Pioneer Valley Planning Commission

Pioneer Valley Green Infrastructure Plan

Promoting clean water.
Greening our streets and neighborhoods.

Produced by the Pioneer Valley Planning Commission with the support of the U.S. Department of Housing and Urban Development Sustainable Communities Initiative Regional Planning Grant Program.

March / 2014

Catalyst for Regional Progress
PVPC

Pioneer Valley Planning Commission

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Prepared by

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Cover photo: The parking lot at River Valley Market in Northampton makes use of rain gardens- also known as bioretention areas- to capture and soak up stormwater flow from parking and sidewalk surfaces.
Photo by John Doherty.

Green Infrastructure Plan

Promoting clean water.
Greening our streets and neighborhoods.

This Green Infrastructure Plan is meant to assist communities in the region as they continue the journey toward a more environmentally sustainable stormwater management program. The plan identifies the three existing infrastructures (stormwater, combined sewers, and roads) where green infrastructure might best be integrated; describes useful criteria for mapping potential green infrastructure facility locations; explores important opportunities and challenges; and proposes workable strategies for local and regional actions that will help to address polluted stormwater flows and meet forthcoming stormwater permit requirements.

"My community is sustainable when we recognize the Connecticut River and its tributaries for the tremendous assets they are – for recreation, tourism, business, health, and more..."

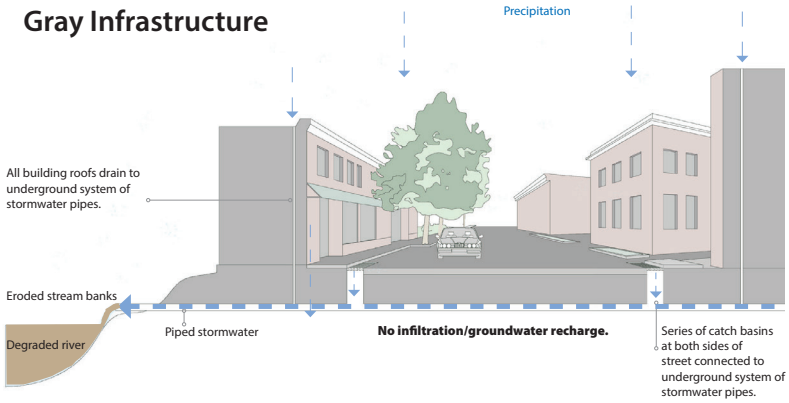
Kathleen Anderson, Holyoke, MA

Note: This is the executive summary of our plan. To obtain or view a copy of the full plan, visit pvpc.org.

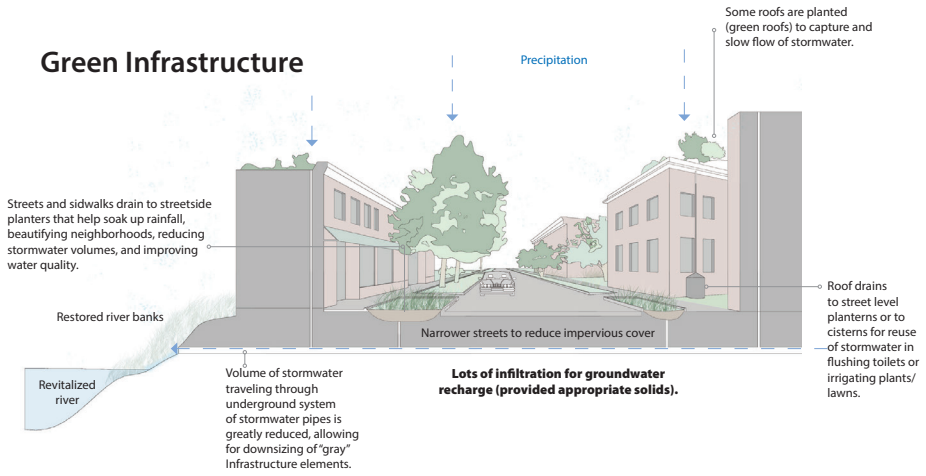
OUR GOALS

The goal of the Green Infrastructure Plan is to promote and support the use of green infrastructure as a cost-effective and sustainable practice for stormwater management in current and future projects wherever possible. This includes:

- Road reconstruction and new road development projects;
- Combined sewer separation projects; and
- New development and redevelopment projects



Traditional stormwater collection is built to convey rainfall from roofs, parking lots, and streets into catchbasins and underground tanks, and then travels in pipes to outlet at the nearest river.



Green Infrastructure: keeps rain close to where it falls, using structures to improve on-site infiltration, such as rain gardens and permeable pavements. These facilities can be used in combination with gray infrastructure to promote cleaner, slower, and smaller storm flows to nearby rivers and streams.

Examples of Existing Green Infrastructure Facilities in the Pioneer Valley

A handful of green infrastructure projects are leading the way for the region, providing both inspiration and instructive lessons. Clockwise from top left: Newly planted green roof at the Jones Ferry River Access Center, Holyoke; rain garden/bioretention area, Northampton Senior Center; porous paved parking lot, grass pavers, and rain garden at New England Environmental Inc. in Amherst; and porous asphalt parking lot at Columbia Greenway Rail Trail in Westfield.

Northampton photo courtesy of Doug McDonald; NEE, Inc. photo courtesy of Kuhn Riddle Architects; and Westfield photo courtesy of Joseph Giffune.

OUR FINDINGS

The Connecticut River in Hadley.
Photo: Chris Curtis

Stormwater flows pollute our waterways.

'grēn 'in-frə-strək-char | n | defined

Green infrastructure entails the use of natural or engineered facilities that capture rainfall near to where it falls. These can include green roofs, rain gardens, as well as cisterns, which "harvest" rainwater for reuse. Green infrastructure also includes non structural approaches sush as better site design, and policies and incentives that promote better development practices.

While there have been vast improvements in water quality since passage of the federal Clean Water Act 40 years ago, there are many Pioneer Valley streams, rivers, and lakes that do not meet fishable, swimmable standards:

- 76 waters in the Pioneer Valley are "impaired" for a variety of pollutants, including phosphorus, total suspended solids, and pathogens;
- The lower Connecticut River in Massachusetts is impaired for bacteria (E-coli) and total suspended solids largely from combined sewer overflows and stormwater;
- Throughout the region many lakes and ponds are choked by plants due to excessive nutrients delivered by stormwater flow;
- Stormwater from the Pioneer Valley also contributes to the estimated three million pounds of nitrogen flowing into the Connecticut River to Long Island Sound annually.

Key factors are driving the need for green infrastructure.

There are two major regulatory drivers under the Clean Water Act that require improved control of stormwater pollution and clean-up of overflows from combined sewer systems.

Forthcoming new U.S. Environmental Protection Agency (EPA) Municipal Separate Storm Sewer System (MS4) stormwater permits - 22 Pioneer Valley communities with "urbanized areas" are currently regulated to control the amount of stormwater discharged from the MS4s to rivers, streams, lakes, ponds, and wetlands and a forthcoming new EPA permit will expand stormwater management requirements.

Federal Administrative Orders for combined sewers - Our 3 urban core cities - Chicopee, Holyoke, and Springfield – are all under federal Administrative Orders to clean up CSOs (Combined Sewer Overflows) polluting the Connecticut River. City officials are in the process of finalizing long term control plans that set timelines and goals for abating combined sewer overflows. In the meantime, however, they have worked to clean up 50 percent of our CSO problem. A total of 99 of the 163 CSO outfalls in the Pioneer Valley region have been eliminated to date, but 64 CSOs remain.

The cost of sewer separation is another major factor driving us toward green infrastructure. Chicopee, Holyoke, and Springfield still face more than an estimated $446 million in costs to eliminate or abate flows coming from the 64 remaining CSO outfalls. Implementation of green infrastructure strategies could provide an important way to reduce costs in meeting CSO requirements. Cities like Philadelphia, New York City, and Portland, Oregon, have led the way. Portland, for example, significantly reduced inflow to its combined system with green streets facilities retaining and infiltrating 8 billion gallons annually or 40 percent of the city's runoff. In one area where the city implemented a program called "Tabor to the River," such green infrastructure improvements helped to avoid $86 million in sewer separation costs.

The Connecticut River in Hadley
Photo: Chris Curtis

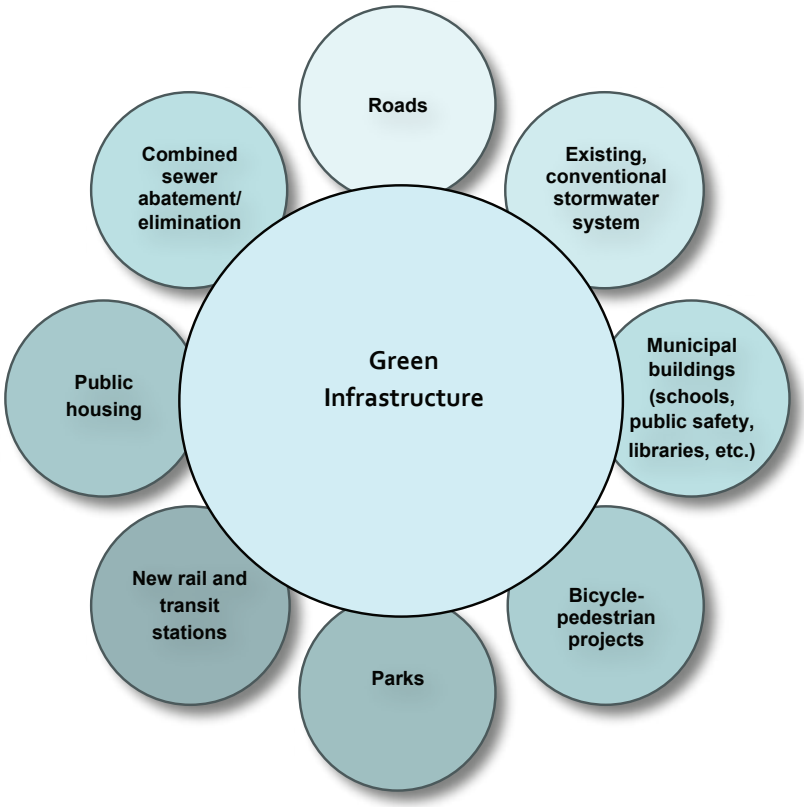
Investments are needed in existing infrastructure.

Needed investments in the region for existing infrastructures—roads, combined sewer systems, and stormwater management systems—tally in the hundreds of millions of dollars. These investments are essential to fixing serious deficiencies within these systems, as well as to achieving regulatory compliance. Integration of green infrastructure within these projects can reduce the environmental impacts of these existing systems and provide important cost savings in many cases.

Green roof installation in Holyoke.
Photo: Chris Curtis

Green infrastructure can integrate with other projects.

Green infrastructure does not need to be built as a stand-alone project, it can be readily integrated into the design of many new projects. This can include incorporating green street design into roadway reconstruction projects or integrating on-site stormwater retention into a combined sewer overflow abatement project.



Example of green infrastructure integrated into North Street Reconstruction, Pittsfield, MA

Before: Street drains to catch basins and storm drains

After: Street drains through curb cuts to bioretention planters.

Photos courtesy of Vanasse Hangen Brustlin, Inc.

Green infrastructure can be a cost effective solution.

The use of green infrastructure in stormwater management promises several important benefits that produce cost savings, including:

- reduced costs for combined sewer separation projects
- decreased demand for expanded "gray" infrastructure stormwater facilities
- reduced polluted stormwater flows into nearby rivers and streams
- mitigation of flooding
- reduced energy use and costs

Compared to gray infrastructure work, which is underground and invisible, green infrastructure is typically above ground, and aesthetically pleasing. As a result, green infrastructure projects provide a far more visible result of public investments.

Tools are of value in promoting green infrastructure.

As part of our place-based planning process, our plan took a look at 22 Pioneer Valley communities that have municipal separate stormwater systems (MS4). These communities will be subject to new federal stormwater permitting requirements, and consequently have the greatest need for green infrastructure. The tools and ideas within the plan, however, can also be deployed for use in other communities to resolve stormwater management issues, including flooding, erosion, and/or improved protection of an important water resource.

Mapping to support decision making for green infrastructure

To support decision making about where to locate green infrastructure, we produced working maps that show eight key criteria. These criteria are mapped for the 22 MS4 communities on a set of two maps.

Working map #1 shows four criteria for consideration in decision making about green infrastructure:

- EPA stormwater permitted area
- roads eligible for federal aid
- areas served by combined sewers (if any)
- soils and their capacity to absorb stormwater.

Working map #2 shows four additional criteria:

- impervious surfaces
- drainage watersheds
- environmental justice areas
- rivers, streams, and lakes with existing water pollution problems.

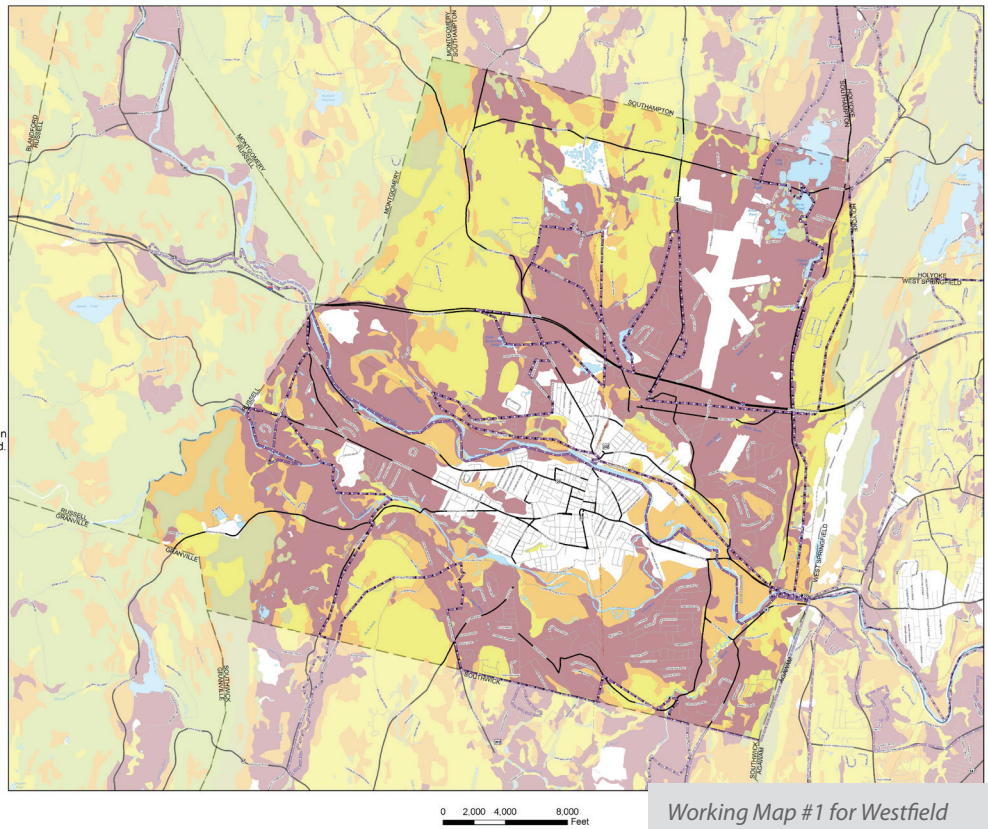
WESTFIELD, MA
Green Infrastructure Planning
Work Map 1 of 2

Legend

- EPA Permitted Area
- Roads eligible for federal aid.
- Combined Sewer Overflow Drainage Basin (Chicopee)
- Combined Sewer (Springfield, Holyoke)

Hydrologic Soils Group

- Unknown
- Group A Low runoff potential when thoroughly wet. Water is transmitted freely through the soil.
- Group B Moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded.
- Group C Moderately high runoff potential when thoroughly wet. Water transmission is somewhat restricted.
- Group C/D Moderately high runoff potential when drained and high runoff potential when undrained.
- Group D High runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted.



Working Map #1 for Westfield

WESTFIELD, MA
Green Infrastructure Planning
Work Map 2 of 2

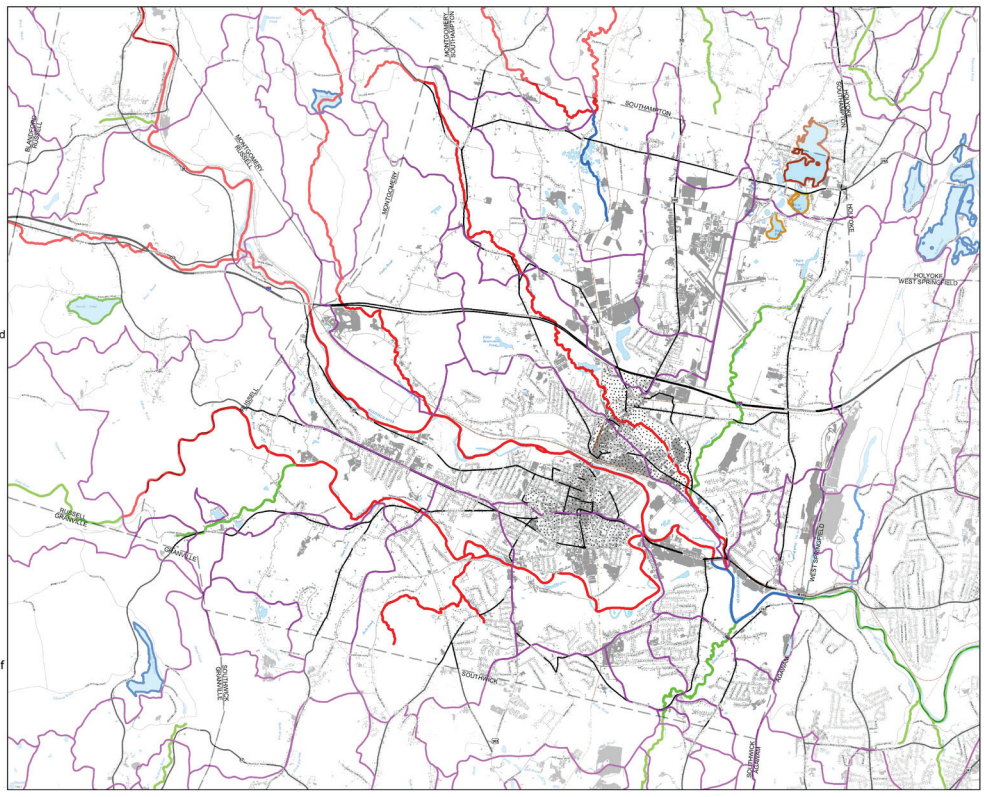
Legend

- Impervious Surface
- Drainage Subbasins/Watersheds
- Environmental Justice Area

2010 TMDL Status- Lakes and Streams

- 2 - Attaining some uses; other uses not assessed
- 3 - No uses assessed
- 4A - TMDL is completed
- 4C - Impairment not caused by a pollutant
- 5 - Waters requiring a TMDL

* Environmental Justice Area – Based on 4 criteria from the 2000 Census block groups, including: where population is 25 percent or more minority; where median household income is less than 65% of the statewide median household income; where 75% or less of households have proficiency with the English language, indicating linguistic isolation; where 25 percent or more of the population is foreign-born.



Working Map #2 for Westfield

Bioretention/rain garden facilities capture stormwater from parking lots and drives at Community Field in Holyoke.

Photos courtesy of Vanasse Hangen Brustlin, Inc.

Mapping shows existing and potential green infrastructure locations

Our planning process included working with municipal officials to map existing and potential locations for green infrastructure. Seven communities responded to our invitation to join us for this mapping effort, including Chicopee, Holyoke, Springfield, Westfield, Huntington, Northampton and South Hadley.

The City of Chicopee, for example, noted that they have already completed two green infrastructure projects, including installing stormwater infiltrators as part of a road reconstruction project, and building a rainwater harvesting system as part of the design of a CSO facility. They also identified 13 other locations where green infrastructure could be incorporated as part of other upcoming projects across the City. The Chicopee green infrastructure map, illustrating existing and potential green infrastructure locations, is shown to the right.

Other tools

Other green infrastructure tools of interest within this plan include:

- Matrix of known existing green infrastructure locations in the region with in-depth descriptions for several of these projects.
- A checklist for reviewing local municipal regulations and the degree to which they allow/facilitate green infrastructure development.
- A listing of existing design resources and identification of which green infrastructure practices are addressed within the documents.

Chicopee, MA - Green Infrastructure Locations

Existing Green Infrastructure Locations

1 Rainwater Harvesting, Jones Ferry Combined Sewer Treatment Facility

2 Stormwater Infiltrators, Upper Granby Road

Potential Green Infrastructure Locations

3 River Mills Redevelopment

4 Biofiltration, Infiltration, and Rainwater Harvesting, Older Adult Community Center

5 Tree Filter Boxes, Exchange Street

6 Call Street Area

7 Sheridan Street Area

8 Downtown Canal Walk

9 Navy Housing Redevelopment

10 Szot Park

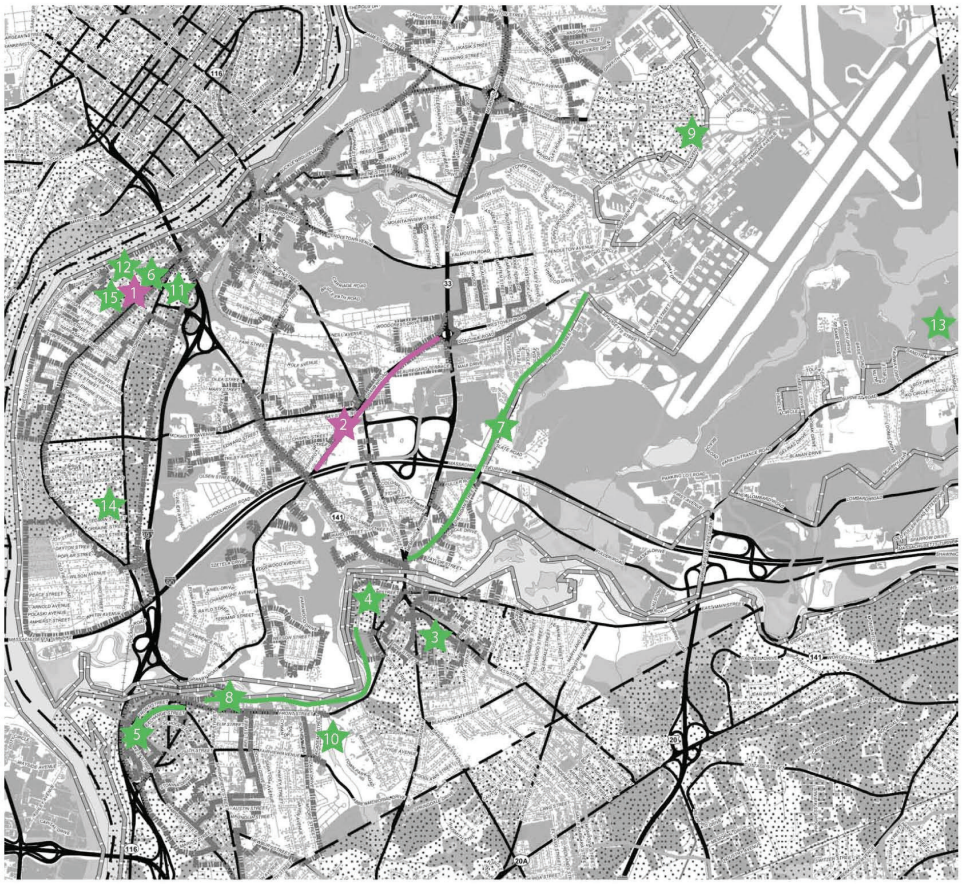
11 Rivers Park

12 Nash Field

13 Chicopee Municipal Golf Course

14 Sarah Jane Sherman Park

15 Wastewater Treatment Plant



Roads Eligible for Federal Aid

Environmental Justice Areas

*Potential locations identified by site assessments, soil maps, and conversations with city officials

Rain garden at Valley Bike and Ski Werks, Hadley, MA
Photo: Berkshire Design Group, Inc.

Sustainable financing options are needed.

Answering the question of how to pay for green infrastructure is critical to advancing this plan. Options for sustainable financing of green infrastructure include:

- **Integration in public projects** - Green infrastructure can be included as cost effective components of roadway reconstruction and repair, combined sewer overflow abatement, and other stormwater projects associated with parks, public housing, civic buildings, and bike and pedestrian projects.
- **Stormwater Utilities or Fees** - Dedicated municipal funds can be created to pay for stormwater management derived from fees based on amounts of impervious surface.
- **Private development projects** - Communities can establish stormwater permit or connection fees and/or regulatory incentives for including green infrastructure components in new projects.
- **Betterments and Management Districts** - Assessments can provide for the cost of public improvements by municipalities.
- **Sponsorships** - Local businesses may provide donations or sponsorships for green infrastructure projects in public locations.

Rain gardens, porous pavers and asphalt are featured in this parking lot at New England Environmental, Amherst.
Photo: Chris Curtis

Sustainable financing: the example of Lenaxa, Kansas.

The City of Lenaxa, Kansas, established three financing mechanisms to help cover the various costs associated with stormwater management.

To help cover the **capital costs** of upgrading and repairing the existing stormwater system, voters approved in 2000 a 1/8th cent sales tax that would sunset within 5 years. The sales tax generated $7.2 million dollars and voters were apparently so pleased with the stormwater upgrades that they approved an extension for another 5 years.

To cover the **long term operation and maintenance** of the stormwater system, the City Council in 2000 approved a stormwater utility that collects approximately $66 annually from residential properties and a fee from commercial and non residential properties that is based amount of stormwater runoff generated by the property. The fee is collected as a special assessment on the Johnson County property tax bill.

To cover the costs for **increasing services and capacity** in the stormwater system, the City in 2004 implemented a one time fee "capital" development charge that developers pay when they apply for a permit. The idea is that "growth pays for growth."

Sources: http://www.lenexa.com/raintorecreation/about_us.html and December 6, 2012 presentation by Jennifer Cotting, Environmental Finance Center, University of Maryland.

Near-term implementation strategies:

There are 14 green infrastructure strategies for near-term implementation that capitalize on important opportunities and respond to immediate needs within the region. (For the full slate of strategies recommended for the region, see Chapter 5 of the full Green Infrastructure Plan.) These near-term strategies are designed to expand understanding of green infrastructure through existing and new projects, promote change in current approaches, and provide useful tools for moving forward. The intent is to help accelerate movement toward the use of green infrastructure so that municipalities and the region can more quickly begin to realize the benefits of these practices, including: reduced polluted stormwater flows, less flooding in developed areas, and lower costs for major combined sewer separation projects, among others.

Finance & Fund Green Infrastructure

SEEK

Funds for Pilot/Demonstration Projects that Transform "Gray" Streets Into "Green" Streets

132

Seek funds to support and promote pilot projects that demonstrate the potential for cost savings in avoiding costly gray infrastructure projects, and showing effectiveness, benefits, and lessons learned.

PARTNERS:
Municipalities and MassDOT with help from PVPC

CROSS-CUTTING STRATEGIES:

EXPLORE

A New State Green Infrastructure Grant Program

133

Explore use of State Revolving Loan Funds (SRF) to establish a new green infrastructure grant program, in accordance with EPA's Green Project Reserve Program, that targets projects in Combined Sewer Overflow (CSO) and Municipal Separate Storm Sewer System (MS4) areas. The State of Illinois has such a program for green infrastructure.

PARTNERS:
Mass DEP, EPA, PVPC, other stakeholders

CROSS-CUTTING STRATEGIES:

PROMOTE

Changes to the Clean Water State Revolving Fund (SRF) to Support Green Infrastructure

134

Include points for green infrastructure stormwater management strategies in ranking SRF projects, including the preponderance of projects financed through the use of the program's "recycled" funds.

PARTNERS:
MassDEP, EPA, PVPC, other stakeholders

CROSS-CUTTING STRATEGIES:

Build Understanding & Promote Engagement

CONDUCT

Green Infrastructure Workshops for Municipal Officials, Design Professionals, and Others

135

Provide workshops to help expand understanding about green infrastructure stormwater management approaches and engagement with green infrastructure planning. Collaborate with EPA on a series of workshops aimed at addressing common barriers to green infrastructure. Projects from within the region should be featured to help build peer to peer relationships on learning from existing projects.

PARTNERS:
PVPC, Municipalities, EPA

CROSS-CUTTING STRATEGIES:

PROMOTE

Citizen-Built Rain Gardens

136

Support local efforts to build rain gardens. This work can include:

- Collaborating with EPA and city partners to conduct a rain garden workshop in Springfield Technical High School that results in a constructed facility;
- Facilitating rain garden trainings in other parts of the region for other young people to develop these skills.

PARTNERS:
PVPC in collaboration with EPA and coordinating with citizen groups and municipalities

CROSS-CUTTING STRATEGIES:

DESIGN AND INSTALL

Interpretive Signage at Key Existing Green Infrastructure Facilities in the Region

137

Highlight existing green infrastructure projects in the region to promote awareness and build greater understanding and appreciation for these types of facilities. This could begin at the Jones Ferry River Access Center where there is a green roof that is largely invisible to the many people who use the Center throughout the rowing season. This is an especially good location because the rowers who use the facility will immediately get the connection between the green roof and water quality in the Connecticut River.

PARTNERS:
PVPC with willing landowners

CROSS-CUTTING STRATEGIES:

Develop Policies & Resources

ASSESS

Existing Local Policies and Regulations that Impact Green Infrastructure and Make Recommendations for Improvements

138

Use the PVPC Green Infrastructure Checklist to review to what extent local policies and regulations make green infrastructure practices allowable in communities.

PARTNERS:
PVPC with interested municipalities

CROSS-CUTTING STRATEGIES:

Support Decision Making

DEVELOP
A Model Green Infrastructure Policy

139

Develop a model policy that includes various components that can be used by municipalities to promote green infrastructure. These components can include:

- Incentives for green infrastructure in private development to be included in stormwater, zoning, and subdivision regulations.
- A "Green Streets Policy" to ensure that green infrastructure is included in all new road and road reconstruction projects.
- Committing new municipal buildings to achieve certain stormwater criteria, perhaps those laid out in the LEED (Leadership in Energy and Environmental Design Green Building Certification) program or the Sustainable Sites Initiative developed by the American Society of Landscape Architects.

CROSS-CUTTING STRATEGIES:

PROVIDE
Technical Assistance to Develop Policies and Regulations that Promote Green Infrastructure

140

Work with municipalities to develop policies and regulations that include provisions to promote green streets, green civic buildings, as well as stormwater, zoning, and subdivision regulations that incentivize green infrastructure in private development.

PARTNERS:
PVPC with interested municipalities

CROSS-CUTTING STRATEGIES:

IDENTIFY
Funding to Develop a Green Infrastructure Stormwater Manual for the Region

141

Identify funding that would enable PVPC, an engineering firm, and a roundtable of municipal partners to work on the development of a green infrastructure stormwater manual for the region, drawing from existing manuals and additional research.

PARTNERS:
PVPC with guidance from interested municipalities

CROSS-CUTTING STRATEGIES:

COORDINATE
With MassDOT's Impaired Waters Program to reduce peak flow in CSO communities

142

Provide information to MassDOT's Impaired Waters Program about locations where runoff from MassDOT roads such as I-91 contributes to combined sewer over-flows and where municipalities have great interest in managing stormwater for peak flows. Conduct a follow-up meeting to talk about where these local interests may combine with MassDOT interests in managing flow to impaired waters.

PARTNERS:
Planning Boards, Conservation Commissions

CROSS-CUTTING STRATEGIES:

PROMOTE

Federal Highway Funding for Projects that Incorporate Green Infrastructure

143

Ensure that new project scoring criteria used by the Metropolitan Planning Organization in evaluating Transportation Improvement Program (TIP) projects include points for managing stormwater through green infrastructure.

PARTNERS:
PVPC and CRCOG with MassDOT, CTDOT, and Metropolitan Planning Organizations

CROSS-CUTTING STRATEGIES:

INCORPORATE

Green Infrastructure Practices Into the Design of Publicly Funded Projects Across the Region

144

Support local officials in their efforts to implement green infrastructure practices in publicly funded projects. These can include: the Connecticut Riverwalk Project and the Older Adult Community Center in Chicopee.

PARTNERS:
Interested municipalities with support from PVPC

CROSS-CUTTING STRATEGIES:

SEEK

To Advance Green Infrastructure Practices Within MassWorks Funded Projects

145

Work with MassWorks grant administrators, possibly in tandem with other interested regional planning agencies, to explore revisions in ranking criteria that would promote projects that incorporate green infrastructure.

PARTNERS:
PVPC with MassWorks administrators and perhaps other RPAs

CROSS-CUTTING STRATEGIES:

CROSS CUTTING STRATEGIES ICONS: The following icons are used in reference to issues and strategies related to other element plans of this report.

- TRANSPORTATION
- ENVIRONMENT
- GREEN INFRASTRUCTURE
- LAND USE
- ECONOMIC DEVELOPMENT
- CLIMATE ACTION
- HOUSING
- FOOD SECURITY
- BROWNFIELDS

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