

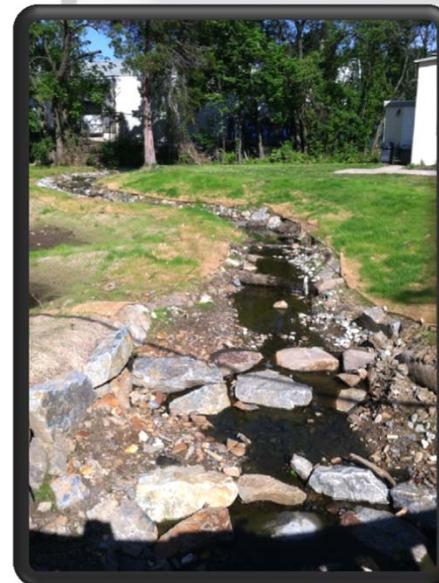


WATER QUALITY IMPROVEMENT PROGRAM

2015 WINTER WORKSHOP

Water Quality Improvement Plan (WQIP)

- ▶ A plan that identifies the main issues impacting the health of the waterways and also identifies and prioritizes the management actions that will reverse the trend of declining water quality
- ▶ Management Tools
 - ▶ Pollutant Removal (Maintenance)
 - ▶ Stormwater Retrofit
 - ▶ Reforestation
 - ▶ Stream Restoration
 - ▶ Impervious Surface Reduction/Treatment



WHY DELDOT?

- ▶ Phase I Permit Holder with New Castle County and Municipalities as Partners in this effort
- ▶ DeIDOT owns, operates and maintains over 89% of the states roadways.
- ▶ The drainage system for these roadways (MS4) channels stormwater from over 40,000 acres of impervious surface.
- ▶ 659 Major Outfalls in New Castle County





Plan Requirements

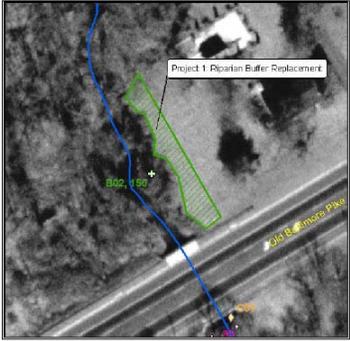
- ▶ Integrated Approach - Municipalities, County and DOT
- ▶ Identify Potential Projects
- ▶ Estimate the Cost of the WQIP
- ▶ Identify Funding Sources

Proposed Project *Leatherman's Run*

Project Number: 1
Catchment Code: LR1

Project Type: Riparian Buffer Replacement
Project Size: Approx. 150 feet in length / 0.07 acres

Project Location: Immediately upstream of the crossing of Old Baltimore Pike.




Project Description: The riparian buffer on the left bank (facing downstream) has been generally reduced to less than 10 feet, and less than 5 feet in localized areas upstream of the Old Baltimore Pike crossing. The above photo shows the view of the buffer facing downstream towards Old Baltimore Pike. The project would entail planting of native trees and shrubs to widen the existing buffer. Some landscape style plantings have been installed in the very southern corner of the site however more natural vegetation with a developed understory will provide the most benefit.

Project Benefits:

Stabilization	Additional trees and shrubs will help stabilize the stream bank.
Water Quality	A more established buffer will provide shading effects to reduce water temperature and will trap runoff and pollutants such as fertilizers from the adjacent property.

Project Constraints:

Environmental	No environmental/permitting constraints are present.
Property Ownership	This property is privately owned.

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Cost Detail:

ITEM	QTY	UNITS	UNIT COST	TOTAL
Riparian Buffer Replacement				
Buffer restoration	0.07	AC	\$19,500.00	\$1,403
Clear and Grub	0.01	AC	\$3,000.00	\$43
			Direct Construction Subtotal	\$1,446
Indirect Costs				
E/SC, MOT, MOS (10% of Directs)	1	LS	\$144.57	\$145
Construction Stakeout (2%)	1	LS	\$28.91	\$29
			Base Construction Cost	\$1,619
			Mobilization (10% of Directs or \$1,000)	\$1,000
			Subtotal	\$2,619
			Contingency (30%)	\$786
			Construction Subtotal	\$3,405
			Env'tl Studies / Permitting (5% of Construction or \$1,000)	\$1,000
			Landscape Design and Surveys (25% of Construction or \$5,000)	\$5,000
			Total Capital Cost	\$9,405
Operations and Maintenance Costs				
Annual Maintenance	5	Percent	\$72	
Discount Rate	5	Percent		
Expected Life	5	Years		
			Net Present Value of Annual Costs	\$313
			Life Cycle Cost	\$9,800

WHAT IS THE GOAL OF THE WQIP

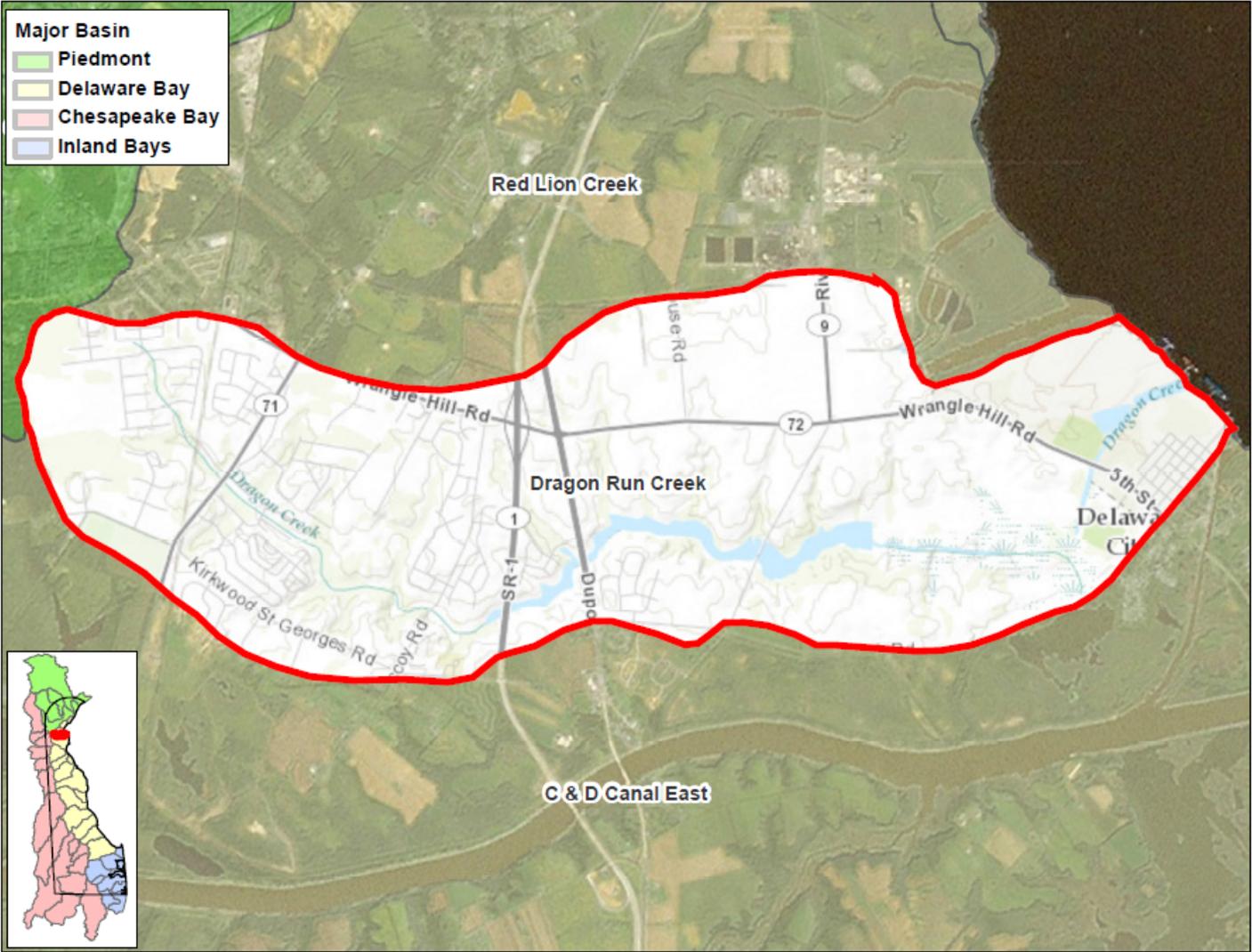
- ▶ Work towards reducing the Total Maximum Daily Load (TMDL)
 - ▶ Nitrogen, Phosphorus and Bacteria
- ▶ 3% reduction in the Effective Impervious Area (EIA)
- ▶ Focus Areas
 - ▶ Stormwater
 - ▶ Open space
 - ▶ Wastewater
 - ▶ Education

Identify and Prioritize Areas Where Stormwater Retrofits Would Effectively Reduce Sediment and Nutrients

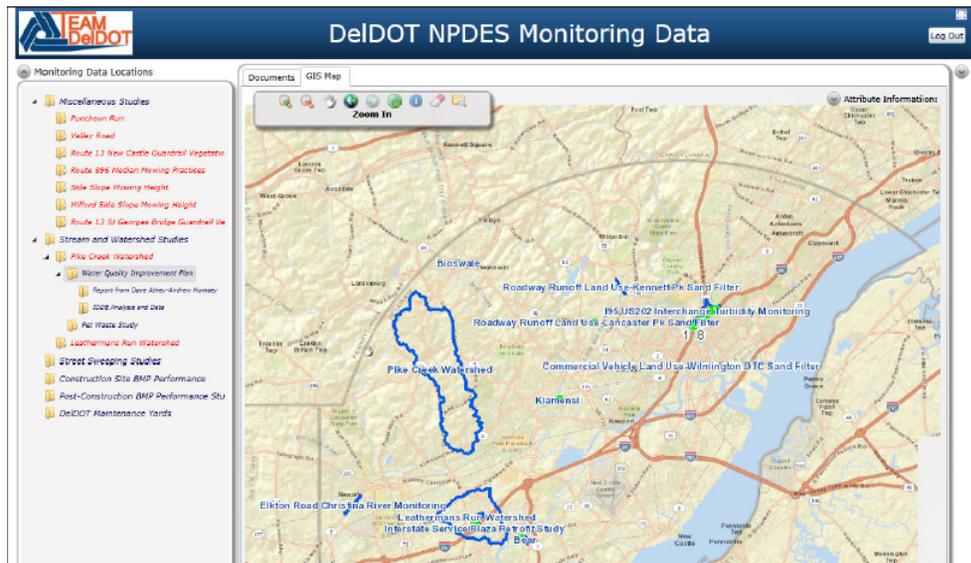
Prioritizing the Watersheds

	305(b) report and 303(d) list - nutrients	305(b) report and 303(d) list - bacteria	Percent load reductions nutrients	Percent load reductions bacteria	Existing impervious cover / EIA	Planned DelDOT roadways / projects	Projected growth	Public or quasi-public open space	ERES waters	Drinking water sources	Flood prone areas	Areas with SSO / CSO impacts	Total score	Notes	Implementation costs	
Restoration Watersheds																
	Weighted Criteria															
	3	3	2	2	3	2	2	3	1	3	1	1				
	Watershed Scores															
Army Creek	3	4	1	4	2	1	4	3	1	0	3	0	60		\$\$\$	
Brandywine Creek	1	1	3	1	2	3	2	4	4	3	1	2	58		\$\$\$	
Christina River	3	2	3	2	4	4	4	2	1	2	3	2	71		\$\$\$\$	
Delaware River	1	1	-	-	3	2	4	2	1	0	4	0	38	*	\$\$\$	
Naamans Creek	4	1	4	3	4	3	2	1	1	0	1	0	56		\$\$\$	
Red Clay Creek	2	1	2	3	1	1	1	3	4	4	1	0	52		\$\$\$	
Shellpot Creek	4	1	2	2	4	3	3	1	1	0	2	1	54		\$\$\$	
White Clay Creek	2	1	3	2	3	2	2	4	4	4	2	0	66		\$\$\$\$	
Preservation Watersheds																
	Weighted Criteria															
	3	3	2	2	3	2	2	3	1	3	1	1				
	Watershed Scores															
Appoquinimink River	3	3	1	2	4	4	3	2	1	0	2	0	59		\$\$\$	
Blackbird Creek	1	4	2	1	2	2	1	2	1	0	2	0	42		\$	
Bohemia Creek	1	1	unk	unk	2	3	2	1	1	0	1	0	unk	**	\$	
C&D Canal East	3	1	-	-	3	4	2	3	1	0	3	0	46	*	\$\$	
C&D Canal West	3	2	unk	unk	3	3	2	2	1	0	1	0	unk	**	\$\$	
Chester River	1	1	3	2	2	1	1	3	1	0	1	0	37		\$	
Delaware Bay	1	1	unk	unk	1	1	1	4	1	0	4	0	unk	**	\$	
Dragon Run	4	3	2	3	4	3	3	3	1	0	2	0	67		\$\$	
Elk Creek	1	1	unk	unk	2	1	2	1	1	0	1	0	unk	**	\$	
Perch Creek	1	1	unk	unk	3	1	2	1	1	0	1	0	unk	**	\$	
Red Lion Creek	2	1	2	2	4	3	4	1	1	0	2	0	49		\$\$	
Sassafras River	1	1	unk	unk	1	2	1	1	1	0	1	0	unk	**	\$	
Smyrna River	1	1	2	1	2	1	1	1	1	0	2	0	28		\$	

Preservation Watershed



STREAM WALKS AND MONITORING DATA



GIS Analysis - BMP Treatment

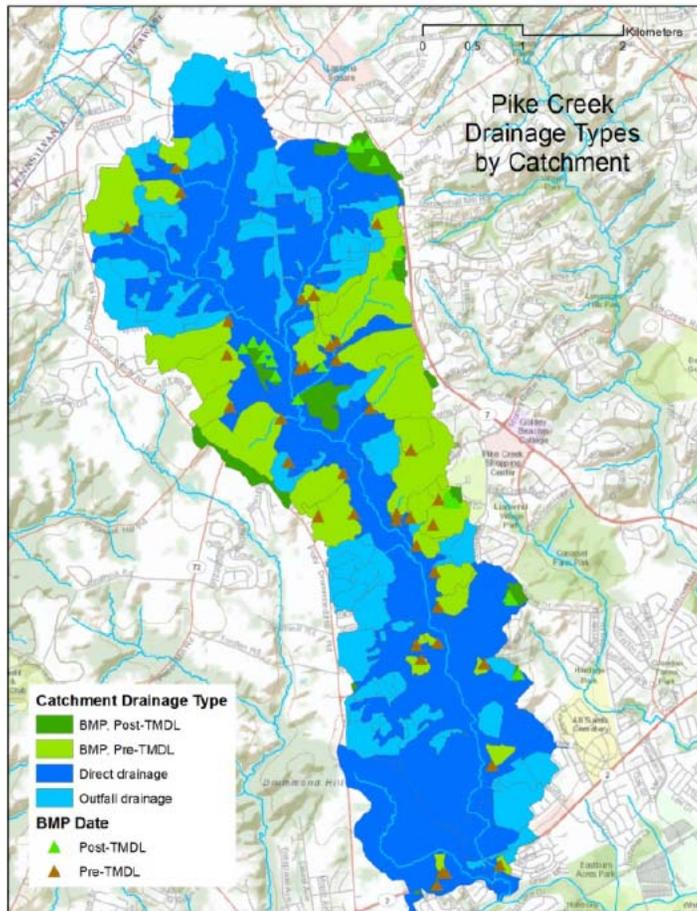
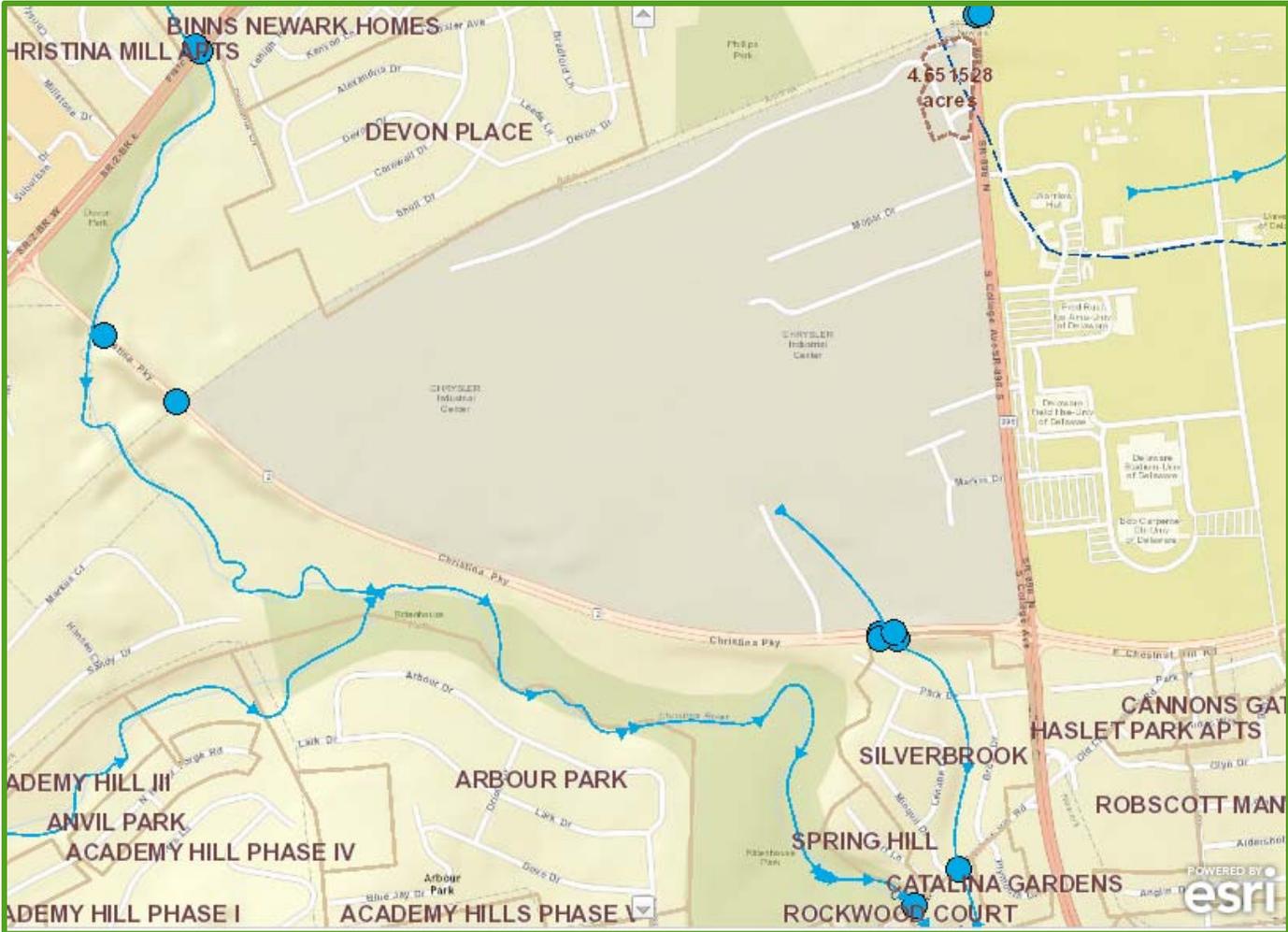


Figure 2 -- Categorized stormwater catchments in the Pike Creek watershed. BMPs and their catchments are differentiated by date to indicate pre- v. post-TMDL implementation.



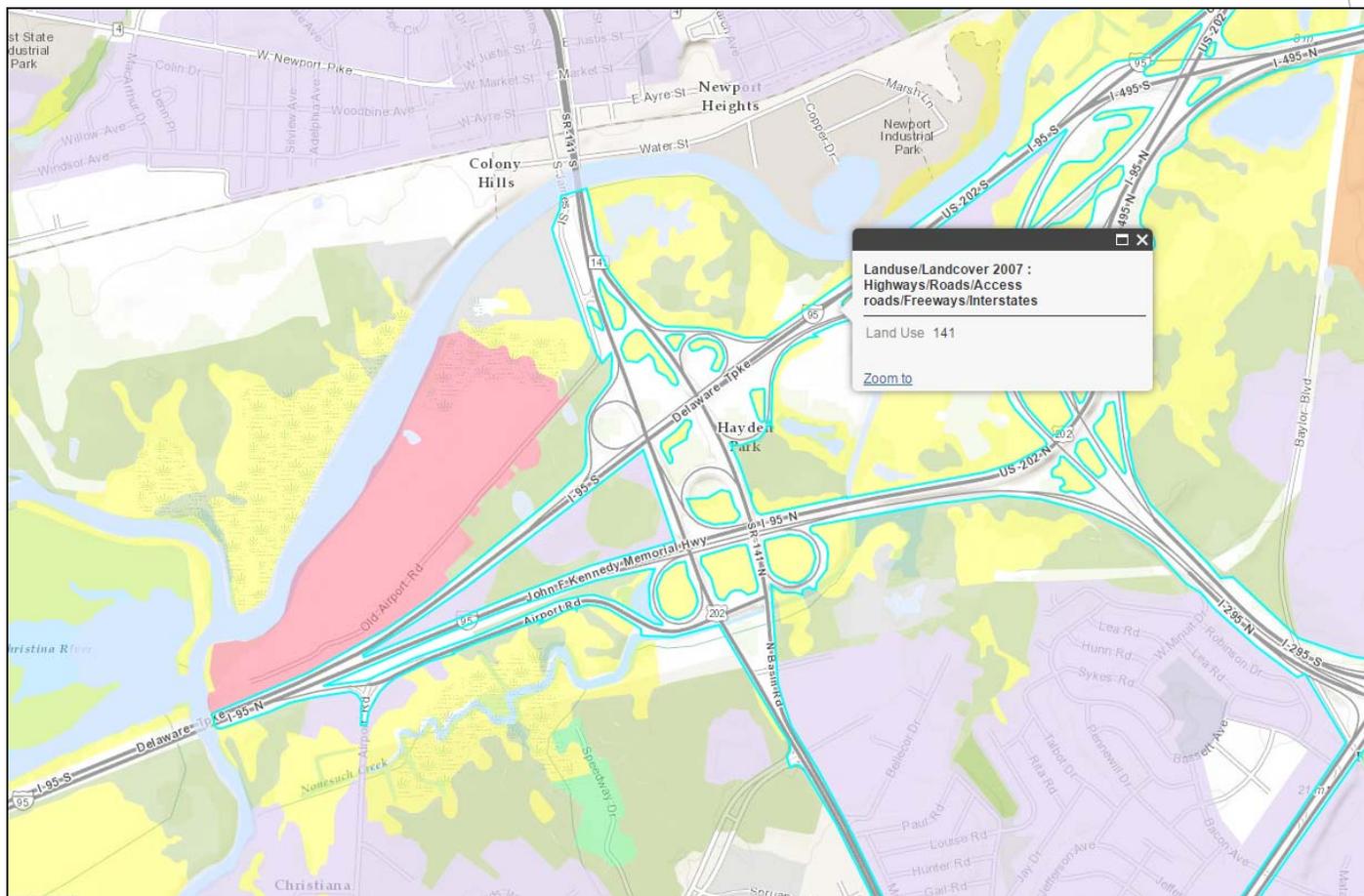
DATE: 7/1/2012	Drainage Area ID: 78	CREATED BY: DAI	 5400 LIMESTONE RD WILMINGTON, DE 19808 OFFICES IN DELAWARE, PENNSYLVANIA, MARYLAND, & NEW JERSEY
SCALE: 1 inch = 350 feet	PCWS Pilot Water Quality Improvement Plan	BASEMAP: ArcGIS Online: Bing Hybrid Basemap	
SHEET: Page 14 of 52	Now Castle County-Delaware	FILE: 8054VC_CatchAreas.MXD	

GIS Analysis - Untreated Areas (Planned Re-Construction)

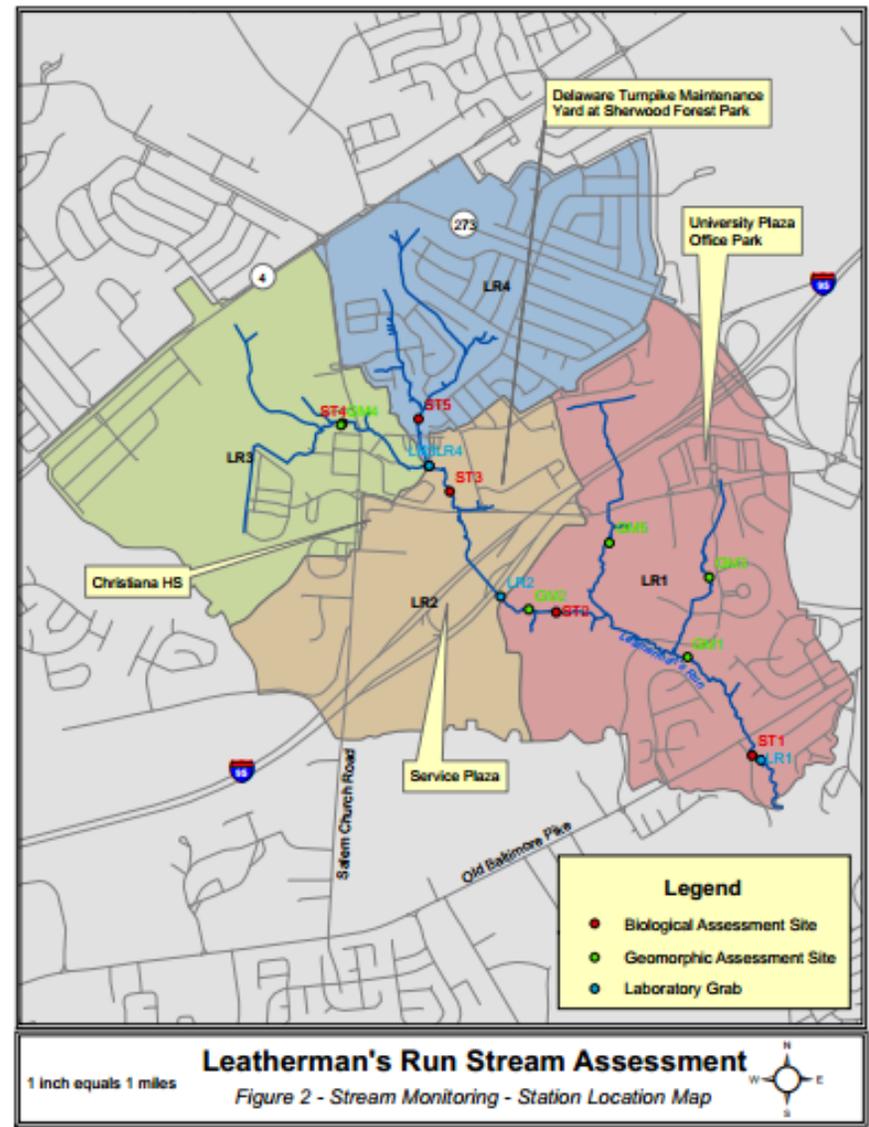
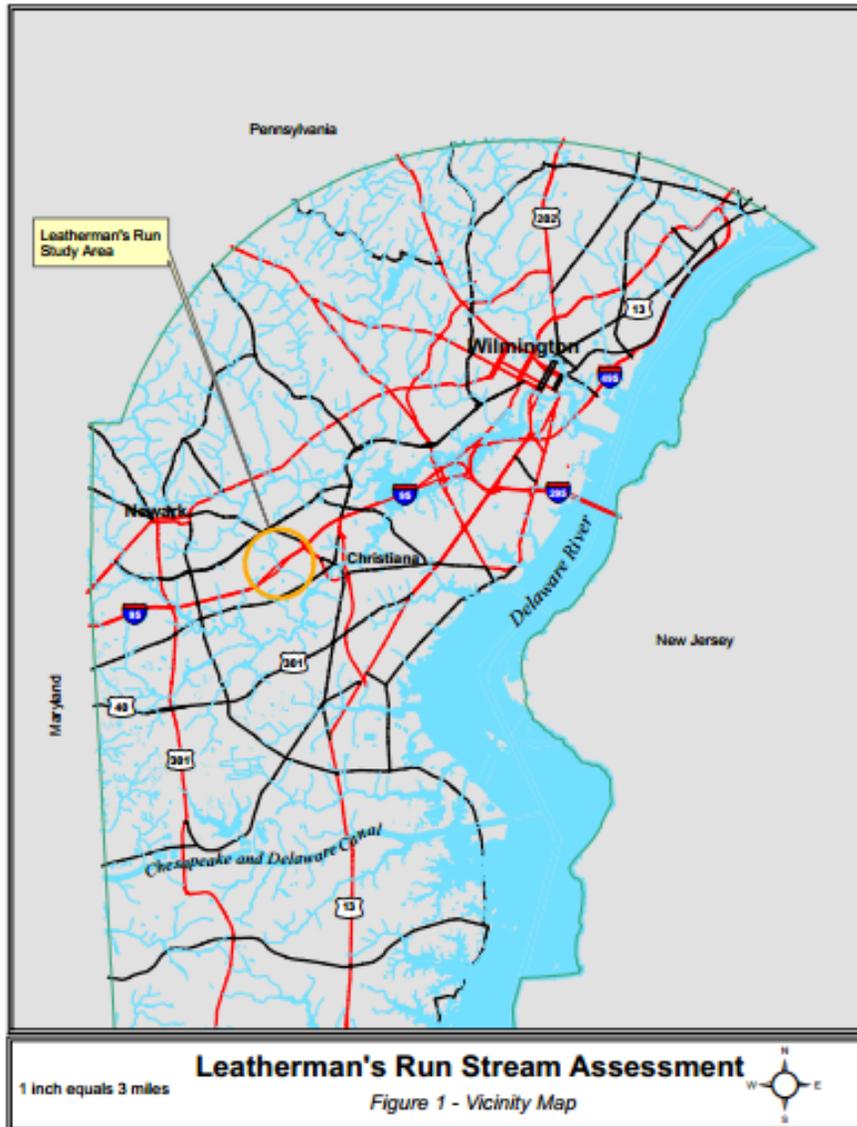


Effective Impervious Area

- ▶ 2007 NCC Land Use/Land Cover Layer



Leatherman's Run Watershed



Watershed Assessments/Studies

Leatherman's Run Stream Assessment

Year Six - 2008

Newark
New Castle County, DE

KCI Job Order No. 0203019



Prepared for:



Prepared by:



KCI Technologies, Inc.
February 2009

LEATHERMAN'S RUN

WATERSHED ASSESSMENT SUMMARY

NEWARK
NEW CASTLE COUNTY, DE

JUNE 2014

PREPARED FOR



PREPARED BY



KCI TECHNOLOGIES, INC.
936 RIDGEBROOK ROAD
SPARKS, MD 21152



Leathermans Run Restoration

Conceptual Design Report

New Castle County, Delaware

JMT Job No. 04-0203-016



Prepared For:



State of Delaware
Department of Transportation

Prepared By:



JMT
131 Continental Drive
Suite 109
Newark, DE 19713

June 2010
Draft

Leatherman's Run Watershed Restoration Project Prioritization

Final Report - July 2007

Newark
New Castle County, DE

KCI Job Order No. 0203019C



Prepared for:

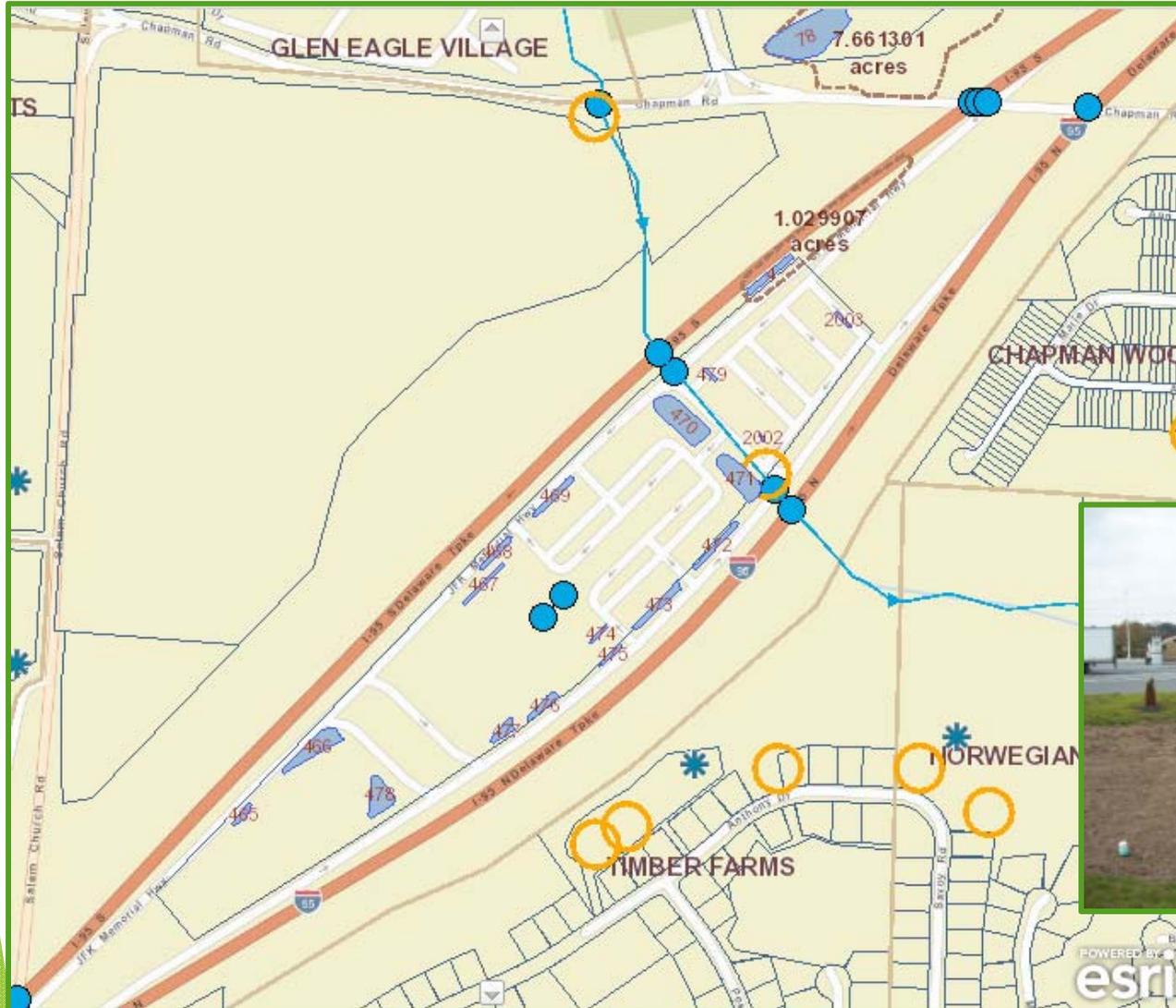


Prepared by:

KCI Technologies, Inc.
1352 Marrows Road
Suite 100
Newark, DE 19711

KCI Technologies, Inc.
July 2007

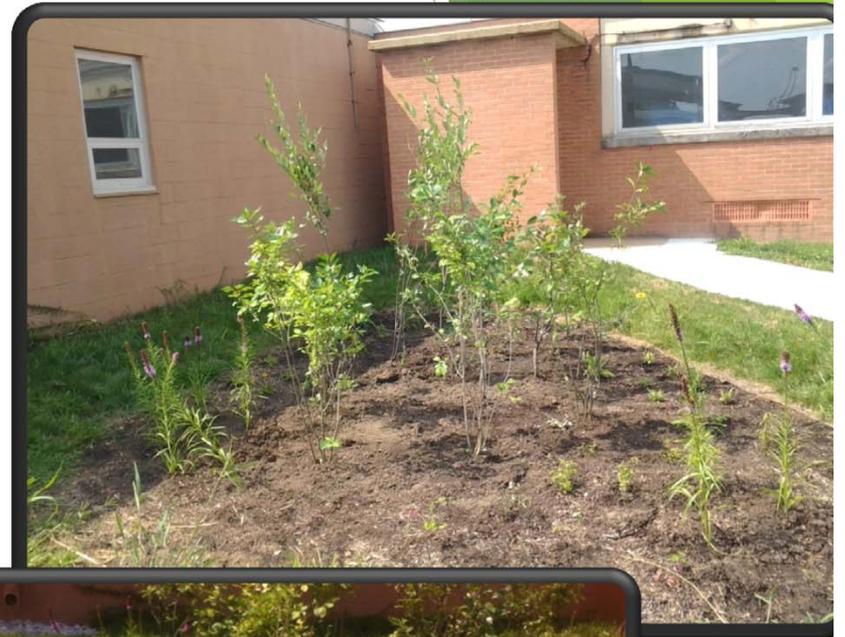
I-95 Service Plaza



Christiana High School SWM Retrofits



Christiana High School - Post Construction



Leatherman's Run Stream Restoration



Leatherman's Run Stream Restoration

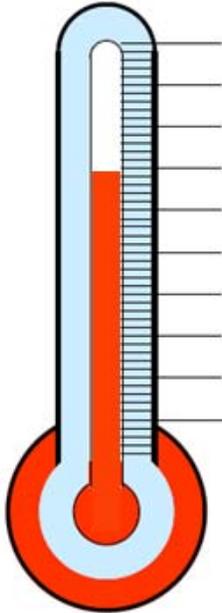


Varlano Outfall Restoration



Progress To Date

CHRISTINA RIVER EFFECTIVE IMPERVIOUS AREA REDUCTION



383.00 ACRES *8.8.14 Goal*

278.33 Acres treated to date by DelDOT

CHS Stormwater Retrofit – 2.89 Acres

I-95 Toll Plaza – 10.763 Acres

BMPs Constructed After 1996 – 264.67 Acres

|

Christina River TMDL - Pollutant Load Reduction Summary Table						
BMP Count	Drainage Area (Ac)	Impervious Area (Ac)	Annual Runoff Reduction (cuft/yr)	TN Reduction (lb/yr)	TP Reduction (lb/yr)	
53	621	245	2,740,794	1,274	266	
45	61	33	296,967	177	39	
6			<i>Insufficient data available to complete calculations</i>			
12			<i>BMPs built before year 1996 were not included in calculations</i>			
5			<i>BMPs were located in Christina watershed but did not have a unique BMP identifying number</i>			
121	681	278	3,037,761	1,451	305	
				3.98 lb/day	0.84 lb/day	

FUTURE REQUIREMENTS

► Drainage Outfall Information

- Treated - BMP ID Form
- Untreated - MS4 Form (Coming Soon)

► Information

- Added Impervious Area
- Drainage Area Shapefiles
- Outfall Locations



DELAWARE DEPARTMENT OF TRANSPORTATION
STORMWATER ENGINEER
BMP FACILITIES

SWM Facility #:

Contract Number:

Road Name:

Location: County:

Maintenance District:

DE State Grid (83 Datum) Northing: Easting:

Station Limits: STA to STA Offset: feet

Watershed Name:

Attach GIS Shapefile of Drainage Area to the BMP ID Form

For BMPs associated with Developments, Location Description is necessary

BMP Description:

<input type="checkbox"/> Filter Strip	<input type="checkbox"/> Dry Pond
<input type="checkbox"/> Biofiltration Swale	<input type="checkbox"/> Wet Pond
<input type="checkbox"/> Bioretention	<input type="checkbox"/> Underground Storage / Infiltration
<input type="checkbox"/> Infiltration Trench	<input type="checkbox"/> Porous Pavement
<input type="checkbox"/> Infiltration Basin	<input type="checkbox"/> Other (Describe) <input style="width: 100px;" type="text"/>
<input type="checkbox"/> Sand Filter	

Facility Dimensions:

Length: feet Width: feet Depth: feet Side Slopes: H:V

Treated Paved Area: Acres

New Existing
 Load Reductions, DURRM
 TN lb/yr TSS lb/yr
 TP lb/yr Annual RR cf/yr

Total Drainage Area to Facility: Acres

General Comments:

Questions?



▶ Christina River Cleanup - Saturday April 18, 2015 - 8am to 12pm