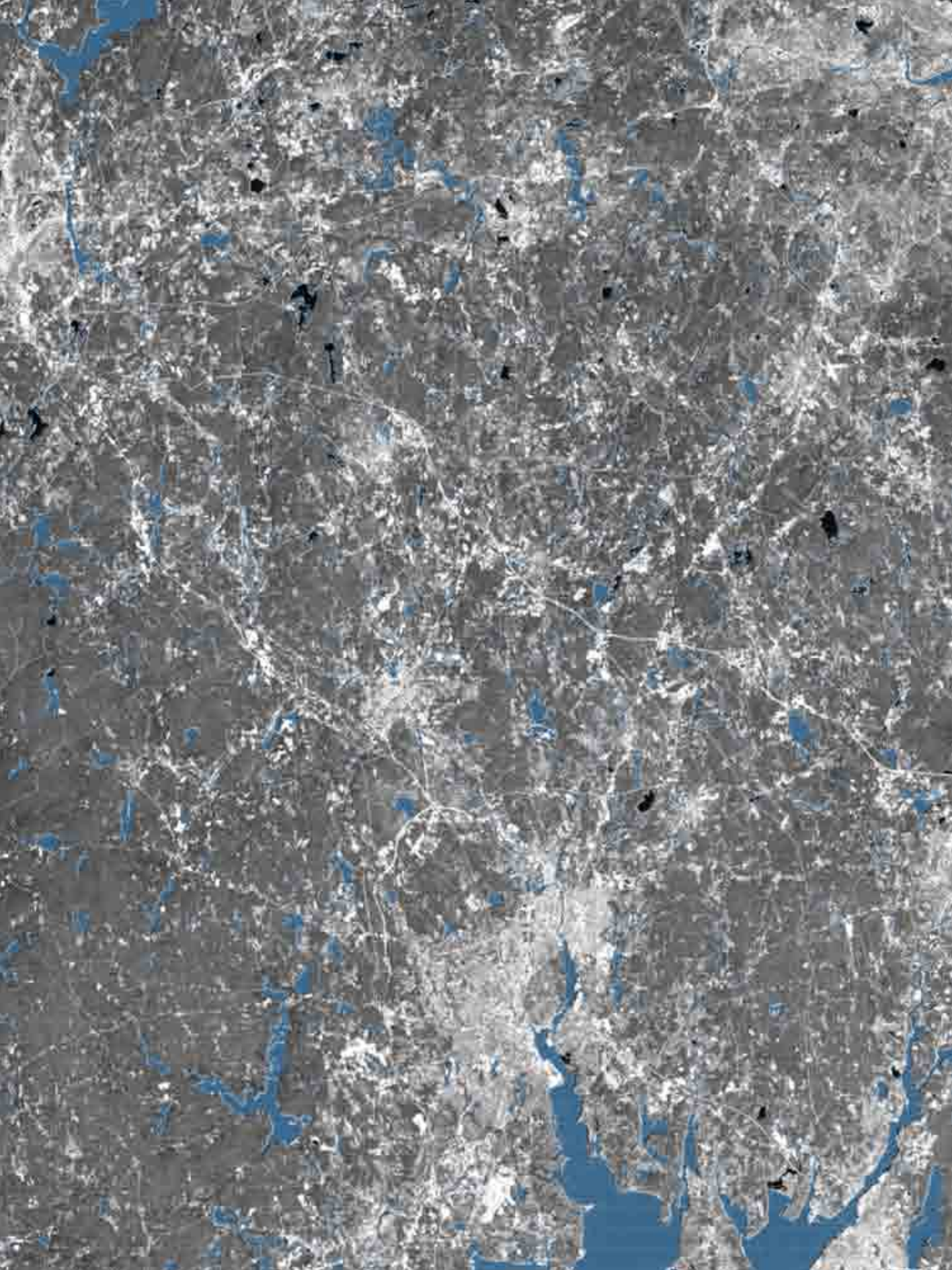


An aerial photograph of a river network, showing a dense web of blue waterways against a light-colored, textured land surface. The rivers vary in size and flow direction, creating a complex pattern across the landscape.

Woonsocket Blackstone River Vision Report

**Prepared for:
Thundermist Taskforce
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APPENDIX

Introduction

This document will provide the task force with a selection of potential future sites for storm water improvement projects.

This document has been prepared for the Thundermist Task Force in response to an RFP released in June 2017. This document will provide the task force with a selection of potential future sites for stormwater improvement projects, as well as design guidelines to aid future decisions on the design and maintenance of these sites. In order to guide both the task force and future partners, this document includes a brief contextual overview of the history of the city of Woonsocket and its relationship to the Blackstone River as well as an overview of the health of the watershed.

In addition to identifying potential sites for storm water improvement projects, this document should provide sufficient context for the task force and collaborators to align future projects with the cultural, environmental, and civic goals outlined by the many local, state, and federal agencies and stakeholders that take an interest in the health of the Blackstone River. This document also identifies potential future partners for the implementation of storm water improvement projects at the selected sites, and suggests alternative funding structures for the deployment of the remaining funding.

BLACKSTONE RIVER FROM OLD HAMLET BRIDGE, W



WOONSOCKET, R. I.



This document is intended as a reference guide for Design Teams as they embark on future Thundermist RFP's. The aim is to provide compilation of useful existing resources and context pertaining to Woonsocket and it's surrounding context. While not comprehensive, we hope this document will serve as starting place for inquiry and a source of inspiration.

Woonsocket, RI
Old Hamlet Bridge

Image Credit:
Phillips Memorial Library - Providence College

Project Background + Goals

The Thundermist Supplemental Environmental Project (SEP) is managed by the Woonsocket Thundermist Task Force, with representatives from the Audubon Society of Rhode Island, the Blackstone River Watershed Council/Friends of the Blackstone, the Blackstone River Coalition, and the City of Woonsocket. This SEP fund was established in 2011 as part of a series of actions taken to address penalties incurred years earlier by the Woonsocket Sewage Treatment Plant and Thundermist hydroelectric dam. In the first six years of the fund, the Task Force provided \$15,000 yearly in grants to fund small storm water capture projects within the City of Woonsocket on public and private properties, with the goal of improving storm water infiltration and contributing to the improvement of water quality in the Blackstone River. These past projects have included several rain gardens, stream bank plantings, tree-box filters and youth education.

In 2017 the task force revised the call for proposals for small storm water improvement projects in order to assess the largest possible impacts that could be created by the fund, and to identify sites that would allow these projects serve as educational, recreational, and civic amenities. These guidelines are an outcome of that process, and have been developed to assemble a list of potential sites, key background information, and guidelines for the projects moving forward.

Future projects should consider the following goals:

- Improve water quality, storm water infrastructure and ecosystem services for the community.
- Provide opportunities for public visibility, engagement, and education.
- Provide or enhance recreational and civic amenities.
- Promote or support the historical and cultural relevance of the river within the city and region.



Woonsocket, RI
Cass Park, Woonsocket, RI
Touring Cass Park's
Vegetated buffer



PREVIOUS THUNDERMIST SEP PROJECTS

Pictured above, *Rain, Drains and Chains* was centered on coordinated project components that educated, demonstrated and facilitated improved stormwater management and behaviors in the City of Woonsocket accomplished through an expanding partnership between the Blackstone River Watershed Council/Friends of the Blackstone and Riverzedge Arts.

Project components included; river buffers + rain gardens, rain barrels + rain chains, educational toolkits for community engagement, community volunteer commitments, and gathering external funding sources. For more information see the Riverzedge 2013 SEP Final Document, *Rains Drains and Water chains*.

Image Credit: Blackstone River Watershed Council/Friends of the Blackstone and Riverzedge Arts

IMPLEMENTATION AND POTENTIAL PARTNERSHIPS

As of 2019, the Task Force has \$50,000 to leverage for good storm water improvement projects. Moving forward, the Thundermist Task Force may consider holding future yearly funding in order to make larger allocations for impactful and innovative stormwater improvement projects in Woonsocket. These possibilities will be discussed further with each of the site recommendations listed in Section 6 of this document. In addition to holding the fund to do fewer, but more impactful projects, there are potential partnerships with local stakeholders and agencies that could help the funding go further. In particular, both RIDOT and the City of Woonsocket are undertaking initiatives to improve storm water infiltration, and the Thundermist fund could be used for parallel projects, either to maximize impact in certain public areas, or to fund design or maintenance for projects that otherwise require a larger construction budget.

BLACKSTONE RIVER AGENCIES AND STAKEHOLDERS

Government Environmental Agencies

Currently there are a number of significant Federal, State, and non-profit agencies overseeing the health, management, and future visioning of the Blackstone River Valley. Regulating agencies include the EPA, the Army Corps of Engineers, the Massachusetts Department of Environmental Protection, and the Rhode Island Department of Environmental Management and Office of Water Resources.

Generally, these agencies oversee the classification of the waters, the standards necessary for maintaining or improving the quality of the waters, and the regulation of stormwater allowed to drain into the river in municipalities in the watershed.

- Army Corp of Engineers
- Environmental Protection Agency of New England
- Rhode Island Department of Environmental Management
- Rhode Island Department of Transportation
- Rhode Island Office of Water Resources
- Woonsocket Department of Planning + Development
- Woonsocket Parks + Recreation
- Woonsocket Education Department

Cultural and Historic Agencies

The National Parks Service and Blackstone River Valley Heritage Corridor, Inc., oversee the management of the corridor as a collection of historical sites and resources. The BRVHC, Inc., released a strategic plan for managing the watershed in 2017. This plan thoroughly articulates current challenges, future goals, and strategies for achieving a unified vision for the preservation and improvement of the river valley. Briefly, the outlined vision includes strategies for supporting and improving: stewardship, historical and cultural preservation, community revitalization, outreach, and education, environmental protection (including wildlife, water, air, and other natural resources), recreation, and economic development.¹

- Blackstone River Valley National Heritage Corridor, Inc.
- Museum of Work and Culture, Woonsocket
- National Parks Service, Blackstone River Valley
- Rhode Island Historical Society
- Slater Mill Historic Site and Museum



Woonsocket, RI
Saint Charles Borromeo Church,
Woonsocket, RI

Former Thundermist SEP Project.
Community members and Volun-
teers completing construction on
the Raingarden.

*Image Credit: Blackstone River
Watershed Council/Friends of the
Blackstone and Riverzedge Arts*

Non-profit Agencies

Non-profit agencies invested in restoring the Blackstone include the Blackstone River Coalition, which is comprised of a number of volunteer and citizen-led agencies such as Blackstone River Watershed Council/Friends of the Blackstone, the Blackstone Headwaters Coalition, and the Blackstone River Watershed Association. These agencies facilitate a range of activities with the goal of making the Blackstone a fishable and swimmable river. These coordinated efforts include annual volunteer water quality monitoring, river debris clean-up, installation of stormwater infiltration and BMP projects, hosting educational programs for adults and children, and hosting an annual water quality summit for local agencies and citizens. The collective work of these non-profits have played a significant role over the last 30 years in improving the water quality of the Blackstone, and also in bringing educational, recreational, and stewardship opportunities to the communities of the watershed. Organizations such as Save the Bay, The Audubon Society of Rhode Island, and Mass Audubon also play a role in advocating for the hydrological and ecological health of the watershed, as part of their larger purview in the region and Narragansett Bay.

- Audubon Society of RI
- Blackstone River Coalition
- Blackstone River Watershed Council/Friends of the Blackstone
- Blackstone Headwaters Coalition
- Blackstone River Watershed Association
- Blackstone Valley Paddle Club
- Main Street Ambassadors
- Mass Audubon
- Neighborworks Blackstone River Valley
- Rhode Island Canoe/Kayak Association
- Save the Bay
- Woonsocket Conservation Commission
- Woonsocket Planning Board

1. Blackstone River Valley National Heritage Corridor, Inc. 2017. 'Surging Toward 2026: A Strategic Plan.'

03

The City of Woonsocket: Brief History + Future Planning

WOONSOCKET BACKGROUND

Woonsocket began as a village built around a series of textile mills that were constructed along the Blackstone River in the 1820's. By 1871, a group of six industrial villages were combined to found the City of Woonsocket; these included Woonsocket Falls Village, Social Village, Jenckesville, Hamlet Village, Globe Village, and Bernon. The City was fully incorporated in 1888, and became a major link the industrial boom that existed along the length of the Blackstone River. The industrial boom, the city population grew with an influx of immigrants, many of whom were coming from Quebec and other

French Canadian provinces. The textile industry in Woonsocket began to decline during the Great Depression, though it was briefly revived during WWII, when the mills were used to create textiles for the war. By 1950, the manufacturing industry went into steep decline, and the city has since faced high rates of depopulation and unemployment. Despite this, the community today is strong and diverse, many of whom still have strong ties to the Canadian immigrant community that grew in the 19th century. The city also has a significant Latino community today.



Woonsocket, RI
Historic Downtown Allen Street
Waterfront With Mills In The
Background

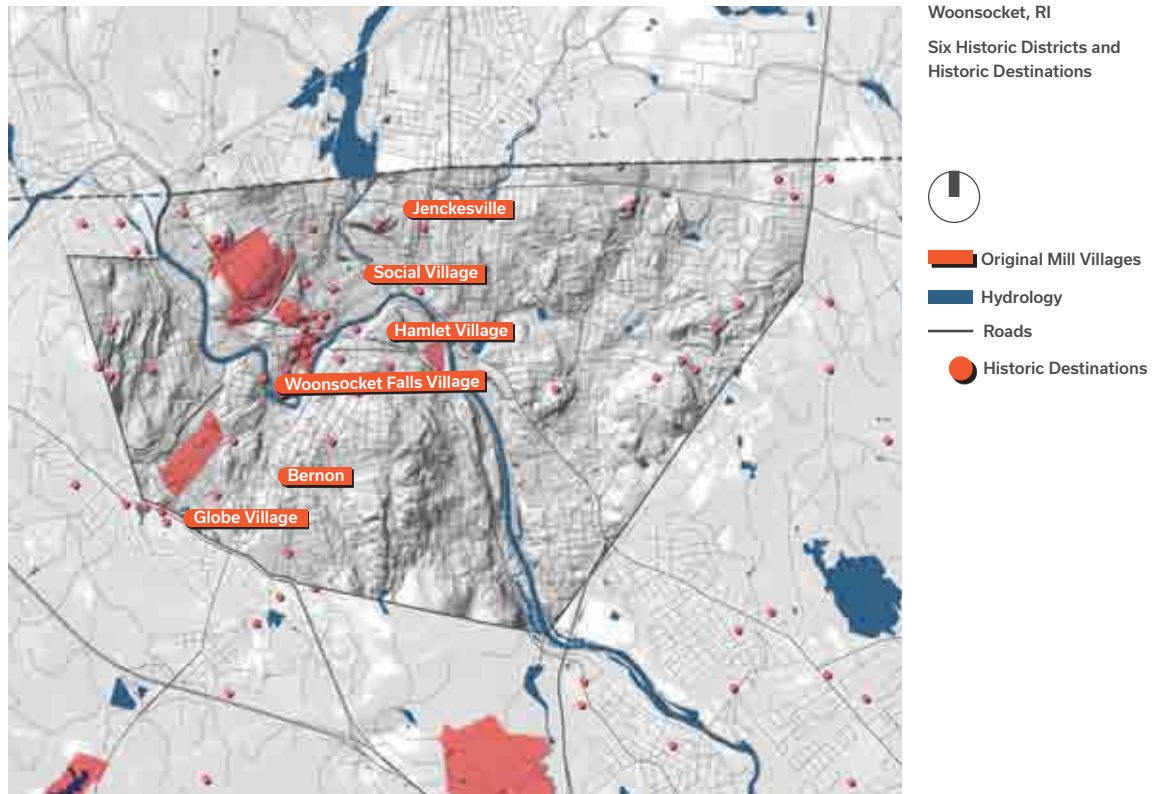
Image Credit:
Phillips Memorial Library - Providence College

FUTURE PLANNING AND KEY INITIATIVES

The most current planning document to date for the city is its 2012 Comprehensive Plan (the plan may currently be in the process of revision, with an updated plan to be released in 2020). The Comprehensive Plan is a catalogue of existing features within the city, but more importantly, a guide to streamlining and facilitating the implementation of city policies and recommendations.² A number of these strategic initiatives relate directly to stormwater infiltration improvement, or present opportunities for the future Thundermist projects to align with the city's larger agenda. These opportunities are highlighted below, and they focus largely on the development of zones for the improvement of public space, recreational amenities, or environmental performance.

Heritage Corridor River Overlay Zone

The Woonsocket Department of Planning has established the Heritage Corridor River Overlay Zone and the Design Review Committee as a way to control inappropriate land uses as it relates to the protection of natural resources, visual environmental barriers and physical design along the Blackstone River in Woonsocket. This initiative provides authority to enhance the success of the larger Blackstone River Heritage Corridor Identity and other environmental initiatives. This land use management approach also allows Woonsocket to be an active participant in the regional planning efforts within the Blackstone Valley.



Main Street Overlay Zone

Currently the Main Street of Woonsocket is suffering from vacancy, marginal uses, destruction of historical features and structures, and poor design decisions. The city has identified the need for better standards to determine which commercial uses are best suited for the historic and cultural hub of the city. It has been determined by Woonsocket's Department of Planning and several stakeholder groups that there is a need for a Main Street review committee to ensure that the future standards for the use of historic commercial buildings along Main Street, as well as the design of public right of way, sidewalks, open space, parking, and green storm water infrastructure, are commensurate with the historic significance of downtown Woonsocket.

Brownfield Program

In 2003 the city began its Brownfield Program, raising over 100,000 in US EPA grant funding for both the assessment and clean-up of recent and historic brownfield sites. This remediation process has resulting in over 20 acres of new amenities for the city, while also alleviating ground water pollution flowing from these sites into the Blackstone River. In order to continue supporting the Brownfields Project, the city will continue to pursue additional state, federal and private funding. This ongoing effort not only improves the future health of Woonsocket's natural water sources, but provides land restoration and additional public amenities.

Open Space + Recreation

Through many initiatives the City of Woonsocket has a goal to increase and improve many of the open space and public amenities, with special attention to areas within The Heritage Corridor River Overlay Zone. This includes, but is not limited to, improvements to public school property, Cass Park, and most importantly the extension and maintenance of the Blackstone River Bikeway. The City and RIDOT have significant plans to link Woonsocket's southern border directly along the River to the Massachusetts border, linking Main Street, major attractions, and public amenities along the way. In addition, Woonsocket has identified the need to improve the promotion and marketing of its current public spaces and recreational amenities.

Stormwater Management Plan

Sustaining the health of the Blackstone river, its adjacent drainage areas, accessibility, and public engagement are top priorities for the City. An initiative has been identified to work with stakeholders and community groups to communicate and educate residents, landowners and businesses the importance of maintaining high water quality standards to ensure public resources are protected.

2. The City of Woonsocket, Department of Planning and Development. '2016. 2016 Annual Report, City of Woonsocket.'

The Blackstone River: Cultural Relevance + Watershed Health

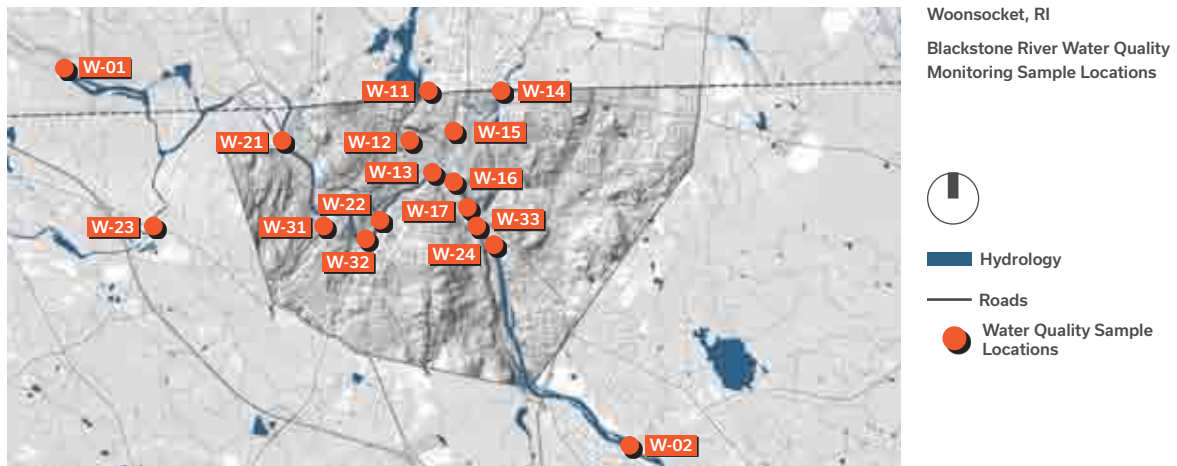
BLACKSTONE SIGNIFICANCE AND ENVIRONMENTAL HISTORY

The Blackstone River Watershed spans the states of Massachusetts and Rhode Island, beginning in headwaters north of Worcester, and emptying into the Providence and Seekonk Rivers, and the Narragansett Bay. It flows 48 miles, and its watershed covers 540 square miles. The watershed provides 25% of the freshwater per day for 2 million residents in Massachusetts and Rhode Island.³ It is the second largest contributor of freshwater to the Narragansett Bay.⁴

During the 18th and 19th century, the Blackstone River rose to prominence as the birthplace of American industrialization. The Blackstone's morphology included steep falls and dramatic elevation changes, making it a prime location to build dams to power the many industrial mills that grew up along the river over time. Beginning with the building of Slater Mills in 1790, the Blackstone River has been heavily engineered, with 19 dams built over its length and harnessed for use for

manufacturing mills that were largely centered around the textile industry. As industry grew along the river, so did villages and urban centers, replacing land that was once mostly agrarian.

Due to this period of heavy industrialization, the Blackstone has over a century's worth of pollution embedded in sediments in the river. The numerous dams located along the river have allowed these sediments to accumulate, and remnants of solvents, detergents, heavy metals, and untreated sewage continue to have a deleterious impact on the health of the river.⁵ In the 1990's, the EPA declared the Blackstone "the most polluted River in the country with respect to toxic sediments"⁶. Today, the Blackstone also continues to be negatively impacted by wastewater treatment plants located along the river, as well as run-off and non-point source pollution.





Woonsocket, RI
Woonsocket Falls Dam, Woonsocket RI
Monitoring Station Location 2018

WATER QUALITY MANAGEMENT

Water quality improvements began in the 1970's for the Blackstone River, after the ratification of the Clean Water Act which became a catalyst for taking better care of the nation's water bodies. However, major improvements have been recent, beginning in the 2000's with improvements to wastewater facilities along the river. In 2008 The Louis Berger Group, Inc. was commissioned to put together a comprehensive report on water quality within the river and its associated tributaries and ponds and is currently the most up-to-date comprehensive study of water quality in the river. In addition to the Berger Group study, volunteer water quality monitoring is done yearly by the Blackstone River Coalition and compiled into a report card that lists the status of the river in the following categories: aesthetics, water temperature, dissolved oxygen, percent saturation, and nutrients. The Berger report indicated that the Blackstone water quality is impaired for 'biodiversity, pathogens, copper, and lead.' This is confirmed by the BRC water quality report cards, which indicate that aesthetics (turbidity, water appearance and odor), nutrients and dissolved oxygen measurements are poor at a number of the monitoring stations.⁷

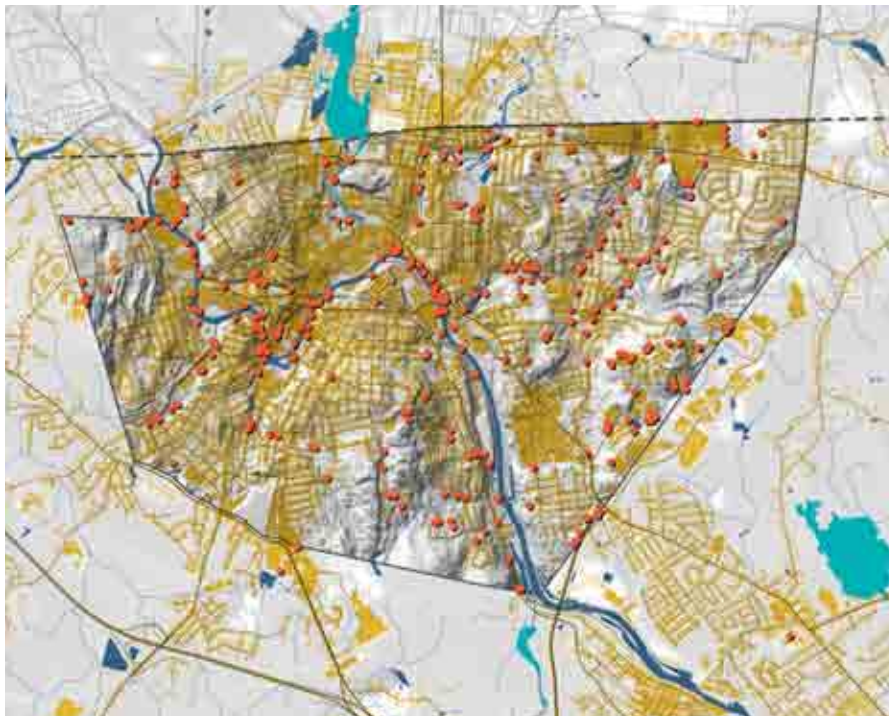
Three monitoring stations are located within Woonsocket, and at each, nutrient levels were determined to be poor in the 2015 report card. In addition to the BRC monitoring, the Narragansett Bay Commission (NBC) monitors its receiving waters, and has two monitoring locations on the Blackstone River, one at Slater Mills, and another at the state line just outside of Woonsocket. In a report presented in 2010, NBC found that the Blackstone River is the highest single contributor of nitrogen to the upper bay, accounting for 31% of the nitrogen load.

In 2013, a water quality study released by the Upper Blackstone Water Quality Abatement District, a clean water treatment facility located in Worcester, indicated that significant improvements had been seen in the main stem of the Blackstone River. In 2012-13, the district had made improvements to wastewater treatment facilities. Their subsequent monitoring showed that phosphorous had been reduced by 89% and nitrogen levels by 61% compared to levels in 2006-8.⁸ While it is unclear from their report whether improvements were seen within or near Woonsocket, it is an indication that the wastewater treatment facilities are likely to be a large part of the story of the nutrient load in the river.

NEXT STAGES OF WATER QUALITY IMPROVEMENT

In 2010, new regulations put in place by the National Pollution Discharge Elimination System (NPDES) required that small urban areas like Woonsocket (with populations less than 100,000 residents) acquire permits to direct overflow stormwater into rivers. These permits required the city to implement best management practices (BMPs) that would sequester and control polluted stormwater to the maximum extent possible. Part of the MS4 NPDES permitting process includes preparing a Storm Water Management Plan that addresses six minimum control efforts: public outreach and education, public engagement and stewardship, illicit discharge detection and elimination, construction site runoff control,

post-construction runoff control, and good housekeeping/pollution prevention.⁹ As of 2013, the total maximum daily loads allowed for the MS4 permits has been revised¹⁰, and Woonsocket, along with other cities along the Blackstone, will need to update their management plans and practices in order to meet these higher standards.



Woonsocket, RI
Impervious Surfaces, Hydrology,
and Stormwater Outfalls



"The Blackstone River is the country's most polluted river, in terms of toxic sediments"

- Environmental Protection Agency

RECOGNIZED HISTORICAL AND CULTURAL VALUE

The Blackstone River Valley is one of the best historical examples of the impact the industrial revolution had on the development of American cities and culture. Much of the industrial fabric, including historic mill structures and dams, has been well preserved. In 1986 the Blackstone River Valley National Heritage Corridor was created by an act of Congress for the sake of preserving the historic significance and educational value of the Blackstone. The original Heritage Corridor included 20 cities and towns in Massachusetts and Rhode Island. In 2014, the Corridor became the Blackstone River Valley National Historical Park. It is now part of the National Parks System, and is overseen by the Blackstone River Valley National Heritage Corridor, Inc., a non-profit organization that was created in 2012 to take over for the federal Corridor Commission as the 'local coordinating entity.'¹¹

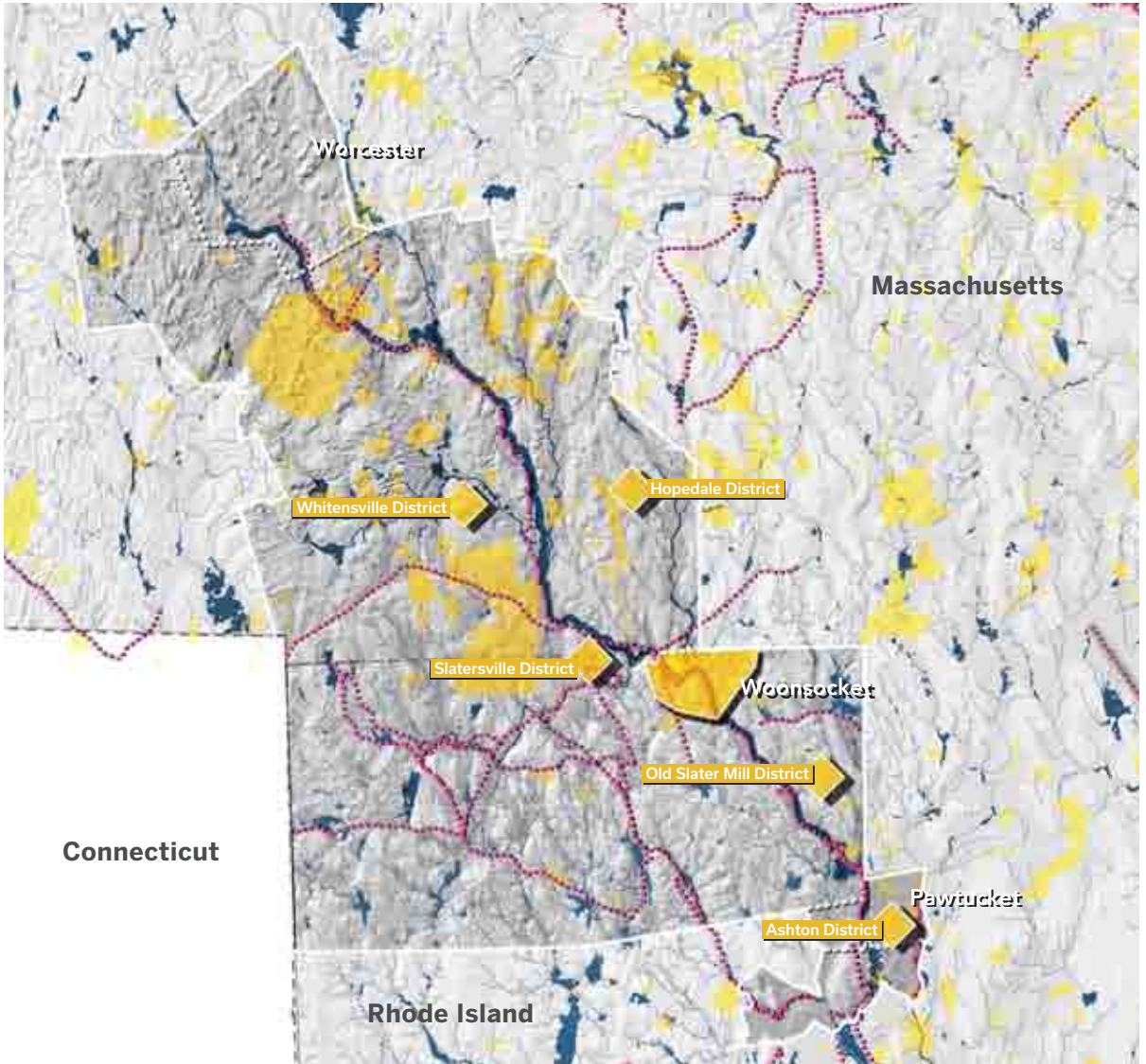
As part of the process of consideration for designation as a National park, a Special Resource Study was done 2006 in order to evaluate the cultural significance of the Blackstone River Valley, and to evaluate the merit of its accession into the national park system. The SRS concluded that the Blackstone Heritage Corridor qualified for designation of national significance under three thematic categories: Developing American Economy (for the historical industrial districts and mill villages), Transforming the Environment (for remaining artifacts and evidence of manipulation of the river for industrial use), and Expressing Cultural Values (for intact architectural mill remnants and buildings).

Areas called out specifically for historical consideration in Rhode Island include the Old Slater Mill Historic Site and Museum in Pawtucket, historic districts in Slatersville and Ashton, and segments of the Blackstone River State Park, the Blackstone River itself, and the Blackstone Canal.¹²

RECREATIONAL VALUE AND OPPORTUNITIES FOR THE RIVER

Currently the Blackstone offers a number of recreational opportunities, from hiking and bike trails, to opportunities to canoe and kayak along portions of the river. The Blackstone River Bikeway runs 48 miles from Worcester to Providence. All along the river corridor and within the watershed, parks provide additional walking trails, open spaces for recreation, as well as opportunities to immerse in natural woodland and riverine habitats. That being said, the water quality of the river is currently impaired and prohibits a number of the recreational and habitat uses it should support.

Future visions for the Blackstone, such those outlined in the strategic plan for the Blackstone Heritage Corridor include strategies that encourage environmental stewardship, protection of wildlife, and the continued facilitation of recreational uses that link communities to the natural resources of the watershed. This includes plans to complete the Blackstone River Bikeway and other regional trail systems, establish bikeways along tributaries, and to develop trail linkages that would create a continuous system along the length of the river, across state lines. In addition to biking and walking trails, this would support a range of activities such as hiking, cross-country skiing, bird-watching, fishing, and hunting.¹³

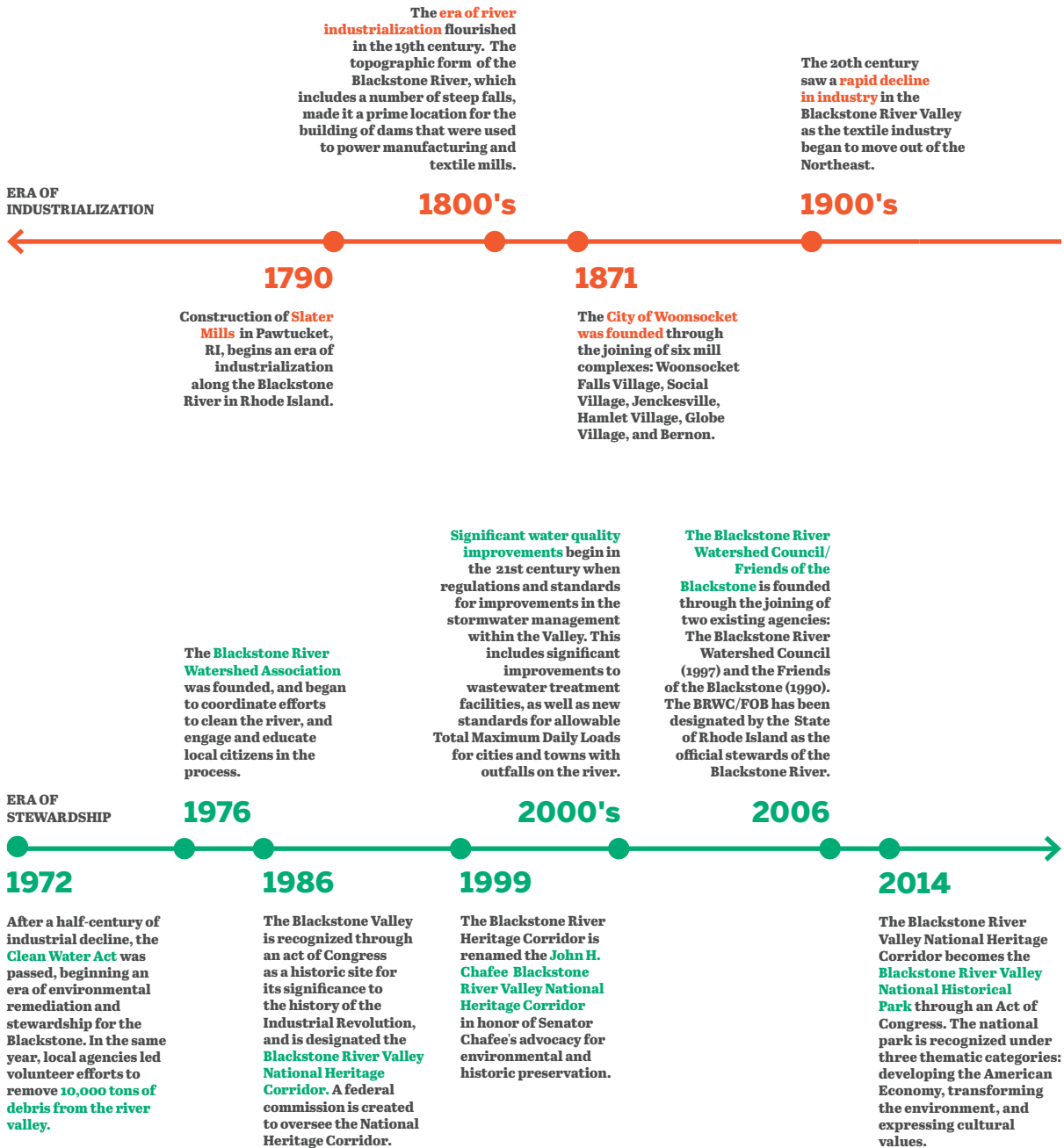


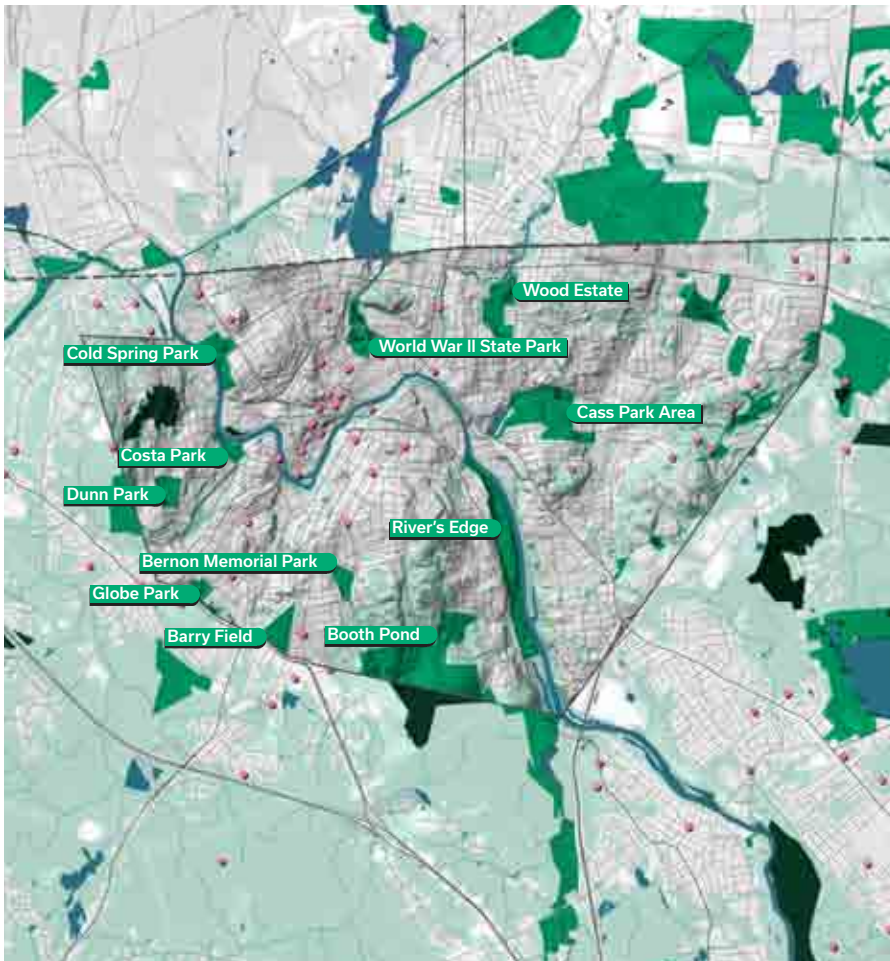
Blackstone River Valley
 Historic Districts and Public Open
 Space



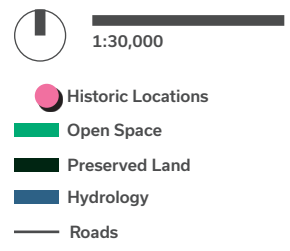
- Open Space
- Historic Districts
- Hydrology
- Heritage Corridor
- Blackstone River Bikeway

EVOLUTION OF THE BLACKSTONE RIVER CORRIDOR





Woonsocket, RI
Public Open Space and
Conservation Areas



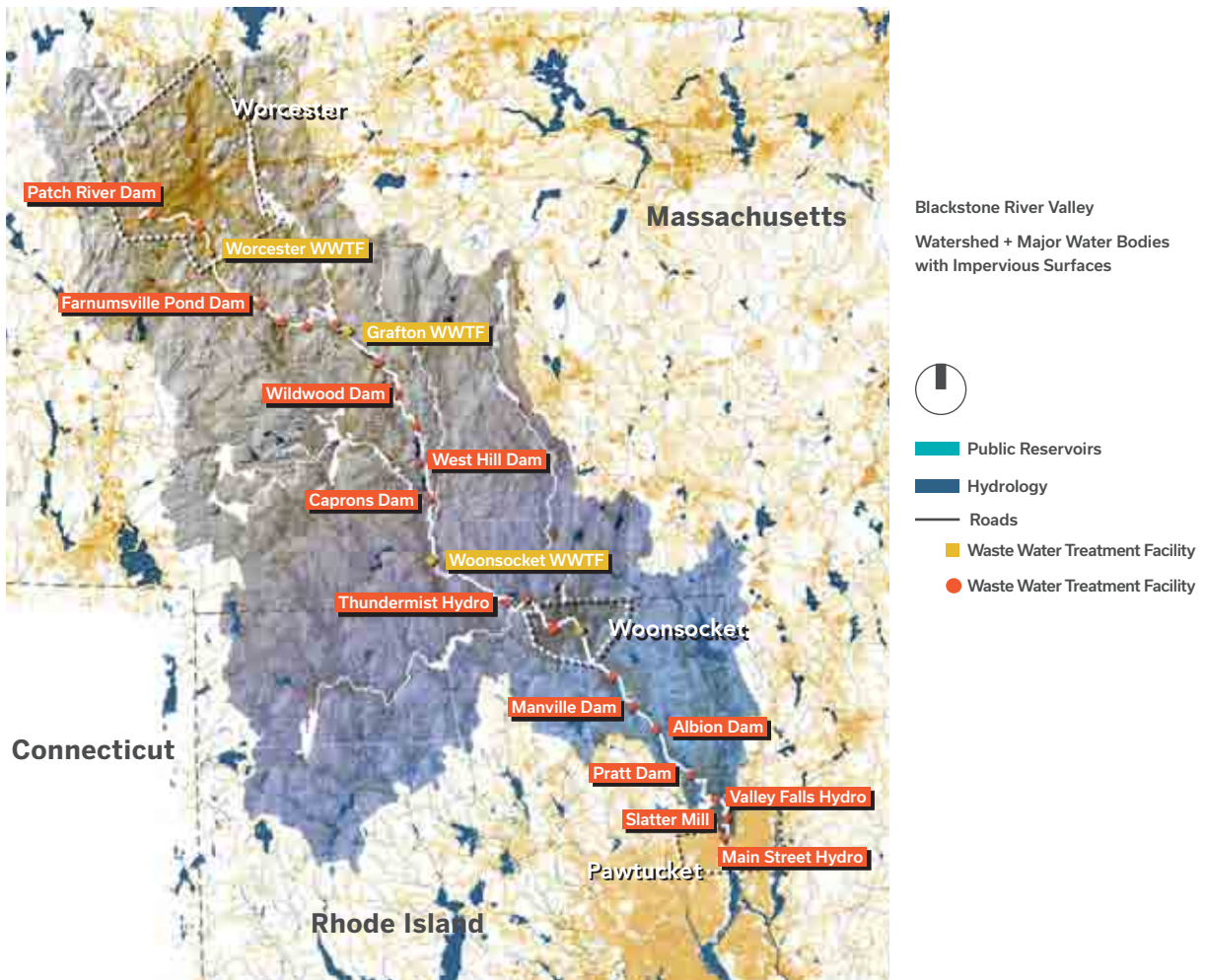
3. Rees, Paula (UMass) and Masterson, Kristina (CDM). 2011. 'Blackstone River HSPF Water Quality Model Presentation.'
4. Louis Berger Group with URI and UMASS. 2008. 'Water Quality – Blackstone River Final Report 2: Field Investigations.'
5. Blackstone River Watershed. Accessed April 27, 2018. <http://www.ririvers.org/wsp/Watersheds/BlackstoneRiverWatershed.htm>.
6. Ibid.
7. Blackstone River Coalition. 2004-15. 'Water Quality Monitoring Program Document Report Card.'
8. Upper Blackstone Water Pollution Abatement District. 2013. 'Blackstone River Water Quality Study: 2013.'
9. Woonsocket Planning Board, Woonsocket City Council, Rhode Island Department of Administration. 2012. 'City of Woonsocket, Rhode Island 2012 Comprehensive Plan.'
10. RIDEM. 2013. 'Total Maximum Daily Load Analysis for the Blackstone River.'
11. Blackstone River Valley National Heritage Corridor, Inc. 2017. 'Surging Toward 2026: A Strategic Plan.'
12. National Park Service, Northeast Regional Office. 2011. 'Blackstone River Valley Special Resource Study.'
13. Blackstone River Valley National Heritage Corridor, Inc. 2017. 'Surging Toward 2026: A Strategic Plan.'

Research Summary + Takeaways

RESEARCH FINDINGS

The preliminary research for this report was focused on four categories: the historical and cultural relevance of the river, the larger watershed health and management, the recreational value of the river corridor, and the

relationship that the City of Woonsocket has to the Blackstone. From the gathered research there are a few key takeaways that may have relevance for future Thundermist projects; they are outlined below.



BLACKSTONE CULTURAL AND HISTORICAL VALUE

- Blackstone River Valley is the birthplace of American Industrialization.
- Use of the River for manufacturing dominated in the 18th and 19th centuries, and led to significant engineering of the River, as well as development of villages and urban centers along its length.
- Remnants of the industrial past remain visible today in the canal, dams, mills and historic structures, as well as in the populations who moved to the valley for the textile industry.
- In 1986 the Blackstone River National Heritage Corridor was created.
- In 2014 the Corridor became part of the National Park System.
- Some of the original 6 mill villages remain, and might serve as historical focal points for stormwater management.

WATERSHED HEALTH

- Due to its heavily industrialized past, the Blackstone has over a century's worth of pollution embedded in sediments in the river.
- The river is also heavily affected by wastewater treatment facilities located along the river and non-point source pollution.
- Annual water quality monitoring has shown impairments for nutrients, dissolved oxygen, and aesthetics at many locations along the river, including points in Woonsocket.

- New TMDL standards released from the Department of Environmental Management are requiring cities in Rhode Island, including Woonsocket, to improve their stormwater management plan and to address a number of these impairments.
- Woonsocket has a wastewater treatment facility and functioning dam located on the river; it may be useful to couple these with stormwater improvement projects.
- RIDEM has identified additional outfalls and targeted drainage basins; consider targeting these locations for stormwater infiltration projects.

RECREATIONAL VALUE

- Much of the Blackstone River is designated CLASS B water, meaning that it is designated for 'fish and wildlife habitat and primary and secondary contact recreational activities.'
- Currently, the water quality of the river is impaired and does not support its designated uses.
- Certain recreational activities are supported: portions of the river can be accessed by kayak, and there are systems of bike and walking trails from Worcester to Providence.
- Future visions for the Blackstone emphasize completing linkages in the trail system, and supporting more recreational opportunities (making it swimmable and fishable).
- Stormwater improvement projects may focus on public open spaces such as parks, downtown streets, and recreational spaces along the bikeway.

WOONSOCKET PLANNING

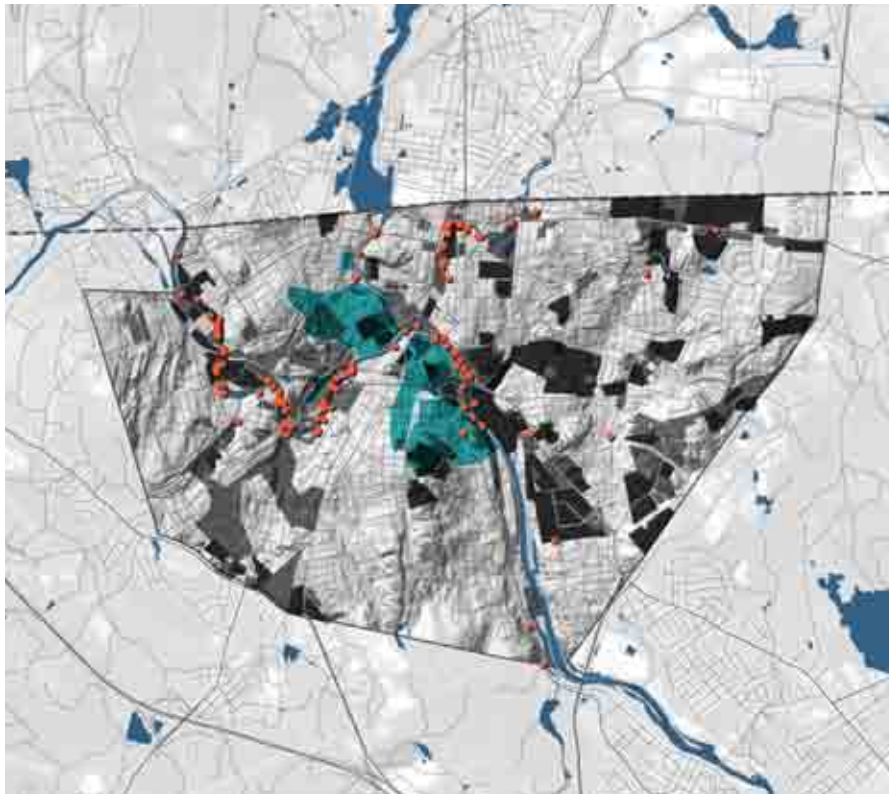
- The City and RIDOT have significant plans to link Woonsocket's bikeway directly along the River to the Massachusetts bikeway, linking Main Street, major attractions and public amenities along the way.
- The City will need to update its Stormwater Management Plan to maintain its MS4 permits with the revised TMDL analysis released in 2013.
- Currently the Main Street of Woonsocket is suffering from vacancy, marginal uses, destruction of historical features and structures, and poor design decisions.
- The Woonsocket Heritage Corridor Overlay Zone and Design Review Committee exist to manage and protect the visual, physical and historic resources within the City.
- In 2003 the city began its Brownfield Program raising over 100,000 in USEPA grant funding for both assessment and clean-up of recent and historic brownfield sites for both private and public amenity.








Identified Project Zones + Sites

PROJECT ZONE SELECTION

Key areas were identified within Woonsocket for future Task force projects. These areas were chosen through the research phase and strategic mapping of environmental conditions in the city, which included an analysis of the watershed and regional hydrology, the amount of impervious surface in the city, areas of brownfields and industrial use, open spaces, and recreational opportunities (see Appendix for catalog of maps).

Ultimately, these zones were chosen based on the following criteria: the amount of impervious surface in or around the area, the location of outfalls, the proximity to the river, the drainage areas prioritized by the DEM, the opportunity for public visibility, the opportunities to pair the project with recreational or cultural amenities, and the likelihood of the project to overlap with other stormwater or planning initiatives within Woonsocket. Five zones were selected: the Costa Park Area, the Cass Park Area, the Bernon Area, the Main Street and Downtown Area, and the River's Edge Area.



- Woonsocket, RI
- DEM Targeted Outfall and Drainage Violation Areas
-  Woonsocket, RI
-  DEM Mapped Outfalls
-  Outfall Drainage Areas
-  2' Acre Impervious Parcels
-  Contiguous Impervious Parcels
-  Hydrology
-  Roads

COSTA PARK AREA

Costa Park is one of Woonsocket's newer parks, and provides a number of recreational facilities for the Fairmount and Constitution Hill Neighborhoods. The park grounds have over the years seen some neglect. The park directly abuts the Blackstone River, and may provide opportunities both for park improvements and for diverting storm water from the river.

CASS PARK AREA

Cass Park is Woonsocket's largest park, and many enhancements have been planned or completed. The improvements include upgrades to many of the recreational facilities, including play fields and courts, playgrounds, walking paths, running tracks, as well as to Cass Pond. The stream and pond provide a natural habitat for many species. As Woonsocket's primary open space and recreational area, storm water infiltration projects located here would provide high visibility, as well as positive impacts for the natural environment.

BERNON AREA

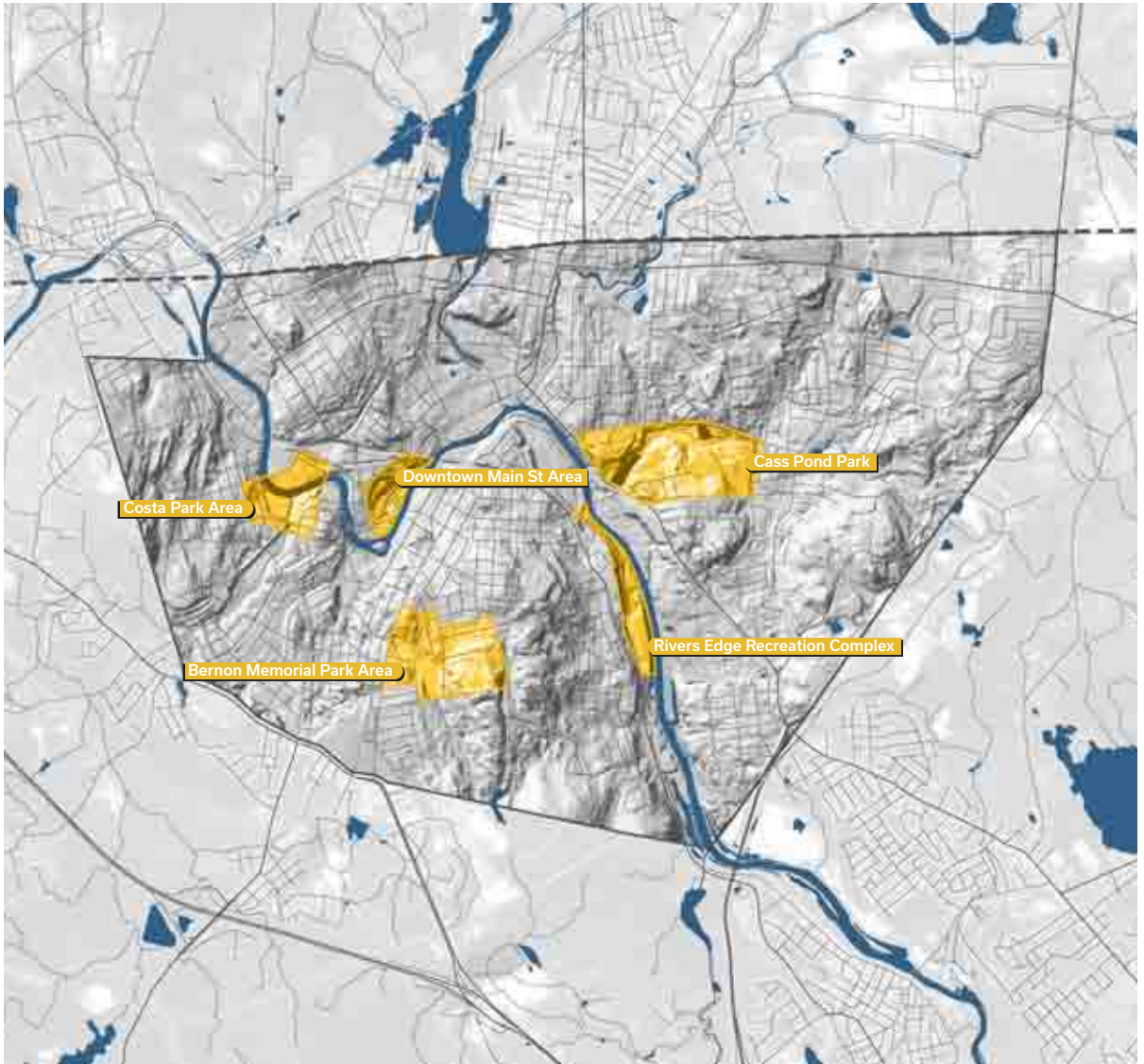
The Bernon neighborhood is located on a hill just south of the river, and is also located in one of the priority drainage zones identified by the RIDEM. The neighborhoods residents are mixed between both rental tenants and owners. The homeowners here may be interested in pilot projects that test strategies for infiltration on their own land.

MAIN STREET AND DOWNTOWN AREA

Woonsocket's historic Downtown and Main Street district have been a major focus for revitalization efforts. This area saw decline through the mid 1990's, but recently significant improvements have been made to the Market Square Area. The historic downtown is covered with a high degree of impervious surface area, and was included as one of the priority zones for storm water improvement by the Rhode Island DEM for the high amount of outflow it contributes to the Blackstone River. With its historic significance, proximity to major historic landmarks such as the Museum of Work and Culture and the Stadium Theatre, and high visibility.

RIVER'S EDGE AREA

Blackstone River Bikeway in Woonsocket and the River's Edge Recreation Area connect to the larger trail system that runs from Worcester to the end of the Blackstone River. In 2004, areas in Woonsocket adjacent to the river were designated protected open space. The city has recognized both the bikeway and protected open spaces in their comprehensive plan as areas targeted for aesthetic improvement as well as public enjoyment. Additionally, as part of the updated comprehensive plan, Woonsocket is planning to construct the missing links in the bikeway. This may present unique opportunities to pair storm water improvement projects with environmental and recreational initiatives the city has already outlined.



Woonsocket, RI
 Selected Thundermist
 Project Zones



- Selected Study Zones
- Hydrology
- Roads

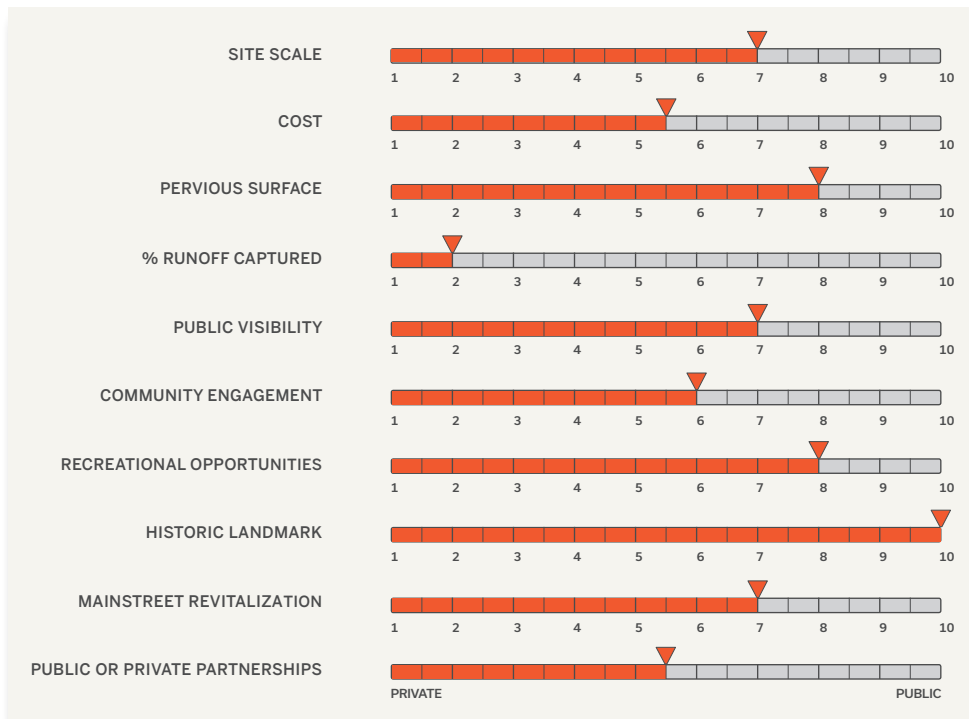
PROJECT SITES AND REPORT CARDS

Through this process we have identified 10 potential sites within the five project zone areas. These sites vary in size, location, type, proximity to the river, and relationship to public space. These sites vary from open areas located within existing parks, to recreational fields in residential neighborhoods, to heavily paved sites located within downtown. The sites range in size, and also provide opportunities for public and private partnerships.

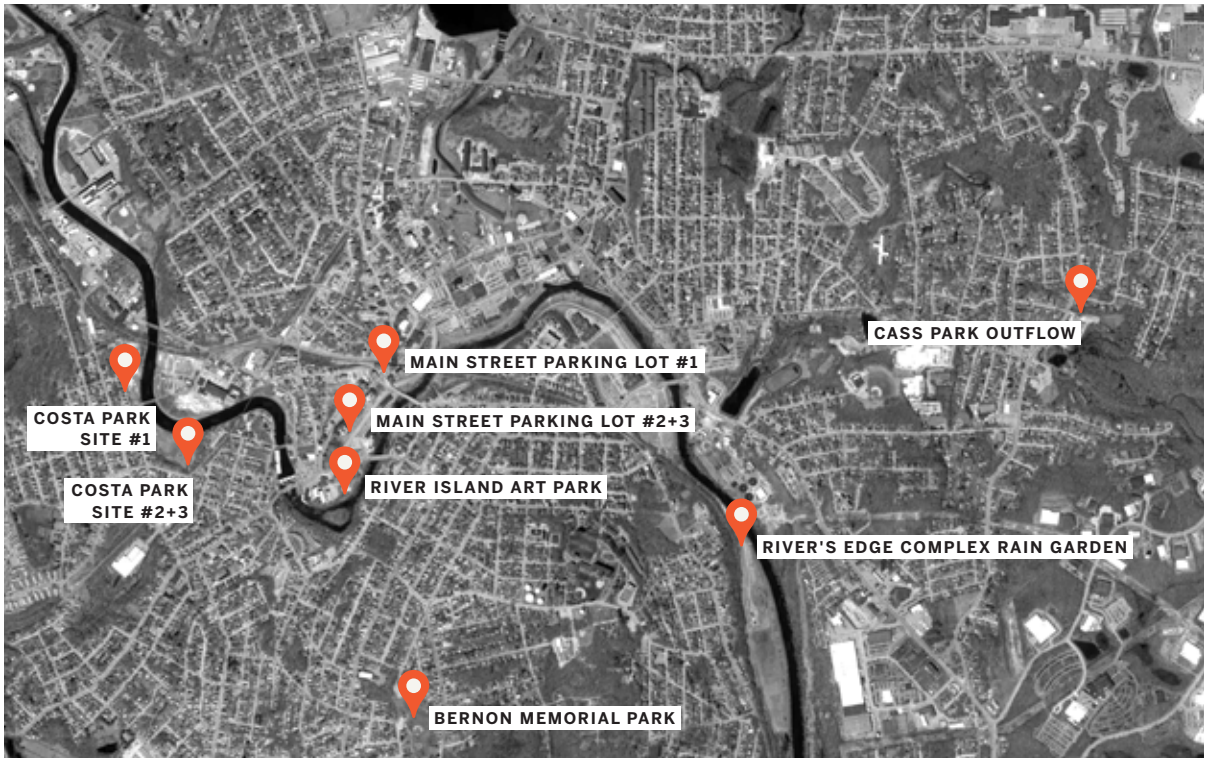
Each of the project sites are listed on the adjacent map. From these sites, four have been prioritized and are described in the following pages, with a vision for what elements the project could include. These sites were chosen

based on their immediate feasibility, and the range of opportunities: one is a main street paved site, one is a downtown park, one is a residential recreational park, and one is located along the river's edge.

For these four sites, a 'report card' has been developed to highlight and compare what the specific opportunities of each project would be. The report card considers site scale, project cost, the potential to capture runoff, and the ways that the project can engage the community in Woonsocket.



Sample Report Card for Potential Project Site



River's Edge Complex Rain Garden

Address: 135 Davison Ave, Woonsocket, RI 02895
 Size: .75 Acres

Cass Park Outflow

Address: 1117 River Street, Woonsocket, RI 02895
 Size: 5,000 Sq Ft

Costa Park Site 01, 02, + 03

Address: 35 1st Avenue, Woonsocket, RI 02895
 Size: 2,700 Sq Ft, 7,000 Sq Ft, 8,250 Sq Ft

Bernon Memorial Park

Address: 190 Main Street, Woonsocket, RI 02895
 Size: 9,000 Sq Ft

Main Street Parking Lot 01

Address: 190 Main Street, Woonsocket, RI 02895
 Size: 10,000 Sq Ft

Main Street Parking Lot 02

Address: 84, Main Street, Woonsocket RI 02895
 Size: 11,000 Sq Ft

Main Street Parking Lot 03

Address: 12 Main Street, Woonsocket, RI 02895
 Size: 1,800Sq Ft

River Island Art Park

Address: Bernon Street, Woonsocket, RI 02895
 Size: 5,000 Sq Ft

**Sites in blue indicate areas for further development*

PROJECT SITE 1: RIVER'S EDGE COMPLEX
 Community Outreach and Recreation
 135 Davison Ave, Woonsocket, RI 02895

PROJECT SIZE

Total Size: 21 acres
 GSI Intervention: .25 acres

COST RANGE

\$41,000 - Approximate cost per square foot.
 This order of magnitude estimate excludes
 community service and donations.

PROJECT DESCRIPTION

River's Edge Recreation Complex is a public park with a multitude of recreational activities spanning over 33 acres. The specific site lies within the sloped area between the bike path and parking drive, where a culvert pipe currently opens. Our proposal is to integrate a vegetated swale to the inlet system already in place. This project would greatly enhance the entry experience in and out of the park while capturing a large amount of water from the bluff and Bikeway before entering the Blackstone River. We see this project as providing opportunities for education and civic engagement as it is located in a key recreation area along the river. This site falls within a critical outfall drainage area making it prone to contaminated outwash.

LOCATION OPPORTUNITIES

- Proximity to river
- Bottom of steep slope
- Part of larger recreational network, including bike access
- Located in Heritage Corridor Overlay Zone (see Section 3—Woonsocket Planning Initiatives)

GOALS

- Capture and control runoff coming from site before it enters the inlet
- Capture and control potential sediments coming from slope before it enters inlet
- Integrate vegetated planting as an intermediate buffer between the slope, site, and river

PROJECT COMPONENTS

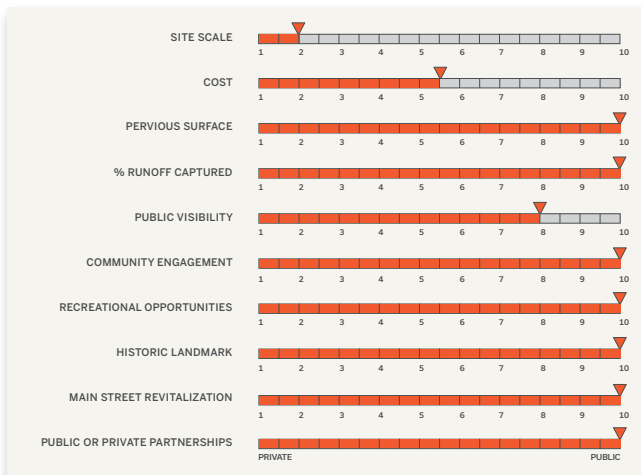
- Vegetated swales

MAINTENANCE INVOLVED

- Rain garden should be cut back once a year
- Drain will need to be occasionally cleaned

STAKEHOLDERS + AGENCIES INVOLVED

- City of Woonsocket Department of Public Works
- Rhode Island Department of Transportation (potential partner)



Riverside Park
 Report Card




Woonsocket, RI
Existing view at River's Edge Complex
proposed rain garden location
facing south



Woonsocket, RI
Existing view at River's Edge Complex
proposed rain garden location
facing north



Woonsocket, RI
River's Edge Complex Rain Garden
 Intervention Location



Proposed view of rain garden at River's Edge Complex entrance

- 1. Existing Outlet Culvert
- 2. Repair Existing Parking Lot
- 3. New Safety Fence
- 4. Existing Bikeway
- 5. Filter Check Dam
- 6. Rain Garden + Native Wetland Perennial Planting
- 7. Stone Filter Border To Meet Existing Grade. Swale Slope 3:1 Max
- 8. Existing Outlet Culvert



PROJECT SITE 2: RIVER ISLAND ART PARK
 Community Outreach and Public Park
 95 Bernon Street, Woonsocket, RI 02895

PROJECT SIZE

Total Size: 3.5 acres
 GSI Intervention: .1 acres in NE corner of site

COST RANGE

\$20,000 - Approximate cost per square foot.
 This order of magnitude estimate excludes
 community service and donations.

PROJECT DESCRIPTION

River Island Art Park is a centrally located public space that offers multiple park amenities, including a scenic river's edge location, sitting areas, a gazebo, and a main stage for public events. This park currently experiences flooding due to poor drainage in the park areas. Our proposal would be to introduce rain gardens in these low areas that would complement the scenery in existing sitting and walking areas, while also capturing some of the site's storm water before it can flow into the river. This site provides high visibility and the possibility for high foot traffic due to its proximity to Downtown Woonsocket. It also falls within a critical drainage area as it is located directly along the river.

LOCATION OPPORTUNITIES

- Proximity to River
- Close to Downtown
- Currently Floods
- High visibility through public events hosted at park

GOALS

- Mitigate flooding to low areas within the park
- Integrate vegetated swales within park sitting and walking areas
- Capture and control a portion of the runoff from the site

PROJECT COMPONENTS

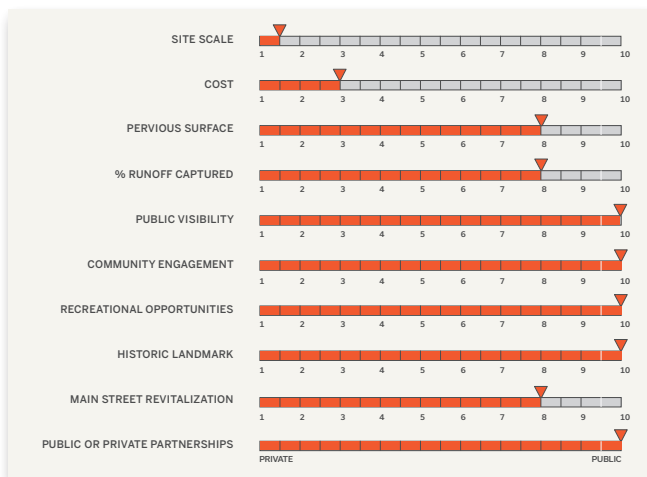
- Rain garden
- Overflow drain

MAINTENANCE INVOLVED

- Rain garden should be cut back once a year
- Drain will need to be occasionally cleaned

STAKEHOLDERS + AGENCIES INVOLVED

- City of Woonsocket Department of Public Works
- Rhode Island Department of Transportation (potential partner)



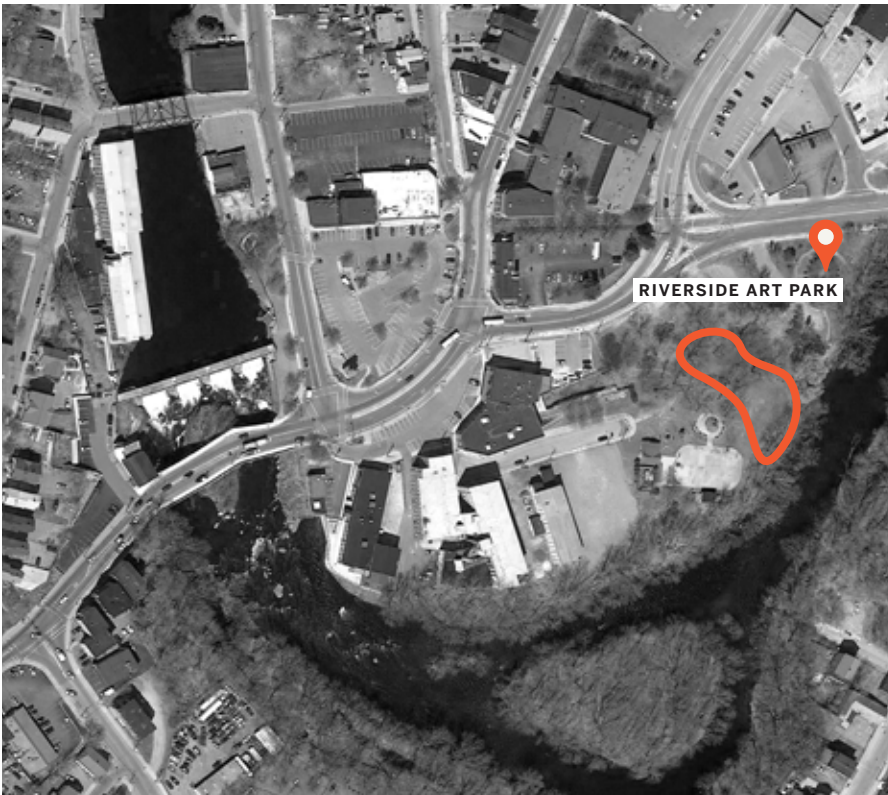
River Island Art Park
 Report Card



Woonsocket, RI
 Riverside Art Park
 proposed rain garden location
 facing north towards Main Street



Woonsocket, RI
 Riverside Art Park
 proposed rain garden location facing south
 towards the Blackstone River



Woonsocket, RI
 Riverside Art Park Rain Garden
 Intervention Location



Proposed view of rain garden
River Island Art Park,
Woonsocket, RI

1. Existing Path
2. Stone Filter Border
3. Native Wetland Perennial Planting
4. Raingarden Center Depth
5. Overflow + Cleanout Drain
6. Additional Seating Provided Around Raingarden
7. Second Raingarden Separated By Walking Path



PROJECT SITE 3: BERNON MEMORIAL PARK
 Athletics and Recreation
 Gilbert and Carnation Streets,
 Woonsocket, RI 02895

PROJECT SIZE

Total Size: 9 acres
 GSI Intervention: .7 acres at north edge of ball field

COST RANGE

\$30,000 - Approximate cost per square foot.
 This order of magnitude estimate excludes community service and donations.

PROJECT DESCRIPTION

Bernon Park is a well-used public area located within the Bernon residential neighborhood, with multiple sports fields, including two baseball fields, a seasonal hockey rink, basketball and tennis courts. The park is currently located in a topographic low area, and floods through much of the play season. Many of its sports fields cannot be used for portions of the year due to flooding. The proposal for this area would be to introduce large areas of vegetated swale in the areas between the ball fields, and at the edge of the site, below the sloped banks that create the boundaries of the park. Stormwater improvements at this site would provide major benefits for the residents of Woonsocket who hope to use the ballfields year round.

LOCATION OPPORTUNITIES

- Currently floods
- Highly used as recreational sports fields
- Tied to residential community

GOALS

- Mitigate current flooding to the site
- Increase the availability of the play fields by decreasing flood events
- Integrate storm water improvement strategies within residential areas of the city

PROJECT COMPONENTS

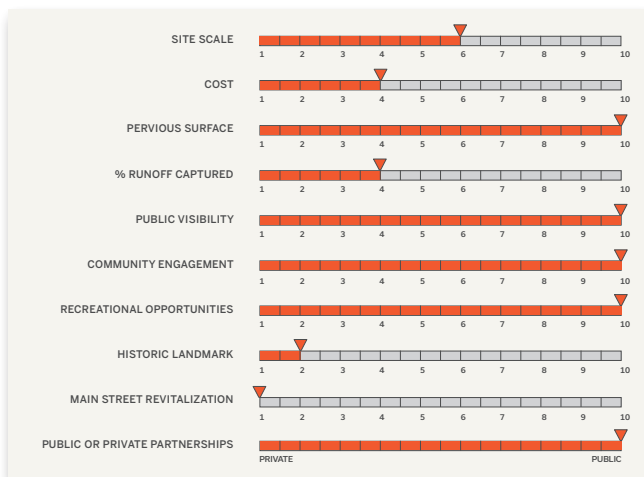
- Rain garden
- Vegetated Swales

MAINTENANCE INVOLVED

- Rain gardens and vegetated swales should be cut back once a year
- Drains will need to be occasionally cleaned

STAKEHOLDERS + AGENCIES INVOLVED

- City of Woonsocket Department of Public Works
- Rhode Island Department of Transportation (potential partner)



Bernon Memorial Park
 Report Card



Woonsocket, RI
 Bernon Memorial Park
 proposed vegetated swale location
 facing north towards inlet and skating rink



Woonsocket, RI
 Bernon Memorial Park
 proposed vegetated swale location
 facing south towards baseball fields



Woonsocket, RI
 Bernon Memorial Park

 Intervention Location



Proposed view of vegetated swale at Bernon Memorial Park

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> 1. Existing Baseball Field 2. Existing Turf ROW 3. Stone Filter Border To Meet Existing Grade. Swale Slope 3:1 Max | <ul style="list-style-type: none"> 4. Native Wetland Perennial Planting 5. Center Of Vegetated Swale 6. Culvert To Link Swale Sections 7. New Pathway To Playground 8. New Concrete Edge Curb 10. Existing Playground |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



PROJECT SITE 4: MAIN STREET PARKING LOT
01
Public Parking Lot
170 Main Street, Woonsocket, RI 02895

PROJECT SIZE

Total Size: .2 acres
GSI Intervention: .2 acres (entire parking lot surface)

COST RANGE

\$80,000 - Approximate cost per square foot. This order of magnitude estimate excludes community service and donations.

PROJECT DESCRIPTION

This parking lot is one of the major lots located on the northbound side of Main Street between Arnold and High Street in the main business district of Woonsocket. This lot, like most lots on Main Street, provides limited planting, and large areas of impermeable surface. This lot (as well as the others listed as potential sites) is located within a zone that has been identified by RI DEM as a critical outfall drainage area. This site provides high visibility and traffic as it is located downtown and is one of the frequently used free public parking lots. It also provides the opportunity to demonstrate techniques for decreasing the amount of impermeable surface and run-off in parking lots, and for increasing vegetated cover to decrease heat island effects of large paved surfaces.

LOCATION OPPORTUNITIES

- Located in Main Street Overlay Zone (see Section 3—Woonsocket Planning Initiatives)
- High public visibility and foot traffic
- Opportunity to demonstrate strategies for reducing runoff from large paved surfaces

GOALS

- Decrease amount of impermeable paved surface in lot
- Capture and retain stormwater on site
- Increase vegetated cover to capture and infiltrate stormwater, and to increase shade protection to the site

PROJECT COMPONENTS

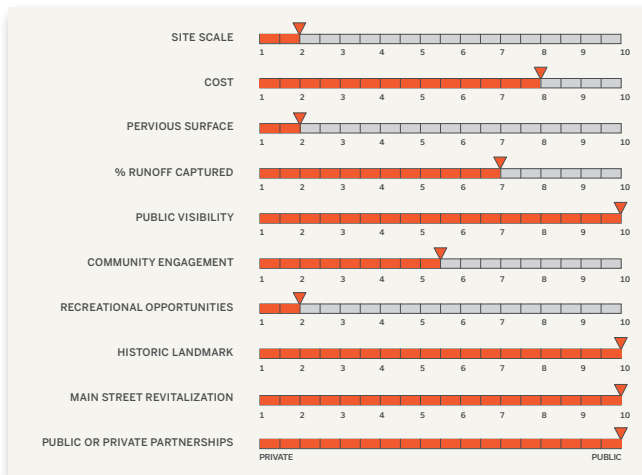
- Permeable paving
- Stormwater planters
- Gravel and sand filtration
- Underground water storage

MAINTENANCE INVOLVED

- Rain gardens and vegetated swales should be cut back once a year
- Drains will need to be occasionally cleaned

STAKEHOLDERS + AGENCIES INVOLVED

- City of Woonsocket Department of Public Works
- Rhode Island Department of Transportation



Main Street Parking Lot 01
Report Card



Woonsocket, RI
Existing view at Main Street Parking Lot 01
facing north west

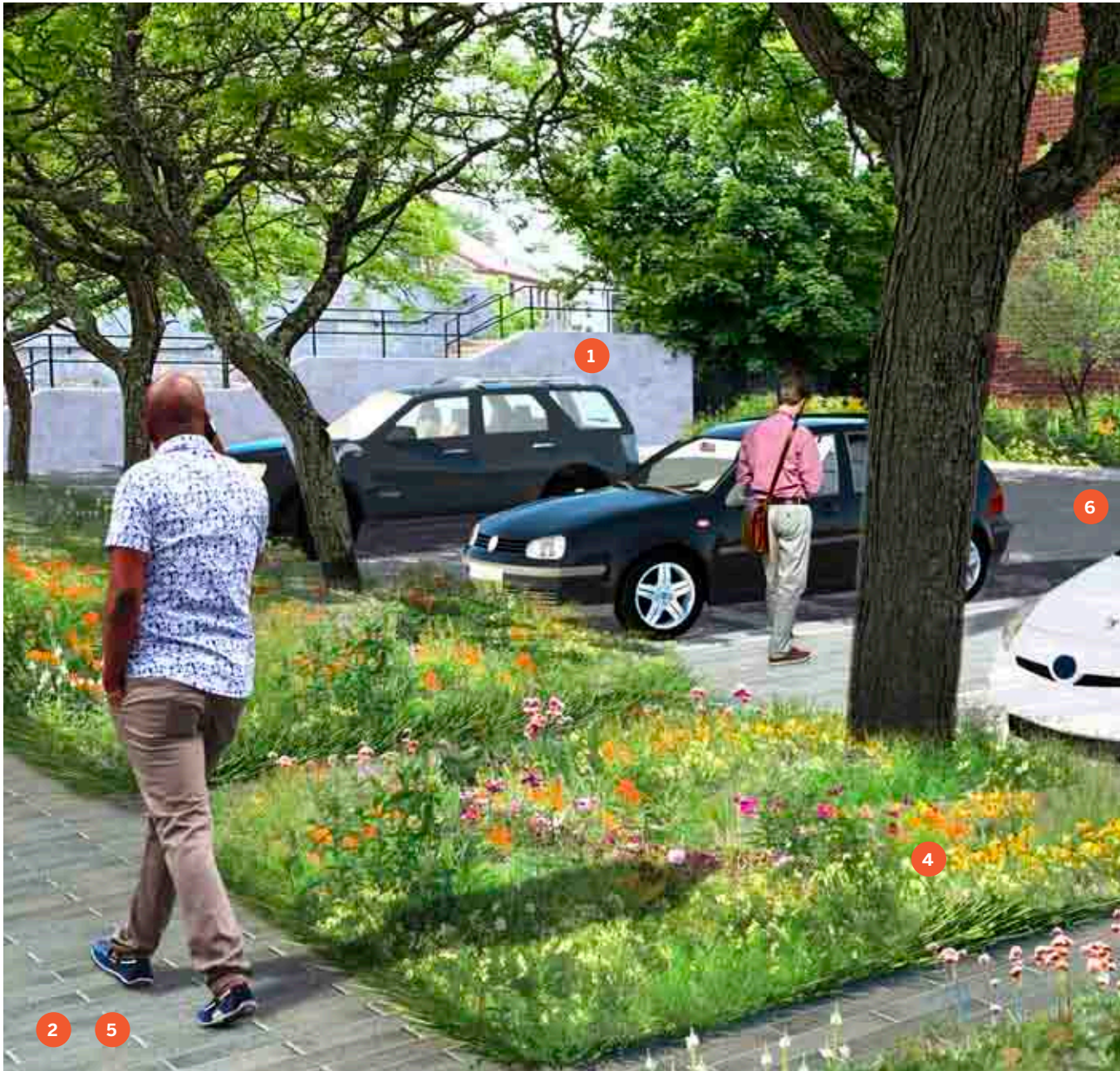


Woonsocket, RI
Existing view at Main Street Parking Lot 01
facing north east



Woonsocket, RI
Main Street Parking Lot 01

— Intervention Location



Proposed view of BMP's at Main Street Parking Lot 01

- 1. Existing Retaining Wall + Stair
- 2. Existing Drive Access + Path
- 3. Continuous Rain Garden
- 4. Stormwater Planters
- 5. Permeable Pavement
- 6. Underground Water Storage
- 7. Native Plant Vegetation
- 8. ADA Accessible Aisle and Curb Cut Ramp

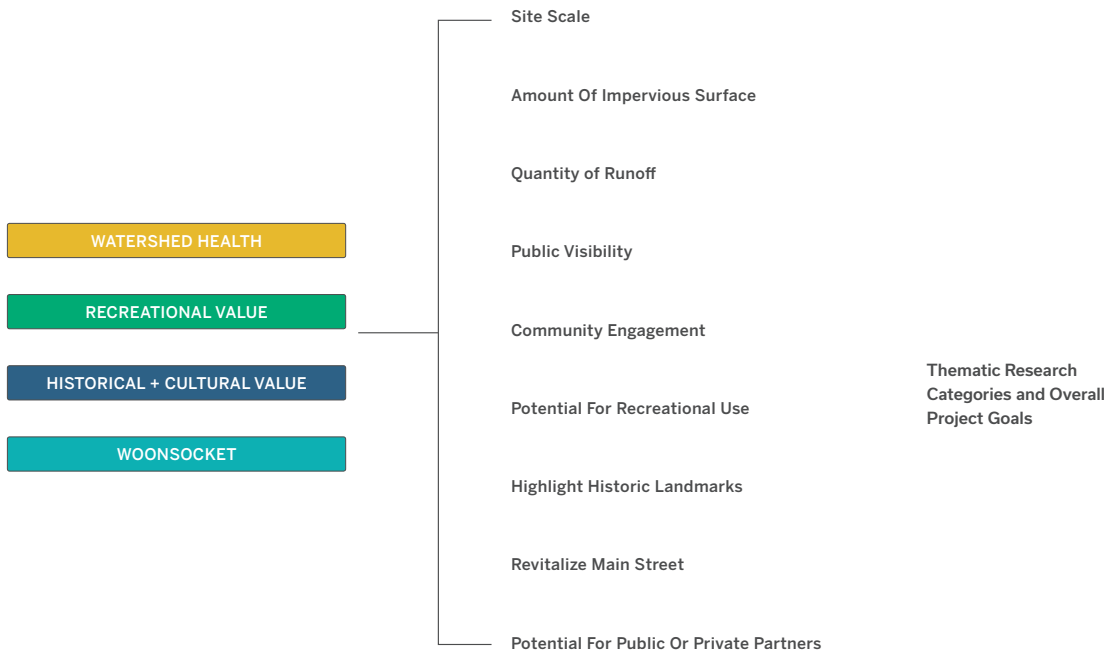


Appendix

RESEARCH OUTCOMES

This vision report was prepared after 6 months of research into the cultural and environmental history of the Blackstone River and its relationship to the city of Woonsocket. This research was framed by four themes that addressed the projected goals of the vision document and future Thundermist projects: watershed health, recreational value, historical and cultural value, and the specific context of Woonsocket.

All of the research compiled could not be covered in this vision document, but some of the research has been included in this appendix as a reference for future work. This includes a series of analytical maps that examine the topographic, hydrological, environmental, and urban systems of Woonsocket and the larger Blackstone River Valley, as well as a series of case studies that look at a range of strategies used in urban green infrastructure projects.

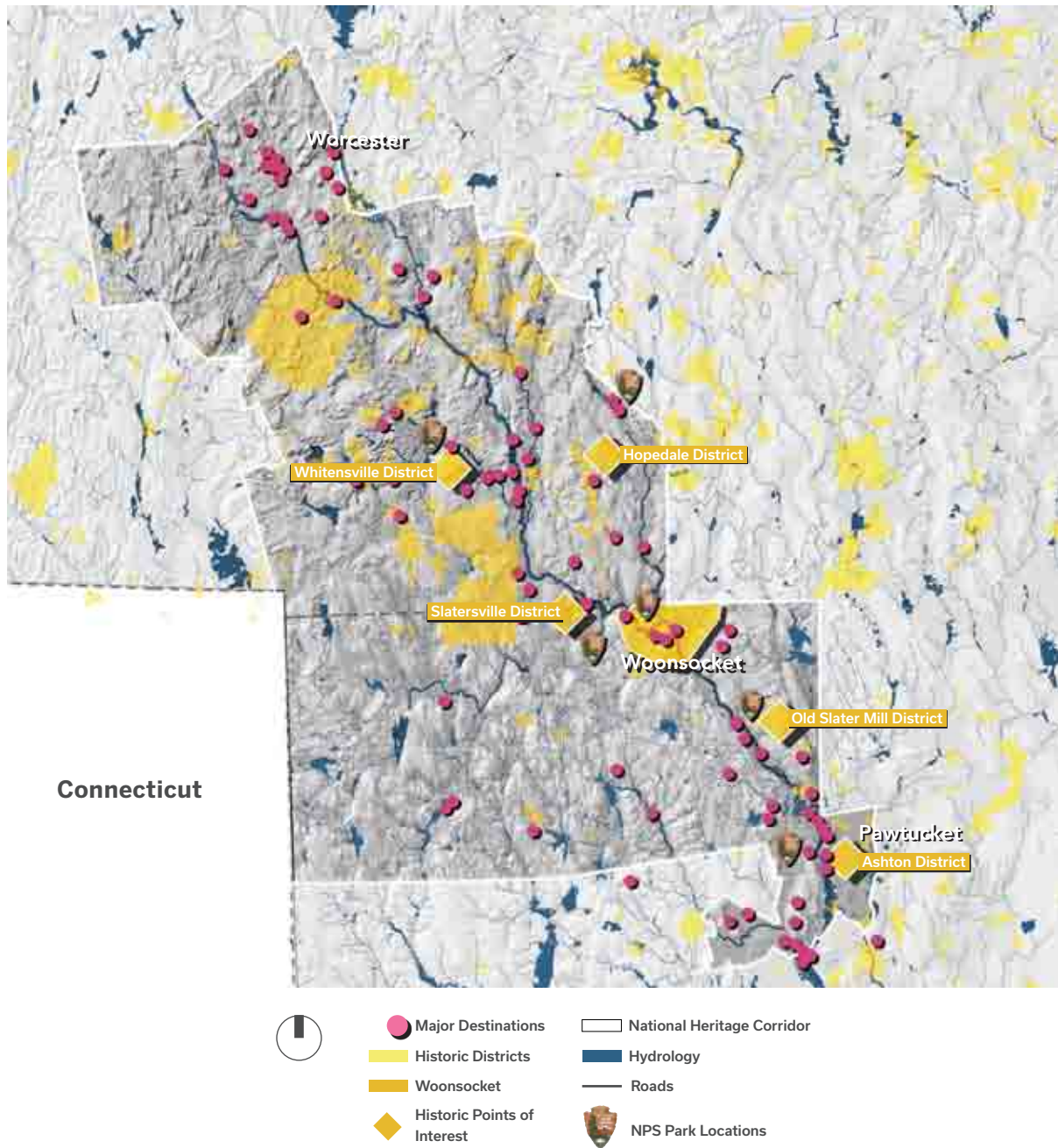


MAPS

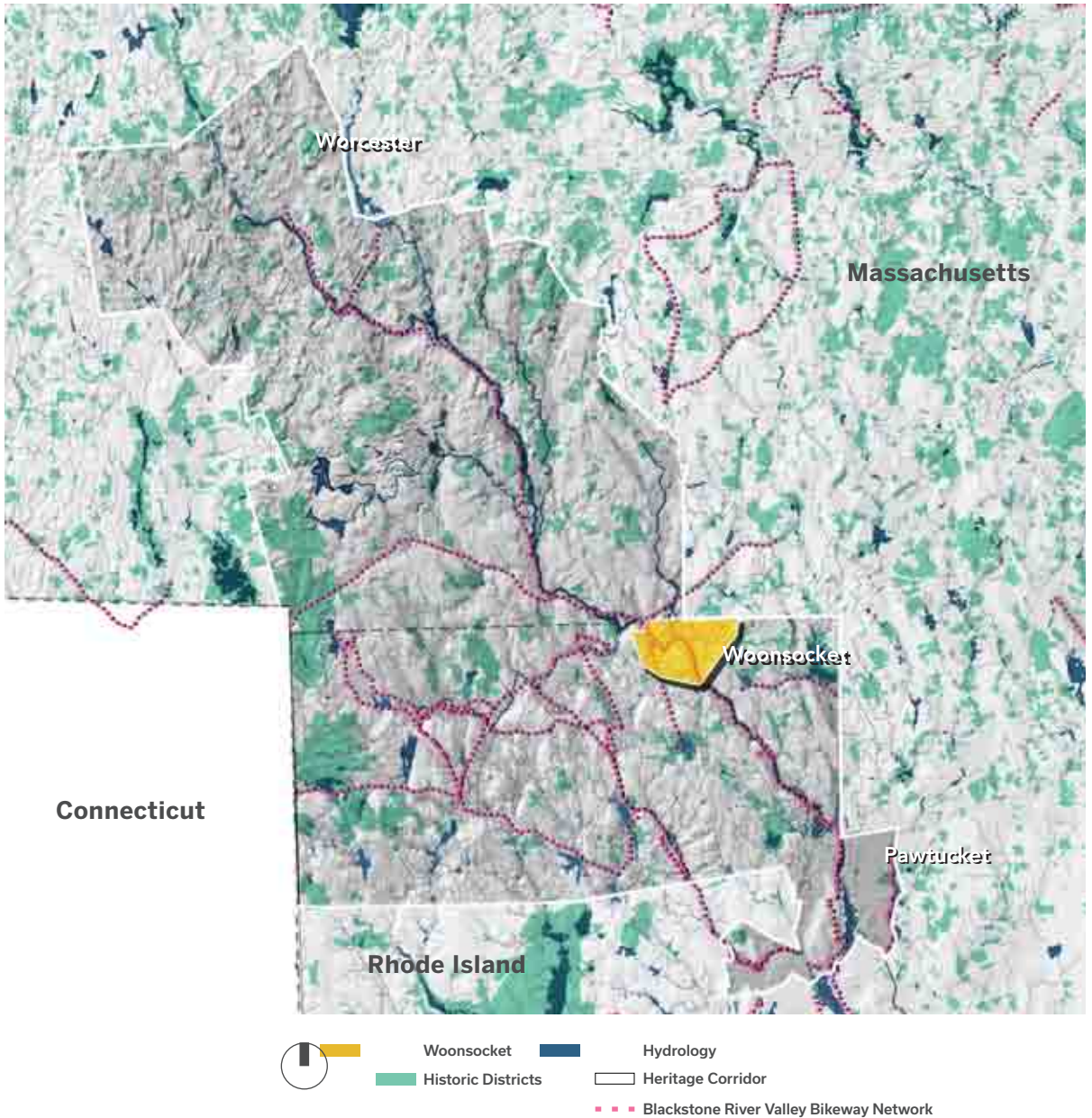
These maps were used to analyze the relationship between the Blackstone River, Woonsocket, and the surrounding context at both the Regional and City scales. These maps

look at hydrology, impervious surface, dams and outfalls, open space, historical sites, and relevant brownfield or industrial sites.

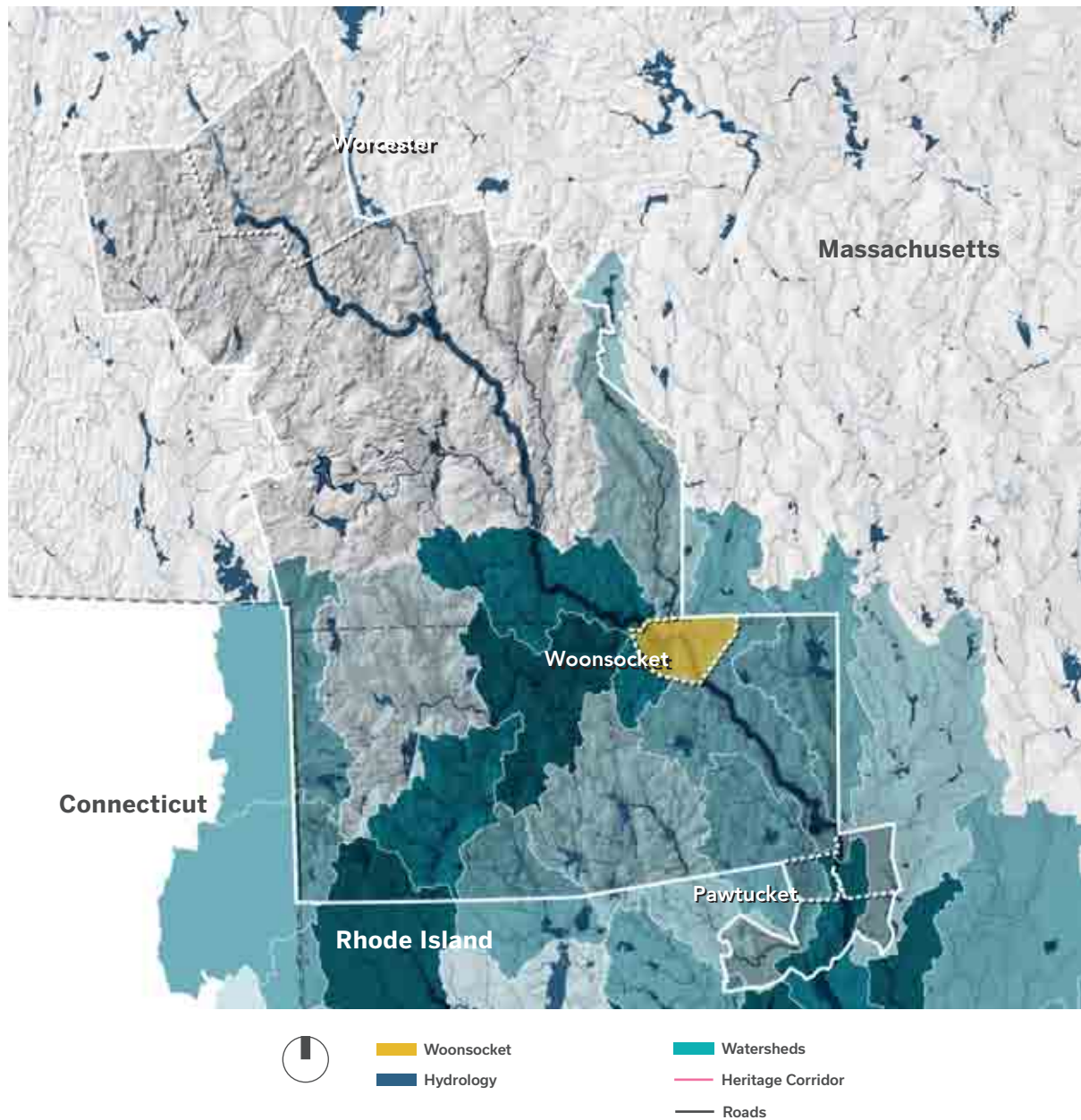
Blackstone River Valley Heritage Corridor National Park + Historic Points Of Interest



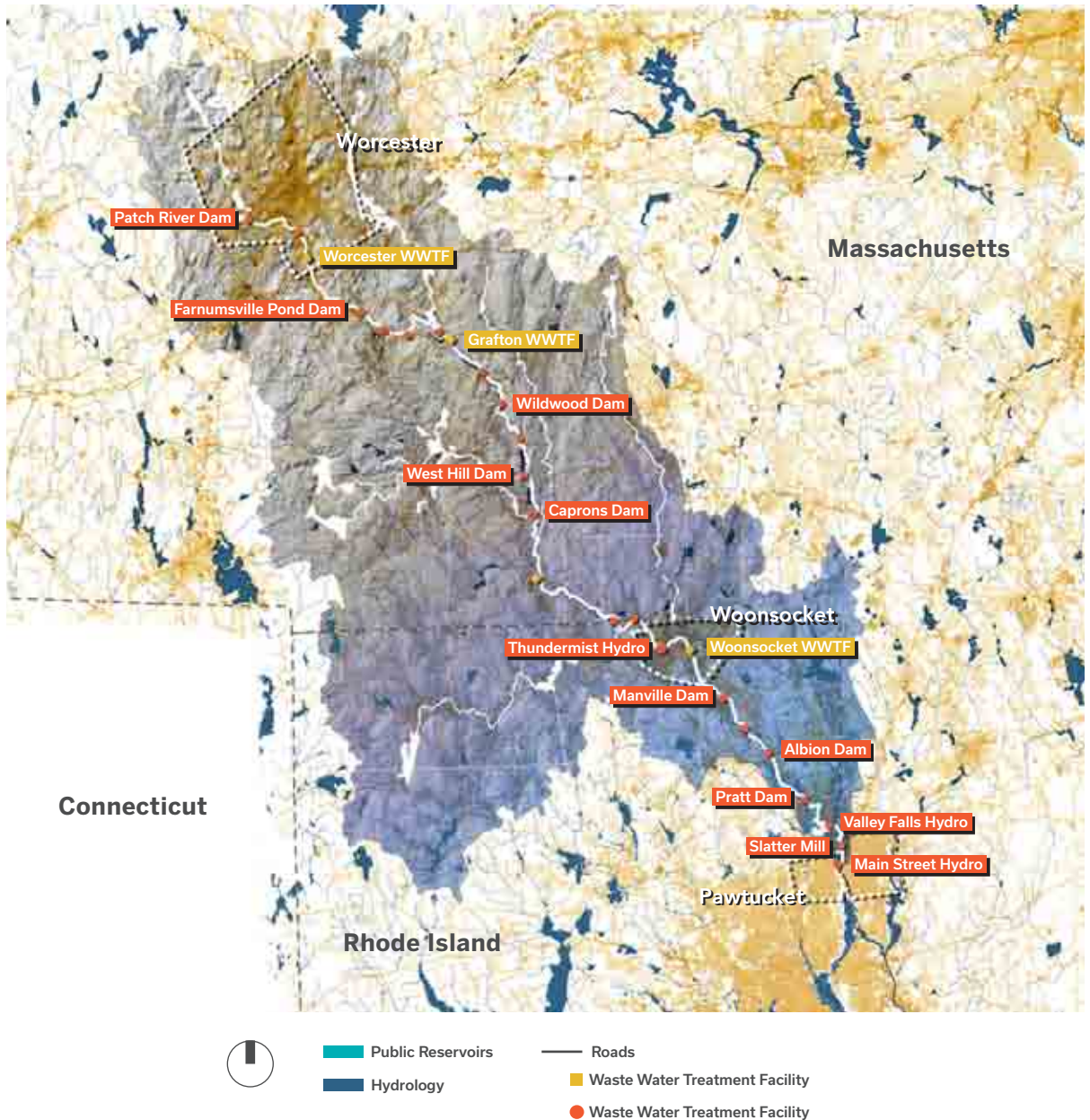
Blackstone River Valley Open Space + Bikeways



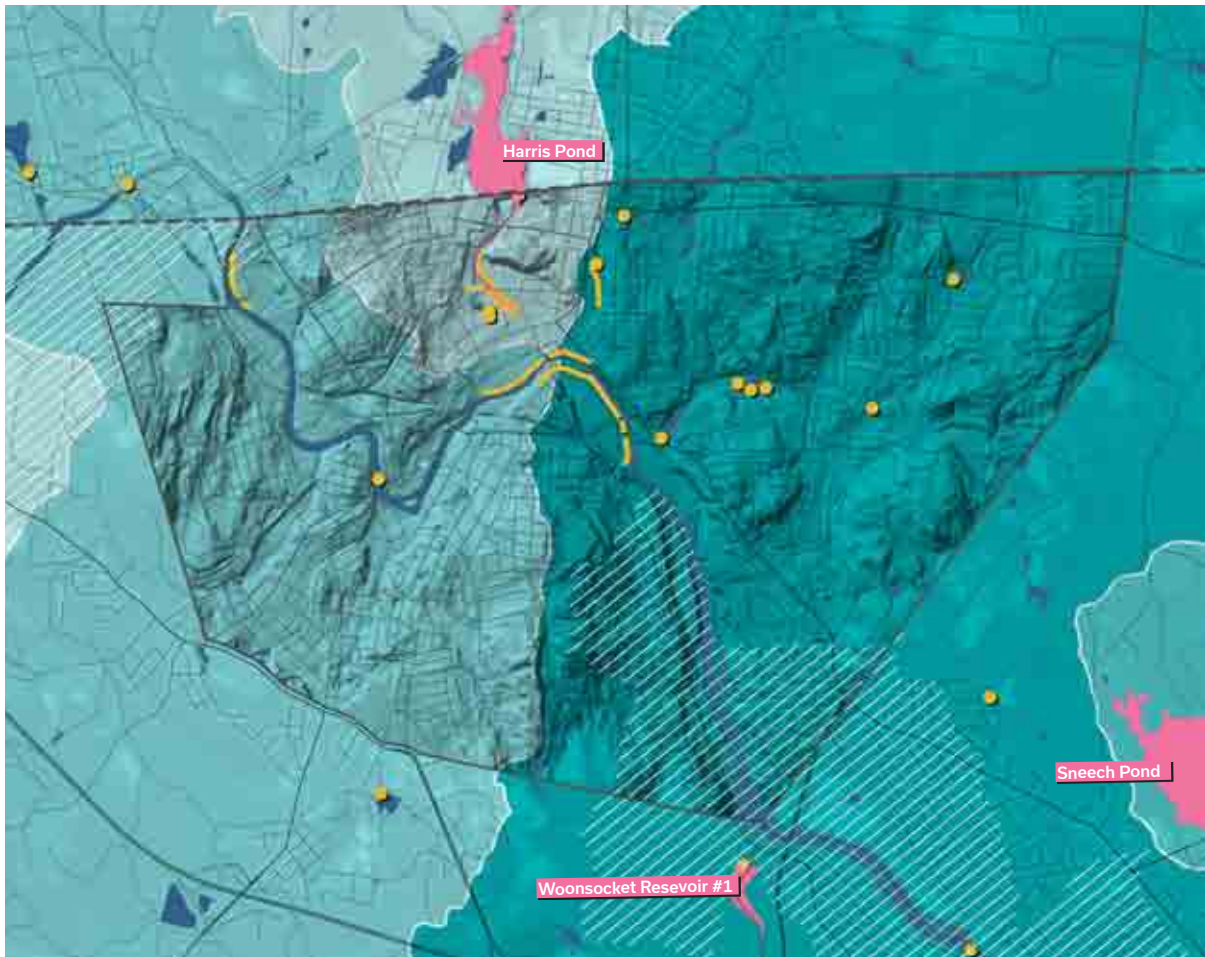
Blackstone River Valley Heritage Corridor Contributing Watersheds



Blackstone River Valley Heritage Corridor Watershed + Major Water Bodies with Impervious Surfaces

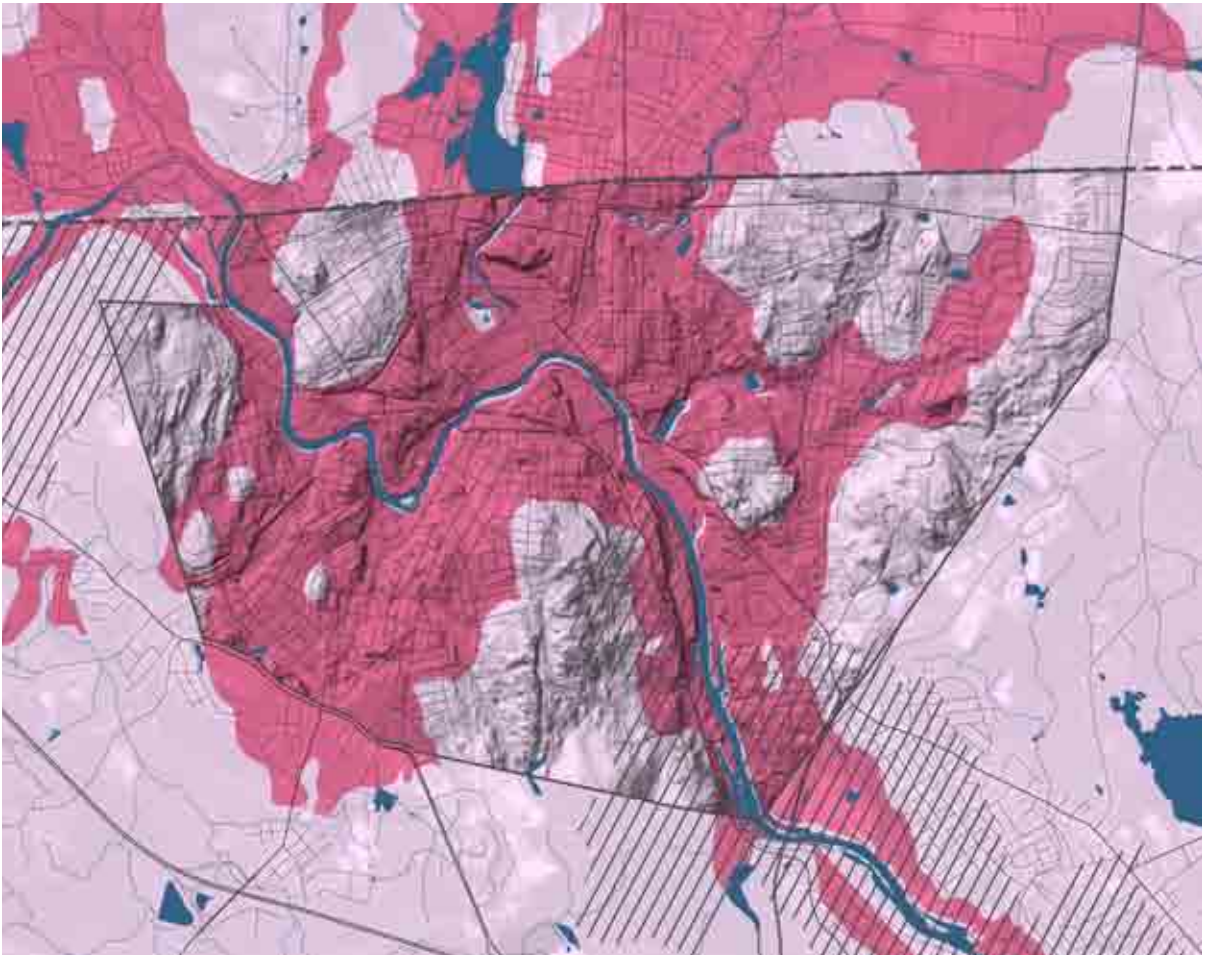



Woonsocket Contributing Watersheds



- Public Reservoirs
- Groundwater Recharge Areas
- Watersheds
- Hydrology
- Roads
- Levees
- Dams

Woonsocket Geology, Bedrock and Hydric Soils




 Groundwater Recharge Areas

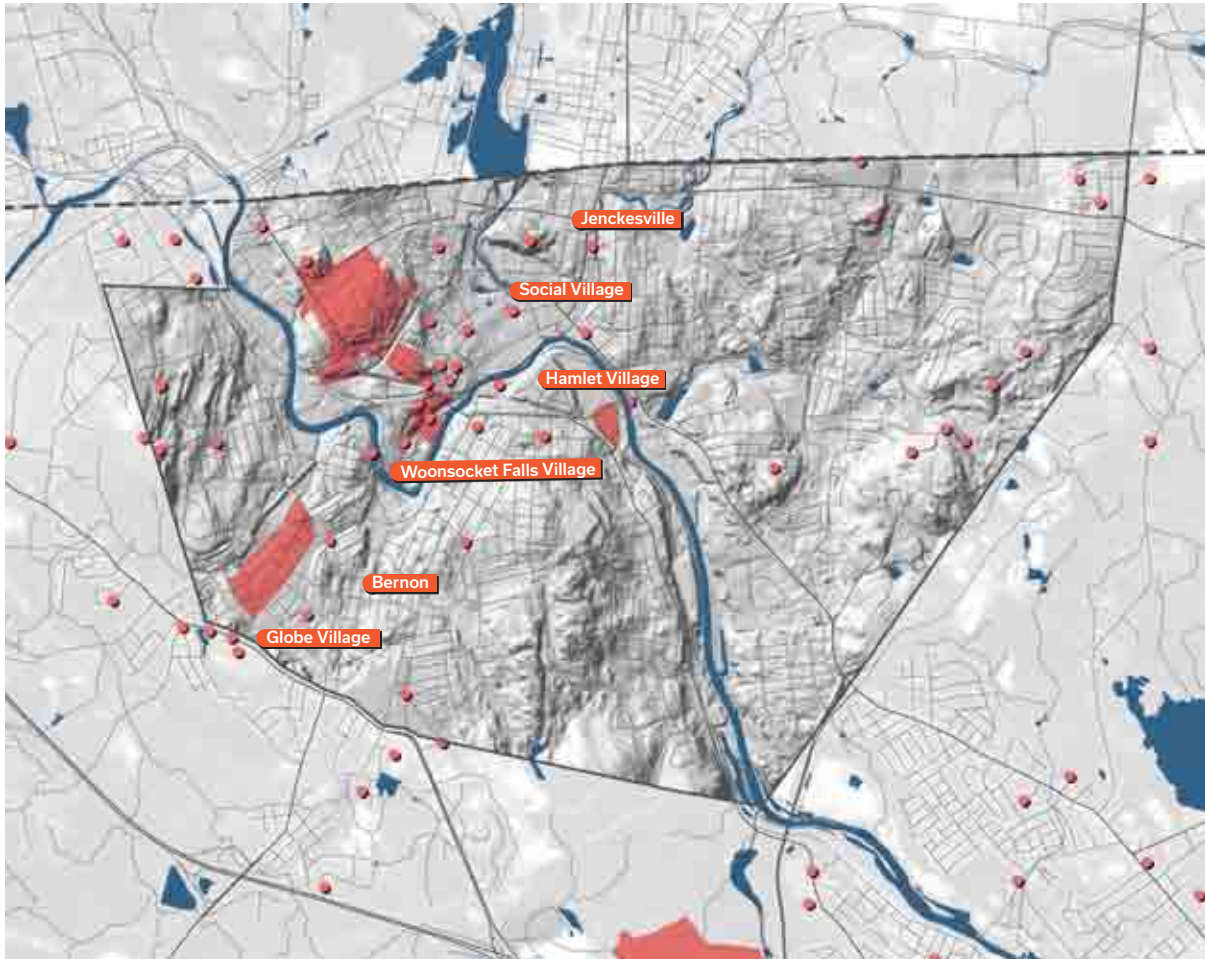
 Bedrock

 Moderate Hydric Soils

 Hydrology

 Roads

Woonsocket Six Historic Districts + Historic Destinations



Original Mill Villages

Hydrology

Roads

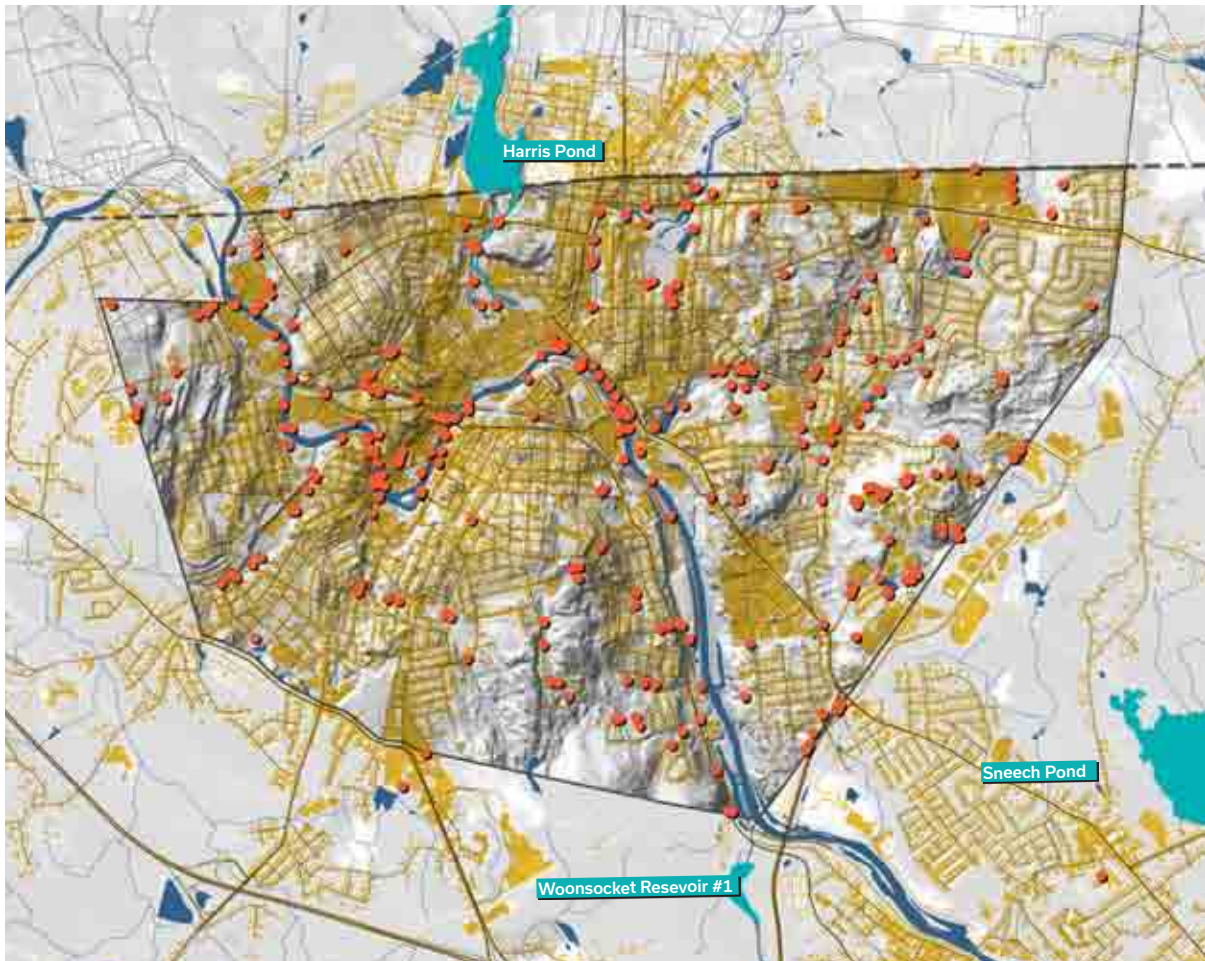
Historic Destinations

Woonsocket Public Open Space + Historic Locations



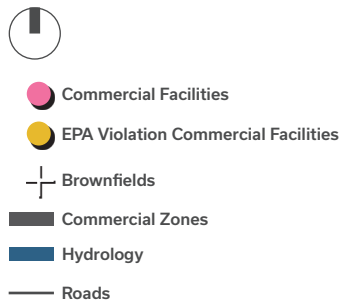
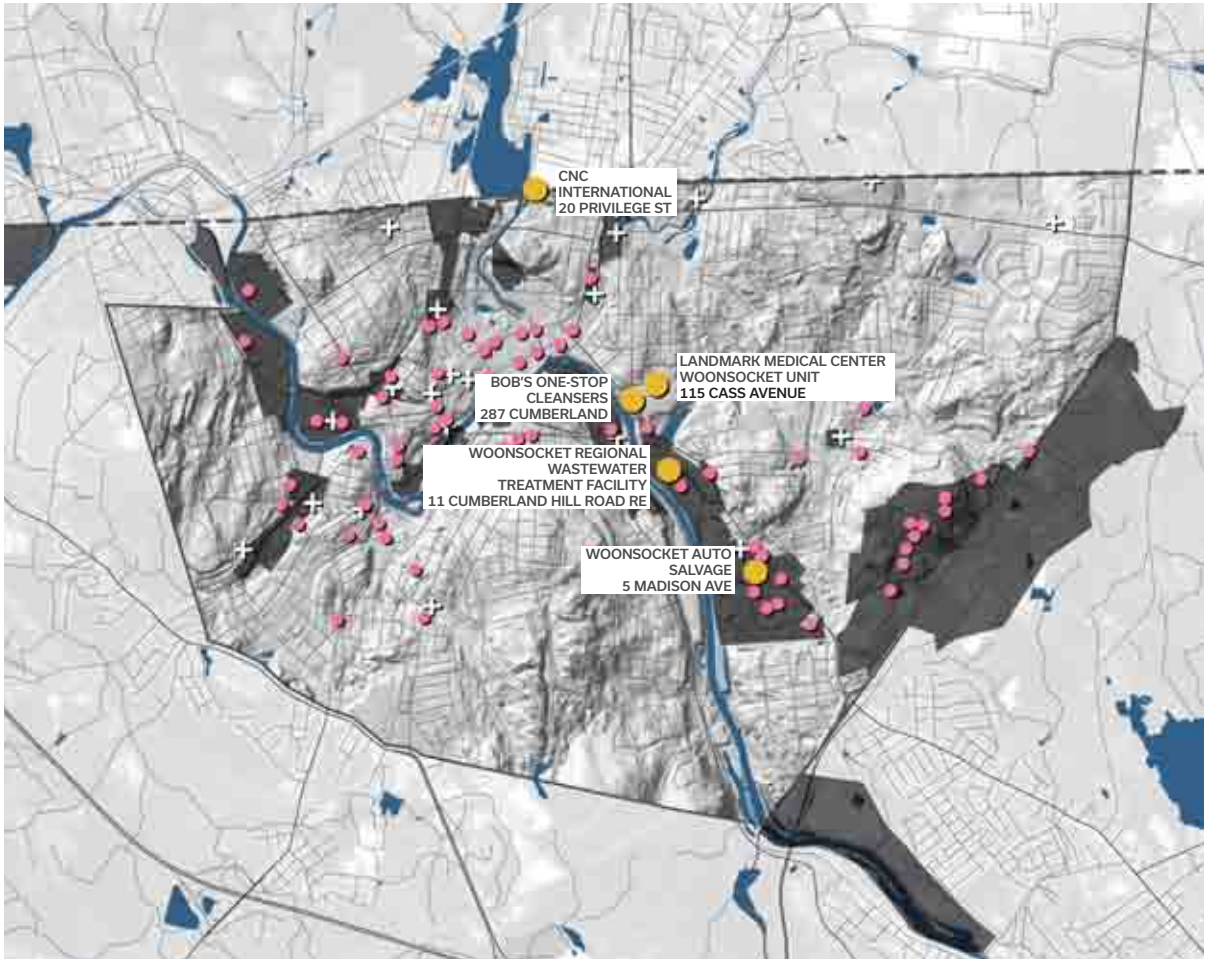
- Open Space
- Preserved Land
- Hydrology
- Roads

Woonsocket Impervious Surfaces and Mapped Outfalls

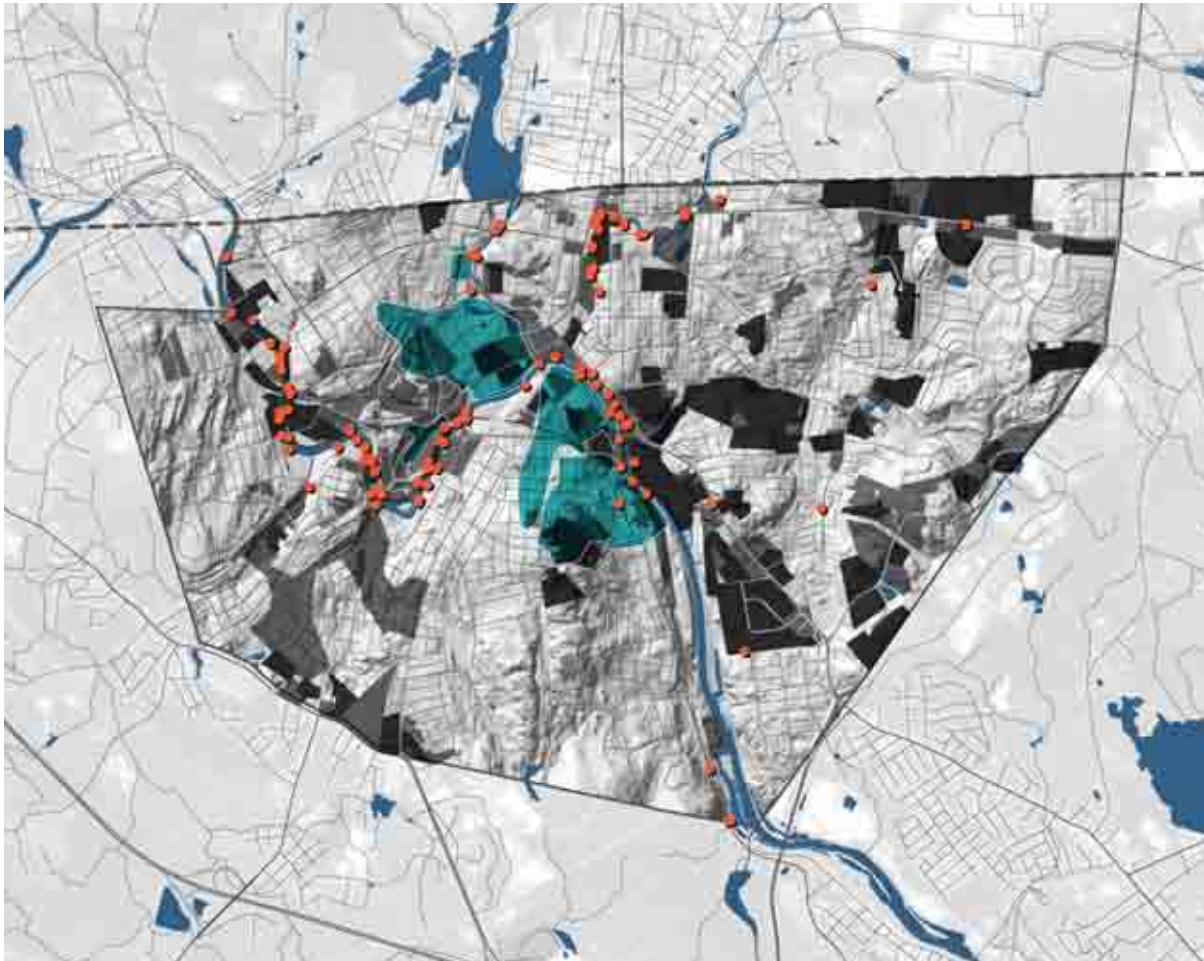


-  Public Reservoirs
-  Impervious Surfaces
-  Hydrology
-  Roads
-  Outfalls

Woonsocket Commercial Zones, Properties, Brownfields + EPA Violation Facilities

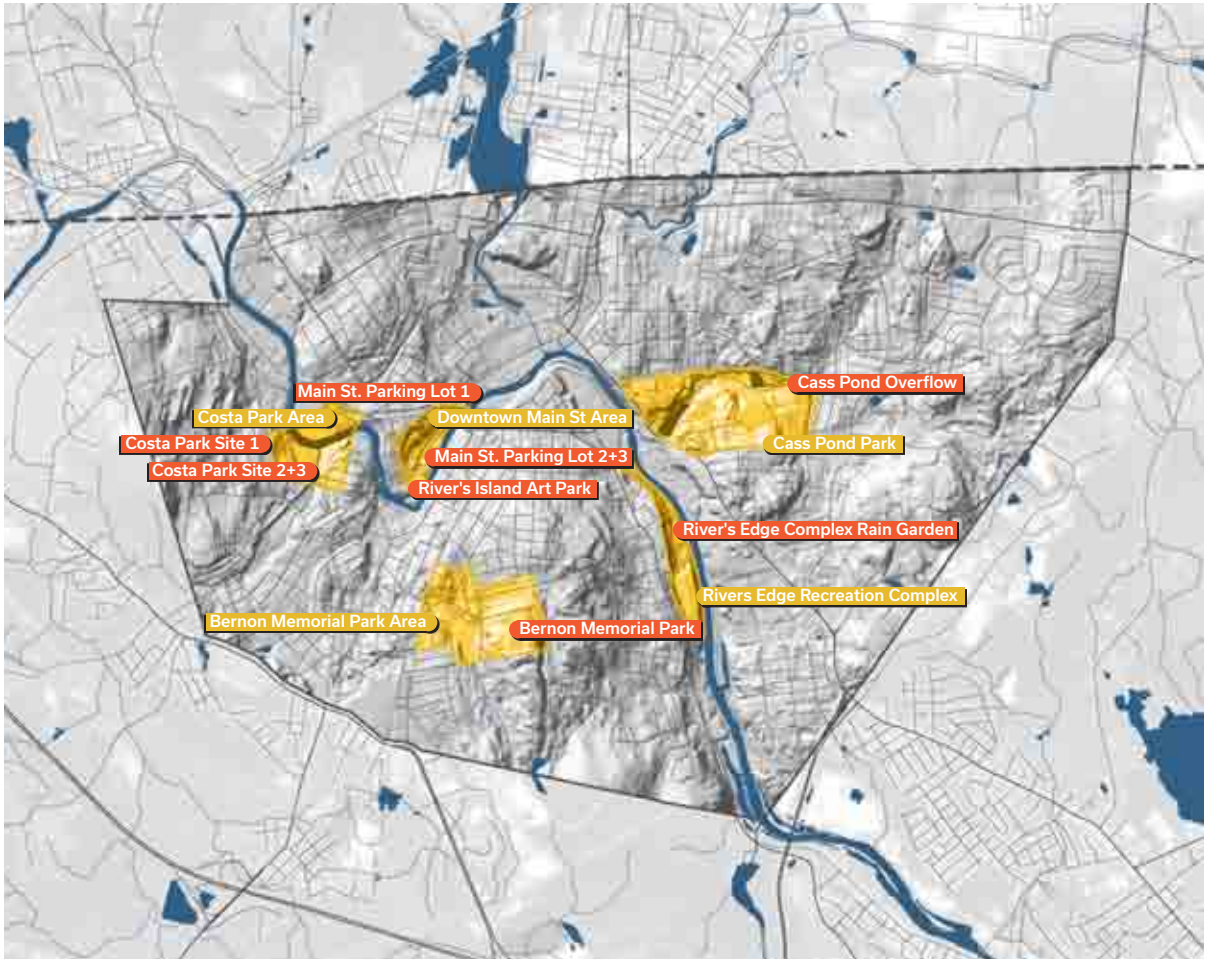


Woonsocket DEM Targeted Outfall and Drainage Violation Areas



-  DEM Mapped Outfalls
-  Outfall Drainage Areas
-  2' Acre Impervious Parcels
-  Contiguous Impervious Parcels
-  Hydrology
-  Roads

Selected Thundermist SEP Project Zones and Sites

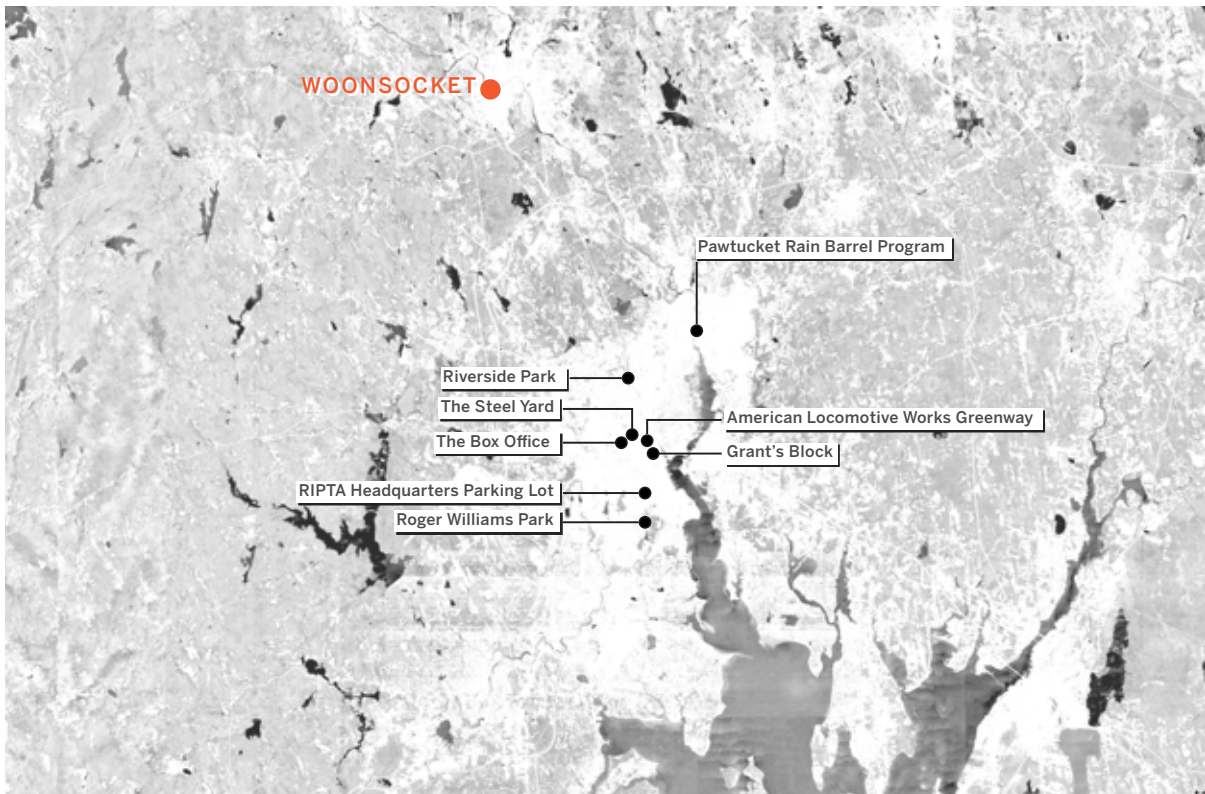


- Selected Study Zones
- Selected Sites
- Hydrology
- Roads

CASE STUDIES

During the research phase we compiled a set of eight case studies of stormwater improvement projects in order to provide the Task Force with a sense of the range of scale, project costs, and material strategies that could be involved in future projects. These case studies were chosen to provide comparative metrics, as well as to understand the range of impacts that stormwater improvement projects can have

on the public realm. Each of the case studies is located in Rhode Island. They range in site from highly urban and post-industrial sites, to private and residential sites, to park and greenway sites. Each case study includes a description of project size, existing site issues, project goals, cost, project components, and stakeholders involved.





The Steel Yard



The Box Office



Grants Block



RIPTA Parking Lot



Riverside Park



Pawtucket Rain Barrel Program



Roger Williams Park



American Locomotive Works Green-way

CASE STUDY 1: THE STEEL YARD
 Re-use and Remediation
 27 Sims Ave, Providence, RI 02909

PROJECT SIZE

Total Size: 3.5 Acres
 GSI Intervention: 3 Acres

PROJECT DESCRIPTION

The Steelyard is a arts and event space, run by a community non-profit organization. The grounds are publicly accessible for daytime visitors and event-goers. Using historic industrial structures and built on capped brownfield soils, the site has been artfully engineered to capture and infiltrate most of the water that falls on the property, while also providing accessible public space.

ISSUES

- Brownfield conditions, \$1.2 million to remediate traditionally
- Impermeable urban context

GOALS

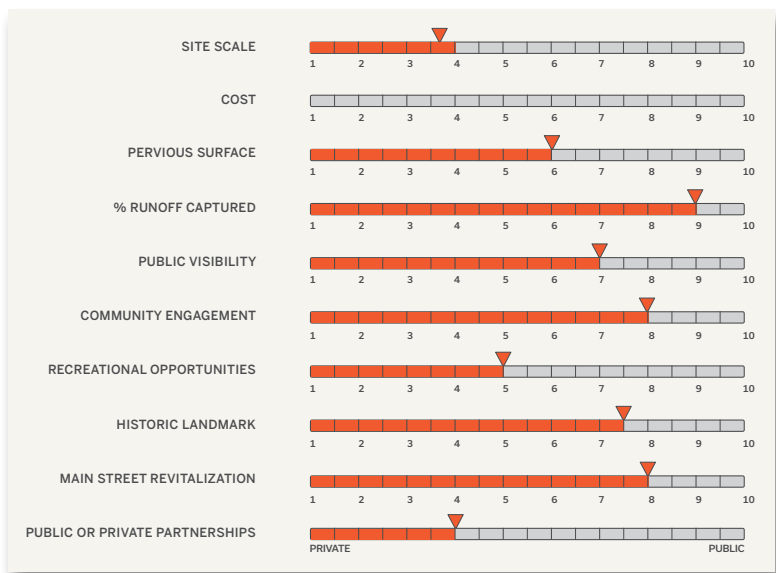
- Infiltrate 90% of stormwater on site
- Safety, inhabitability, cost effectiveness
- Deal with toxic soils without dumping elsewhere
- Integrate “urban wild” vegetation & habitat

PROJECT COMPONENTS

- Capping
- Infiltration
- Bioretention moats
- Permeable pavement

STAKEHOLDERS + AGENCIES INVOLVED

- The Steel Yard
- Morris Beacon Design
- Structures Workshop, Inc.
- Catalano Construction
- Groundwork Providence
- EPA



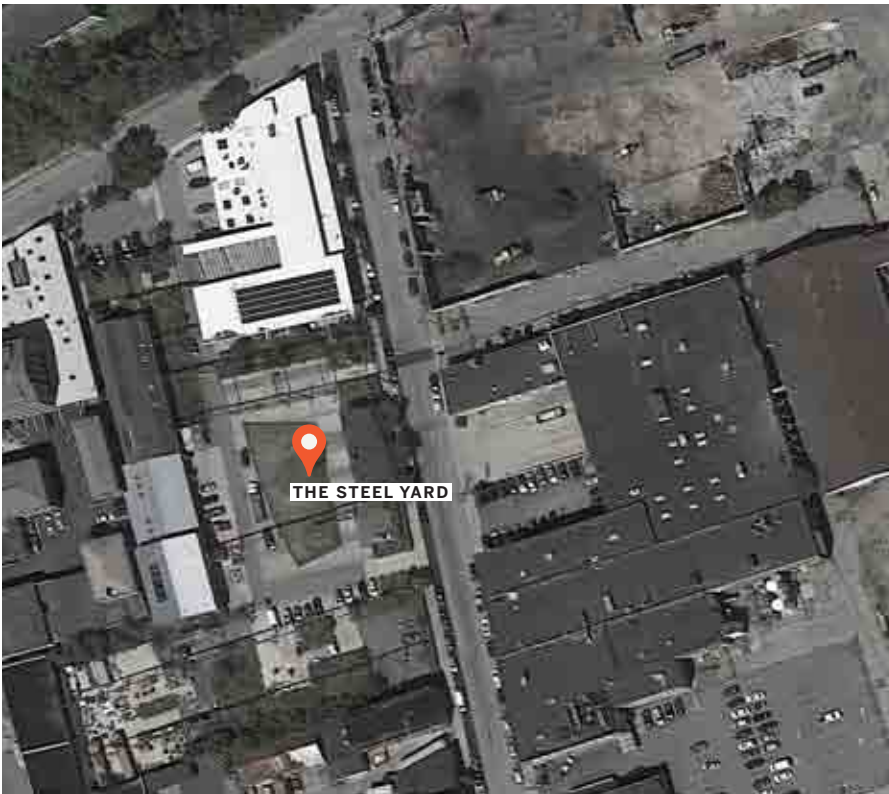
The Steel Yard Report Card



Permeable Paving & Re-purposed Industrial Materials



Urban Wild Vegetation & Permeable Pavers



Cass Park



The Steel Yard

CASE STUDY 2: THE BOX OFFICE
 Re-use and Remediation
 27 Sims Ave, Providence, RI 02909

PROJECT SIZE

Total Size: 2 Acres
 GSI Intervention: 100 square feet

PROJECT DESCRIPTION

The Box office is a multi-tenant office space created from repurposed industrial shipping containers on a brownfield site. The project has had a large impact in its neighborhood, by colorfully reviving a historically industrial area while increasing vegetation and water infiltration in a hardened context.

ISSUES

- Brownfield conditions
- Impermeable urban context

GOALS

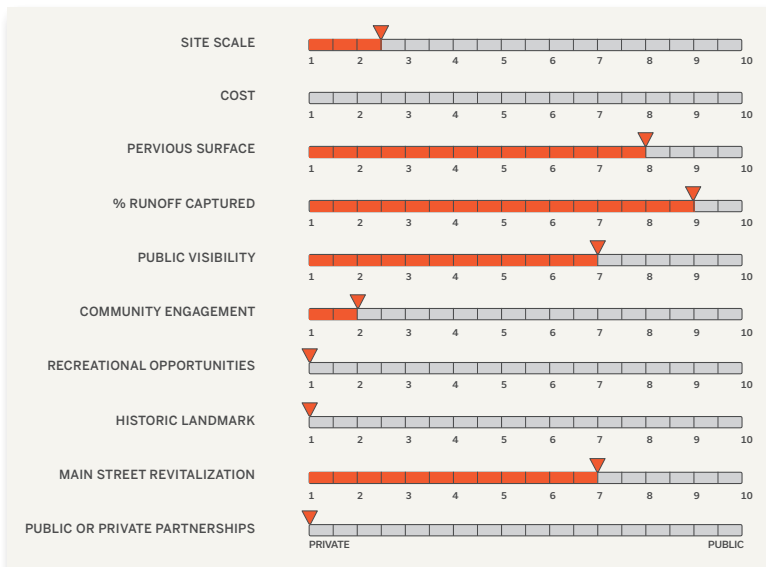
- Capture 90% of stormwater on site
- “To provide a first-of-its-kind and highly efficient “Class A” office space at an affordable price”
- Reclamation of brownfield site

PROJECT COMPONENTS

- Bioretention
- Phytoremediation

STAKEHOLDERS + AGENCIES INVOLVED

- Stack Design Build
- Truth Box, Inc. (Developer)
- Distill Studio (Architect)
- Morris beacon Design (Civil Engineer)
- Klopfer Martin Design Group (Landscape Architect)
- Structures Workshop, Inc. (Structural Engineer)



The Box Office Report Card



Cass Park



The Box Office

CASE STUDY 3: GRANT'S BLOCK
 Multi-use Permeability
 260 Westminster St, Providence, RI 02903

PROJECT SIZE

Total Size: 2 Acres
 GSI Intervention: 100 square feet

PROJECT DESCRIPTION

Situated in the heart of downtown Providence between three universities, myriad restaurants, bars, and office buildings, Grant's block provides a vital public space in an urban context. The setting for festivals, outdoor film screenings, and more, Grant's block doubles as a multi-use event space and parking area.

ISSUES

- Impermeable downtown context

GOALS

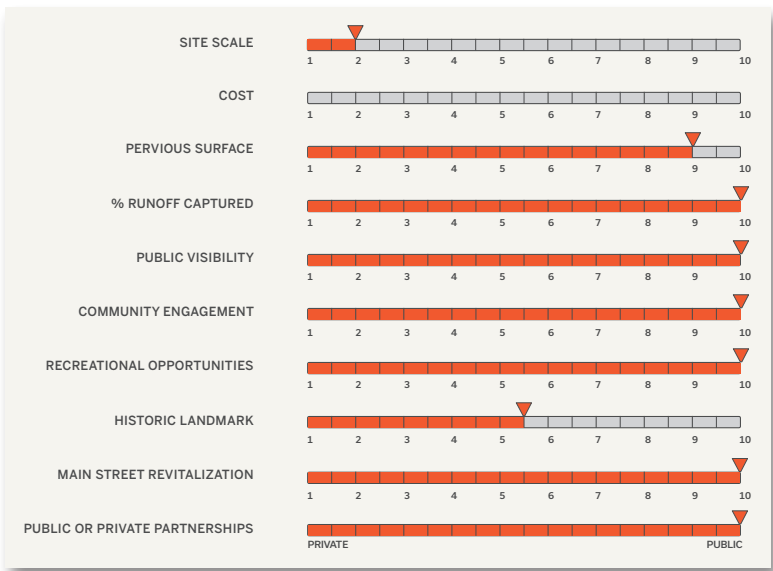
- Create a place for water to infiltrate
- Filter and treat stormwater
- Maintain parking capacity
- Serve as flexible event space

PROJECT COMPONENTS

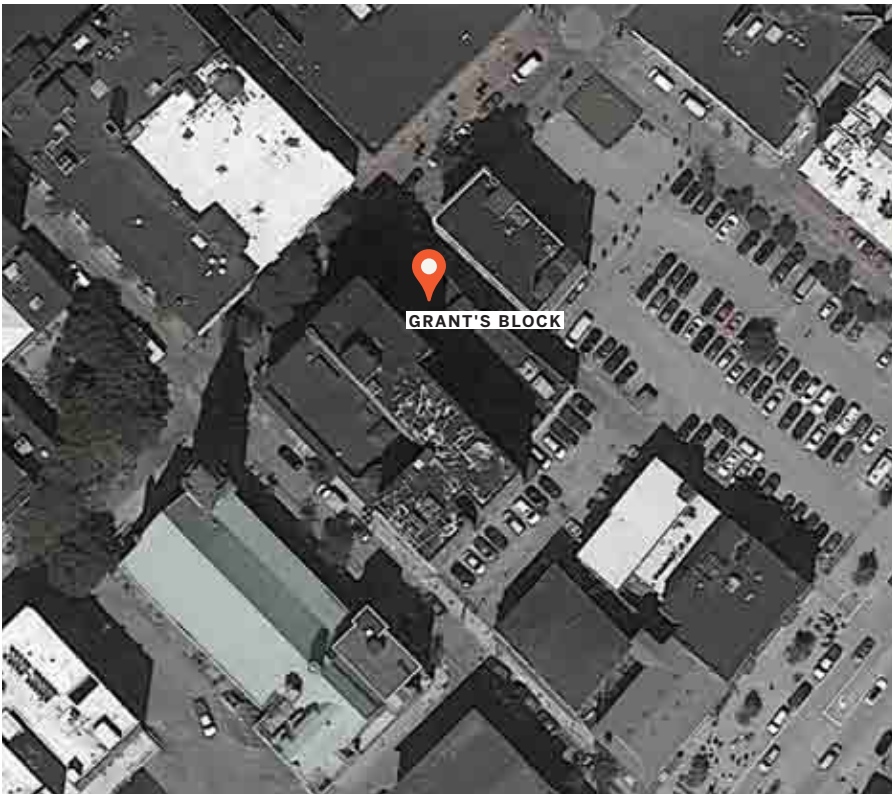
- Permeable pavers over gravel and sand
- Drywells that treat stormwater
- Bioretention swales

STAKEHOLDERS + AGENCIES INVOLVED

- Cornish Associates (Developer)
- Morris Beacon Design
- Catalano Construction, Inc



Grant's Block
 Report Card



Cass Park



Grant's Block

CASE STUDY 4: RIPTA PARKING LOT
 Utilitarian Permeability
 269 Melrose St, Providence, RI 02907

PROJECT SIZE

Total Size: 43,000 square feet
 GSI Intervention: 43,000 square feet

PROJECT DESCRIPTION

The Rhode Island Public Transportation Authority’s bus parking area is the largest permeable paved parking lot in New England. The permeable paving helps not only with stormwater runoff in the area, but also allows for swifter snow melt and fewer necessary salt applications in winter. The use of permeable paving creates a visual as well as environmental impact in the busy urban area in which it is located.

ISSUES

- Large paved area
- Impermeable context

GOALS

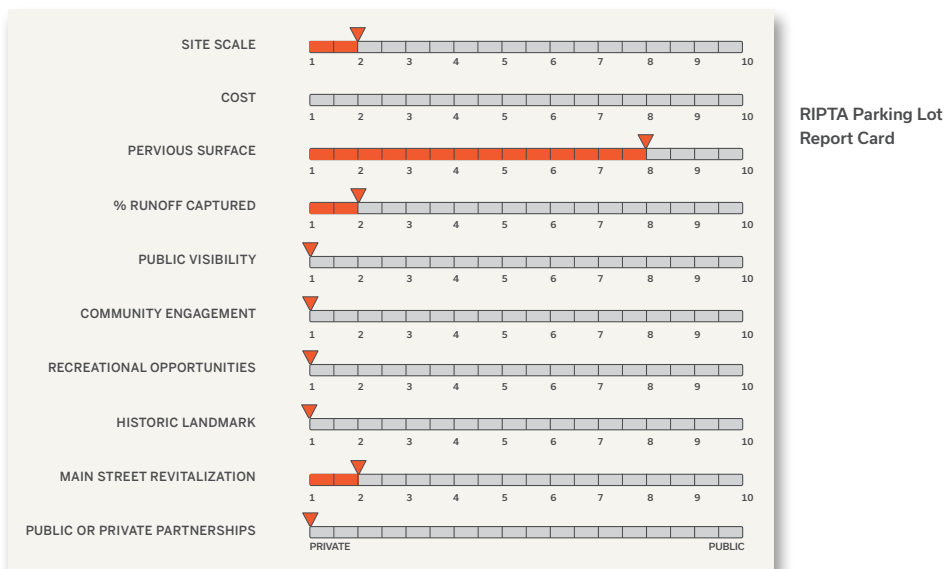
- Reduce runoff by 1 million gallons/year
 - Reduces total necessary salt treatments by 77%
- Project Components
- Permeable Pavers
 - Gravel Substrate
 - Well draining soil substrate

PROJECT COMPONENTS

- Permeable pavers over gravel and sand
- Drywells that treat stormwater
- Vegetated infiltration areas

STAKEHOLDERS + AGENCIES INVOLVED

- Rhode Island Public Transport Authority
- Federal funds from Hurricane Sandy response efforts

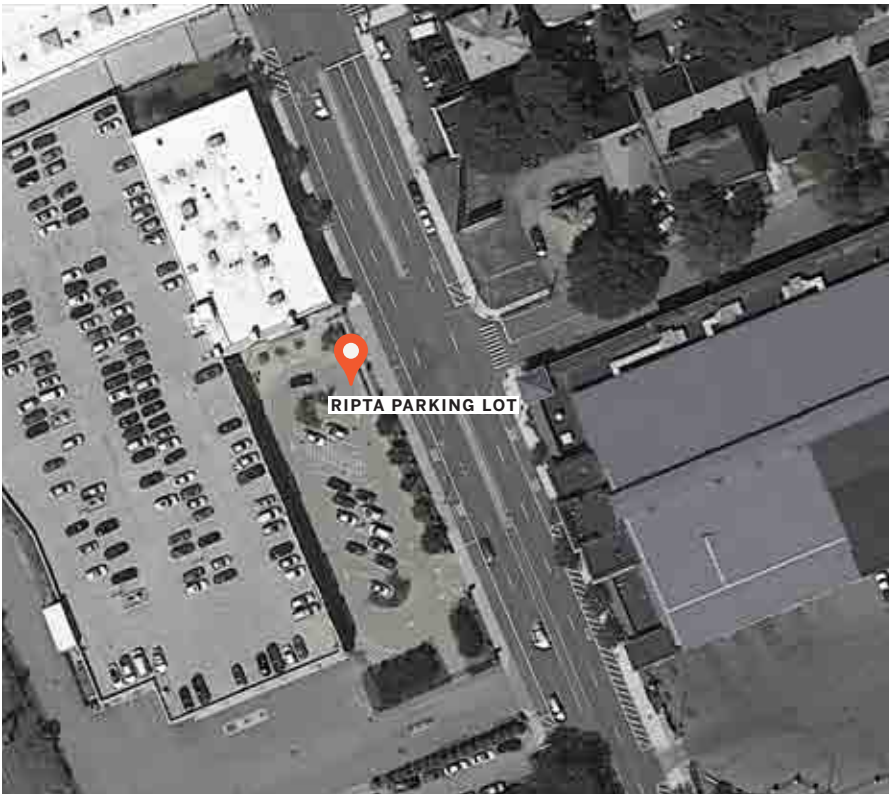




Permeable Paving



Vegetated Infiltration Area



RIPTA PARKING LOT



Cass Park



RIPTA Parking Lot

CASE STUDY 5: RIVERSIDE PARK
 Community Outreach and Recreation
 50 Aleppo St, Providence, RI 02909

PROJECT SIZE

Total Size: 2 acres
 GSI Intervention: 2 acres

PROJECT DESCRIPTION

Riverside Park was created on the site of a former factory and is situated amongst historic industrial buildings and a residential neighborhood. Along the edge of a creek, the park itself is a vegetated buffer between the surface water and its urban context, and the system of green infrastructure built into the park reaches beyond the boundaries of the park. Education about stormwater runoff, pollution, and green infrastructure is an important part of this project and happens through signage, the River Rangers Apprentice program, and on-site bike and children's programs.

ISSUES

- Brownfield conditions
- Impermeable urban context

GOALS

- Industrial-residential neighborhood Goals
- Create an educational and revitalizing public space for the community
- Reduce run-off

PROJECT COMPONENTS

- Vegetated Swales
- Permeable pavement
- Riparian edge restoration
- Community garden
- Community bike workshop
- River Ranger's Youth Education and Environmental Stewardship Program

STAKEHOLDERS + AGENCIES INVOLVED

- Rhode Island Green Infrastructure Coalition
- Woonasquatucket River Watershed Council
- RIDEM

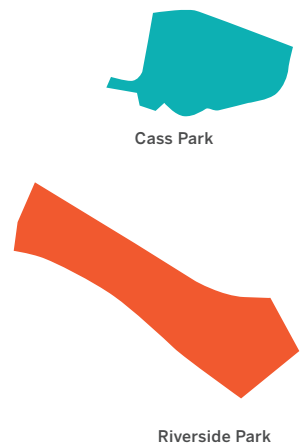




Central Vegetated Swale



Community Bike Shop Green Roof



CASE STUDY 6: AMERICAN LOCOMOTIVE WORKS

Green Corridor

460 Harris Ave, Providence, RI 02909

PROJECT SIZE

Total Size: 12 acres

PROJECT DESCRIPTION

The American Locomotive Works development includes office buildings, shops, and a grocery store, and is situated in an industrial part of Providence at the edge of a canalized and polluted urban creek. Along the water's edge, project designers created a walking path along the water with vegetated beds and swales.

Planned as part of a larger greenway project, the pathway will eventually create a green corridor for people and animals, as well as a buffer for stormwater infiltration.

ISSUES

- Brownfield conditions
- Impermeable urban context

GOALS

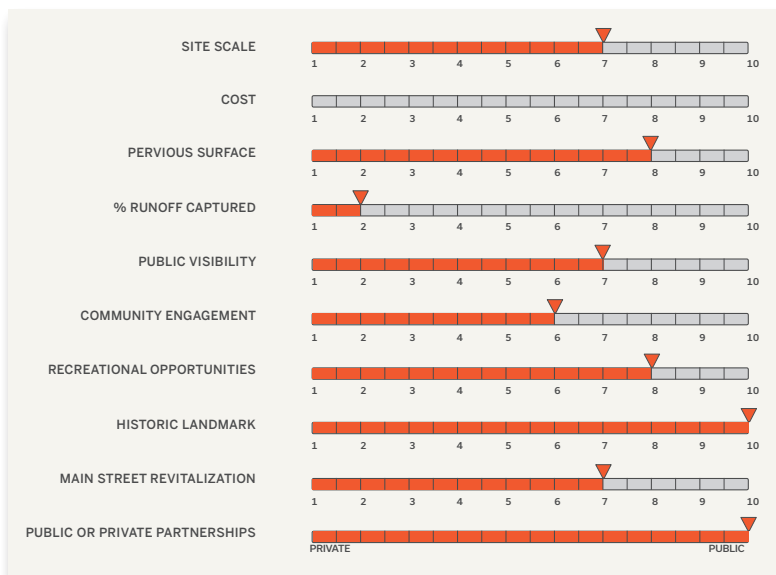
- Create human and ecological corridor
- Revitalize historic industrial neighborhood
- Remediate toxic soils

PROJECT COMPONENTS

- Vegetated swales
- Riparian revitalization / stabilization
- Permeable pathways
- Rain gardens

STAKEHOLDERS + AGENCIES INVOLVED

- Rhode Island Coastal Resources Management Council
- RIDEM
- Woonasquatucket Watershed Council
- Gates Leighton and Associates (Landscape Architects)



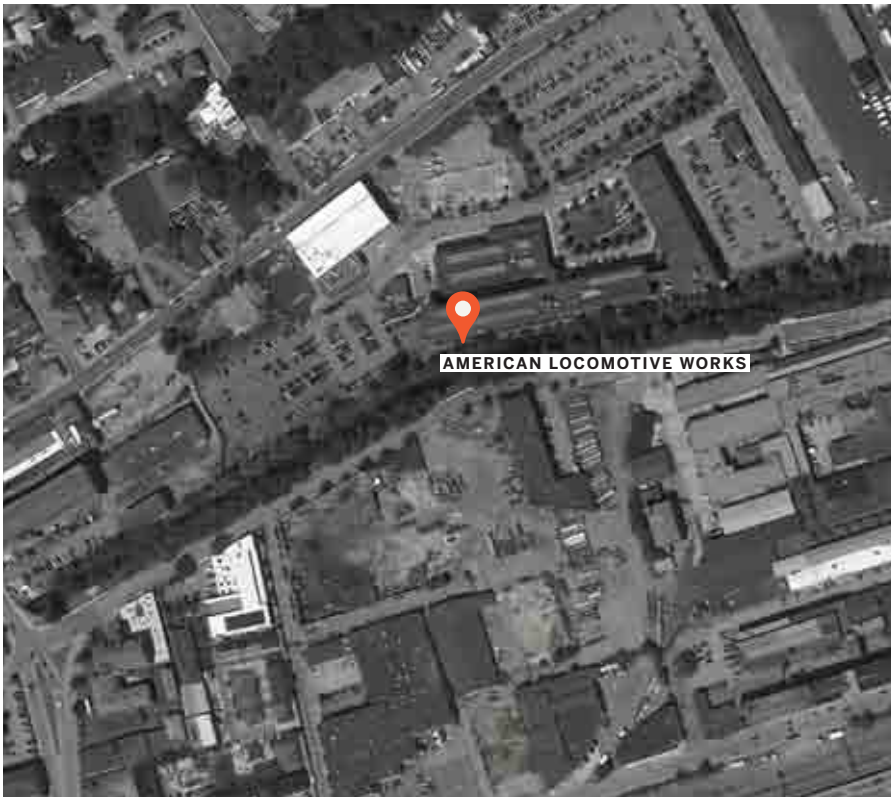
American Locomotive Works Greenway Report Card



Permeable Pathway



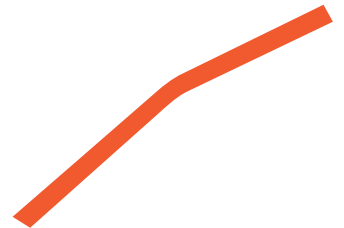
Grass Swale



AMERICAN LOCOMOTIVE WORKS



Cass Park



American Locomotive Works

CASE STUDY 7: ROGER WILLIAMS PARK
 Outdoor Recreation
 1000 Elmwood Ave, Providence, RI 02907

PROJECT SIZE

Total Size: Varies
 GSI Intervention: Varies

PROJECT DESCRIPTION

Roger Williams Park is a popular historic public park that includes a variety of gardens, walking paths, open areas, historic structures, playgrounds, ponds, and a zoo. In order to protect water quality in the park's many ponds and streams, roadside swales and bioretention areas have been incorporated throughout the park. Notably, the park functions to treat and collect, not only water that falls within park boundaries, but also stormwater from the surrounding neighborhood.

ISSUES

- Eutrophication of ponds
- Habitat health
- Aesthetic quality

GOALS

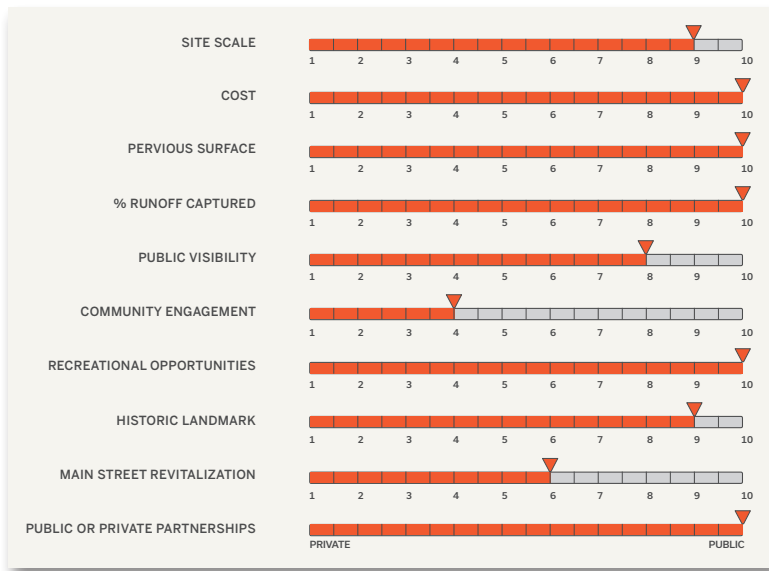
- Protect habitat health and aesthetic quality of the park
- Capture and control runoff

PROJECT COMPONENTS

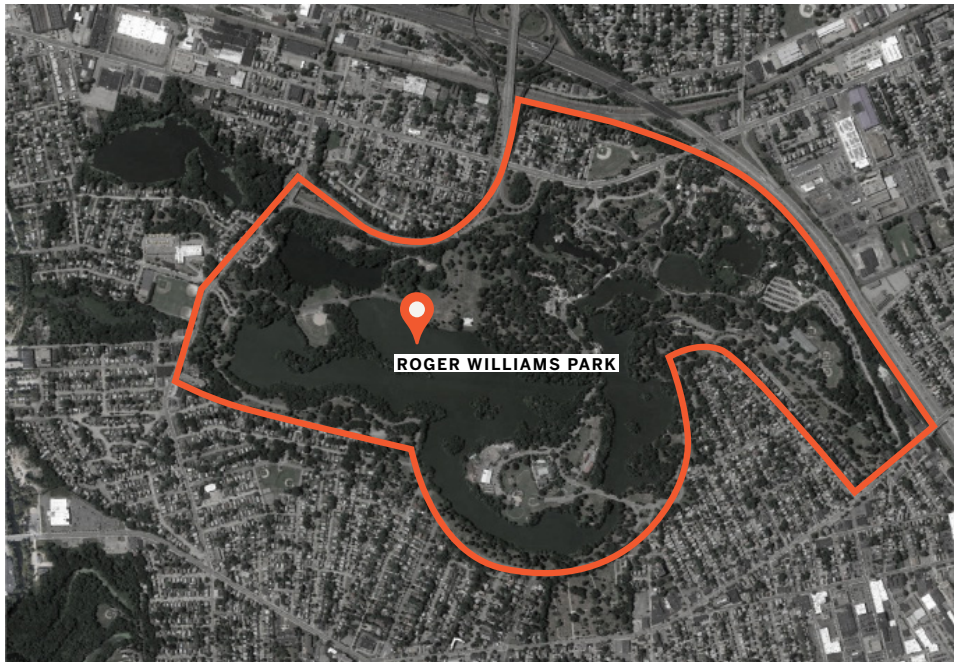
- Bioretention and infiltration basins
- Water direction flumes
- Vegetated and unvegetated swales
- Gravel and sand filtration

STAKEHOLDERS + AGENCIES INVOLVED

- Rhode Island Green Infrastructure Coalition
- Roger Williams Park Conservancy
- Rhode Island Foundation
- Providence Parks and Recreation Department



Roger Williams Park
 Report Card



CASE STUDY 8: PAWTUCKET RAIN BARREL PROGRAM

Arts and Community

Pawtucket, RI

PROJECT SIZE

Total Size: Roughly 12 square miles
GSI Intervention: 4' tall rain barrels

PROJECT DESCRIPTION

Citizens of Pawtucket, RI can apply and receive a free rain barrel through the city of Pawtucket's rain barrel program. Thus far, over 100 barrels have been distributed through the city, providing a way for citizens to mediate stormwater on the larger scale by capturing and reusing water that falls in their yards. Rain barrels can be used to water gardens and lawns and wash cars.

PROJECT COST

A \$100,000 grant from the Rhode Island Foundation purchased the first 100 rain barrels and to fund programming

ISSUES

- Urban and residential runoff concerns
- Strain on municipal water supplies

GOALS

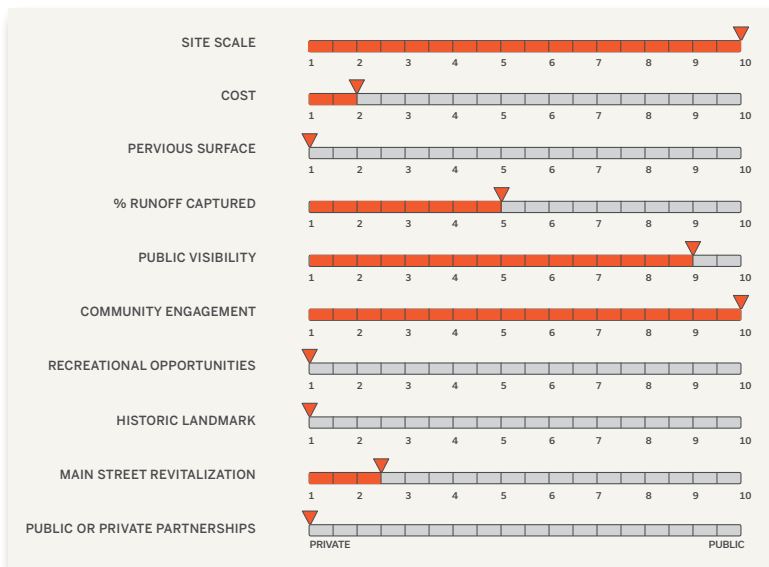
- Encourage broader public participation in stormwater management efforts
- Education
- Reduce strain on public water supply
- Encourage gardening

PROJECT COMPONENTS

- Plastic rain barrels
- Education and outreach via website and publication

STAKEHOLDERS + AGENCIES INVOLVED

- Pawtucket Arts and Culture Commission
- The Jacqueline M. Walsh School for the Performing and Visual Arts
- The Rhode Island Green Infrastructure Coalition
- The City of Pawtucket
- The Rhode Island Foundation
- Providence Parks and Recreation Department



Pawtucket Rain Barrel Program
Report Card



Rain Barrel Fitted to Gutter



Children's Arts and Educational Engagement



ONE DOT PER RAIN BARREL

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