MS4 Program Management

Funding Strategies for BMP Implementation

Southwest Pennsylvania Commission (SPC)
Findlay Township Activity Center
Imperial, PA 15126
August 17, 2017

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Land Studies

Funding Strategies

Agenda

- Introduction
- Building Reserves
- Grants
- Advanced Mechanisms
- Public-Private Partnerships (P3s)

Funding Strategies

Introduction

Challenges Facing Communities

MS4

Municipal

Separate

Storm

Sewer

System

Regulating the MS4

Clean Water Act

MS4

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

FINED

MS4 Permit – A Primary Requirement

Authorization to Discharge

- "2013 PAG-13" – Limitations on Coverage (part 2.j)
- "2018 PAG-13 (draft)" – Discharges Not Authorized (item 6)

"The discharge is not, or will not, result in compliance with an applicable effluent limitation or water quality standard."

The operator must, at a minimum, develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from the MS4:

- to the maximum extent practicable (MEP),
- to protect water quality, and
- to satisfy the appropriate water quality requirements of the Clean Water Act. [40 CFR 122.34(a)]

Pollutant Reduction Plans (PRPs)

APPENDIX E

POLLUTANT REDUCTION PLAN REQUIREMENTS FOR DISCHARGES TO WATERS IMPAIRED FOR NUTRIENTS AND/OR SEDIMENT

MS4 permittees with at least one stormwater discharge to surface waters considered impaired for nutrients (nitrogen and phosphorus) and/or sediment, in which a TMDL has not been developed or the TMDL has not identified a wasteload allocation (WLA) for the permittee, must develop and submit a Pollutant Reduction Plan (PRP) with the NOI to reduce the pollutant loads to those waters. In the event the permittee also has at least one stormwater discharge to surface waters within the Chesapeake Bay watershed, the PRP may be combined with the CBPRP described in Appendix D.

- Sediment
- Total Phosphorus (TP)

Approach Consideration

What is important to you, or what your primary concerns are may help dictate which funding strategy (or strategies) will work best for your municipality.

“Benefit Stacking”

Single Function

Multiple Function

Economic Ecology

Ecological Benefits: *"How does the project or plan improve or protect our natural resource assets?"*

- Stormwater Management
- Water quality
- Source Water Protection
- Environmental compliance (regulatory)
- Catastrophe Remediation
- Impaired Streams "Strategy"
- Habitat Improvements

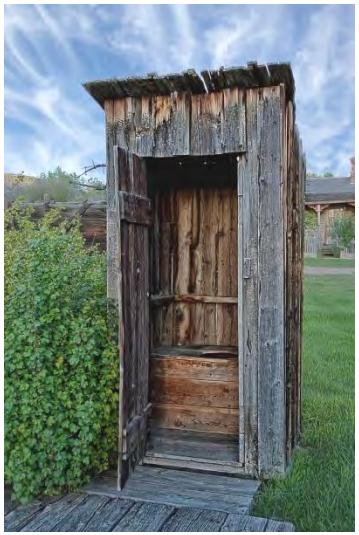
Community Benefits: *"How does the project or plan provide or protect our community assets?"*

- Flood hazard mitigation
- Open Space and/or Parks
- Aesthetic Appeal
- Heritage Restoration
- Catastrophe Remediation
- Residential corridor recovery and protection

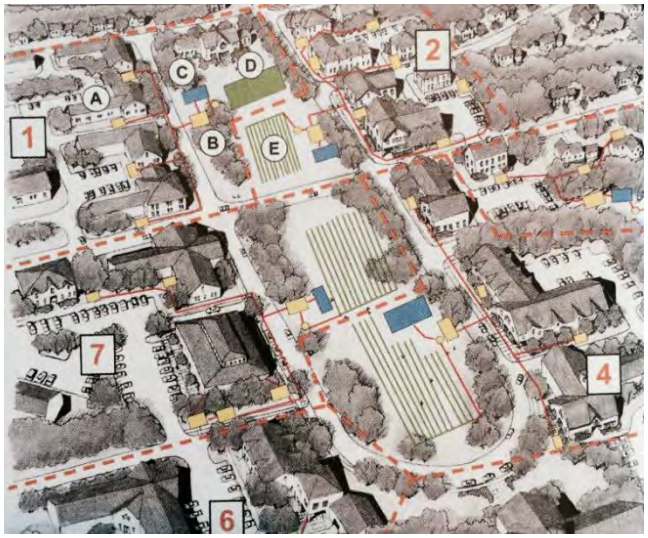
Economic Benefits- *"How does the project or plan improve and build resilience into the local economy?"*

- "Conventional" transportation infrastructure & bridges
- Intermodal transportation
- Non-motorized transportation
- Commercial corridor recovery and protection
- Catastrophe remediation
- Return on Investment

Wastewater Evolution (Site to Regional) – Infrastructure Investment



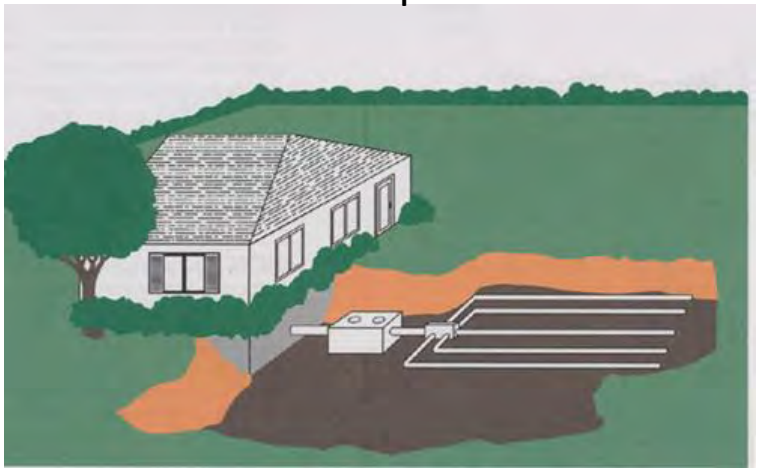
Outhouse



Large Multi Septic Field

Small Package Field

Individual Septic Field



Conventional Sewer Plant

LandStudies

Funding Strategies

Building Reserves

Building Reserves

Sounds as simple as it is…saving money each year until you build enough reserves to implement a BMP.

Example: Ephrata Borough, PA

Map Plate 1. Important Resources - Critical Aquifer Recharge Areas

Northern Lancaster County Groundwater Study

A recharge area is a location where water from precipitation is transmitted to an aquifer. Aquifers with relatively high flow rates that are located in areas where conditions promote high infiltration are important to the recharge and groundwater flow system. Land areas characterized by features or attributes that provide an exceptional amount of replenishment (recharge) to the aquifer per acre are termed Critical Aquifer Recharge Areas (CARAs). During the course of the study, four CARA types were identified; dry valleys, siliciclastic to carbonate stream crossings, losing stream reaches, and karst modified uplands. Local planning decisions on growth management should consider the retention and protection of CARAs. Other characteristics such a high density of karst features suggest that these may be important to recharge.

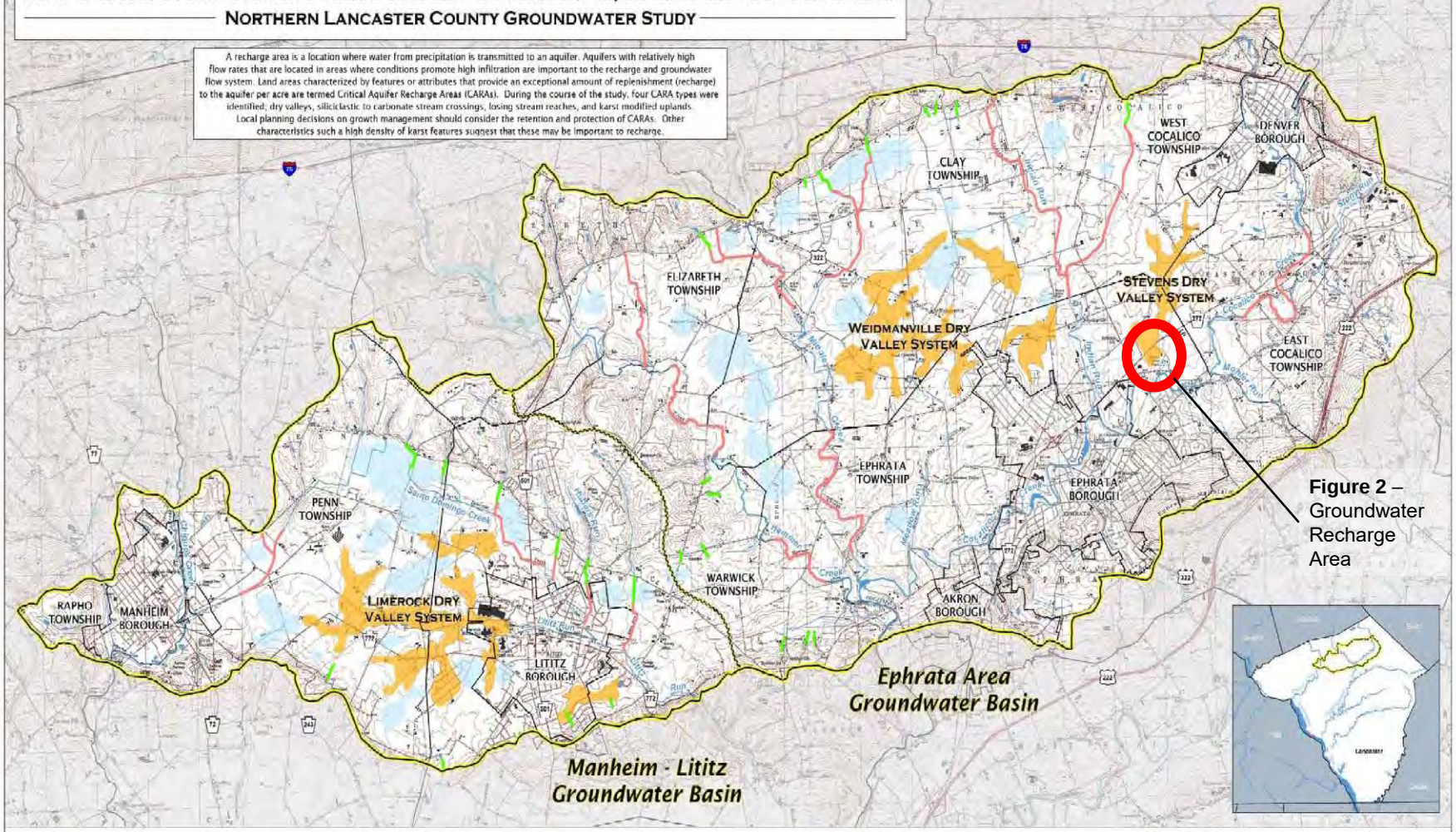


Figure 2 – Groundwater Recharge Area

Stream Crossings

Streams that drain from siliciclastic (shale or sandstone) areas to carbonate areas are naturally acidic. When streams with acidic water emerge from siliciclastic terrains onto a carbonate terrain that is underdrained, the acidic water percolates through the streambed and valley floor alluvium, into the underlying carbonate bedrock. The seasonal to continuous supply of acidic water produces enhanced karst permeability beneath the percolation area and for some distance down gradient. The lost streamflow moves through the aquifer, and emerges where the water table intercepts a streambed.

Losing Stream Reaches

Streams can be classified according to their gain or loss of flow along their course. Losing streams generally lose flow to the aquifer because their channels are above the water table. In areas underlain by carbonate bedrock, some beds or zones in the bedrock are more soluble than others resulting in a potentially wide range in the permeability of the bedrock beneath the channel. Where a stream flows over a high permeability zone, the water table abruptly drops beneath the channel and conditions for flow loss are present. If the stream is flowing over an intervening low permeability material such as clay-rich carbonate weathering residuum, minimal flow may be lost and the stream is said to be perched. Streams flowing across carbonate terrain may have gaining, perched and losing reaches along their course.

Dry Stream Valleys

Dry valleys consist of an integrated network of broad valleys that lack streamflow or even discrete stream channels. The valleys have been modified by dissolution of the underlying carbonate bedrock resulting in wider, subtly depressed valleys over more soluble bedrock formations. Dry valleys contribute an exceptional amount of recharge because the underlying bedrock has greater karst permeability (more voids and conduits) and can therefore accept more recharge, and because more surface water infiltrates to the water table.

Karst Modified Uplands

The Pennsylvania Geologic Survey has published a series of reports presenting mapped karst features. Karst features can provide pathways of high infiltration to the aquifer. The distribution and density of surface depressions, sinkholes and caves are good indicators of karst development. Areas with a high density of surface depressions suggest that these areas may be important recharge areas in the carbonate basin. For the purpose of planning and preliminary site studies, the high karst density areas presented are defined as areas where there is greater than one karst feature per acre. The locations of these areas are not a substitute for site specific subsurface investigations.

General Legend

N

0 1 2 Miles

1:27,000

Municipal Boundary

River / Stream

Waterbody

Groundwater Basin Divide

Study Area

SRBC

Groundwater Recharge Channel

Meadow “Solar” Field

Retro-fitted Detention Basin

North Reading Road

Route 272

Springhouse Road

East Trout Run Road

Primary site outfalls

Land Studies

Ephrata Sewer Authority

Green Infrastructure Concept Plan

Updated Concept

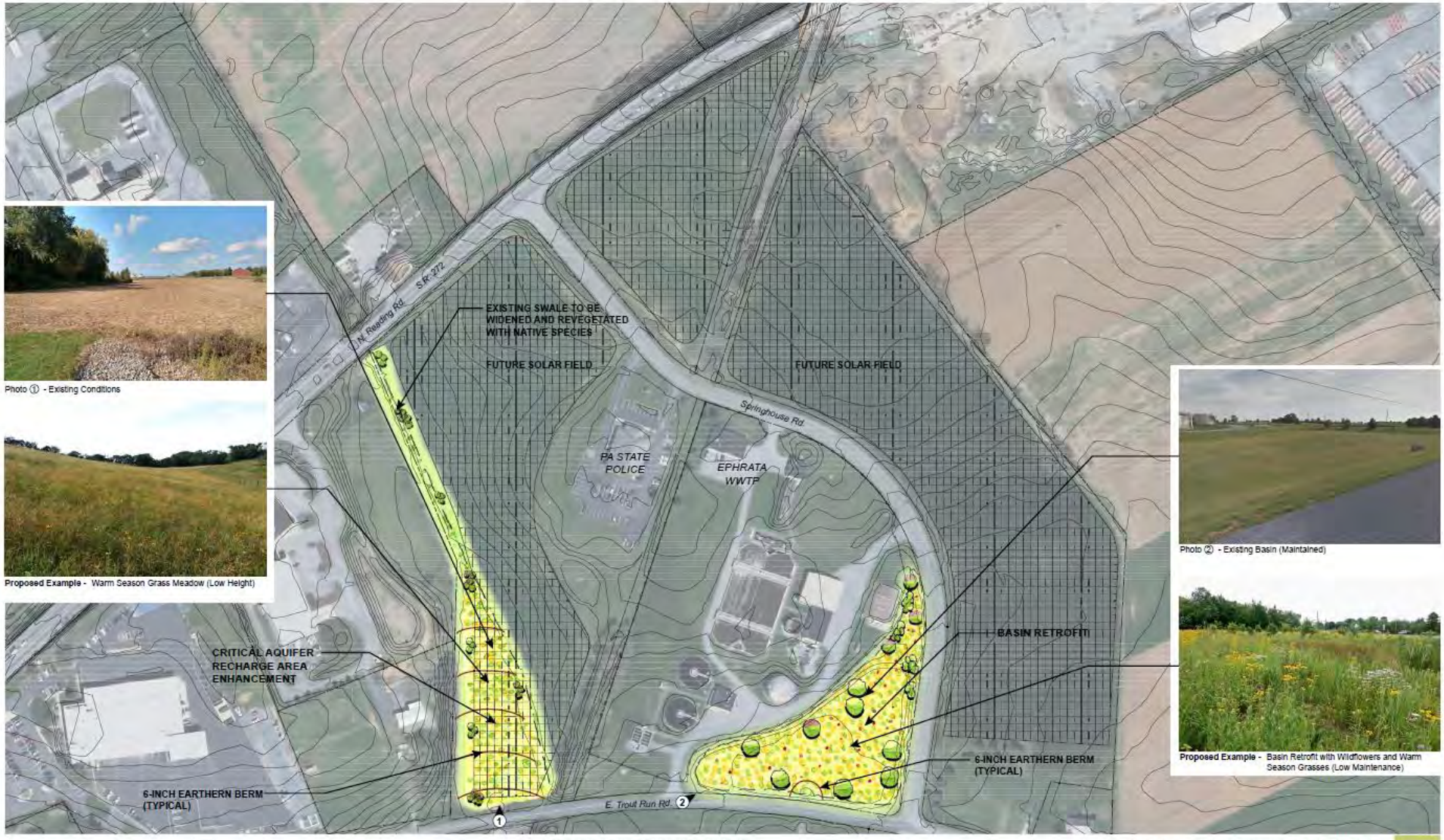


Photo ① - Existing Conditions

Proposed Example - Warm Season Grass Meadow (Low Height)

Photo ② - Existing Basin (Maintained)

Proposed Example - Basin Retrofit with Wildflowers and Warm Season Grasses (Low Maintenance)

Legend

Existing Contours
Parcel
Fence
Future Solar Field

Notes

1. Topographic information is from 2009 LiDAR data collected by Pennsylvania Department of Conservation and Natural Resources (PA DCNR).
2. Parcel information is from 2012 GIS information supplied by Lancaster County Planning Commission, GIS Department.
3. Aerial imagery is 2009 PAMAP orthoimagery, collected by PA DCNR, 1:2,400 scale, 1 ft pixel resolution, color.

ANNUAL SEDIMENT AND NUTRIENT LOAD REDUCTION ESTIMATES**

	N (lbs)	P (lbs)	Sediment (tons)
WWTP Stormwater Basin Retrofit	267.97	14.49	5.26
CARA Enhancement	2,315	113	35

**"Methodology for Annual Sediment and Nutrient Load Reduction Estimates, from "Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects", prepared by Schueler and Lane, revised January 20, 2015.

EPHRATA REGIONAL WASTERWATER TREATMENT FACILITY

RETROFIT CONCEPT PLAN

EPHRATA IMPLEMENTATION PLAN
NOVEMBER 6, 2015

315 North Street, Lititz, PA | (717) 627-4440

Land Studies

Building Reserves

Estimated Project Cost (design-permits-build): ~$120,000

From 2015-2019: Set aside $24,000 per year to “save up” for BMP(s) implementation

***Project will realize multiple benefits on site for WWTP, electrical power generation, aquifer recharge, stormwater management, and…

PRP COMPLIANCE UNDER THE MS4 PERMIT

Funding Strategies

Grants

Grants

This is an area of funding where benefit stacking becomes more crucial to help your application stand out.

If we limited our applications to a sole stormwater BMP implementation focus to achieve permit compliance, your chances for grant award are severely limited.

Grant Entities – limited to BMP implementation

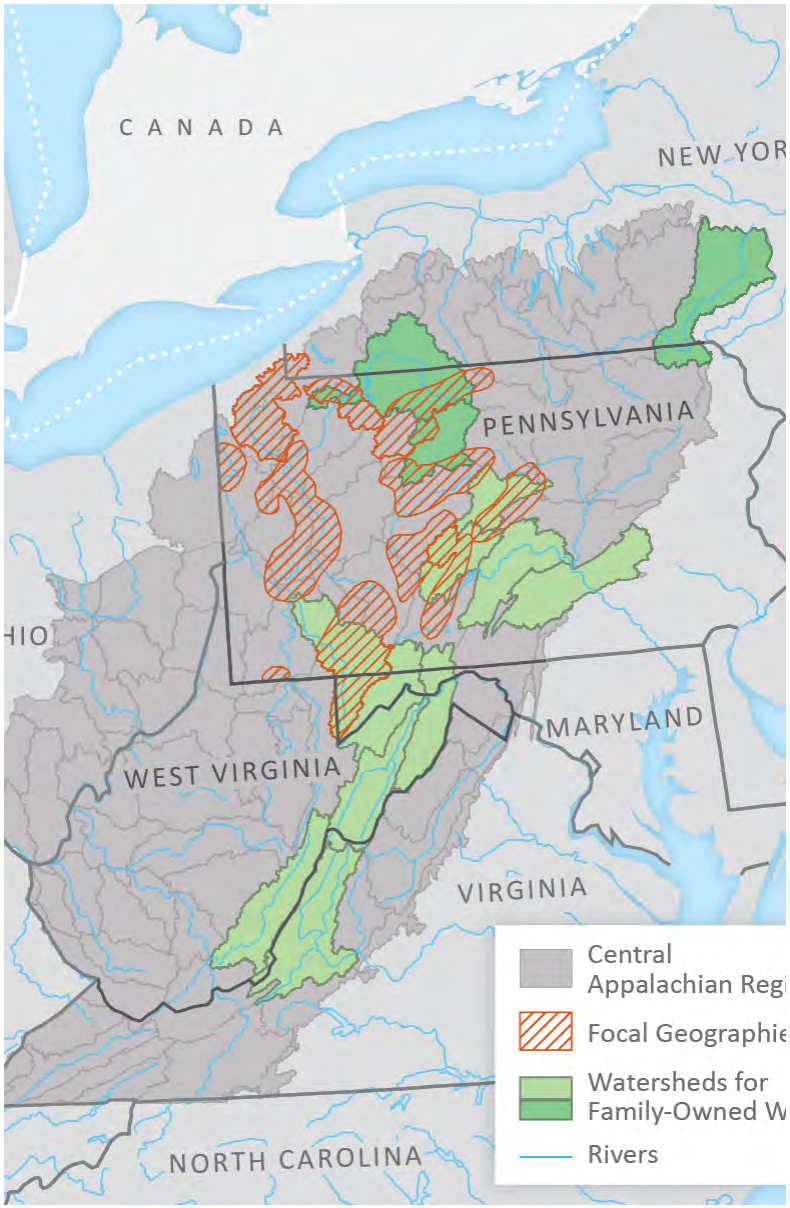
PADEP

Grant Entities – benefit stacking approach

Potential Applicable NFWF Programs

National Fish & Wildlife Foundation (NFWF):

- Resilient Communities Program
- Five Stars and Urban Waters Restoration Program
- Central Appalachia Habitat Stewardship Program



Potential Applicable DCNR Programs

DCNR (C2P2 Category):

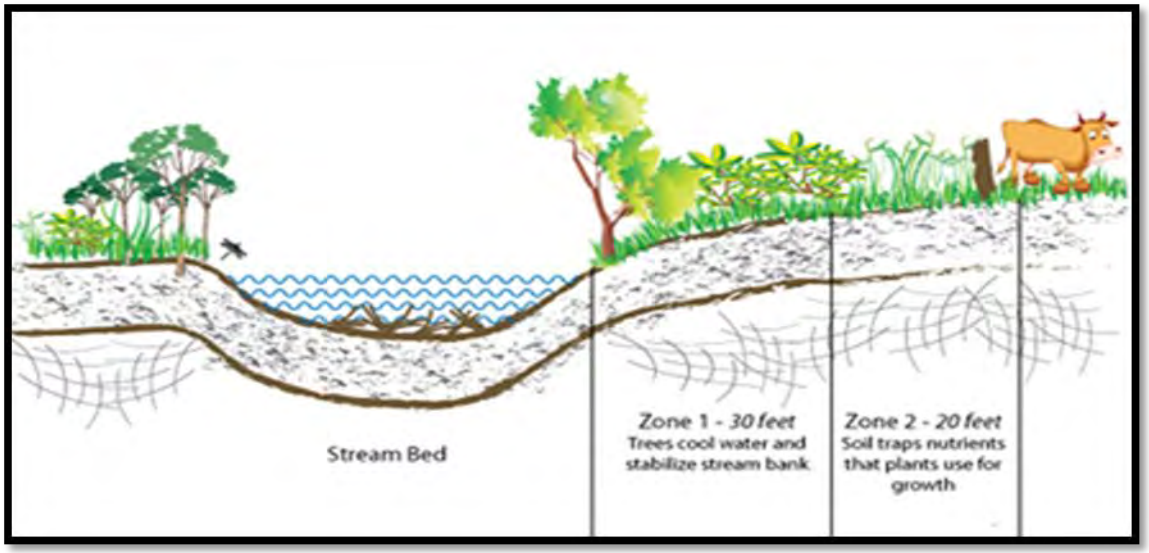
- Riparian Forest Buffer Program
- Non-motorized Trails Program
- Land Acquisition & Conservation Program
- Park Rehabilitation and Development Program

One Approach to Stormwater Management

What if the key to effectively and economically addressing stormwater management regulations is to rethink how we view our public infrastructure---especially our public park, trail and waterway systems---and how we view our community partners?

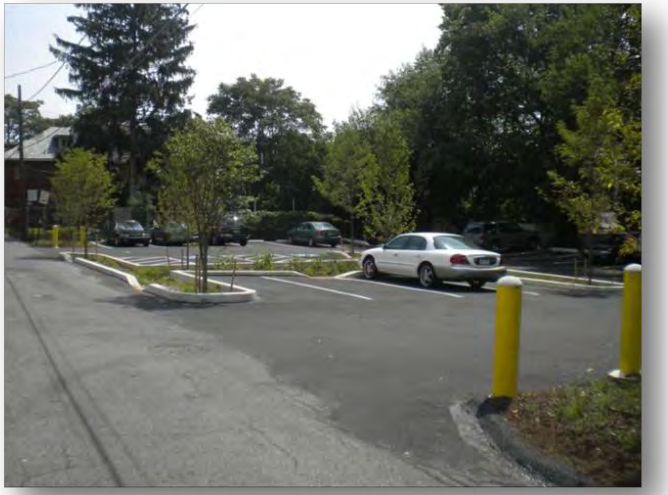
Green Infrastructure

- Naturalized Infiltration Basin
- Floodplain Restoration
- Vegetated Swale
- Constructed Wetlands
- Riparian Buffers



Green Infrastructure

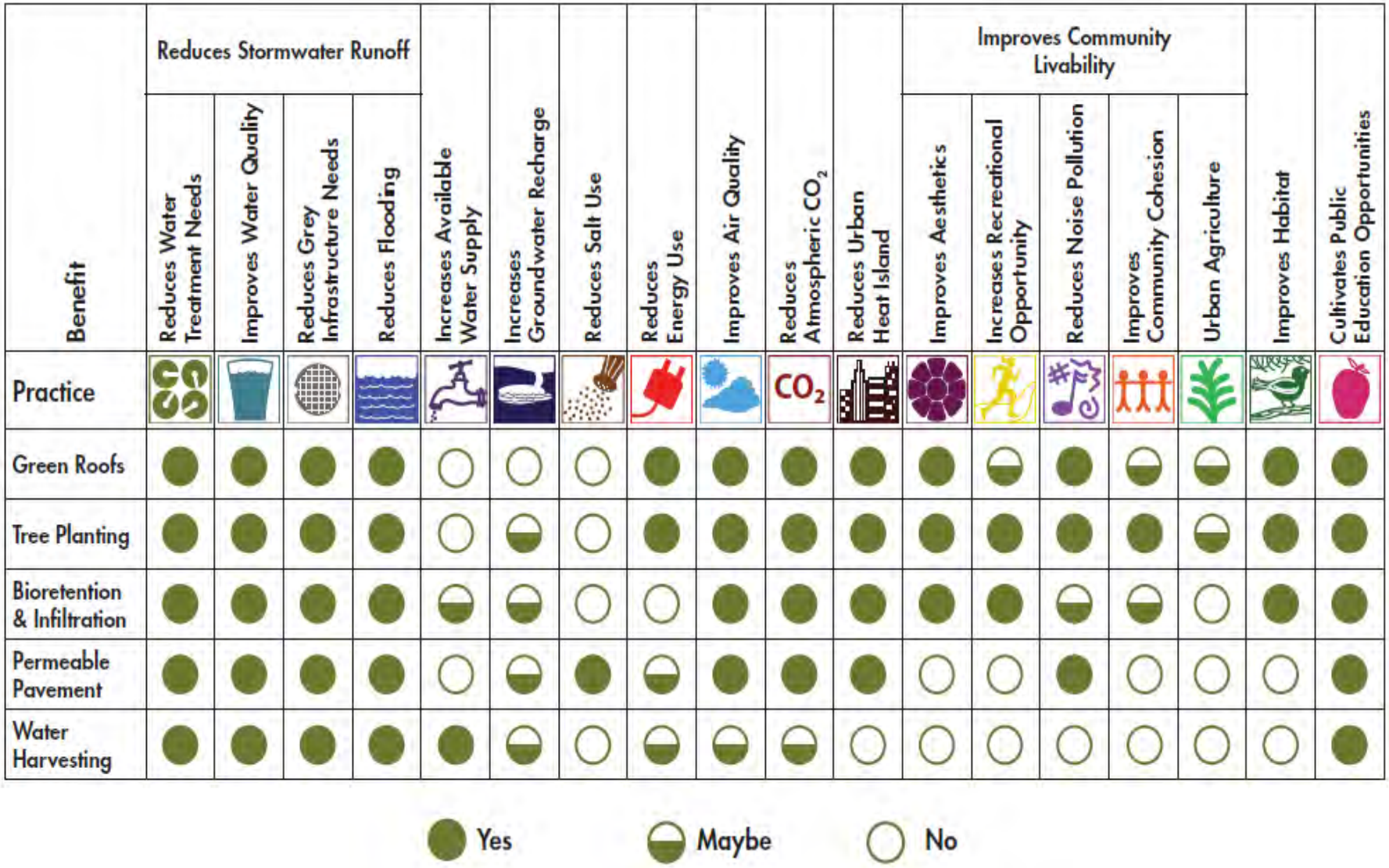
- Vegetated Roof
- Green Streets
- Rain Barrels
- Rain Gardens
- Pervious Pavement



Green Infrastructure

Pervious Pavement

Multifunctional Value of Green Infrastructure



***The Value of Green Infrastructure A Guide to Recognizing Its Economic, Environmental and Social Benefits*, American Rivers**

Project Example: Wrightsville Borough Riverfront

Project Example: Wrightsville Borough

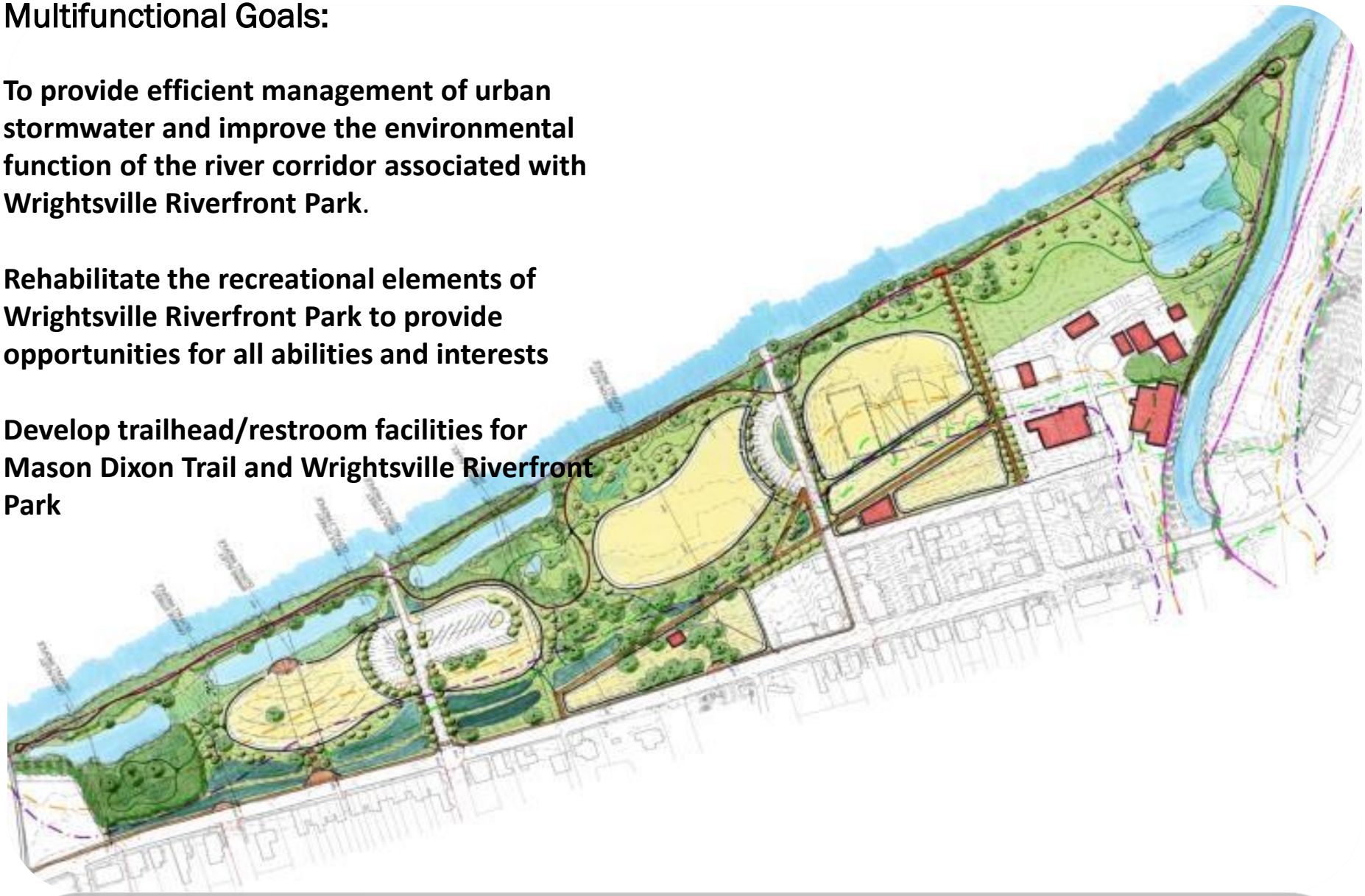
Project Example: Wrightsville Borough

Multifunctional Goals:

To provide efficient management of urban stormwater and improve the environmental function of the river corridor associated with Wrightsville Riverfront Park.

Rehabilitate the recreational elements of Wrightsville Riverfront Park to provide opportunities for all abilities and interests

Develop trailhead/restroom facilities for Mason Dixon Trail and Wrightsville Riverfront Park



Project Example: Wrightsville Borough

Project Example: Wrightsville Borough

Funding Partners:

Chesapeake Bay Trust:
$47,181

GG: Pending $350,000

National Fish and Wildlife Foundation: $300,000

DCNR: $280,000/ PENDING $340,000

National Park Service:
$182,384

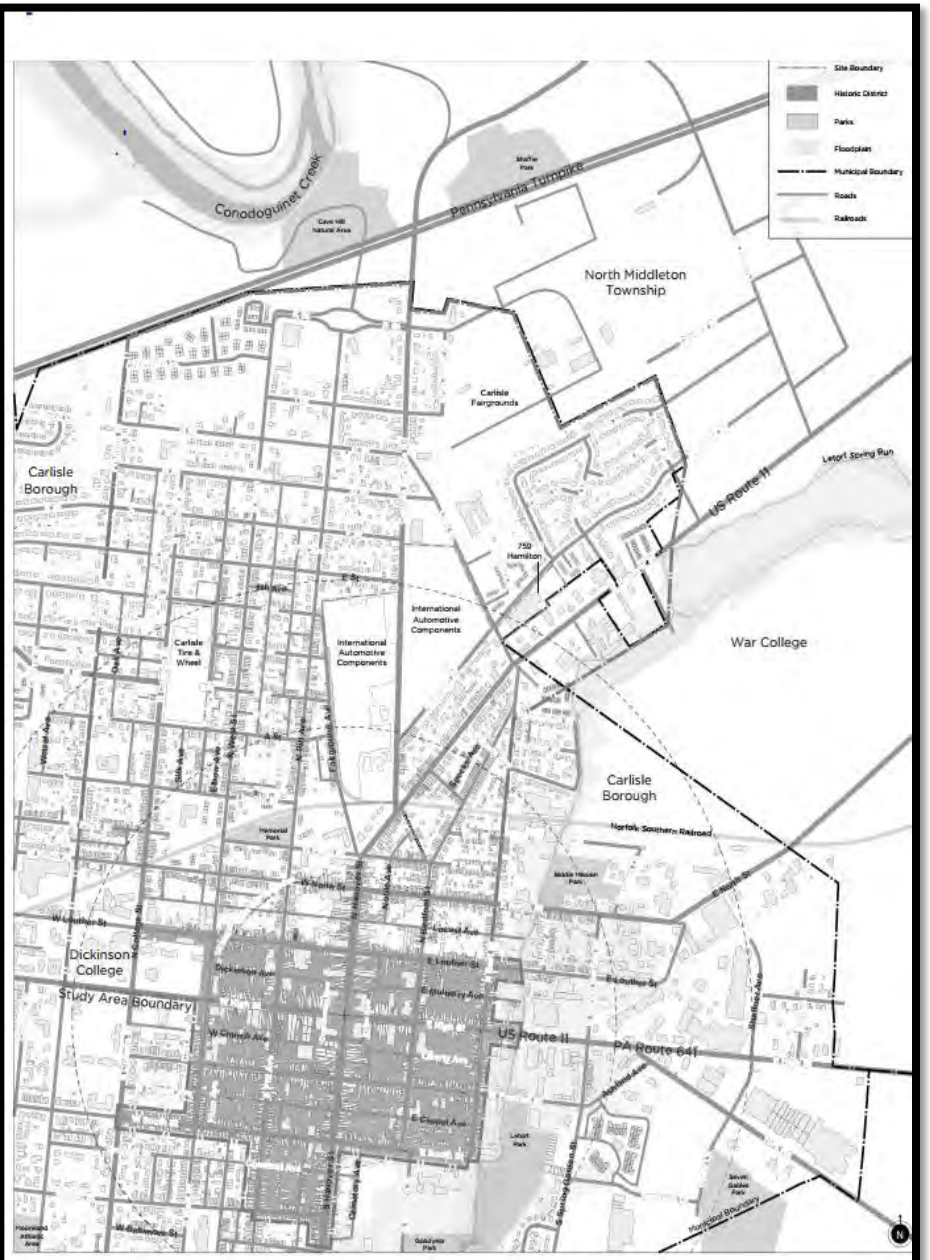
York County Community Foundation: $10,000

Project Example: Carlisle Borough

Quote from Matt Candland, the Borough Manager:
"The Borough, through extensive public participation, identified storm water management as a priority to be addressed through the redevelopment of these two brownfield sites. Given the existing contamination, we had to devise approaches that were not only consistent with current best practices but also minimize infiltration to prevent the contamination spreading. We are currently working on designing facilities that ideally will manage much of the stormwater on the brownfield sites as well as stormwater outside of the redevelopment area. As a result, it is our hope that the plan we have created coupled with the partnerships we have forged with the surrounding community, several funding partners (EPA, National Fish and Wildlife Foundation, etc.) and the developers will result in a win-win situation. The community, developer and environment will all win. "

Masland/IAC property--- Future site of Carlisle's Fairground Avenue Stormwater Park

Project Example: Carlisle Borough



Project Example: Carlisle Borough

Masland/IAC property--- Future site of Carlisle's Fairground Avenue Stormwater Park

Funding Partners:

EPA: $600,000

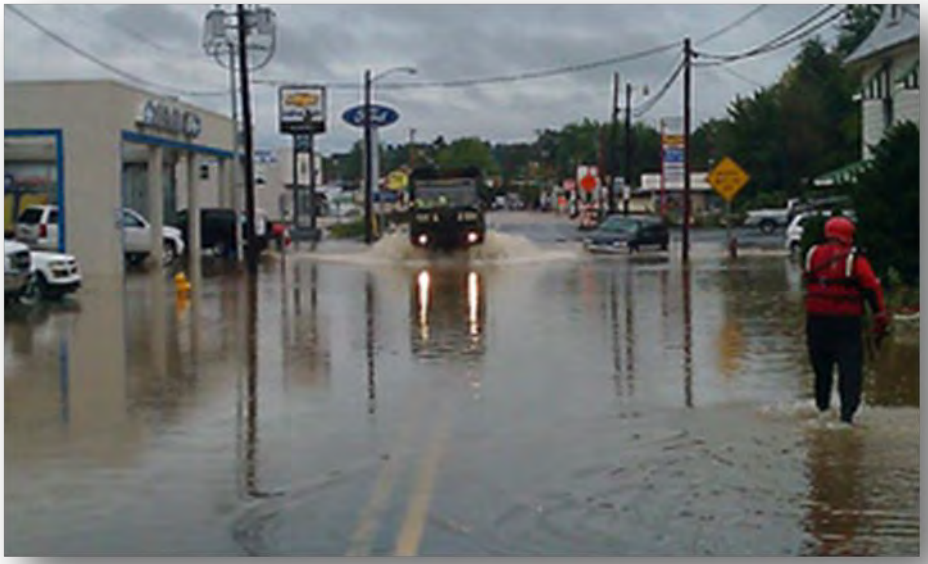
National Fish and Wildlife Foundation: $599,453

DCNR:
$150,000/Pending
$250,000

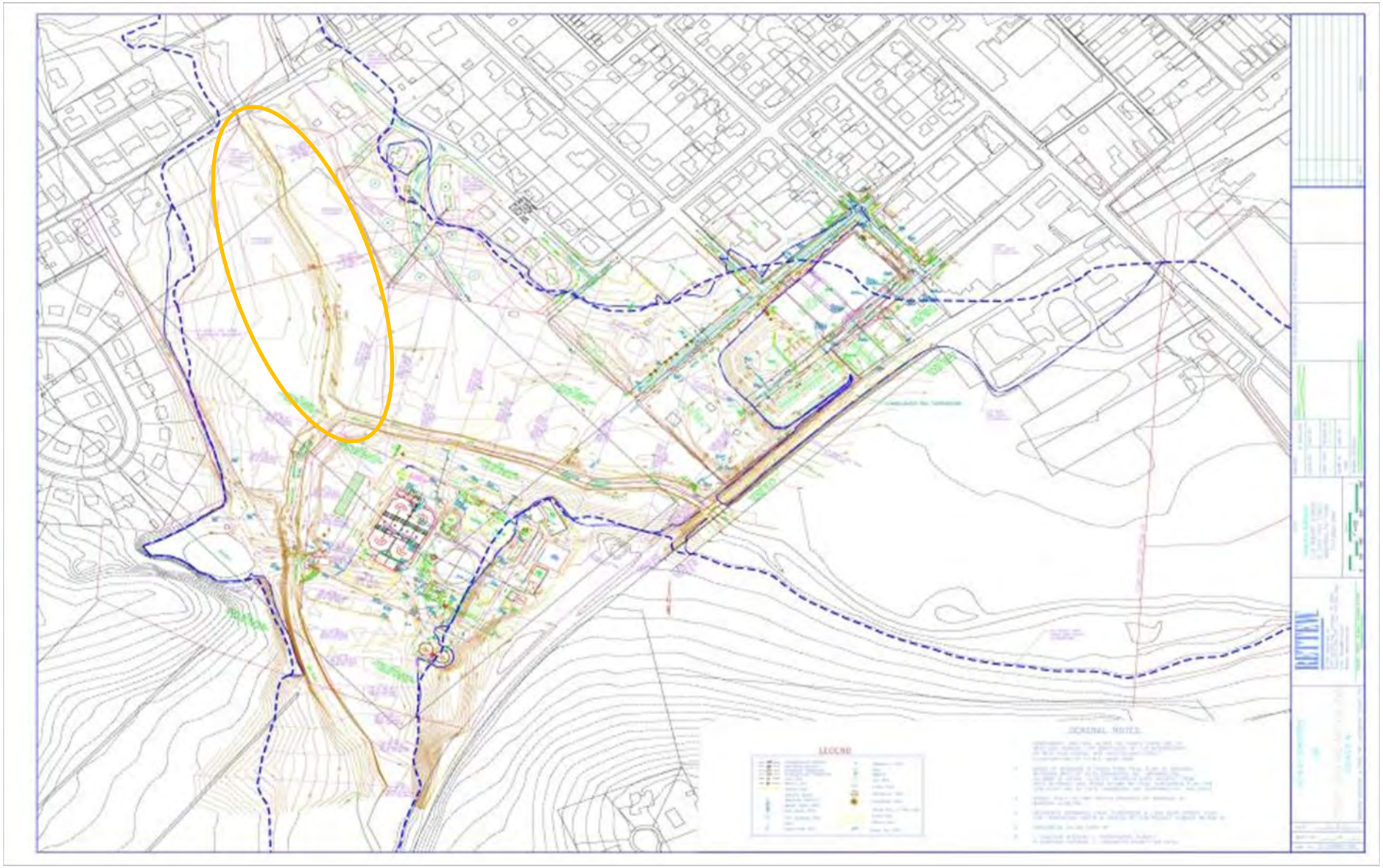
Chesapeake Bay Foundation $30,000,

National Endowment for the Arts $15,000

Tropical Storm Lee – Sept 2011



Project Example: Logan Park



Logan Park


Section View
A Primary Access and Parking
B Sport Field Locations
C Open Field
D Greenway Trail System
E Service Corridor
F Stormwater BMP's
G Stream and Floodplain Restoration
H Riparian Buffer and Tree Planting
Stormwater Basin
Land Studies

Logan Park – Goals

- Provide flood storage capacity
- Improve water quality
- Improve bio-diversity
- Address drainage issues – soccer fields are flooded or too wet to use
- Provide passive and active recreational opportunities
- Incorporating a flood plain restoration into an active recreation space

Logan Park – After Restoration

Funding Partners

Design:
National Fish & Wildlife Foundation (NFWF): $30,000

Construction:
DEP: $239,000
NFWF: $200,000

Logan Park – Results

- 118 Tons / yr Sediment Load Reduction
- 757 lb / yr Nitrogen Load Reduction
- 293 lb/yr Phosphorus Load Reduction
- 2.5 ac + of Wetland Creation
- 1,500 LF of Stream Channel Stabilized
- 10,000 cu yds of Legacy Sediment removed from the floodplain

Project Example: New Street Park

Project Example: New Street Park

Project broken up into three (3) primary phases covering approximately 14 years

- Phase 1: completed in 2006
  - Funding: PADEP, Pfizer
- Phase 2: completed in 2015
  - Funding: Lititz Borough, Act 13 Watershed Restoration Program (DCED)
- Phase 3: currently underway (completion in 2018)
  - Funding: Exelon

New Street Park – Cost-Benefit Analysis

LandStudies

Lititz Run Watershed Restoration Project
Cost-Benefit Analysis

		UOM	ALL PROPOSED PHASES & SECTIONS				NOTES
			UNITS	VALUE	TOTAL	PV	
DIRECT COSTS	Professional Services/Consultants - Phase 1	LS	1	$ 82,920.00	$ 82,920.00	$ 82,920.00	Design and consulting, captures permitting services and fees
	Professional Services/Consultants - Phase 2	LS	1	$ 11,259.00	$ 11,259.00	$ 11,259.00	Design and consulting, captures permitting services and fees
	Engineering - Phase 1	LS	1	$ 27,200.00	$ 27,200.00	$ 27,200.00	SWM calculations and general engineering, engineering consultation for phase 1 sections
	Engineering - Phase 2	LS	1	$ 4,760.00	$ 4,760.00	$ 4,760.00	Engineering consultation for remaining sections
	Construction-Section 1 (Ph. 1)	LS	1	$ 125,000.00	$ 125,000.00	$ 125,000.00	FPR-west side of New Street Park
	Construction-Section 2A (Ph. 1)	LS	1	$ 60,000.00	$ 60,000.00	$ 60,000.00	Stream restoration/stabilization from New Street Park to Locust Street Bridge
	Construction-Section 2B (Ph. 2)	LS	1	$ 117,000.00	$ 117,000.00	$ 117,000.00	Park Improvements in New Street Park
	Construction-Section 3 (Ph. 2)	LS	1	$ 41,000.00	$ 41,000.00	$ 41,000.00	Stream restoration/stabilization from Locust Street Bridge to Front Street Bridge
	Construction-Section 4 (Ph. 1)	LS	1	$ 51,812.00	$ 51,812.00	$ 51,812.00	Stabilization at Oak Street Bridge
	Maintenance-park area	AC/YR	1.5	$ 9,800.00	$ 14,700.00	$183,194.49	Lititz Borough data
	Maintenance-naturalized areas	AC/YR	0.8	$ 1,500.00	$ 1,200.00	$14,954.65	LSI data, 2012
	Other (audit, contingency, etc.)	LS	1	$ 13,421.28	$ 13,421.28	$ 13,421.28	Assume ~2.5% of all direct costs, for all sections
	TOTAL COSTS				$ 550,272.28	$ 732,521.42	
DIRECT BENEFITS	Increased land values (naturalized areas) for business properties	EA	3	$ 91,915.53	$ 275,746.59	$ 275,746.59	Assumes 10.5% increase in property value (Delaware Riverkeeper Network: 6%-15%, avg. 10.5%); assumes average business property value of $875,386 (Prudential, 2013)
	Increased home values (naturalized areas) as net increase in value	EA	8	$ 23,534.00	$ 188,272.00	$ 188,272.00	Assumes 14% increase in home value (Univ. of Washington: 8%-20%, avg. 14%); average home value of $168,100 as baseline (Zillow, May 2013)
	General park use	EA/YR	4480	$ 1.91	$ 8,556.80	$106,636.64	Per visit, per day (Trust for Public Land, 2009), 20 per day over 32 weeks
	Sports facility use	EA/YR	800	$ 3.05	$ 2,440.00	$30,407.79	Proposed open field at NE corner of park property, per visit per day (Trust for Public Land, 2009), 25 per week over 32 weeks
	Special uses in parks	EA/YR	480	$ 9.33	$ 4,478.40	$55,810.76	Proposed stream access points-educational access points, per visit per day (Trust for Public Land, 2009), 15 per week for 32 weeks
	Increased property values (adjacent to improved parks) as net increase in value	EA	15	$ 8,405.00	$ 126,075.00	$ 126,075.00	Assumes additional 5% increase from baseline (Trust for Public Land, 2009)
	TOTAL DIRECT BENEFITS				$ 605,568.79	$ 782,948.79	

New Street Park – Cost-Benefit Analysis cont'd

LandStudies

Lititz Run Watershed Restoration Project
Cost-Benefit Analysis

INDIRECT BENEFITS	Avoided damages in watershed	EA/YR	2	$ 3,000.00	$ 6,000.00	$74,773.26	Based on clean-up costs per "event"
	Flood reduction mitigation	EA/YR	26	$ 597.00	$ 15,522.00	$193,438.43	PDA method (Protocol 2 per on ACOE, City of Roanoke study), $597/property
	Tourism-park visitors (via Healthy Watershed Tour)	EA/YR	120	$ 48.00	$ 5,760.00	$71,782.33	$48 per visitor, assumes visitors spend money in Lititz area (Trust for Public Land, 2009); 120 visitors per year
	MS4 Permit compliance	EA/5-YR	4	$ 72,000.00	$ 288,000.00	$ 1,021,233.75	Assumes annual compliance; uses non-compliance fines in Lancaster County as basis-$72,000/EA (Manor Township) over 5-yr permit term
	Wildlife Value-Trout	MI/YR	0.42	$ 29.77	$ 12.50	$155.78	$29.77/mile annually
	TOTAL INDIRECT BENEFITS				$ 315,294.50	$ 1,361,383.55	
THEORETICAL	Nitrogen	LBS/YR	432.6	$ 3.19	$ 1,379.99	$17,197.78	$3.19/lb (PADEP)
	Phosphorus	LBS/YR	71.8	$ 3.37	$ 241.97	$3,015.43	$3.37/lb (PADEP)
	Sediment	TNS/YR	66.1	$ 13.85	$ 915.49	$11,408.97	$13.85/ton (PADEP)
	SW Volume Offset Value	CF	20000	$ 2.59	$ 51,800.00	$ 51,800.00	$2.59/cf
	Healthcare cost savings	EA/YR	180	$ 250	$ 45,000.00	$560,799.47	Total visitors, assumes average difference of $250 between active and inactive persons (Trust for Public Land, 2009); assumes weekly repeat of visitors
	TOTAL THEORETICAL BENEFITS				$ 99,337.45	$ 644,221.64	

	TOTAL	PV	
TOTAL COSTS	$ 550,272	$ 732,521.42	
TOTAL BENEFITS (DIRECT+INDIRECT+THEORETICAL)	$ 1,020,201	$ 2,788,553.97	
BCR (DIRECT+INDIRECT+THEORETICAL)		3.8068	
NPV - DIRECT ONLY / ROI		$ 17,328.99	6.9%
NPV - ALL COSTS AND BENEFITS / ROI		$ 203,089.24	280.7%

REFERENCES

CALCULATIONS	NOTES
$PV=P_i/(1+r)^t$	1. 20 year timeframe only applies to items provided as unit per year under UOM
For PV/NPV: TIMEFRAME, t = 20.0 YR	2. Sum of PV values in each table represents the NPV of the individual table
DISCOUNT RATE, r = 5.0%	3. Assumes 20 year lifespan of park amenities
$NPV=\sum[(B_i-C_i)/(1+r)^t]$	

New Street Park – Stacked Benefits

The proposed Lititz Run Watershed Restoration Project, including the stacked benefits will realize the following benefits:

- Storm water Management
  - MS4 (municipal separate storm sewer system) Permit Compliance
    - Addresses local and Chesapeake Bay TMDL
    - Strategy that benefits the community
    - Low Impact Development (Vegetative filtration)
  - Community-based regional facility managing rate and volume in an urbanized area
  - Infiltration

- Flood Mitigation
  - Expanded, accessible floodplain helps alleviate nuisance flooding
  - Reduce 100-year floodplain elevation
  - Reduce pressure on waterway

New Street Park – Stacked Benefits cont'd

- Water Quality Improvements
  - Nutrient and sediment reductions
  - Traps incoming sediments and filters pollutants
  - General pollutant reductions

- Riparian Buffers for improved stream bank stability
  - Stable location for planting buffers

- Aesthetic Enhancement
  - Natural habitats in an urbanized setting,
  - Low maintenance natural landscape
  - Native plants
  - Modern facilities
  - Invasive species removal

New Street Park – Stacked Benefits cont'd

- Groundwater Recharge
  - Reconnection of floodplain and stream to the water table
- Wildlife Habitat Improvement
  - Corridor and habitat for flora and fauna
  - Improved ecological system
- Environmental Education
  - Stream access points for student learning
- Recreational Improvements
  - Fishable waters
  - Improved facilities in New Street Park
  - Non-motorized transportation accessibility

New Street Park – Stacked Benefits cont'd

- Economic Development
  - Increased home/land values
  - Quality of life improvements

- Increased tourism.

New Street Park

New Street Park (Phase 2 Considerations)

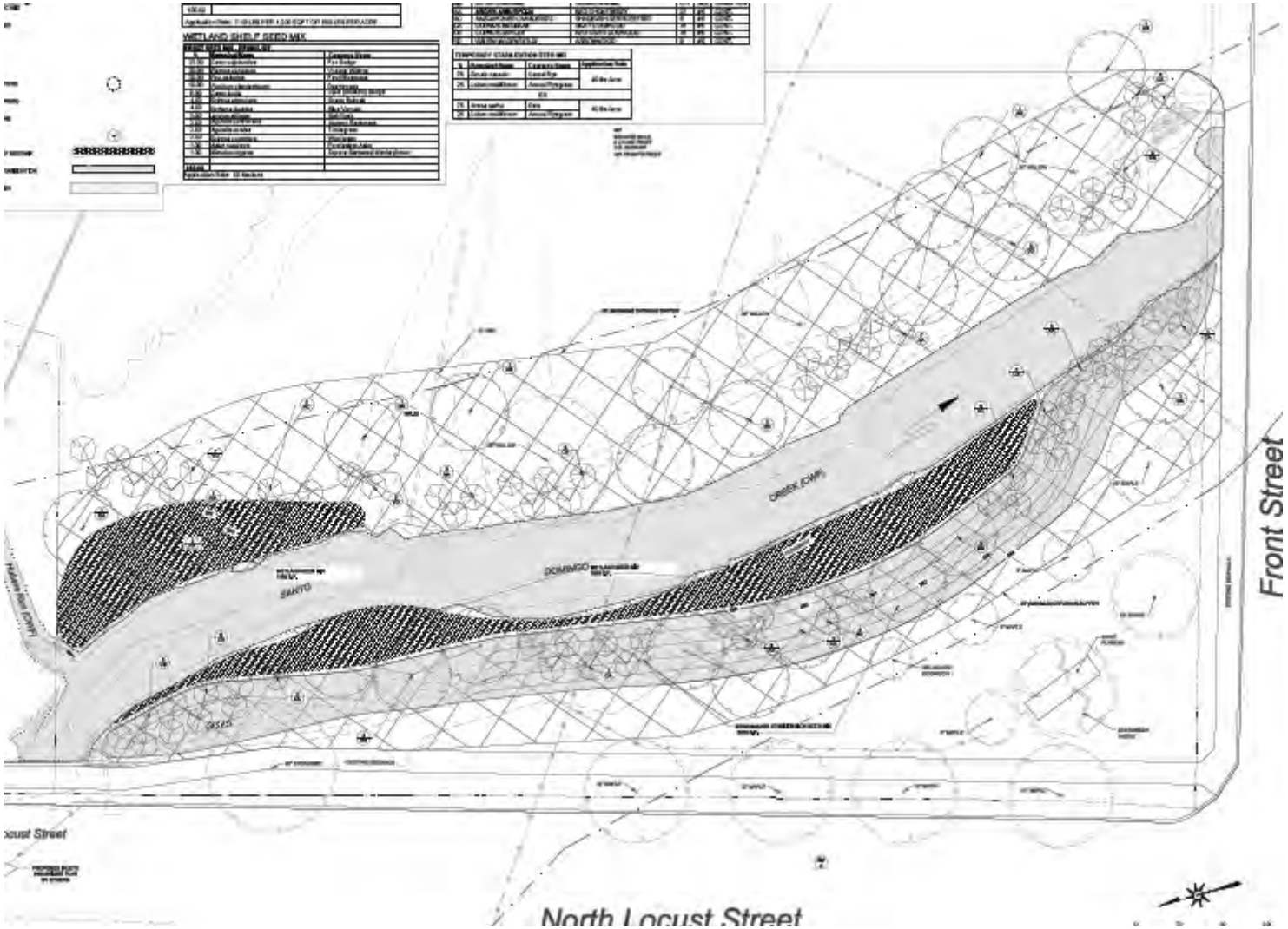
- Had this location identified since the 1990's for improvements to address issues (flooding, TMDL, infrastructure protection (bridges and water pumps), recreational facility improvements, non-motorized trail connections, etc.)

- Before organizing the application, approached our local state representative, senator, and county commissioners

- Built consensus of support from community partners (letters of support from Warwick Township, Lititz Regional Community Development Corp., Lititz Run Watershed Alliance, Lititz Sportsman's Association, Trout Unlimited, Chesapeake Bay Foundation, VentureLititz, and local businesses (adj. landowners))

- Details, details, details

New Street Park (Phase 3)



Stacked Benefits (Economic Ecology)

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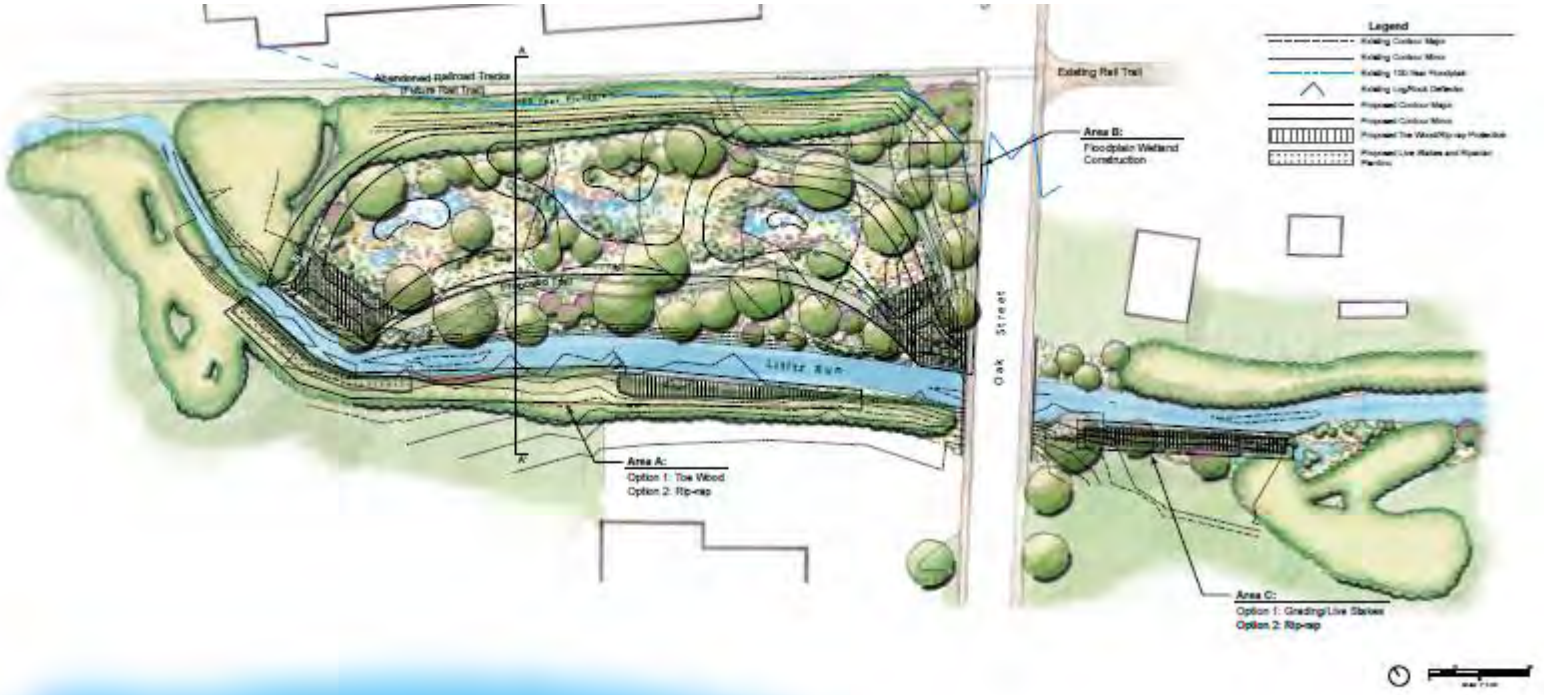
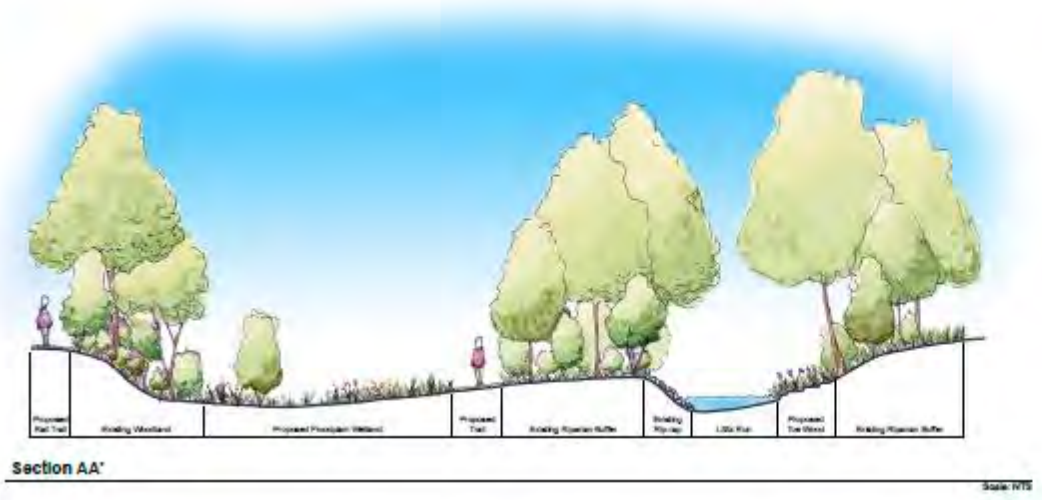
- Catastrophe remediation
- Return on Investment

Project Example: Oak Street-Lititz Run Restoration





Lititz Run Oak Street
Restoration Masterplan
April 2012
Lititz, PA

315 North Street | Lititz, PA 17543
(717) 627-4440 | www.landstudies.com
Land Studies

Oak Street-Lititz Run Restoration Grant Application

Project Narrative

Lititz Run Oak Street Restoration

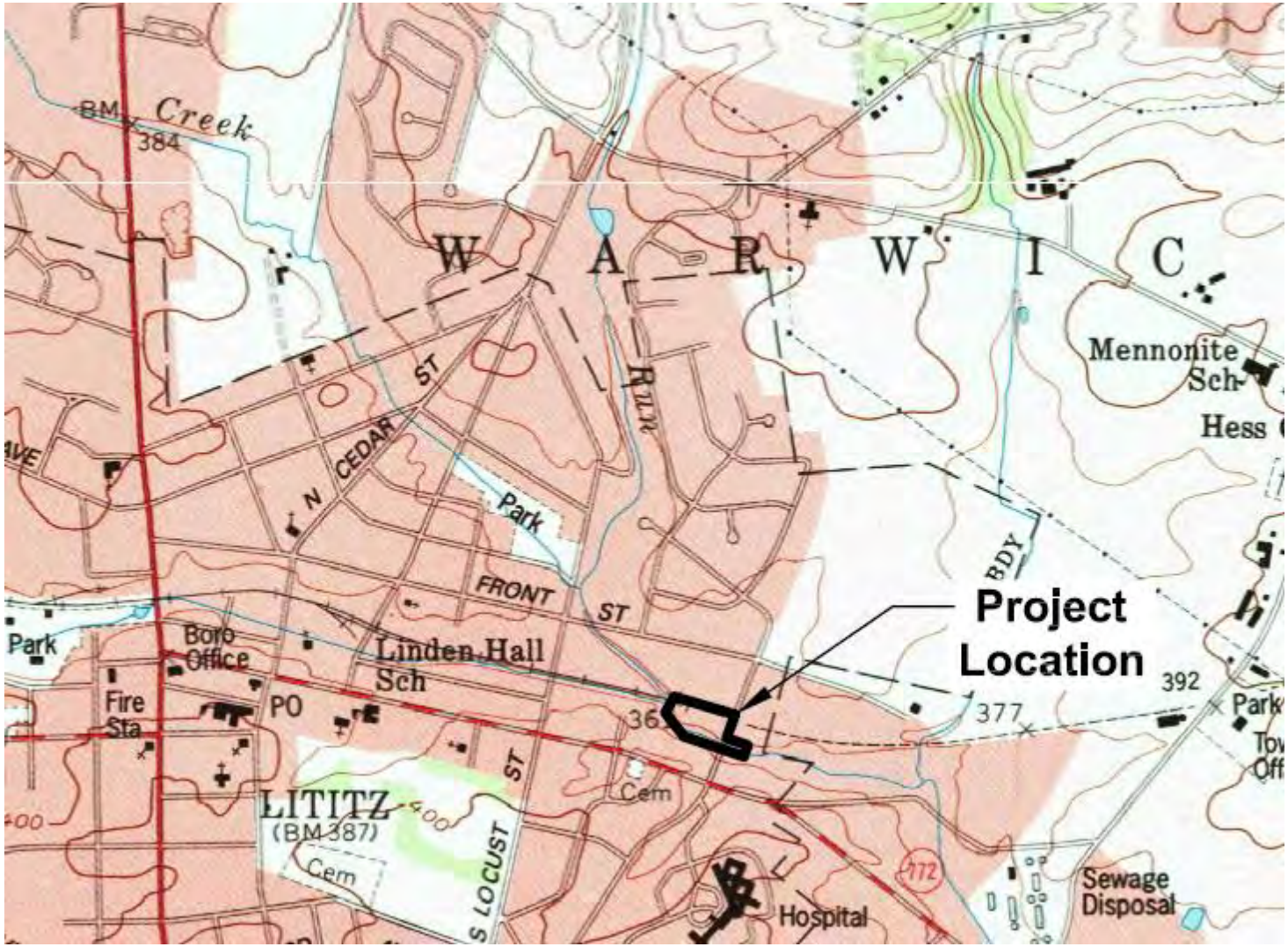
Borough of Lititz

Lancaster County, Pennsylvania

LandStudies, Inc. is requesting authorization on behalf the Lititz Borough Flood Committee for streambank stabilization and wetland creation activities along Lititz Run, upstream and downstream of the North Oak Street Bridge. The proposed project reach begins approximately 450 feet upstream of the North Oak Street Bridge and extends approximately 150 feet downstream of the bridge. The proposed project is located on property owned by Listrak.

The purpose of the project is to provide streambank stabilization and create floodplain wetlands. A floodplain wetland complex will be excavated on the north side of the stream to relieve the stresses on the banks above the bridge while providing a biologically diverse, high quality wetland which will provide biological treatment of storm flows from Lititz Run. With the proximity of the site to the elementary school and a rail trail, this project may also provide

Oak Street-Lititz Run Restoration Grant Application



Oak Street-Lititz Run Restoration Grant Application

LOCAL STORMWATER BMP IMPLEMENTATION PROGRAM
APPLICATION CHECKLIST

Applicant Name	Lititz Borough

Check the following list to make sure you have included all the required information. Place a checkmark in the box provided for all items completed and/or provided. Failure to provide all of the requested information will delay processing.

ENCLOSE THIS CHECKLIST WITH YOUR COMPLETED APPLICATION.

	KEY REQUIREMENTS	Check ✓ If Included/Yes	Check ✓ If Not Applicable
1.	Two signed copies of the completed application provided.	☒	
2.	Is the application complete and includes attachments?	☒	
3.	Is the applicant a "local entity?"	☒	
4.	Is/are the BMP(s) located within the Chesapeake Bay basin?	☒	
5.	Does the location of the BMP(s) drain to an MS4 or CSS system?	☒	
6.	Topographic map provided with project area identified.	☒	
7	Is a preliminary design attached?	☒	
8.	If the applicant and permittee are not the same, attach a letter from the permittee indicating its support for the project.	☐	☒
9.	Is the derivation of pollution reductions provided?	☒	
10.	If matching funds will be used, attach a letter of commitment from the applicant or other project sponsor.	☐	☒
11.	Does the applicant request $200,000 or less?	☒	
12.	Does the project cost appear reasonable for the type of project?	☒	
13.	If BMPs are located on private property, is consent provided by the property owner?	☒	☐
14.	Are the project milestones and dates reasonable?	☒	

Project Example: Village Grande

Project Example: Village Grande

Village Grande – Outfall Bio-retention

Project Description

The grant funding would be used for the design and construction of bio-retention facilities at five (5) outfall locations within the common open space of the Village Grande development located in the Urbanized Area of East Hempfield Township. The outfalls discharge directly into Millers Run, an impaired tributary of the Little Conestoga Creek. The bio-retention areas when completed will provide pollution load reductions totaling 49.70 lbs./year nitrogen, 3.91 lbs./year of phosphorus and 3697.17 lbs./year of sediment. These Best Management Practice's (BMP's) may be considered for inclusion in the future Chesapeake Bay Pollutant Reduction Plan (CBPRP) to be completed by the Township.

This community and its residents have shown leadership and a commitment to implementing stormwater BMP's and natural landscapes as part of an overall sustainability plan for their open space areas. The project will serve as a showcase for the Township to demonstrate how communities and Homeowner Association's (HOA's) with common open space can implement BMP's with regional benefits.

Project Example: Village Grande

October 9, 2015

Mr. Ronald Furlan
Department of Environmental Protection
Bureau of Point and Non-Point Source Management
400 Market Street, 11th floor
PO Box 8774
Harrisburg, PA 17105

Re: Stormwater Management BMP Implementation – Village Grande

Dear Ronald:

I am writing on behalf of the Village Grande Homeowner's Association to state our support and consent for the implementation of the proposed Stormwater Management BMP's on our property in accordance with the information included with this grant application. Our community has actively embraced doing our part of improve the environment and water quality in the Little Conestoga Watershed through implementation of a rain garden and other natural landscapes as part of an overall sustainability plan for the development. The stormwater BMP's proposed to be implemented through this grant, will provide demonstrable reductions in nutrient and sediment loads to Millers Run. The

Project Example: Village Grande

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

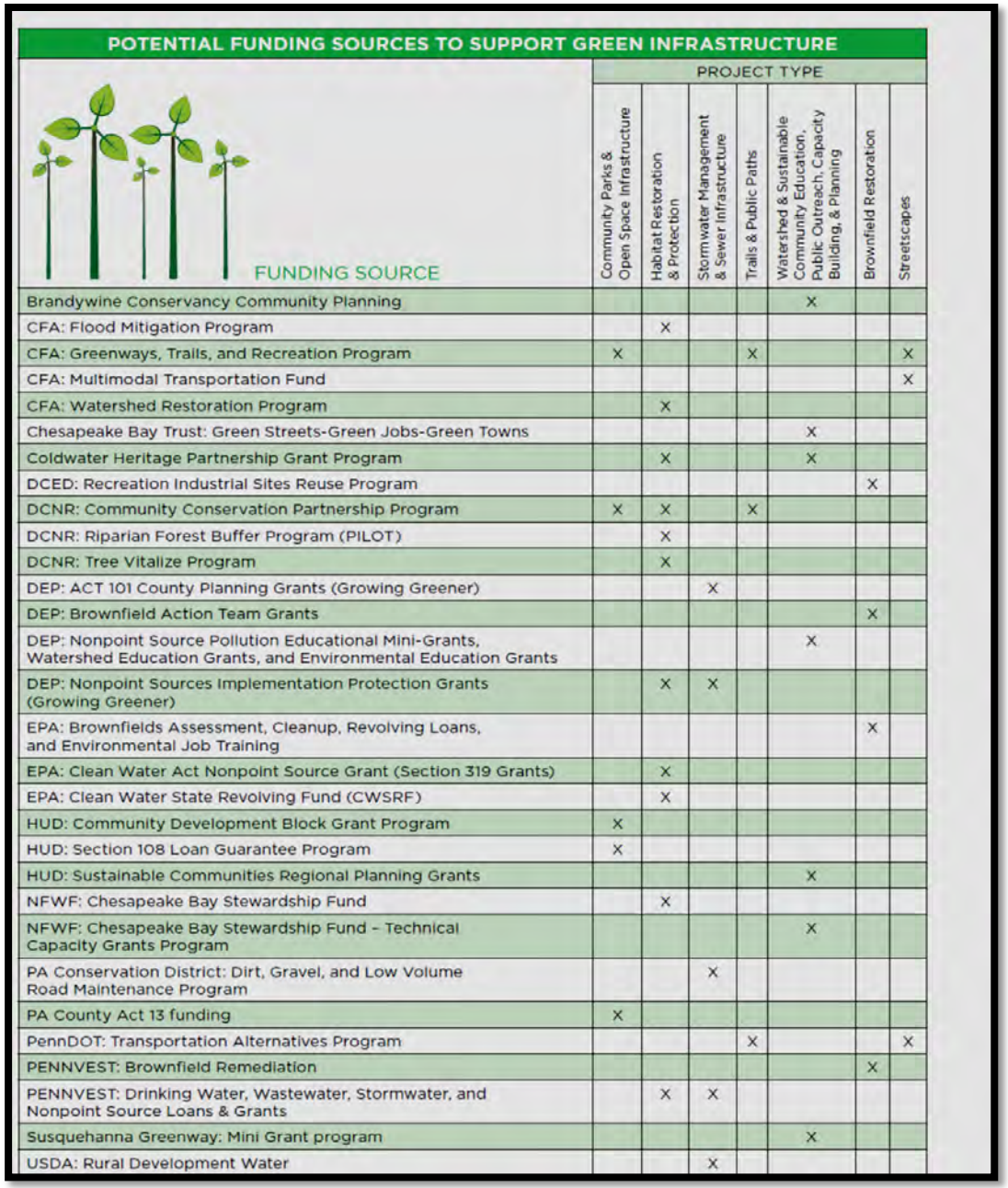
LOCAL STORMWATER BMP IMPLEMENTATION PROGRAM PROJECT APPLICATION

APPLICANT / PERMITTEE INFORMATION			
1. Applicant Name:	East Hempfield Township	2. Applicant DUNS No.:	199395740
3. Applicant Address:	1700 Nissley Rd, PO BOX 128, Landisville, PA 17538	4. Entity Type:	Township
5. Applicant Contact:	Andrew Stern		
6. Applicant Email:	planning@easthempfield.org	7. Applicant Phone:	717-898-3100, ext 230
8. Permittee Name:		9. NPDES Permit No.:	
10. Permittee Contact:			
11. Permittee Email:		12. Permittee Phone:	

GENERAL PROJECT INFORMATION							
1. Project Name:	Village Grande Development - Outfall Bioretention						
2. Project Description:	Please see attached						
3. Project Coordinates: (Attach Map)	Latitude			Longitude			
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	

Opportunities on private property

Funding: Leveraging Opportunities



POTENTIAL FUNDING SOURCES TO SUPPORT GREEN INFRASTRUCTURE

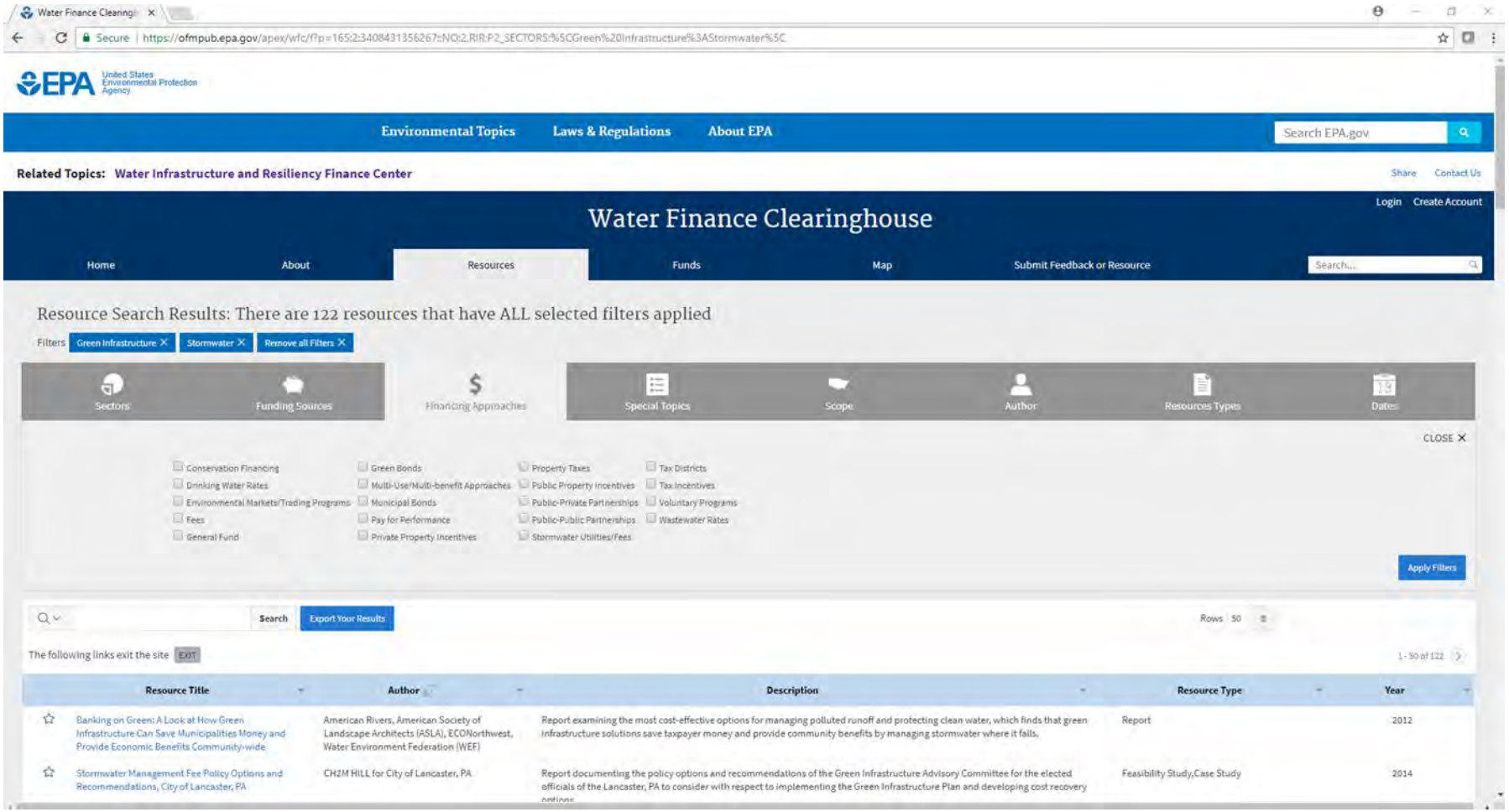
FUNDING SOURCE	PROJECT TYPE: Community Parks & Open Space Infrastructure	Habitat Restoration & Protection	Stormwater Management & Sewer Infrastructure	Trails & Public Paths	Watershed & Sustainable Community Education, Public Outreach, Capacity Building, & Planning	Brownfield Restoration	Streetscapes
Brandywine Conservancy Community Planning					X		
CFA: Flood Mitigation Program		X					
CFA: Greenways, Trails, and Recreation Program	X			X			X
CFA: Multimodal Transportation Fund							X
CFA: Watershed Restoration Program		X					
Chesapeake Bay Trust: Green Streets-Green Jobs-Green Towns					X		
Coldwater Heritage Partnership Grant Program		X			X		
DCED: Recreation Industrial Sites Reuse Program						X	
DCNR: Community Conservation Partnership Program	X	X		X			
DCNR: Riparian Forest Buffer Program (PILOT)		X					
DCNR: Tree Vitalize Program		X					
DEP: ACT 101 County Planning Grants (Growing Greener)			X				
DEP: Brownfield Action Team Grants						X	
DEP: Nonpoint Source Pollution Educational Mini-Grants, Watershed Education Grants, and Environmental Education Grants					X		
DEP: Nonpoint Sources Implementation Protection Grants (Growing Greener)		X	X				
EPA: Brownfields Assessment, Cleanup, Revolving Loans, and Environmental Job Training						X	
EPA: Clean Water Act Nonpoint Source Grant (Section 319 Grants)		X					
EPA: Clean Water State Revolving Fund (CWSRF)		X					
HUD: Community Development Block Grant Program	X						
HUD: Section 108 Loan Guarantee Program	X						
HUD: Sustainable Communities Regional Planning Grants					X		
NFWF: Chesapeake Bay Stewardship Fund		X					
NFWF: Chesapeake Bay Stewardship Fund – Technical Capacity Grants Program					X		
PA Conservation District: Dirt, Gravel, and Low Volume Road Maintenance Program			X				
PA County Act 13 funding	X						
PennDOT: Transportation Alternatives Program				X			X
PENNVEST: Brownfield Remediation						X	
PENNVEST: Drinking Water, Wastewater, Stormwater, and Nonpoint Source Loans & Grants		X	X				
Susquehanna Greenway: Mini Grant program					X		
USDA: Rural Development Water			X				

Potential G.I. Funding sources: Strategic Leveraging Opportunities; *Borough News, November 2016*

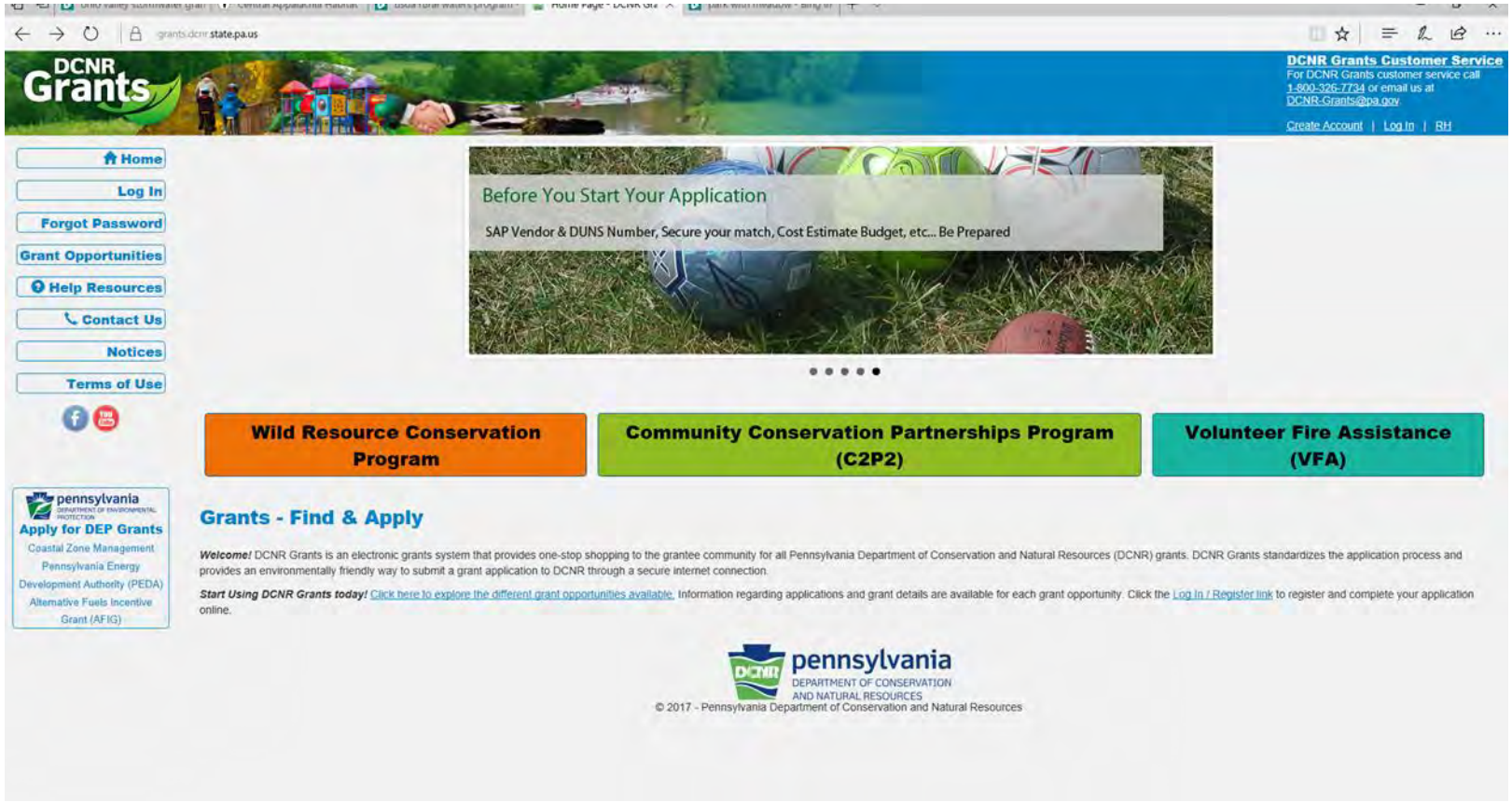
Funding: Tracking Potential Opportunities

USEPA Water Finance Clearinghouse

ofmpub.epa.gov



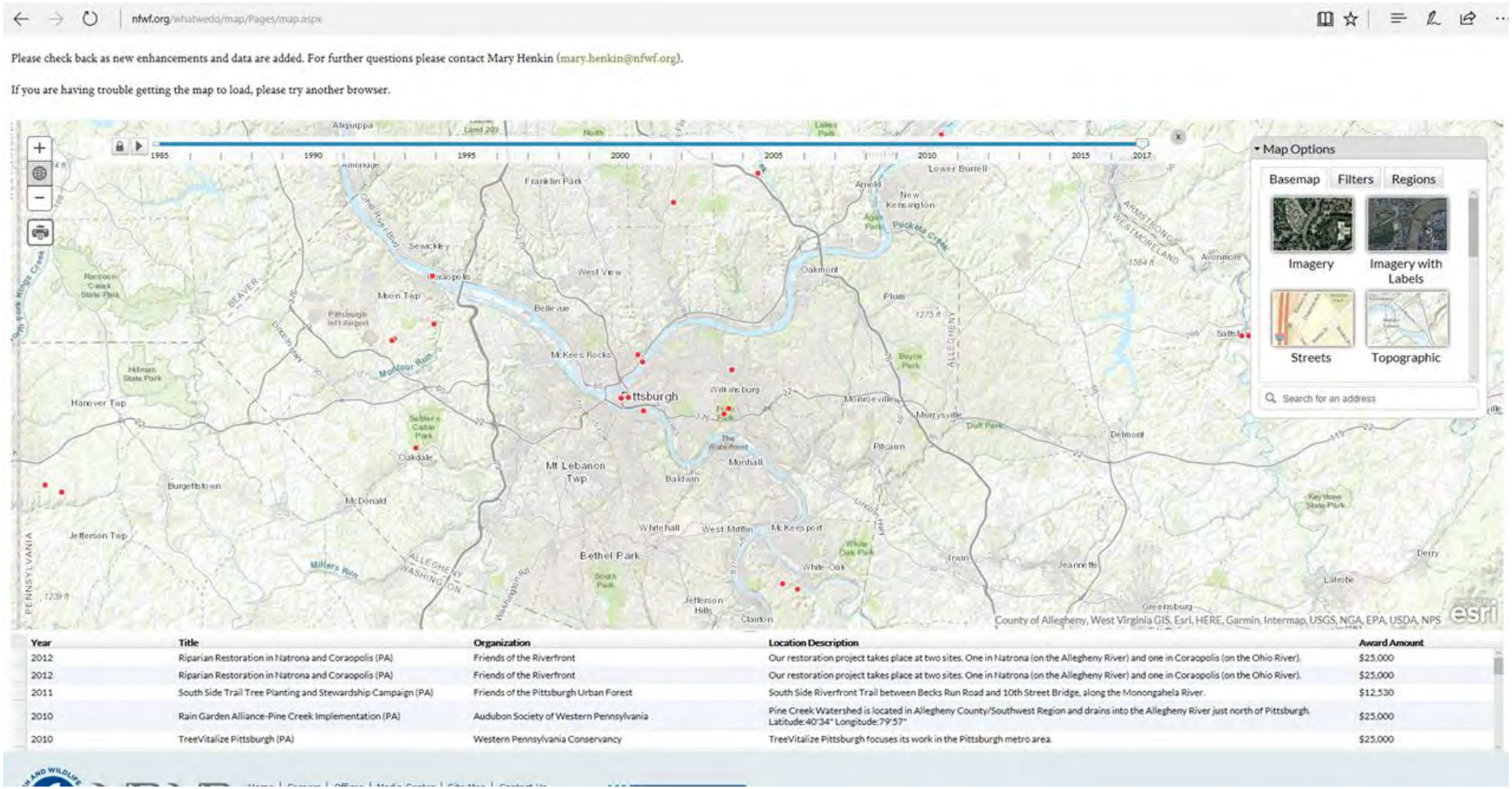
Funding: Tracking Potential Opportunities



Funding: Tracking Potential Opportunities

Funding: Tracking Potential Opportunities

NFWF website (project tracker):



Year	Title	Organization	Location Description	Award Amount
2012	Riparian Restoration in Natrona and Coraopolis (PA)	Friends of the Riverfront	Our restoration project takes place at two sites. One in Natrona (on the Allegheny River) and one in Coraopolis (on the Ohio River).	$25,000
2012	Riparian Restoration in Natrona and Coraopolis (PA)	Friends of the Riverfront	Our restoration project takes place at two sites. One in Natrona (on the Allegheny River) and one in Coraopolis (on the Ohio River).	$25,000
2011	South Side Trail Tree Planting and Stewardship Campaign (PA)	Friends of the Pittsburgh Urban Forest	South Side Riverfront Trail between Becks Run Road and 10th Street Bridge, along the Monongahela River.	$12,530
2010	Rain Garden Alliance-Pine Creek Implementation (PA)	Audubon Society of Western Pennsylvania	Pine Creek Watershed is located in Allegheny County/Southwest Region and drains into the Allegheny River just north of Pittsburgh. Latitude:40°34" Longitude:79°57"	$25,000
2010	TreeVitalize Pittsburgh (PA)	Western Pennsylvania Conservancy	TreeVitalize Pittsburgh focuses its work in the Pittsburgh metro area.	$25,000

Funding Strategies

Advanced Mechanisms

Other funding/implementation approaches

Municipal/Mitigation Bank

Public-Private Partnerships

Fee in lieu of

Authority

Ordinance provisions

Ordinance provisions (riparian corridors)

§270-36. Riparian Corridors

A. In order to protect and improve water quality, a Riparian Corridor Easement shall be created and recorded as part of any subdivision or land development that encompasses a Riparian Corridor.

B. Except as otherwise required by Chapter 102, the Riparian Corridor Easement shall be measured to be the greater of the limit of the 100 year floodplain or 35 feet from the top of streambank (on each side).

C. Minimum Management Requirements for Riparian Corridors.

1. Existing native vegetation shall be protected and maintained within the Riparian Corridor Easement.

Ordinance provisions (riparian corridors cont'd)

2. Whenever practicable invasive vegetation shall be actively removed and the Riparian Corridor Easement shall be planted with native trees, shrubs and other vegetation to create a diverse native plant community appropriate to the intended ecological context of the site.

D. The Riparian Corridor Easement shall be enforceable by the Township and shall be recorded in the Lancaster County Recorder of Deeds Office, so that it shall run with the land and and shall limit the use of the property located therein. The easement shall allow for the continued private ownership.

E. Any permitted use within the Riparian Corridor Easement shall be conducted in a manner that will maintain the extent of the existing one-hundred-year floodplain, improve or maintain the stream stability, and preserve and protect the ecological function of the floodplain.

Ordinance provisions (treatment)

S. The Township may require additional stormwater control measures for stormwater discharges to special management areas including but not limited to:

1. Water bodies listed as "impaired" on Pennsylvania's Clean Water Act 303(d/305(b) Integrated List.

2. Any water body or watershed with an approved Total Maximum Daily Load (TMDL).

3. Critical areas with sensitive resources (e.g., state designated special protection waters, cold water fisheries, carbonate or other groundwater recharge areas highly vulnerable to contamination, drainage areas to water supply reservoirs, source water protection zones, etc.)

Fee in lieu of (FILO)

Essentially FILO means a property can qualify to pay a fee to a regional storm water fund *in lieu of* creating and/or meeting certain on-site requirements (volume, rate, and treatment). This saves the property owner money, it creates funds for the government to use in improving downstream conditions, and it avoids creating unused space a detention basin or other feature can create. It's especially helpful in urban settings where land (and funds for that matter) must be used as efficiently as possible.

Fee in lieu of (FILO)

Harford County Stormwater Fees in Lieu between 1/1/2013 and 12/3

site	location	date	quality		quantity		watershed
			area*	fee	area*	fee	
OAK STREET - LOTS 2 - 5	1018 OAK STREET	10/28/2013	0	$0	0.4	$18,100	10
SANDY RIDGE	EAST SIDE OF NORTH FOUNTAIN GREEN ROAD,	2/20/2013	0.02	$806	0	$0	10
		Totals:	0.02	$806	0.40	$18,100	

Fee in lieu of (FILO)

FILO can fund design, construction, and/or maintenance of BMPs implemented (or to be implemented) to meet PRP and MS4 Permit obligations.

Which leads us to…

Municipal Mitigation Bank

A mitigation bank is a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or (in certain circumstances) preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation.1 A mitigation bank may be created when a government agency, corporation, nonprofit organization, or other entity undertakes these activities under a formal agreement with a regulatory agency.

Municipal Mitigation Bank

Mitigation banks have four distinct components:

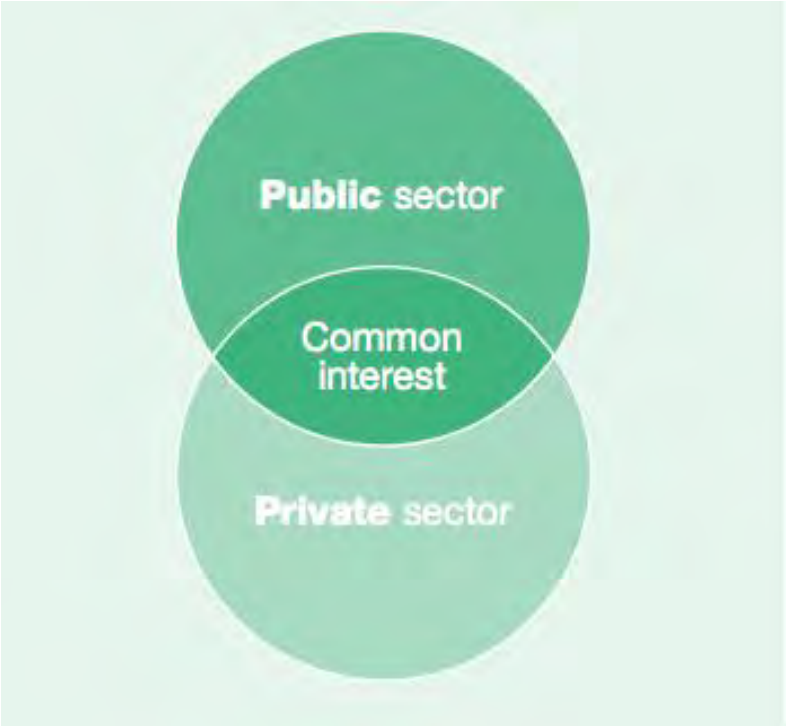
- The bank site: the physical acreage restored, established, enhanced, or preserved;
- The bank instrument: the formal agreement between the bank owners and regulators establishing liability, performance standards, management and monitoring requirements, and the terms of bank credit approval;
- The Interagency Review Team (IRT): the interagency team that provides regulatory review, approval, and oversight of the bank; and
- The service area: the geographic area in which permitted impacts can be compensated for at a given bank.

Funding Strategies

Public-Private Partnerships (P3s)

Public-Private Partnerships (P3s)

A public–private partnership (PPP) is a government service or private business venture which is funded and operated through a partnership of government and one or more private sector companies. These schemes are sometimes referred to as PPP.



P3 Mechanisms

- ***Design-Build-Finance***
- ***Design-Build-Finance-Maintain***
- ***Design-Build-Finance-Operate-Maintain-Availability Payment P3 (DBFOM-AP)***
- ***Design-Build-Finance-Operate-Maintain-Revenue Concession (DBFOM-RC)***
- ***…and several others***

*****BOO Model*****

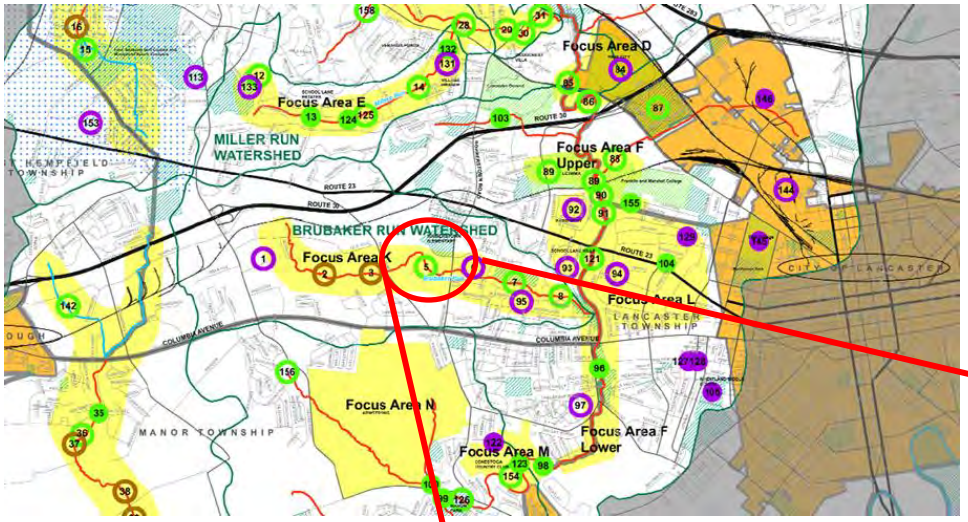
Build-Own-Operate (BOO) is a model that represents the greatest transfer of responsibilities to the private partner. In this instance, the private partner develops and operates a new asset on land that it owns or controls.

Case Study: Lime Spring Farm Development

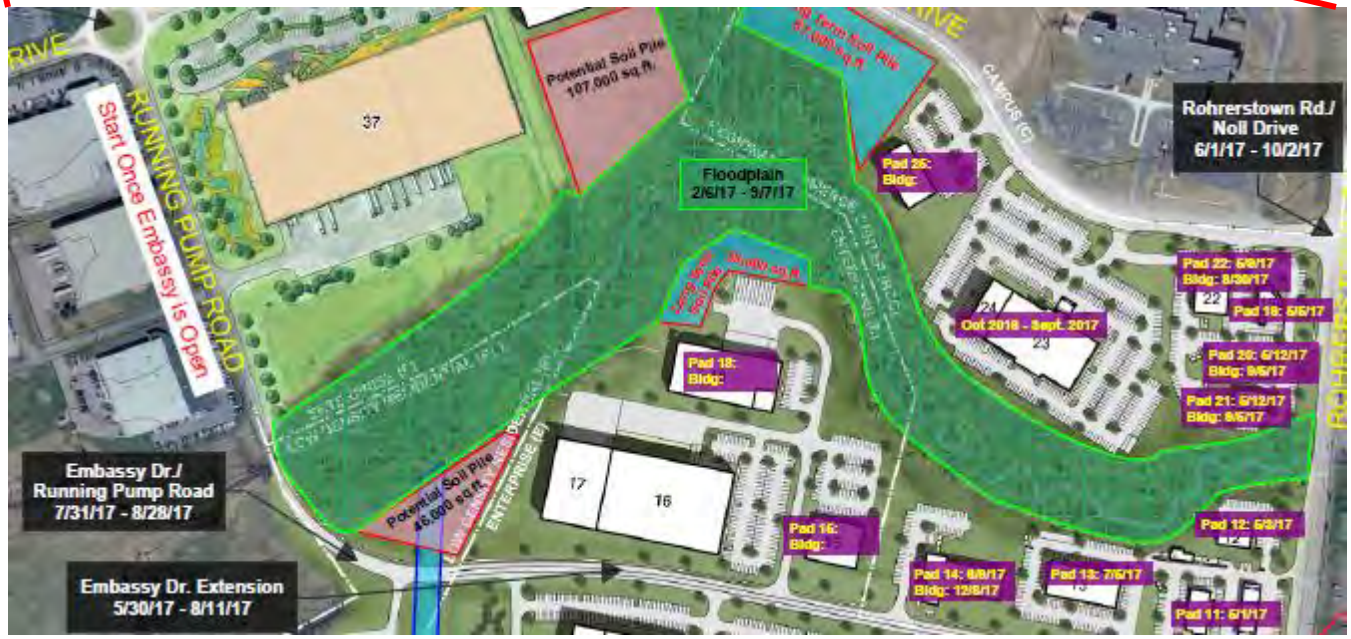
Case Study: Lime Spring Farm Development

Oak Tree Development Group, a Lancaster based real estate development company, is partnering with East Hempfield Township on the proposed approximate 96 acre Lime Spring Square commercial development project as a way to help the Township meet its MS4 Chesapeake Bay pollution reduction goals for Brubaker Run at no cost to taxpayers.

Case Study: Lime Spring Farm Development



Little Conestoga Watershed Action Plan



Case Study: Lime Spring Farm Development

Worksheet 13 - Pollutant Reduction Through BMP Applications*

*Fill this worksheet out for each BMP type with different pollutant removal efficiencies. Sum pollutant reduction achieved for all BMP types on final sheet.

BMP Type: Floodplain Restoration

Disturbed Area Controlled by this BMPs (AC)	97.73

Disturbed Area Controlled by this BMPs:

		Pollutant					Pollutant Load**		
	Land Cover Classification	TSS EMC (mg/l)	TP EMC (mg/l)	Nitrate- Nitrite EMC (mg/l as N)	Cover (Acres)	Runoff Volume (AF)	TSS** (LBS)	TP** (LBS)	NO_3 (LBS)
Pervious Surfaces	Forest	39	0.15	0.17					
	Meadow	47	0.19	0.30	12.57	0.1446	18.34	0.07	0.12
	Fertilized Planting Area	55	1.34	0.73					
	Native Planting Area	55	0.40	0.33					
	Lawn, Low-Input	180	0.40	0.44	35.36	0.0499	24.27	0.05	0.06
	Lawn, High-Input	180	2.22	1.46					
	Golf Course Fairway/Green	305	1.07	1.84					
	Grassed Athletic Field	200	1.07	1.01					
Impervious Surfaces	Rooftop	21	0.13	0.32	15.00	3.1248	177.18	1.10	2.70
	High Traffic Street/Highway	261	0.40	0.83	4.80	0.9999	704.65	1.08	2.24
	Medium Traffic Street	113	0.33	0.58					
	Low Traffic/Residential Street	86	0.36	0.47					
	Res. Driveway, Play Courts, etc.	60	0.46	0.47					
	High Traffic Parking Lot	120	0.39	0.60	30.00	6.2496	2,024.87	6.58	10.12
	Low Traffic Parking Lot	58	0.15	0.39					
	TOTAL LOAD TO THIS BMP TYPE						**2,949.31**	**8.89**	**15.24**
	POLLUTANT REMOVAL EFFICIENCIES FROM APPENDIX A. STORMWATER MANUAL (%)						N/A	N/A	N/A
	POLLUTANT REDUCTION ACHIEVED BY THIS BMP TYPE (LBS)						**169,779.00**	**88.80**	**5,077.00**

POLLUTANT REDUCTION ACHIEVED BY ALL BMP TYPES (LBS)			
REQUIRED REDUCTION from WS12 (LBS)	**2,506.91**	**7.55**	**7.62**

*Pollutant Load = [EMC, mg/l] X [Volume, AF] X [2.7, Unit Conversion]

**TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area

Spreadsheet referenced simply for the purpose to communicate that there are BMPs that generate more reductions than a developer may need to meet permit requirements

Case Study: Lime Spring Farm Development

East Hempfield Township will inherit an approximate 11 acre park as part of the process.

After the developer assumes the reductions necessary for development, the township will inherit the balance of the reductions for their PRP/CBPRP.

Case Study: Lime Spring Farm Development

Table 6. Summary of Proposed BMPs in the Little Conestoga Watershed

BMP ID Number	BMP Project	Sediment Load Reduction (lbs/yr)
1	Brubaker Run Floodplain Restoration	790,821
2	UNT to Swarr Run Stream Restoration	83,375
	Total Load Reduction	**880,596**
	Required East Hempfield Township	708,386
	Required East Petersburg Borough	15,000
	Required West Hempfield Township	17,606
	Total Required Load Reduction	**740,992**

Case Study: Rock Lititz

In 2014, Rock Lititz was the first floodplain restoration project to be accepted by DEP to satisfy the overwhelming majority of the site's stormwater management requirements. Use of FPR to restore 3,100 feet of stream resulted in nine (9) additional acres of developable land The value of the recapture land is estimated at $3.1 million. This restoration is expected to provide annual pollutant load reductions of 248,000 pounds of sediment, 1,110 pounds of nitrogen and 173 pounds of phosphorus. The floodplain restoration is helping Warwick Township to meet MS4 and TMDL requirements for the Lititz Run Watershed.

Case Study: Rock Lititz

Similar to Lime Spring, after the developer assumes the reductions necessary for development, the township will inherit the balance of the reductions for their TMDL Plan from the 17-acre restored floodplain.

Case Study: New Street Park (Phase I)

Public-Private Partnership between Lititz Borough and Pfizer

Case Study: New Street Park (Phase II)

Case Study: New Street Park (Phase III)

Continued public-private approach between Lititz Borough and Hass Properties. Improvements will be used for the borough's Lititz Run Watershed TMDL Plan and PRP/CBPRP required reductions.

Case Study: New Street Park

Original Watershed Action Plan dates back to the 1990's, and coordinated across maps for improvements (water quality/stream, park amenities, and transportation) over time.

More Information

Questions & Answers

"Sometimes the questions are complicated and the answers are simple."

Dr. Seuss