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**August 2017**

**REGIONAL CHESAPEAKE BAY POLLUTANT  
REDUCTION PLAN  
FOR  
WYOMING VALLEY SANITARY AUTHORITY (WVSA)**

**PREPARED FOR:  
WVSA**

**LUZERNE COUNTY, PENNSYLVANIA**

**HRG Project No. R005655.0426**

**REGIONAL CHESAPEAKE BAY POLLUTANT REDUCTION PLAN  
FOR  
WYOMING VALLEY SANITARY AUTHORITY,  
LUZERNE COUNTY, PENNSYLVANIA**

**TABLE OF CONTENTS**

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Executive Summary

Introduction

Section A – Public Participation

Section B – Maps

Section C – Pollutants of Concern

Section D – Existing Pollutants of Concern Loading

    D.1 Baseline Pollutant Load Calculation

    D.2 Baseline Adjustment

Section E – Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loading

    E.1 Pollutant Reduction Requirements

    E.2 Proposed BMPs

    E.3 Partnerships

    E.4 Reportable BMPs

Section F – Funding Mechanism

Section G – BMP Operations and Maintenance (O&M)

Appendices

    Appendix I – MS4 Permittee Participant List

    Appendix II – Public Comment Documentation

    Appendix III – Impaired Sewershed Maps

    Appendix IV – MS4 Municipal Requirements

    Appendix V – Existing Pollutant Loading Calculations

    Appendix VI – Pollutant Load Reduction Requirements

        BMP Strategy Pollutant Load Reduction Calculations

    Appendix VII – BMP Schematic Construction Details

## Executive Summary

The Wyoming Valley Sanitary Authority (WVSA) has expanded their purpose and powers to include stormwater management. This plan represents a regional effort by WVSA to meet the Pennsylvania Department of Environmental Protection (PADEP) Municipal Separate Storm Sewer (MS4) permitting requirements for the 32 member municipalities located within the Authority's service area. Permitting requirements intended to be covered by this plan include Pollutant Reduction Plans (PRPs) for stormwater discharges to local surface waters impaired for nutrients and/or sediment and Chesapeake Bay Pollutant Reduction Plans (CBPRPs) for stormwater discharges to surface waters located within the Chesapeake Bay watershed.

The impaired waters and pollutants of concern for each WVSA municipality were determined by referencing the PADEP's Pollutant Aggregation Suggestions for MS4 Requirements Table (Municipal)<sup>1</sup>. The WVSA service area contains six impaired waters; five with siltation impairments and one with nutrient impairments. GIS software was used to map stream impairments and determine the planning area associated with each impaired waterway. The Simplified Method was used to calculate the existing pollutant loading for the entire WVSA service area (CBPRP Planning Area) as well as for each impaired water (PRP Planning Areas). The permit-required pollutant load reductions are based upon impairments. For waters with only siltation (TSS) impairments, a 10-percent reduction of sediment pollutant load is required. For waters with nutrient (organic enrichment/low dissolved oxygen) impairments, a 5-percent total phosphorus (TP) reduction is required. The existing pollutant loads and corresponding required pollutant load reduction requirements for each planning area are summarized below. The existing pollutant loads take into account several baseline load reductions for recently-installed BMPs.

**Table A. Pollutant Load Reduction Requirements by PRP Planning Area**

Planning Area	Impaired Waters (Impairment)	Pollutant Load (lbs/yr)	
		TSS	TP
Newport Creek	South Branch Newport Creek (siltation)	1,293,705	--
<b>Required Reduction (10% TSS)</b>		<b>129,371</b>	--
Warrior Creek/Susquehanna River	Warrior Creek (siltation)	2,243,746	--
<b>Required Reduction (10% TSS)</b>		<b>224,375</b>	--
Sugar Notch Run/Solomon Creek	Solomon Creek (siltation); Spring Run (siltation); Sugar Notch Run (siltation)	3,698,801	--
<b>Required Reduction (10% TSS)</b>		<b>369,880</b>	--
City of Wilkes-Barre/Mill Creek	Laurel Run (siltation)	4,892,909	--
<b>Required Reduction (10% TSS)</b>		<b>489,291</b>	--
Lackawanna River/Susquehanna River	Lackawanna River (siltation)	2,337,790	--
<b>Required Reduction (10% TSS)</b>		<b>233,779</b>	--
East Fork Harveys Lake/Harveys Creek	East Fork Harveys Creek (nutrients)	532,121	1,685
<b>Required Reduction (5% TP)</b>		<b>0</b>	<b>84</b>

<sup>1</sup> PADEP, MS4 Requirements Table (Municipal) (rev. 6/26/17)

In addition to meeting the PRP requirements for impaired waters, the WVSA service area discharges stormwater to surface waters located within the Chesapeake Bay watershed and is therefore required to reduce the TSS loading from their entire service area (Chesapeake Bay planning area) by 10-percent.

**Table B. Pollutant Load Reduction Requirements, CBPRP Planning Area**

Planning Area	Impairment	Pollutant Load (lbs/yr)
		TSS
CBPRP Planning Area	Chesapeake Bay Nutrients/Sediment	34,552,752
<b>Required Reduction (10% TSS)</b>		<b>3,455,275</b>

As a regional plan, this document will address both the PRP requirements, pollutant reductions required for individual impaired waters, as well as the Chesapeake Bay impairments. The individual impaired water planning areas are included within the larger CBPRP planning area, therefore any pollutant load reductions achieved within the PRP planning areas will also be counted and progress towards achieving the overall CBPRP pollutant load reduction goals.

The BMP implementation strategy developed in order to meet the pollutant load reduction goals includes one regionally-applied project to meet the majority of the Chesapeake Bay sediment load reduction requirement, multiple stream restoration projects to target areas of major erosion along impaired waters, and various small-scale BMP projects to be complete on a local level. The components of the BMP strategy and a summary of the estimated pollutant load reductions associated with each BMP type are shown below.

**Table C. WVSA BMP Strategy**

BMP Type	Map Reference	Planning Area	Est. Pollutant Load Reduction (TSS lbs/yr)
Regional Project (Toby Creek Impoundment)	BMP-1	CBPRP	3,069,352
Impaired Stream Restorations	Various*	Newport Creek, Warrior Creek/Susquehanna River, Sugar Notch Run/Solomon Creek, City of Wilkes-Barre/Mill Creek; Harvey's Lake/Harveys Creek, Lackawanna River	316,225
Municipality-Suggested Projects from Prior PRP Plans	BMP-2	Harveys Lake/Harveys Creek	15,697
	BMP-3	CBPRP	22,775
	BMP-4		
	BMP-5		
Local Cost Share BMPs	TBD**	CBPRP	81,073
Stormwater Parks	TBD**	CBPRP	51,887
<b>Total</b>			<b>3,557,009</b>

\*See Impaired Watershed Maps

\*\*Not shown on map, specific sites to be determined.

In order to finance the BMP implementation to achieve the pollutant load reduction goals, WVSA conducted a feasibility study to determine if a regional stormwater authority was in the long term best interest of the Authority, its municipalities, and the community. Stormwater management costs have been historically funded through general tax revenue, however for many municipalities within the WVSA service area, tax revenue remains relatively stagnant and is in demand for other government services. By utilizing a regional stormwater authority through a rate structure, WVSA will bring valuable benefits to the community, including a predictable and dedicated revenue stream to meet growing stormwater management costs and a more equitable distribution of costs among property owners served.

Public participation was integrated into the development of this plan through providing the public with a draft copy of the CBPRP for review and presenting the contents of the CBPRP at a public meeting. During the public meeting, held on August 10, 2017, the information contained in this report was presented and the public was provided an opportunity to ask questions and make comments. A notice was placed in the *Wilkes-Barres Citizen's Voice* on August 1, 2017 that briefly described the plan, listed the dates and locations at which the plan was available for review by the public, and the length of time provided for the receipt of comments. Public comments will be reviewed and incorporated into the final version of this plan.

## Introduction

As authorized by Pennsylvania Act 68 of 2013, the Wyoming Valley Sanitary Authority (WVSA) expanded their purpose and powers to include stormwater management in 2017. This Chesapeake Bay Pollutant Reduction Plan (CBPRP) represents a regional effort by WVSA to meet a component of the Pennsylvania Department of Environmental Protection (PADEP) Municipal Separate Storm Sewer (MS4) permitting requirements. More specifically, the permitting requirements covered by this plan include Pollutant Reduction Plans (PRPs) for stormwater discharges to local surface waters impaired for nutrients and/or sediment, and Chesapeake Bay Pollutant Reduction Plans (CBPRPs) for stormwater discharges to surface waters located within the Chesapeake Bay watershed. As a regional plan, this CBPRP addresses both the local impairment PRP and CBPRP requirements.

This document was prepared following the guidance provided in the Pennsylvania Department of Environmental Protection (DEP) document 3800-PM-BCW0100k - National Pollutant Discharges Elimination Systems (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions<sup>2</sup>.

The participants include 32 MS4-designated municipalities. A complete list of municipalities participating in the regional plan is included in Appendix I.

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<sup>2</sup> PADEP - PRP Instructions, Document # 3800-PM-BCW0100k (3/2017)

## Section A: Public Participation

A complete copy of this CBPRP was made available for public to review at Wyoming Valley Sanitary Authority from August 1, 2017 to August 30, 2017. The availability of the document was publicized in the *Wilkes-Barre Citizen's Voice* on August 1, 2017. The published public notice contained a brief description of the plan, the dates and locations at which the plan was available for review by the public, and the length of time provided for the receipt of comments.

The final version of this report contains a copy of the public notice (Appendix II). Public comments will be accepted for 30 days following the publication date of the public notice. The final version of this report will contain the copies of all public comments and the responses issued to each comment (Appendix II).

A public meeting was held on August 10, 2017 at Wyoming Valley Sanitary Authority's public meeting room at 1000 Wilkes-Barre Street, Hanover Township, PA 18706 to present the information contained in this report to the public. Comments and questions regarding the CBPRP were received during the public presentation. A copy of the plan presentation meeting minutes will be included in the final version of this report.

## Section B: Maps

The WVSA Planning Area Map contains the land uses, impaired streams, and the watersheds (PRP planning areas) associated with each impaired stream located within the WVSA service area (Appendix III). As multiple municipalities are jointly addressing each impaired stream, the PRP planning area shown on the Planning Area Map represents the combined watershed of all MS4 outfalls discharging to each impaired stream. Due to the large scale of the PRP planning areas spanning several municipalities, the assumption was made that the drainage area to each impaired stream was approximately equal to the HUC-12 watershed. The combined UA from all of the municipalities included within the WVSA service area was used as the CBPRP planning area.

The locations of the proposed BMPs are shown on a separate map by watershed (Appendix III). The Project Location Maps identify the location of each proposed BMP and also include site photos to provide information on the existing conditions of each BMP project site.

The WVSA service area includes 32 municipalities with a total urbanized area (UA) of 47,392 acres according to the 2010 U.S. Census. No areas were parsed from the CBPRP or impaired stream PRP planning areas.



## Section C: Pollutants of Concern

The pollutants of concern for each planning area were determined by referencing the PADEP's Pollutant Aggregation Suggestions for MS4 Requirements Table (Municipal)<sup>3</sup>. A summary table of the pollutants of concern listed by planning area is below. A full list of the MS4 Municipal Requirements for each municipality within the WWSA service area is included in Appendix IV.

**Table 1. Pollutants of Concern by Planning Area**

<b>Planning Area</b>	<b>Impaired Water (Pollutant of Concern)</b>
CBPRP	All (Appendix D - nutrients/siltation)
Newport Creek	South Branch Newport Creek (Appendix E - siltation)
Warrior Creek-Susquehanna River	Warrior Creek (Appendix E - siltation)
Sugar Notch Run-Solomon Creek	Solomon Creek (Appendix E - siltation); Spring Run (Appendix E - siltation); Sugar Notch Run (Appendix E - siltation)
City of Wilkes-Barre-Mill Creek	Laurel Run (Appendix E - siltation)
Lackawanna River-Susquehanna River	Lackawanna River (Appendix E - siltation)
Harveys Lake-Harveys Creek	East Fork Harveys Creek (Appendix E - Organic Enrichment/Low D.O.)

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<sup>3</sup> PADEP, MS4 Requirements Table (Municipal) (rev. 6/26/17)

## Section D: Determine Existing Loading for Pollutants of Concern

### D.1 Existing Pollutant Load Calculation

The existing loading in pounds per year for each pollutant of concern was determined for the entire WVSA service area (CBPRP planning area) as well as for each impaired water (PRP planning areas). Existing pollutant loads were calculated using the Simplified Method<sup>4</sup>. The urbanized area (UA) associated with each planning area was determined using GIS software and the following layers: WVSA Service Area boundary (provided by WVSA); UA boundary (from the 2010 U.S. Census); municipal boundaries (provided by Luzerne County GIS); and the HUC 12 watersheds (USGS National Hydrography data set).

The UA from each planning area was multiplied by the percent pervious and impervious land use values for the corresponding municipality listed in the Statewide MS4 Land Cover Estimates<sup>5</sup> to determine the acres of impervious and pervious land within each planning area. The impervious and pervious acreages were then multiplied by the Developed Land Loading Rates for Luzerne County<sup>6</sup> to determine the total existing pollutant loading for each planning area (Table 2). As the PRP planning areas are contained within the overall CBPRP planning area, the existing pollutant load was calculated for each PRP planning area as well as the additional portion of the CBPRP planning area not included in a PRP planning area. Therefore, the pollutant load from each of PRP planning areas, plus the pollutant load from the CBPRP planning area not already included in a PRP planning area, is equal to the overall pollutant load for the entire regional planning area.

**Table 2. Existing Pollutant Loading by Planning Area**

Planning Area	UA (acres)	Existing Pollutant Load (lbs/yr)	
		TSS	TP
Newport Creek	2,102	1,293,705	--
Warrior Creek/Susquehanna River	3,987	2,243,746	--
Sugar Notch Run/Solomon Creek	4,864	3,698,801	--
City of Wilkes-Barre/Mill Creek	6,325	4,915,349	--
Lackawanna River/Susquehanna River	3,235	2,337,790	--
Harveys Lake/Harveys Creek	1,398	532,121	1,685
<i>CBPRP Planning Area outside of PRP Planning Areas</i>	<i>25,481</i>	<i>19,562,656</i>	<i>--</i>
<b>Total Regional CBPRP Planning Area</b>	<b>47,392</b>	<b>34,584,168</b>	<b>--</b>

A full table of the pollutant loading associated with each municipality within each planning area listed above is included in Appendix V. It should be noted that no areas were parsed from any of the PRP or CBPRP planning areas during the calculation of the baseline pollutant loading, therefore this method provides a conservative estimate of the existing regional pollutant load.

<sup>4</sup> PADEP - PRP Instructions Document # 3800-PM-BCW0100k, Attachment C "Chesapeake Bay PRP Example Using DEP Simplified Method" (3/2017)

<sup>5</sup> PADEP - Statewide MS4 Land Cover Estimates

<sup>6</sup> PADEP - PRP Instructions, Document # 3800-PM-BCW0100k Attachment B "Developed Land Loading Rates for PA Counties" (3/2017)

The PRP Instructions allow for removing those areas that do not drain to the MS4 to be removed from the pollutant load calculations<sup>7</sup>. However, as a new stormwater managing entity, WVSA does not currently have adequate information about the existing MS4 infrastructure to accurately delineate the extent of the areas tributary to the system (i.e. sewershed boundaries). It is anticipated that as WVSA obtains funding and completes mapping of the MS4, this information will be used to refine the regulated sewersheds and the associated baseline pollutant loading in future MS4 Status Reports.

## D.2 Existing Pollutant Load Adjustment for Previously Implemented BMPs

Two stream restoration projects were completed prior to the completion of this plan and are being utilized as credit to reduce the existing baseline loading estimates for the City of Wilkes-Barre-Mill Creek planning area and the CBPRP planning area (Table 3). Additional information on these BMPs is provided in Appendix V.

**Table 3: Pollutant Load Reduction for Installed BMPs**

BMP		Planning Area	Pollutant Load Reduction (lbs/yr)
			TSS
Ex-1	Toby Creek Stream Restoration (200 ft)	CBPRP	8,976
Ex-2	Laurel Run Stream Restoration (500 ft)	City of Wilkes-Barre/Mill Creek	22,440
<b>Total</b>			<b>31,416</b>

The pollutant loading for each planning area adjusted for the installed BMPs listed in Table 3 is shown on Table 4.

**Table 4. Adjusted Existing Pollutant Loading by Planning Area**

Planning Area	UA (acres)	Existing Pollutant Load (lbs/yr)	
		TSS	TP
Newport Creek	2,102	1,293,705	--
Warrior Creek/Susquehanna River	3,987	2,243,746	--
Sugar Notch Run/Solomon Creek	4,864	3,698,801	--
City of Wilkes-Barre/Mill Creek	6,325	4,892,909	--
Lackawanna River/Susquehanna River	3,235	2,337,790	--
Harveys Lake/Harveys Creek	1,398	532,121	1,685
<i>CBPRP Planning Area Not included in a PRP Planning Area</i>	<i>25,481</i>	<i>19,553,680</i>	<i>--</i>
<b>Total Regional CBPRP Planning Area</b>	<b>47,392</b>	<b>34,552,752</b>	<b>--</b>

<sup>7</sup> PADEP - PRP Instructions, Document # 3800-PM-BCW0100k Attachment A "Parsing Guidelines for MS4s in Pollutant Reduction Plans" (3/2017)

## Section E: Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loading

### E.1 Pollutant Reduction Requirements

Six streams within the WVSA service area have water quality impairments required to be addressed as a result of regulation through PAG-13 General Permit, Appendix E (nutrients and/or sediment in stormwater discharges to impaired waterways). Appendix E impairments based on siltation require a minimum 10-percent sediment reduction within the impaired water planning area. Impairments based on nutrients require a 5-percent TP reduction within the impaired water planning area. The pollutant load reduction requirements in pounds per year for Appendix E planning areas are shown in Table 5. The pollutant load reduction requirements listed below take into account adjustments to baseline loading from the installed BMPs listed in Table 3 (Section D.2). More detailed calculations for the pollutant load reduction required for each planning area are included in Appendix VI.

**Table 5: Required Pollutant Load Reduction - Impaired Waters Planning Areas**

Planning Area	UA (acres)	Impairment	Required Load Reduction (lbs/yr)	
			TSS	TP
Newport Creek	2,102	Sediment	129,371	0
Warrior Creek/Susquehanna River	3,987	Sediment	224,375	0
Sugar Notch Run/Solomon Creek	4,864	Sediment	369,880	0
City of Wilkes-Barre/Mill Creek	6,325	Sediment	489,291	0
Lackawanna River/Susquehanna River	3,235	Sediment	233,779	0
Harveys Lake/Harveys Creek	1,398	Nutrients	0	84

In addition to meeting the PRP requirements for impaired waters listed above, the WVSA service area discharges stormwater to surface water located within the Chesapeake Bay watershed and is, therefore, also regulated by PAG-13 General Permit, Appendix D (nutrients and sediment in stormwater discharges to waters in the Chesapeake Bay watershed). The pollutants of concern for Appendix D are TSS, TP, and total nitrogen (TN) with required loading reductions of 10-percent, 5-percent, and 3-percent, respectively. However, it is presumed that within the overall Bay watershed, the TP and TN goals will be achieved when a 10-percent reduction in sediment is achieved<sup>8</sup>. Therefore, only the required 10-percent TSS reduction is calculated herein as a requirement for CBPRP planning area load reductions (Table 6).

**Table 6: Required Pollutant Load Reduction Goals – Chesapeake Bay Planning Area**

Planning Area	UA (acres)	Impairment	Required Load Reduction (lbs/yr)
			TSS
CBPRP	47,392	Chesapeake Bay Nutrients/Sediment	3,455,275

<sup>8</sup> PADEP - PRP Instructions, Document # 3800-PM-BCW0100k (3/2017)

As discussed in Section D, the planning areas and corresponding pollutant load reduction requirements listed in Table 5 are included within the larger CBPRP planning area. Therefore, any load reduction achieved in one of the PRP planning areas will also count as progress towards meeting the overall CBPRP planning area pollution load reduction goal. As this is a Regional CBPRP, it is presumed that by targeting the placement of BMPs in impaired portions of the planning area watersheds and meeting the overall CBPRP 10% TSS reduction, the nutrient reductions of the impaired watersheds regulated by Appendix E will also be met.

## **E.2 Proposed BMPs**

The following section outlines the BMP implementation strategy developed to achieve the required pollutant load reduction goals stated in Section E.1. The proposed BMPs were determined through a review of previously submitted PRPs from municipalities included in the WVSA planning area, in-field stream assessments, conversations with the Luzerne County Conservation District, and public outreach meetings with elected officials and municipal staff.

The proposed BMP projects have not been fully designed. The project descriptions are conceptual and intended for planning purposes. Proposed projects have been evaluated in terms of preliminary feasibility and anticipated pollutant load reductions in order to meet the goals of this plan. The proposed BMPs will be designed in accordance with the Pennsylvania BMP Manual design guidance and all local ordinances. Additionally, as many of the proposed projects include stream restoration, all proposed stream restoration projects will be designed in accordance with the requirements listed in DEP's stream restoration guidance<sup>9</sup>. Additional details and calculations for each proposed project developed during the design and implementation project phases will be documented in the Annual MS4 Status Reports.

A summary of the type and scale of BMP projects included in the WVSA strategy is listed in Table 7. The pollutant loading reductions for the each proposed BMP were calculated in terms of pounds per year using PADEP's standard BMP Effectiveness Values<sup>10</sup>. A comprehensive list of the individual BMP projects to be implemented in each planning area is provided in Appendix VI.

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<sup>9</sup> PADEP, "Consideration of Stream Restoration Projects in Pennsylvania for Eligibility as an MS4 Best Management Practice" (June 22, 2017)

<sup>10</sup> PADEP Document 3899-PM-BCW0100M, NPDES Stormwater Discharges from Small MS4s, BMP Effectiveness Values (5/2016)

**Table 7: WVSA BMP Strategy Summary**

BMP Type	Map Reference	Planning Area	Stream / Location	# of Projects	Pollutant Load Reduction TSS (lbs/yr)
<b>Regional BMPs</b>					
Toby Creek Impoundment	BMP-1	CBPRP	Toby Creek	1	3,069,352
Stream Restoration	*Various	Newport Creek	Newport Creek	3	69,160
		Warrior Creek/ Susquehanna River	Warrior Creek	16	140,699
		Sugar Notch Run/ Solomon Creek	Spring Run	6	71,808
		City of Wilkes-Barre/ Mill Creek	Laurel Run	2	13,464
		Lackawanna River/ Susquehanna River	Unnamed Trib	1	8,976
		City of Wilkes-Barre/ Mill Creek	Gardners Creek	2	11,220
		Harveys Lake/ Harveys Creek	E. Fork Harveys Creek	1	898
Stormwater Parks	**TBD	CBPRP	TBD	4	51,887
<b>Local BMPs</b>					
Prior PRP Projects	BMP-2	Harveys Lake/ Harveys Creek	E. Fork Harveys Creek (Riparian Buffer)	1	15,697
	BMP-3	CBPRP	Plains Twp. (Tree Planting)	1	37
	BMP-4	CBPRP	Forty Fort Boro (Stream Restoration)	1	20,645
	BMP-5	CBPRP	Plains Twp. (Rain Gardens)	2	2,093
Local Cost Share BMPs	**TBD	CBPRP	TBD	25	81,073
<b>Total</b>				<b>66</b>	<b>3,557,009</b>

\*See Impaired Watershed Maps

\*\*Not shown on map, specific sites to be determined.

The BMP strategy outlined in Table 7 represents the most cost-effective approach to meeting the required pollutant reductions while also improving the quality of local impaired waterways. The proposed BMPs include one large regional BMP to achieve a major sediment load reduction and several smaller local-level BMPs to target specific impaired waters. The pollutant load reductions achieved by the proposed BMPs listed above exceed the pollutant load reduction requirement by 101,734 lbs/TSS/yr. The pollutant load reductions achieved within each PRP Planning area are shown in Table 8. As allowed during the five-year permit term, it is anticipated that the plan will be revised on an annual basis based upon actual progress made and new project opportunities.

**Table 8: WVSA Pollutant Load Reductions Achieved by Planning Area**

Planning Area	Reduction Required (lbs/yr)		Reduction from Proposed BMPs (lbs/yr)		% of Reduction Goal Achieved
	TSS	TP	TSS	TP	
CBPRP	3,455,275	--	3,557,009	--	103%
Newport Creek	129,371	--	69,160	--	53%
Warrior Creek/Susquehanna River	224,375	--	140,699	--	63%
Sugar Notch Run/Solomon Creek	369,880	--	71,808	--	19%
City of Wilkes-Barre/Mill Creek	489,291	--	24,684	--	5%
Lackawanna River/Susquehanna River	233,779	--	8,976	--	4%
Harveys Lake/Harveys Creek	--	84	--	49	58%

### ***E.2.1 Regional BMPs***

In evaluating potential BMPs, it was determined that the implementation of one large centrally-located BMP, capable of treating a large drainage area, would be more cost-effective than managing, constructing, and maintaining numerous smaller-scale BMPs located throughout the CBPRP planning area.

The area proposed for the large BMP, the Toby Creek Impoundment BMP, is shown as BMP-1 on the BMP Location Map (Section B). The proposed regional BMP is an extended detention basin with bioretention plantings located within an existing flood control levee in Pringle Borough. Stormwater from approximately 10,167 upstream acres drains to Toby Creek and is conveyed behind the levee. The existing levee basin is a detention basin meant to collect stormwater and slowly release it at a controlled rate to prevent flooding of downstream areas. While effective for flood control, the basin currently has little impact on water quality. Stabilizing the approximately 2,000 feet of stream that flows through the levee and retrofitting the approximate 7.5 acre footprint of the basin with amended soil for infiltration and water-tolerant plants for sediment and nutrient removal is estimated to remove over three million pounds of TSS per year. Pollutants will be removed when stormwater is filtered through the soil planting bed and vegetation. Additionally, the vegetation in the soil planting bed will provide uptake of pollutants and runoff and help maintain the pores and associated infiltration rates of the soil in the basin. Pollutant Load Reduction calculations for the Regional BMP are included in Appendix VI.

Preliminary conversations occurred with the regulators of the levee (U.S. Army Corps of Engineers) and the operators of the levee (Luzerne County Flood Protection Authority) to determine the feasibility of implementing such a large-scale project. The levee system was constructed during the 1950s and raised from its initial height of 37-feet to 41-feet in 2003. The levee system was initially maintained by the municipalities located along each reach of the levee; however, since 1996, the Luzerne County Flood Protection Authority has taken over operation of the levee system and provided consistent maintenance of the levees walls and flood gates. Preliminary discussions indicate that the project opportunity is worthwhile to pursue for this regional plan. Due to the complexity of the system, the proposed amount of sediment reduction credit calculated in this plan, as for all sediment reduction credits, will be evaluated in accordance with DEP guidance as the project is designed and permitted.

Stormwater parks, a combination stormwater quality enhancement and recreational space, are included in this plan. The concept is to target locations within the service area with a significant space to work in and a large contributing drainage area that would provide opportunities for rate payers to realize the benefits and aesthetics of stormwater quality BMPs while providing recreational space that improves their quality of life. Specific detail related to the stormwater park concept will be discussed during the implementation of the plan. An allocation for anticipated sediment reduction credit is accounted for in this plan, by assuming each park will treat approximately 20 acres of stormwater runoff. More detailed site-specific calculations will be developed during the project design process.

### ***E.2.2 Local BMPs***

In order to address local impaired waters, site visits were conducted throughout the PRP planning areas to determine sites for potential BMP projects. The areas proposed for local-level stream restoration projects include sections of streambank observed as having severe erosion within the following planning areas: Newport Creek, Warrior Creek-Susquehanna River, Sugar Notch-Solomon Creek, City of Wilkes-Barre-Mill Creek, and Lackawanna River-Susquehanna River. Depending on the severity of the erosion and stream flow at the particular site, stream restoration may include the structural stabilization of streambanks to repair eroded banks and prevent future erosion and/or the installation of in-stream structures to redirect flow and/or absorb water energy.

An allocation for local-lead rain garden or small BMP installation is included in this plan as WVSA anticipates providing a cost-share program with this purpose. It was assumed that approximately 25 small-scale local BMPs will be installed throughout the regional CBPRP planning area. To the extent that local rate payers or municipalities look to propose BMPs on their properties, those implemented BMPs will be reported on an annual basis to WVSA as credit toward the regional CBPRP goal.

The proposed BMP strategy also includes several BMPs that were proposed by municipalities during previous pollutant planning efforts prior to the involvement of WVSA. These BMPs include a riparian buffer along East Fork Harveys Creek and a tree planting and several small rain gardens in Plains Township. The Harveys Creek riparian buffer will be a permanent area of trees and shrubs located adjacent to the streams. The buffer will be approximately 50-feet wide and provide both ecological and water quality benefits. The Plains Township rain gardens will be excavated and shallow surface depressions planted with specially selected native vegetation to treat and capture runoff. The vegetation serves to both filter and transpire runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control.

Calculations for the anticipated pollutant load reductions associated with these BMPs and the basis for certain assumptions are included in Appendix VI. More detailed pollutant load reduction calculations for these BMPs will be developed according to the prevailing DEP guidance during the design and implementation phase of the project and submitted with the Annual Status Reports.



### ***E.2.3 BMPs to Be Installed by Others***

The WVSA design strategy may potentially include a project to be completed by another entity. The Luzerne County Conservation District is in the process of planning a stream restoration project in Edwardsville Borough along Toby Creek. If this project is implemented during the permit term, the pollutant load reductions for this stream restoration will be credited towards WVSA's pollutant load reduction goal.

## **E.3 Partnerships**

Non-municipal MS4s and industrial permittees were not parsed out of this plan. As a result, stormwater management BMP accomplishments of other NPDES permit holders can also count toward meeting the Regional CBPRP pollutant reduction goals, provided that they meet pollutant reduction plan criteria.

### ***E.3.1 Flood Protection Authority Partnership***

Being that the regional levee system serves a portion of the planning area, it is anticipated that the system may be considered for bioretention retrofits, depending on the success of the Toby Creek Impoundment. To that end, this plan may be revised in the future to include other retrofit opportunities that align with the Flood Protection Authority's operation and maintenance projects.

### ***E.3.2 PennDOT Partnership***

This planning strategy does not cite any PennDOT projects as planned projects contributing to the planning goal. However, it is anticipated that WVSA will attempt to engage PennDOT during the implementation of the plan so that joint credit opportunities can be achieved. Further, PennDOT has indicated that there is an intention to coordinate PennDOT projects with local municipalities during the 2018-2023 permit term. PennDOT and the municipality/WVSA will share any reductions achieved through partnership projects, provided the municipality or WVSA either contributes funding or agrees to perform the long-term operation and maintenance responsibilities for the additional or enhanced stormwater controls.

As part of the Annual MS4 Status Reports submitted under this permit, PennDOT will provide a list of actions taken by the department to support municipalities in achieving their PRP goals in Sediment Impaired Watersheds in urbanized areas.

## **E.4 Other Reportable BMPs**

Notwithstanding that the Regional CBPRP outlines enough planned projects to meet the regional pollutant reduction goal, pollutant reduction planning requirements are also intended to be met through municipal actions and approvals. Examples of BMP reporting opportunities are described below. Any permit-eligible BMP documentation for pollutant reductions will be accepted for inclusion in the Annual MS4 Status Reports.

### ***E.4.1 Stormwater Inlet Cleaning***

As part of on-going MS4 maintenance, several municipalities within the WVSA service area routinely remove solids from their MS4s. However, at this time, no pollutant reduction has been allotted to storm sewer system solids removal because tracking of this removed material has not been to the degree required to accurately calculate the pollutant load reduction as described in the PADEP BMP effectiveness values

table<sup>11</sup>. It is anticipated that municipalities that track inlet cleaning in accordance with DEP requirements will report those activities to WVSA for inclusion in the Annual MS4 Status Reports. The reported reduction will contribute toward meeting the sediment reduction five (5)-year goal. WVSA's level of service provided to the participating municipalities may also include inlet cleaning once mapping is completed. When that portion of the maintenance service begins, WVSA will have in-house staff to track this data for inclusion in the Annual MS4 Status Reports.

#### ***E.4.2 Land Development BMPs Installed On Sites with Less than One Acre of Disturbance***

To the extent that local municipal ordinances require the installation of stormwater BMPs at construction sites where land disturbance will be less than one-acre, those BMPs can be reported to WVSA for inclusion in the Annual MS4 Status Reports and the reported reductions will contribute toward the sediment reduction five-year goal.

#### ***E.4.3 Street Sweeping***

Municipalities that regularly conduct street sweeping (at least 25 times per year) may use this practice for pollutant load reduction credit as long as street sweeping is conducted in accordance with the minimum standards outlined in the Chesapeake Bay Program expert panel report for street sweeping<sup>12</sup> and the guidance provided on the BMP Effectiveness Values Table<sup>13</sup> is used to calculate the corresponding pollutant load reduction. The reported reduction will contribute toward meeting the sediment reduction five (5)-year goal. Similar to the level of service discussed in Section E.4.1, should WVSA include street sweeping in the service offerings to the participants, this data will be tracked for inclusion in the Annual MS4 Status Reports and as credit toward the regional pollutant reduction plan goal.

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<sup>11</sup> PADEP Document 3800-PM-BCW010m, NPDES Stormwater Discharges from Small MS4s BMP Effectiveness Values (Rev. 5/2016)

<sup>12</sup> Chesapeake Bay Program Expert Panel, Recommendation of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices (5/26/2016)

<sup>13</sup> PADEP Document 3800-PM-BCW010m, NPDES Stormwater Discharges from Small MS4s BMP Effectiveness Values (Rev. 5/2016)

## **Section F: Identify Funding Mechanisms**

This BMP implementation strategy outlined in Section E will be implemented by the Wyoming Valley Sanitary Authority (WVSA) as outlined in the Intergovernmental Agreements (“Agreements”) between WVSA and each of the partner municipalities. The WVSA is in the process of expanding their purpose and powers to include stormwater management and via the Agreements will serve in the role of MS4 Permit Administrator for the 2018 permit cycle. As an existing Authority, WVSA has a fee structure in place to provide sanitary sewer service. WVSA intends to enact a similar fee to cover Permit Administrator and plan implementation costs, including BMP construction, operation and maintenance, and other expenditures related to MS4 regulatory compliance.

WVSA is in the process of forming strategic partnerships with entities such as the US Army Corps of Engineers and the Luzerne County Flood Protection Authority in order to reduce costs and will consider government-subsidized grant and loan options for construction projects.

## Section G: BMP Operations and Maintenance (O&M)

Once implemented, the BMPs outlined in this plan will be operated and maintained by WVSA to ensure that they continue to produce the expected pollutant reductions. The O&M activities will be reported in the Annual MS4 Status Reports submitted in accordance with the General Permit.

The general list of the activities involved with O&M for each BMP and the frequency at which O&M activities will occur are as follows:

**Table 8: O&M Activities by BMP Type**

<b>BMP</b>	<b>Responsible Party</b>	<b>O&amp;M Activities</b>	<b>Frequency</b>
Toby Creek Impoundment	WVSA Staff	Mowing	10 times per year
		Selective Weeding	Annually at beginning of growing season
		Invasive species removal	Annually at end of growing season
		Inspection	Monthly (and after large storm events)
		Sediment Removal	As needed in compliance with permit requirements
Stream Restoration	WVSA Staff	Inspection	Twice per year and as needed after major storm events
		Revegetation (replanting, replacement of dead, or impaired vegetation)	As needed
		Repairs to streambank armoring structures	As needed
		Removal of nuisance aquatic vegetation/ woody debris	As needed
Riparian Buffer	WVSA Staff	Inspection	Twice per year
		Watering	Regularly during the first growing season
		Mowing/Weed Control	Twice per growing season
		Invasive Removal	As needed
Rain Gardens	WVSA Staff/ Municipal Partners	Inspection	Twice per year
		Pruning/Weeding	Annually (or as needed while vegetation is being established)
		Cut down Perennial Plantings/ Detritus Removal	Annually (at end of growing season)
		Re-spread Mulch	Every 2 - 3 years (or as needed when erosion is evident)
		Watering	As needed during periods of extended drought

## APPENDIX I

### MS4 Permittee Participant List

**Appendix I – Table 1: WVSA Municipal Participants**

Municipality	NPDES Permit No.
Ashley Borough	PAG132224
Courtdale Borough	PAG132293
Dureyea Borough	PAG132206
Edwardsville Borough	PAG132217
Exeter Borough	PAG132243
Forty Fort Borough	PAG132225
Hanover Township	PAG132231
Hughestown Borough	PAG132277
Jackson Township	PAG132228
Jenkins Township	PAG132229
Kingston Borough	PAG132268
Laflin Borough	PAG132233
Larksville Borough	PAG132222
Lehman Township	PAI132233
Luzerne Borough	PAG132305
Nanticoke City	PAG132247
Newport Township	PAG132248
Pittston City	PAG132221
Pittston Township	PAG132246
Plains Township	PAG132227
Plymouth Borough	PAG132220
Plymouth Township	PAG132274
Pringle Boro	PAG132297
Sugar Notch Borough	PAG132223
Swoyersville Borough	PAG132242
Warrior Run Borough	PAG132232
West Pittston Borough	PAG132265
West Wyoming Borough	PAG132251
Wilkes-Barre City	PAG132272
Wilkes-Barre Township	PAG132219
Wyoming Borough	PAG132245
Yatesville Borough	PAG132266

## APPENDIX II

### Public Participation Documentation

To be included in Appendix II (as applicable):

Copy of the public notice from newspaper

Copies of all public comments and the responses issued to each comment

Meeting minutes for the meeting at which the CBPRP was presented

A record of the incorporated changes as a result of public comment



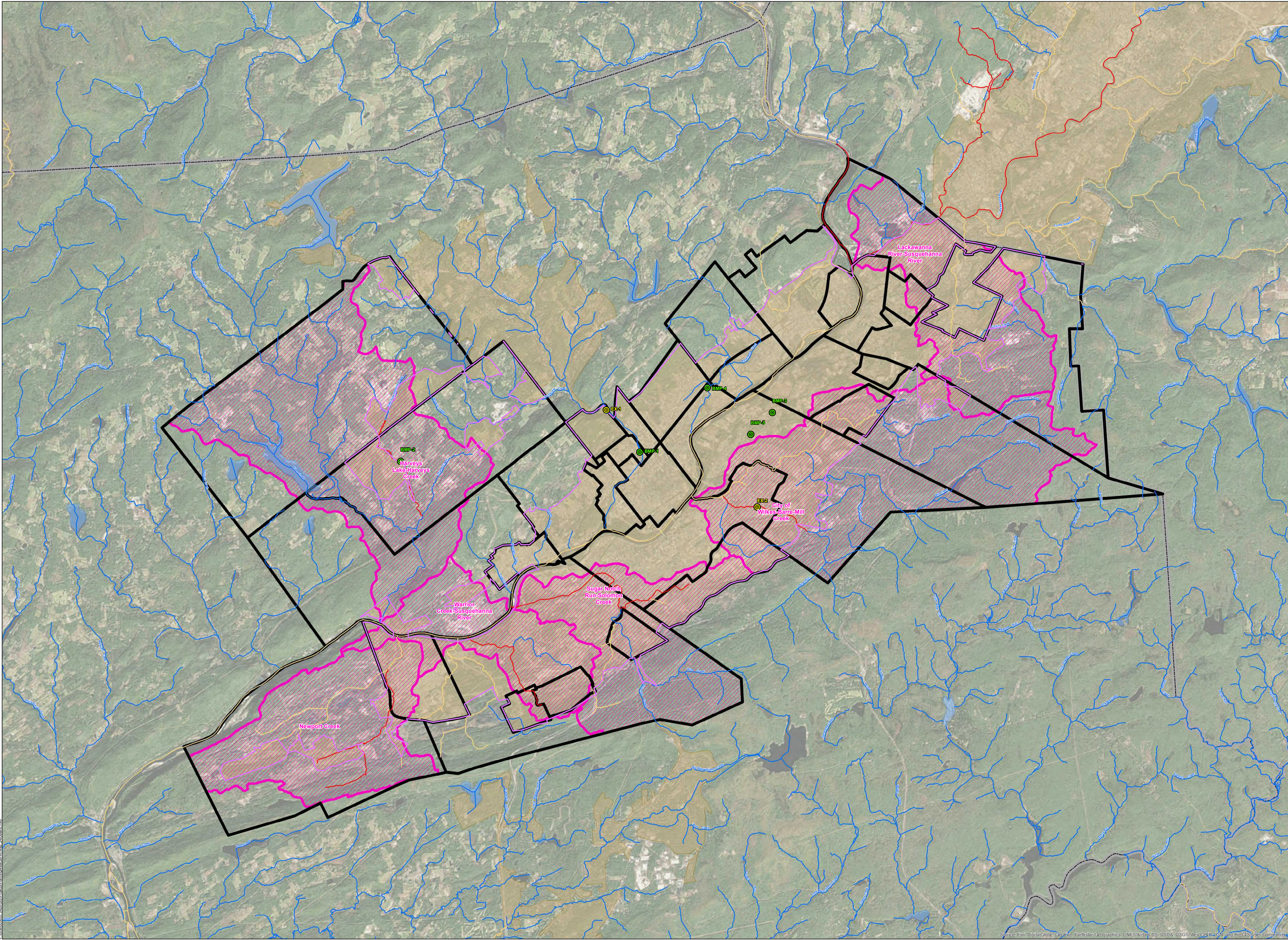
### APPENDIX III

#### Maps



**Planning Area Map  
and Chesapeake Bay  
Pollutant Reduction Plan  
Locations**  
Wyoming Valley Sanitary Authority  
Luzerne County, Pennsylvania

- Integrated List Attaining Stream
- Integrated List Attaining Lake
- Integrated List Non Attaining Stream
- Integrated List Non Attaining Stream  
(Siltation or Nutrients)
- Impaired Watershed (HUC-12)
- CBPRP Planning Area
- US Census Urbanized Areas (2010)  
(Chesapeake Area Planning Area)
- County Boundary



**WVSA** WYOMING VALLEY  
SANITARY AUTHORITY



Mapping derived from data provided by PennDOT, US Census, PA DEP, and ESRI.

7/21/2017 PM:AMV GIS:BLS QA: HSH R005655.0426

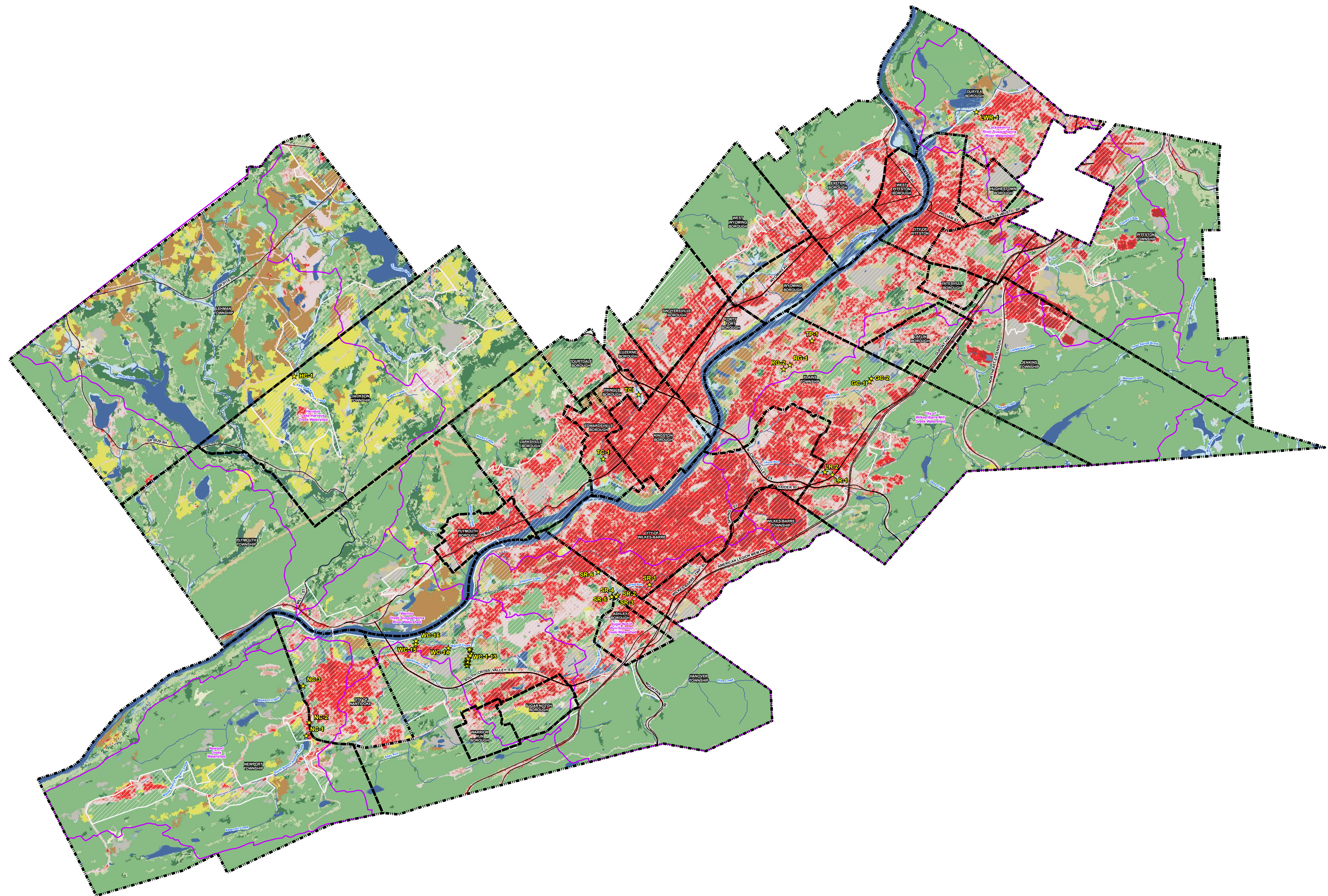
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Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**Land Use Map**  
Wyoming Valley Sanitary Authority  
Luzerne County, Pennsylvania

- ★ Project Location
- Highway
- - - Municipal Boundary
- Urban Area (2010)
- Impaired Watershed Boundary
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land (Rock/Sand/Clay)
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herbaceous
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands



**WVSA** WYOMING VALLEY  
SANITARY AUTHORITY



Mapping derived from data provided by MRLC, PennDOT, USGS, and US Census.  
7/21/2017 PM: AMV GIS: HMG QA: BLS R007662.0425

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4,500 0 4,500 Feet

Mapping derived from data provided by ESRI, PA DEP, PennDOT, and US Census.

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Proposed BMP



Project Location



State Road



Sediment Impaired Stream



Non-Impaired Stream



Municipal Boundary



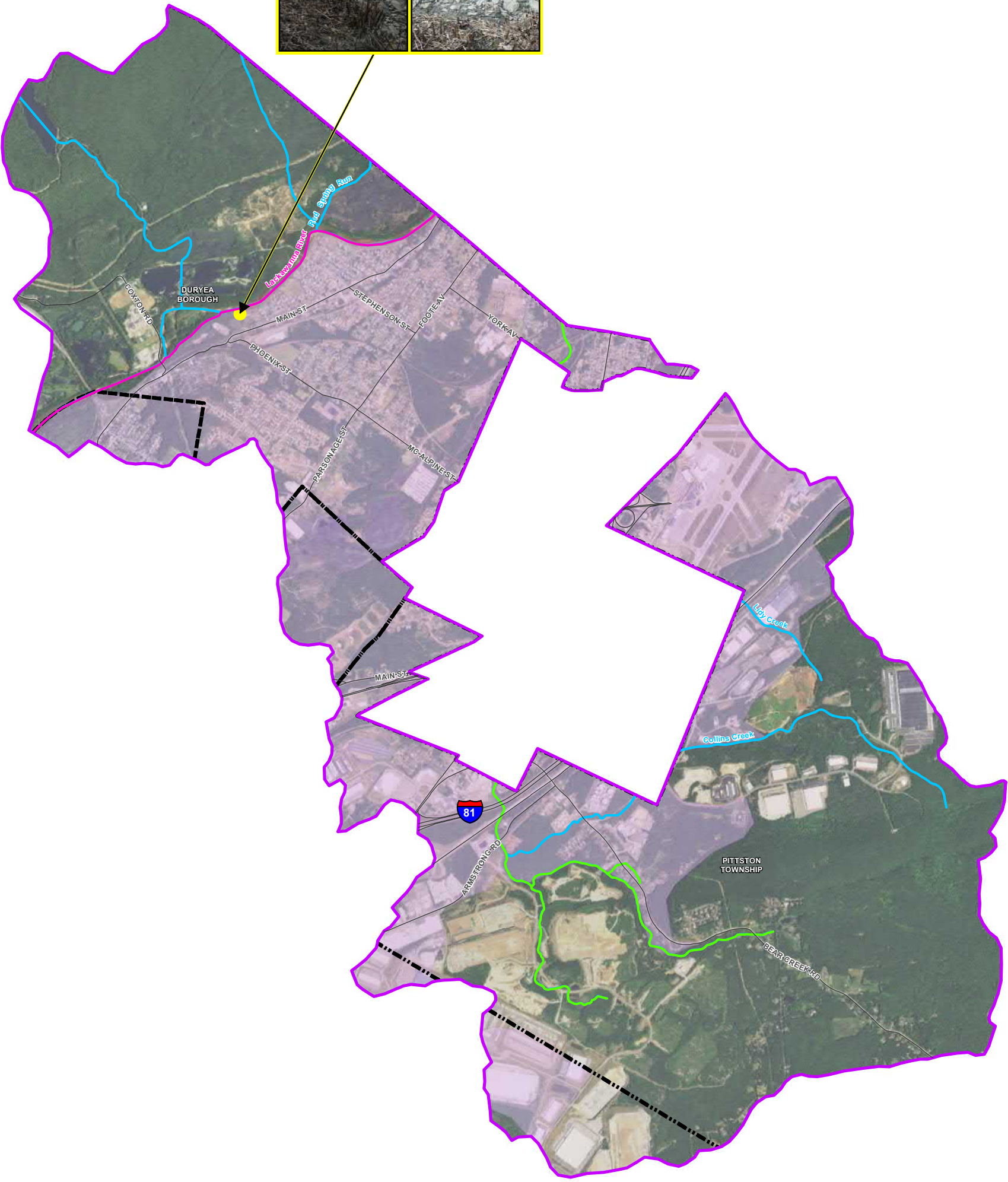
Urban Area (2010)



Watershed Boundary (HUC-12)

Impaired Watershed  
Harveys Lake /  
Harveys Creek Watershed  
Luzerne County, Pennsylvania





3,000 0 3,000 Feet

Mapping derived from data provided by ESRI, PA DEP, PennDOT, and US Census.

7/21/2017 PM: AMV GIS: HMG QA: BLS R005655.0426



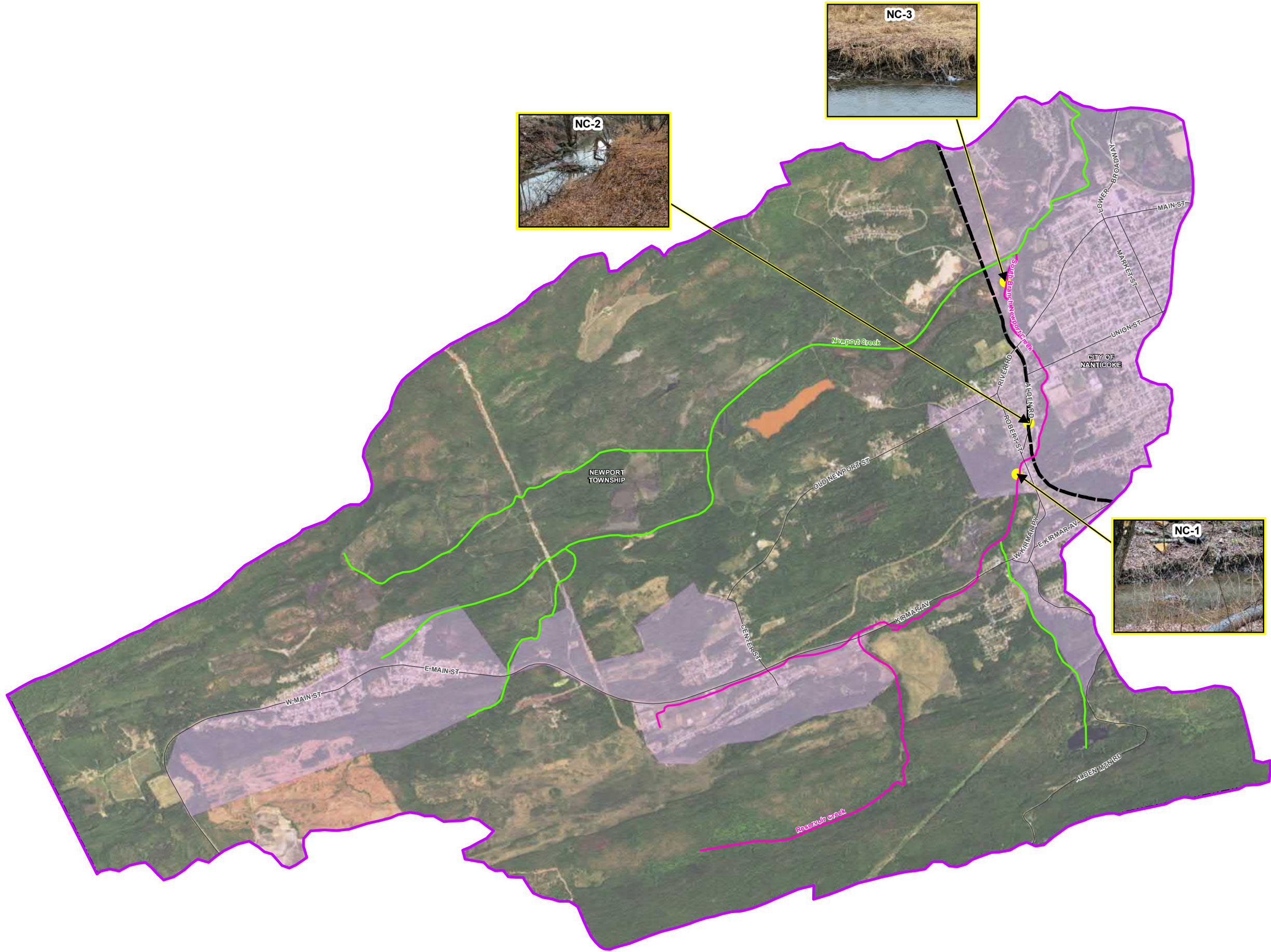
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- Project Location
- State Road
- Sediment Impaired Stream
- Other Type of Impaired Stream
- Non-Impaired Stream
- Municipal Boundary
- Urban Area (2010)
- Watershed Boundary (HUC-12)

Impaired Watershed  
Lackawanna River /  
Susquehanna River Watershed  
Luzerne County, Pennsylvania



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# Impaired Watershed

## Newport Creek Watershed

### Luzerne County, Pennsylvania

- Project Location
- State Road
- Sediment Impaired Stream
- Other Type of Impaired Stream
- ▭ Municipal Boundary
- ▭ Urban Area (2010)
- ▭ Watershed Boundary (HUC-12)

**WVSA** WYOMING VALLEY  
SANITARY AUTHORITY



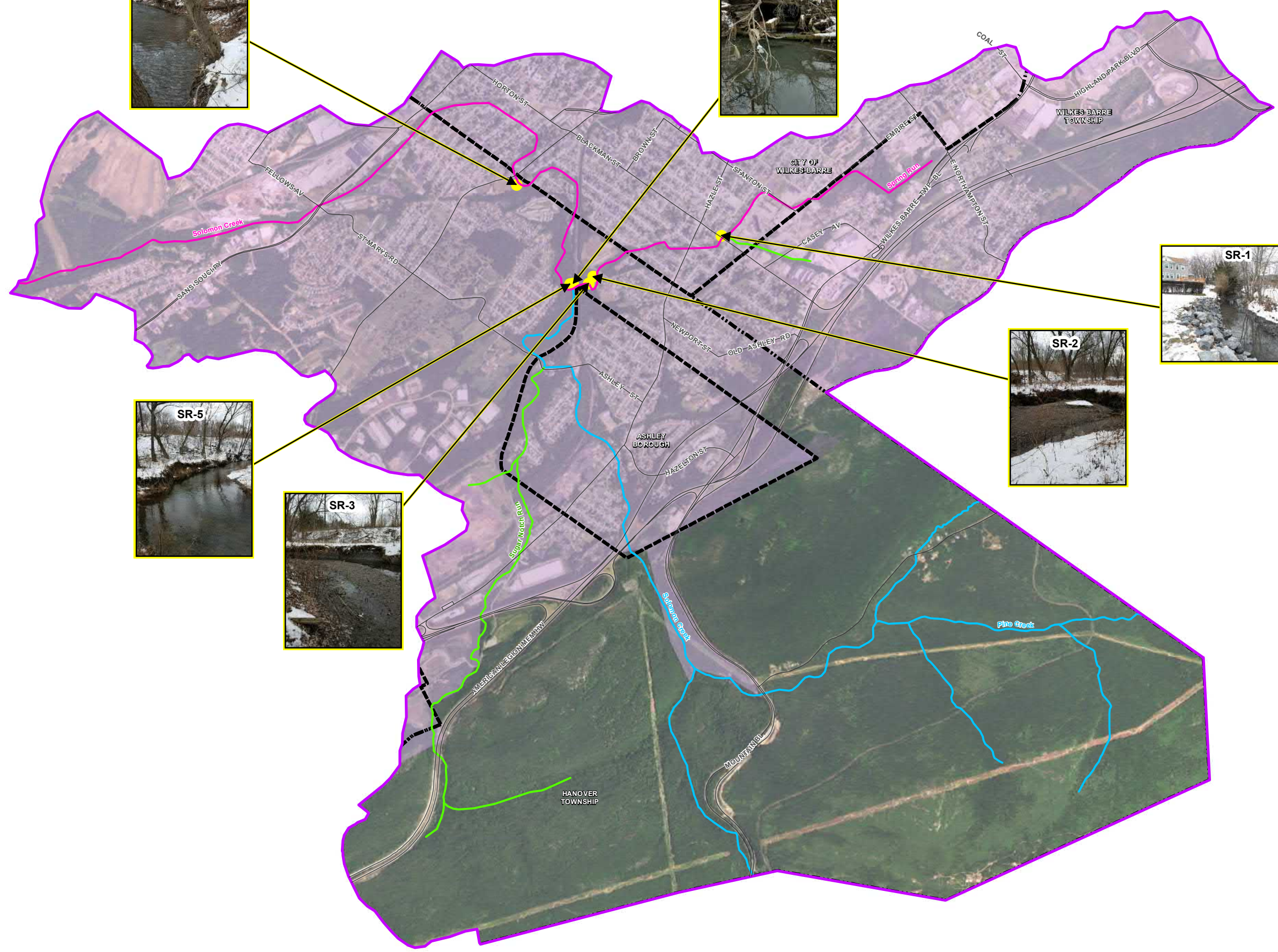
Mapping derived from data provided by ESRI, PA DEP, PennDOT, and US Census.

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# Impaired Watershed

## Sugar Notch Run / Solomon Creek Watershed Luzerne County, Pennsylvania

- Project Location
- State Road
- Sediment Impaired Stream
- Other Type of Impaired Stream
- Non-Impaired Stream
- ▭ Municipal Boundary
- ▭ Urban Area (2010)
- ▭ Watershed Boundary (HUC-12)



Mapping derived from data provided by ESRI, PA DEP, PennDOT, and US Census.

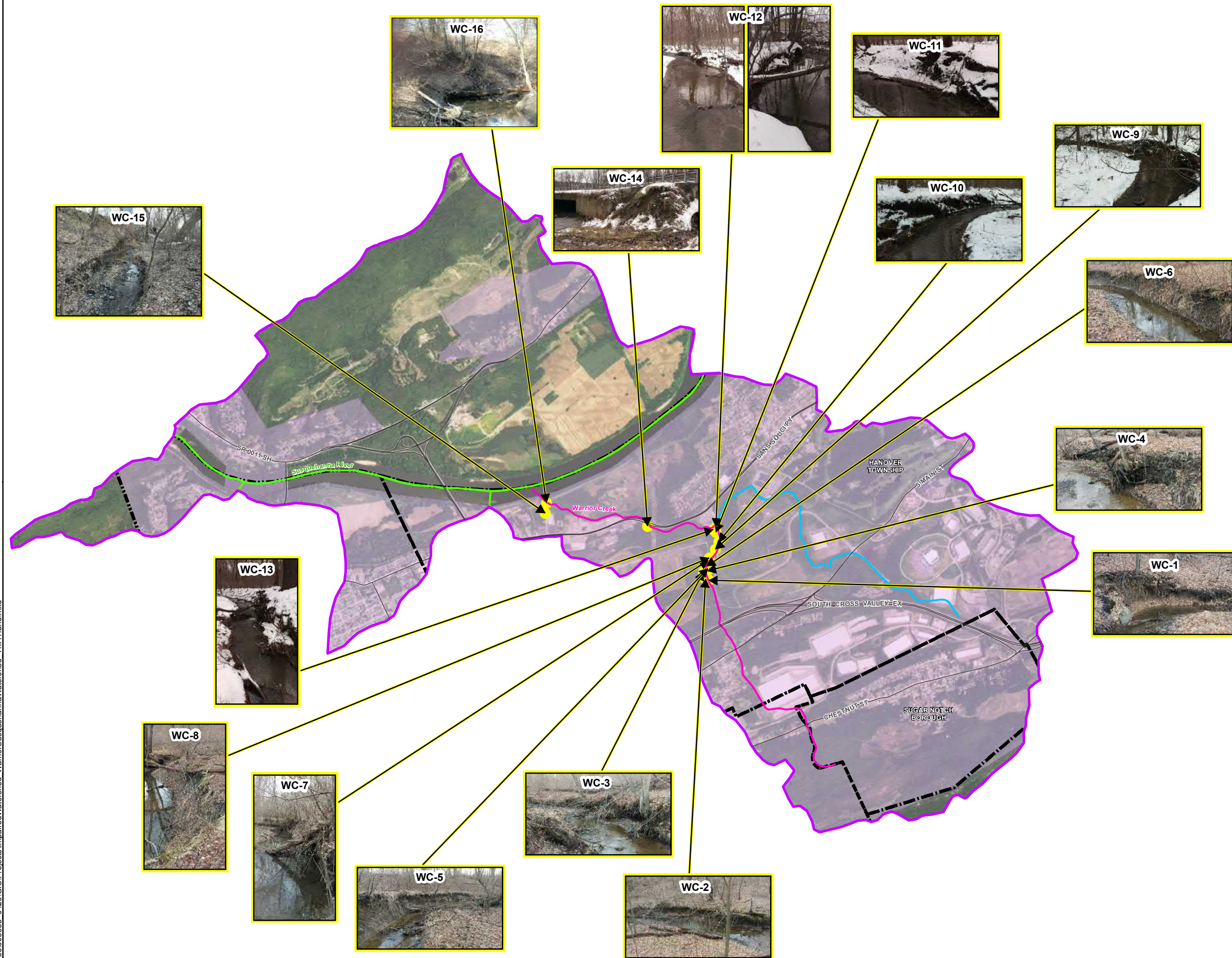
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## Impaired Watershed

Warrior Creek /  
Susquehanna River Watershed  
Luzerne County, Pennsylvania

- Project Location
- State Road
- Sediment Impaired Stream
- Other Type of Impaired Stream
- Non-Impaired Stream
- Municipal Boundary
- Urban Area (2010)
- Watershed Boundary (HUC-12)

**WVSA** WYOMING VALLEY  
SANITARY AUTHORITY



Mapping derived from data provided by ESRI, PA DEP, PennDOT, and US Census.

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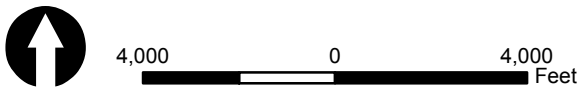
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Impaired Watershed  
City of Wilkes-Barre /  
Mill Creek Watershed  
Luzerne County, Pennsylvania

- Existing BMP
- Project Location
- State Road
- Sediment Impaired Stream
- Other Type of Impaired Stream
- Non-Impaired Stream
- Municipal Boundary
- Urban Area (2010)
- Watershed Boundary (HUC-12)

WVSA WYOMING VALLEY  
SANITARY AUTHORITY

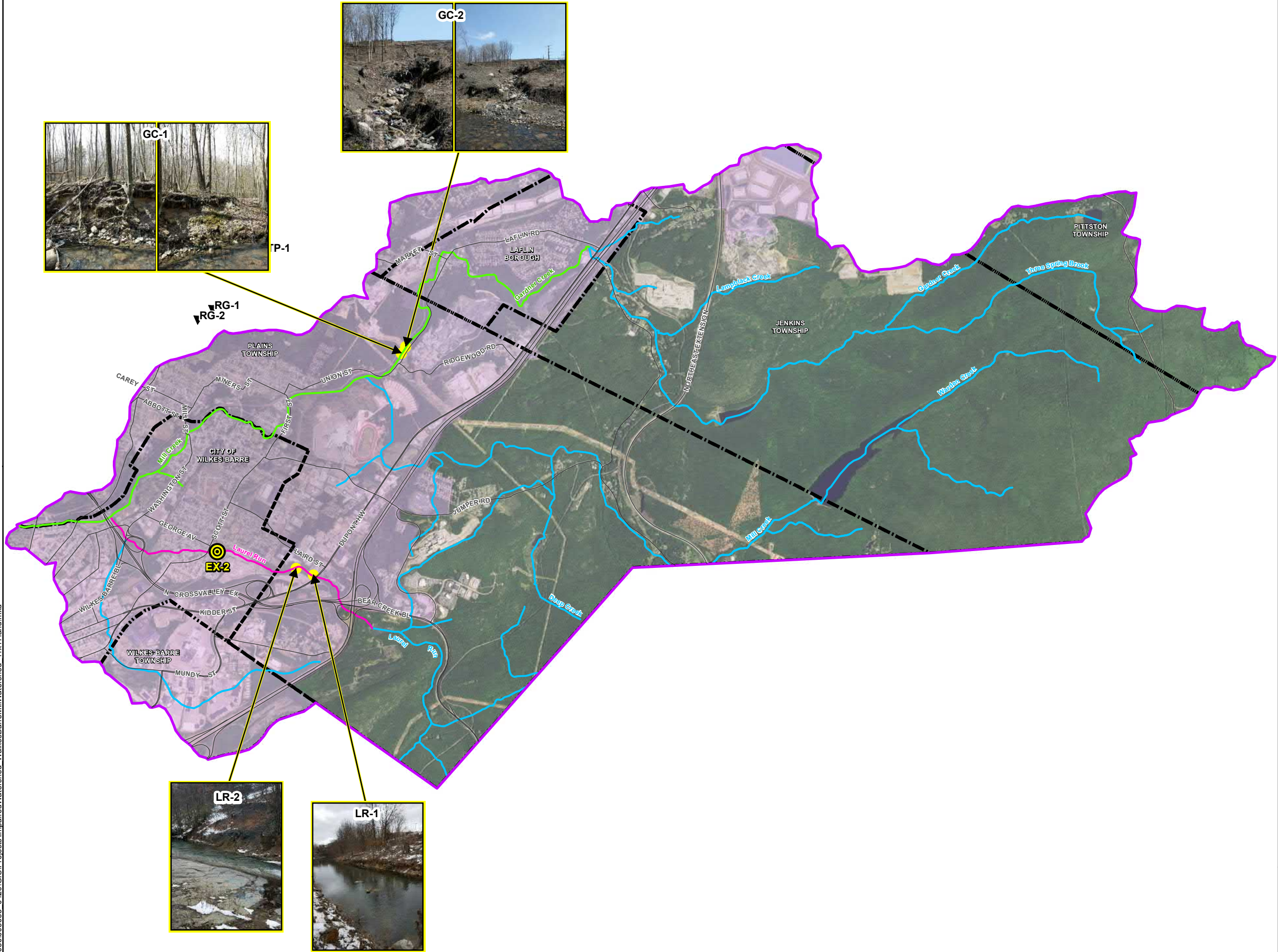


Mapping derived from data provided by ESRI, PA DEP,  
PennDOT, and US Census.

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## APPENDIX IV

### Municipal MS4 Requirements

**Appendix IV – Table 1: Pollutants of Concern<sup>14</sup> WWSA Service Area Municipalities**

<b>Municipality</b>	<b>Pollutants of Concern</b>
Ashley Borough	Chesapeake Bay Nutrients /Sediment; Solomon Creek - Siltation
Courtdale Borough	Chesapeake Bay Nutrients /Sediment
Dallas Borough	Chesapeake Bay Nutrients /Sediment
Dallas Township	Chesapeake Bay Nutrients /Sediment
Duryea Borough	Chesapeake Bay Nutrients /Sediment; Lackawanna River - Siltation
Edwardsville Borough	Chesapeake Bay Nutrients /Sediment
Exeter Borough	Chesapeake Bay Nutrients /Sediment; Susquehanna River - Siltation
Forty Fort Borough	Chesapeake Bay Nutrients /Sediment
Hanover Township	Chesapeake Bay Nutrients /Sediment; Warrior Creek - Siltation; Spring Run - Siltation; Solomon Creek - Siltation
Harveys Lake Borough	Chesapeake Bay Nutrients /Sediment
Hughestown Borough	Chesapeake Bay Nutrients /Sediment; Susquehanna River - Siltation; Lackawanna River - Siltation
Jackson Township	Chesapeake Bay Nutrients /Sediment; East Fork Harveys Creek - Organic Enrichment/Low D.O.
Jenkins Township	Chesapeake Bay Nutrients /Sediment;
Kington Borough	Chesapeake Bay Nutrients /Sediment
Kingston Township	Chesapeake Bay Nutrients /Sediment
Laflin Borough	Chesapeake Bay Nutrients /Sediment
Larksville Borough	Chesapeake Bay Nutrients /Sediment
Lehman Township	Chesapeake Bay Nutrients /Sediment; East Fork Harveys Creek - Organic Enrichment/Low D.O.
Luzerne Borough	Chesapeake Bay Nutrients /Sediment
Nanticoke City	Chesapeake Bay Nutrients /Sediment; South Branch Newport Creek - Siltation
Newport Township	Chesapeake Bay Nutrients /Sediment; South Branch Newport Creek - Siltation; Reservoir Creek - Siltation
Pittston City	Chesapeake Bay Nutrients /Sediment; Lackawanna River - Siltation; Susquehanna River - Siltation
Pittston Township	Chesapeake Bay Nutrients /Sediment; Lackawanna River - Siltation; Susquehanna River - Siltation
Plains Township	Chesapeake Bay Nutrients /Sediment; Laurel Run - Siltation
Plymouth Borough	Chesapeake Bay Nutrients /Sediment
Plymouth Township	Chesapeake Bay Nutrients /Sediment
Pringle Borough	Chesapeake Bay Nutrients /Sediment
Sugar Notch Borough	Chesapeake Bay Nutrients /Sediment; Warrior Creek -Siltation; Solomon Creek -Siltation
Swoyersville Borough	Chesapeake Bay Nutrients /Sediment
Warrior Run Borough	Chesapeake Bay Nutrients /Sediment; Warrior Creek - Siltation
West Pittston Borough	Chesapeake Bay Nutrients /Sediment
West Wyoming Borough	Chesapeake Bay Nutrients /Sediment
Wilkes-Barre City	Chesapeake Bay Nutrients /Sediment; Spring Run - Siltation; Solomon Creek - Siltation, Laurel Run - Siltation
Wilkes-Barre Township	Chesapeake Bay Nutrients /Sediment; Spring Run - Siltation; Solomon Creek - Siltation, Laurel Run - Siltation
Wyoming Borough	Chesapeake Bay Nutrients /Sediment
Yatesville Borough	Chesapeake Bay Nutrients /Sediment

<sup>14</sup> MS4 Municipal Requirements Table (Municipal) – last revised 5/9/2017

## APPENDIX V

### Existing Pollutant Loading Calculations



**Appendix V – Table 2A: Existing Pollutant Load by Impaired Watershed Planning Area**

PRP Planning Area	Municipalities	UA (acres)	Land Use*		Loading Rates** TSS (lbs/yr)		Loading Rates** TP (lb/yr)		Baseline Pollutant Load (lbs/yr)	
			Imperv.	Per.	Imperv.	Per.	Imperv.	Per.	TSS	TP
Newport Creek	Nanticoke City	909.3	35%	65%	1648.22	221.19	--	--	655,287	--
	Newport Twp.	1193	22%	78%	1648.22	221.19	--	--	638,418	--
	<b>TOTAL</b>	<b>2,102.3</b>							<b>1,293,705</b>	<b>--</b>
Warrior Creek/ Susquehanna River	Hanover Twp.	2,386.6	25%	75%	1648.22	221.19	--	--	1,379,330	--
	Nanticoke City	385.8	35%	65%	1648.22	221.19	--	--	278,027	--
	Plymouth Twp.	423.9	20%	80%	1648.22	221.19	--	--	214,746	--
	Sugar Notch Boro	615.7	19%	81%	1648.22	221.19	--	--	303,125	--
	Warrior Run Boro	174.6	12%	88%	1648.22	221.19	--	--	68,519	--
	<b>TOTAL</b>	<b>3,986.6</b>							<b>2,243,746</b>	<b>--</b>
Sugar Notch Run/ Solomons Creek	Ashley Boro	591.6	33%	67%	1648.22	221.19	--	--	409,452	--
	Hanover Twp.	2,369.6	25%	75%	1648.22	221.19	--	--	1,369,504	--
	Sugar Notch Boro	26.9	19%	81%	1648.22	221.19	--	--	13,244	--
	Wilkes-Barre City	821.4	60%	40%	1648.22	221.19	--	--	884,983	--
	Wilkes-Barre Twp.	1,060.6	52%	48%	1648.22	221.19	--	--	1,021,618	--
	<b>TOTAL</b>	<b>4,863.6</b>							<b>3,698,801</b>	<b>--</b>
City of Wilkes-Barre/ Mill Creek	Laflin Boro	790.7	27%	73%	1648.22	221.19	--	--	479,550	--
	Jenkins Twp.	532.7	33%	67%	1648.22	221.19	--	--	368,687	--
	Plains Twp.	2,818.1	29%	71%	1648.22	221.19	--	--	1,789,574	--
	Wilkes-Barre City	1525	60%	40%	1648.22	221.19	--	--	1,643,047	--
	Wilkes-Barre Twp.	658.7	52%	48%	1648.22	221.19	--	--	634,490	--
	<b>TOTAL</b>	<b>6,325.2</b>							<b>4,915,349</b>	<b>--</b>
Lackawanna River/ Susquehanna River	Dureyea Boro	1289.8	35%	65%	1648.22	221.19	--	--	929,495	--
	Hughestown Boro	225.3	27%	73%	1648.22	221.19	--	--	136,642	--
	Jenkins Twp.	147.4	33%	67%	1648.22	221.19	--	--	102,017	--
	Pittston City	142.6	53%	47%	1648.22	221.19	--	--	139,394	--
	Pittston Twp.	1429.6	35%	65%	1648.22	221.19	--	--	1,030,242	--
	<b>TOTAL</b>	<b>3,234.7</b>							<b>2,337,790</b>	<b>--</b>
Harveys Lake/ Harveys Creek	Lehman Twp.	488.9	8%	92%	1648.22	221.19	3	0.98	656,274	558
	Jackson Twp.	808.3	12%	88%	1648.22	221.19	3	0.98	317,204	988
	Plymouth Twp.	100.6	20%	80%	1648.22	221.19	3	0.98	50,964	139
	<b>TOTAL</b>	<b>1,397.8</b>							<b>532,121</b>	<b>1,685</b>

\*PADEP - Statewide MS4 Land Cover Estimates

\*\*PADEP PRP Instructions - Attachment B, Developed Land Loading Rates for PA Counties

**Appendix V – Table 2B: Additional Existing Pollutant Load Outside of Impaired Watershed Planning Areas**

Planning Area	Municipalities	UA	Land Use*		Loading Rates** TSS (lbs/yr)		Baseline Pollutant Load (lbs/yr)
			Imperv.	Per.	Imperv.	Per.	TSS
CBPRP (outside of PRP Planning Areas)	Courtdale Boro	646.8	14%	86%	1648.22	221.19	272,286
	Dureyea Boro	78	35%	65%	1648.22	221.19	56,211
	Edwardsville Boro	779.1	44%	56%	1648.22	221.19	661,521
	Exeter Boro	1592.1	33%	67%	1648.22	221.19	1,101,908
	Forty Fort Boro	972.4	45%	55%	1648.22	221.19	839,525
	Hanover Twp.	1,292.0	25%	75%	1648.22	221.19	746,708
	Hughestown Boro	357.3	27%	73%	1648.22	221.19	216,698
	Jackson Twp.	817.7	12%	88%	1648.22	221.19	320,893
	Jenkins Twp.	1877.5	33%	67%	1648.22	221.19	1,299,436
	Kingston Boro	1395.8	68%	32%	1648.22	221.19	1,663,194
	Laflin Boro	71.8	27%	73%	1648.22	221.19	43,546
	Larksville Boro	1380.7	32%	68%	1648.22	221.19	935,893
	Lehman Twp.	740.7	8%	92%	1648.22	221.19	248,396
	Luzerne Boro	441	44%	56%	1648.22	221.19	374,446
	Nanticoke City	929.1	35%	65%	1648.22	221.19	669,556
	Pittston City	943	53%	47%	1648.22	221.19	921,797
	Pittston Twp.	1347.9	35%	65%	1648.22	221.19	971,365
	Plains Twp.	1,867.5	29%	71%	1648.22	221.19	1,185,916
	Plymouth Twp.	112.3	20%	80%	1648.22	221.19	56,891
	Plymouth Boro	738.8	57%	43%	1648.22	221.19	764,360
	Pringle Boro	297.3	49%	51%	1648.22	221.19	273,645
	Swoyersville Boro	1361.4	40%	60%	1648.22	221.19	1,078,232
	Warrior Run Boro	314.5	12%	88%	1648.22	221.19	123,420
	West Pittston Boro	598.5	64%	36%	1648.22	221.19	678,992
	West Wyoming Boro	693.2	33%	67%	1648.22	221.19	479,771
	Wilkes-Barre City	2,284.6	60%	40%	1648.22	221.19	2,461,446
	Wilkes-Barre Twp.	158.6	52%	48%	1648.22	221.19	152,771
	Wyoming Boro	1002.6	33%	67%	1648.22	221.19	693,909
	Yatesville Boro	390	33%	67%	1648.22	221.19	269,924
	TOTAL		25,481	19,562,656			
CBPRP Regional Planning Area Total		47,392	34,584,168				

\*PADEP - Statewide MS4 Land Cover Estimates

\*\*PADEP PRP Instructions - Attachment B, Developed Land Loading Rates for PA Counties

**Appendix V – Table 3: Baseload Reduction Documentation**

BMP	Planning Area	Municipality	Location	Length (ft)	Pollutant Load Reduction (lbs/yr)
					TSS
Stream Restoration	CBPRP	Courtdale Borough	Toby Creek	200	8,976
Stream Restoration	City of Wilkes-Barre/ Mill Creek	Wilkes-Barre City	Laurel Run	500	22,440
<b>Total</b>					<b>31,416</b>

### **Toby Creek Stream Restoration**

The design and construction specifications of Toby Creek Stream Restoration project was documented in the Toby Creek Streambank Stabilization Project Design Package, prepared by the Luzerne Conservation District for Courtdale Borough, November 2013. This report included the following description of the project.

“The streambank stabilization using riprap rock to effectively stabilize the 200-foot streambank area and prevent further degradation of the waterway. Stabilizing the stream with the proposed riprap lining will eliminate the potential for a much more costly restoration effort if the stream continues to degrade. Also, at both ends of this 200-foot reach of stream are three trees plus a pile of about 40 tires that will need to be removed to access the construction area. All of the disturbed area will need to be seeded/stabilized once construction has been completed.

R8 riprap at a maximum height of nine feet can be used to stabilize the approximate 200 feet of eroding stream bank. The stabilization effort should include a five-foot-long key-in of the R8 riprap at the upper and lower ends of the riprap placement.”

The stream restoration project is located at 41.291565; -75.909539. This location is labeled as EX-1 on the WVSA Planning Area Map. According to the Luzerne Conservation District, the project was permitted by General Permit 114012421 on October 15, 2012. The pollutant load reduction for the stream restoration project was calculated as described in the BMP effectiveness table (length of stream in feet multiplied by the BMP effectiveness value of 44.88 lbs. TSS/ft/yr). According the Luzerne Conservation District, this BMP continues to function as designed. The operation and maintenance (O&M) activities associated with the BMP include the following:

- Inspect streambank after storms and observe any displacements of rock or erosion upstream or downstream of the riprap. Repair minor damages.
- Be aware of obstruction in the stream, which high water can deposit. Often this form of material is beneficial as aquatic habitat, but located inappropriately it can deflect flows into an unprotected streambank and cause scour. Allow for aquatic habitat, but in situations which are causing damage, rearrange or remove the obstruction.

- Encourage natural streambank stability from shrubs growing on the slope of streambank and trees on the top of bank.

### **Laurel Run Stream Restoration**

The Laurel Run stream restoration project involved the restoration of 500 linear feet of stream bank along Laurel Run within the municipal boundary of the City of Wilkes-Barre. Grouted rip-rap was installed to restore the streambank that was eroded. An access point was created for future maintenance of the streambank. The stream restoration project is located at latitude/longitude location 41.257283, -75.838397. This location is labeled as EX-2 on the WVSA Planning Area Map. The pollutant load reduction for the stream restoration project was calculated as described in the BMP effectiveness table (length of stream in feet multiplied by the BMP effectiveness value of 44.88 lbs. TSS/ft/yr.). According to the Luzerne Conservation District, this BMP continue to function as designed.



## APPENDIX VI

### Proposed BMP Pollutant Load Reduction Calculations

**Appendix VI - Table 1: Pollutant Load Reduction Requirements (PAG-13, Appendix E)**

PRP Planning Area	Baseline Pollutant Load (lbs/yr)	
	TSS	TP
Newport Creek	1,293,705	--
Load Reduction Required (%)	10%	--
<b>Load Reduction Required (lbs)</b>	<b>129,371</b>	<b>--</b>
Warrior Creek/ Susquehanna River	2,243,746	--
Load Reduction Required (%)	10%	--
<b>Load Reduction Required (lbs)</b>	<b>224,375</b>	<b>--</b>
Sugar Notch Run/Solomons Creek	3,698,801	--
Load Reduction Required (%)	10%	--
<b>Load Reduction Required (lbs)</b>	<b>369,880</b>	<b>--</b>
City of Wilkes-Barre/Mill Creek	4,915,349	--
Baseline Reduction	22,440	--
Load Reduction Required (%)	10%	--
<b>Load Reduction Required (lbs)</b>	<b>489,291</b>	<b>--</b>
Lackawanna River/Susquehanna River	2,337,790	--
Load Reduction Required (%)	10%	--
<b>Load Reduction Required (lbs)</b>	<b>233,779</b>	<b>--</b>
Harveys Lake/Harveys Creek	532,121	1,685
Load Reduction Required (%)	10%	5%
<b>Load Reduction Required (lbs)</b>	<b>53,212</b>	<b>84</b>
<b>Total Load Reduction Required from Impaired Watersheds</b>	<b>1,499,907</b>	<b>84</b>

**Appendix VI - Table 2: Pollutant Load Reduction Requirements (PAG-13, Appendix D) – Non-PRP Area**

CBPRP Planning Area	Baseline Pollutant Load (lbs/yr)
	TSS
Non-Impaired Area Load	19,562,656
Baseline Reduction	- 8,976
Load Reduction Required (%)	10%
<b>Load Reduction Required (lbs)</b>	<b>1,955,368</b>

**Appendix VI - Table 3: Pollutant Load Reduction Requirements (PAG-13, Appendix D) – Total CBPRP Planning Area**

CBPRP Planning Area	Baseline Pollutant Load (lbs/yr)
	TSS
PRP Planning Area	1,499,907
Non-Impaired Area Load	1,955,368
<b>Total CBPRP Requirement</b>	<b>3,455,275</b>

**Appendix VI - Table 4A: BMP Strategy, Pollutant Load Reduction Calculations – Regional Project**

Drainage Area Municipality	Drainage Area (acres)	Land Use*				Loading Rate** (lbs/yr)		Pollutant Load TSS (lbs/yr) TSS
		% Imperv.	Imperv. (acres)	% Perv.	Perv. (acres)	Perv.	Imperv.	
Primary Treatment Area (WVSA Planning Area)								
Courtdale Boro	635	14%	88.9	86%	546.1	221.19	1648.22	267,319
Lehman Twp.	743	8%	59.4	92%	683.2	221.19	1648.22	249,033
Jackson Twp.	797	12%	95.6	88%	701.1	221.19	1648.22	312,652
Luzerne Boro	362	44%	159.5	56%	202.9	221.19	1648.22	307,708
Pringle Boro	126	49%	61.7	51%	64.3	221.19	1648.22	115,975
Swoyersville Boro	241	40%	96.4	60%	144.6	221.19	1648.22	190,872
Subtotal	2,904							1,443,559
Secondary Treatment Area (Outside WVSA Planning Area)								
Dallas Twp.	3,244	23%	746.12	77%	2497.9	221.19	1648.22	1,782,276
Dallas Boro	1,443	22%	317.46	78%	1125.5	221.19	1648.22	772,202
Kingston Twp.	2,576	26%	669.76	74%	1906.2	221.19	1648.22	1,525,553
Subtotal	7,263							4,080,031

\*PADEP - Statewide MS4 Land Cover Estimates

\*\*PADEP PRP Instructions - Attachment B, Developed Land Loading Rates for PA Counties

The location of the Toby Creek Impoundment is shown on the Planning Area Map as (BMP-1).

The UA drainage area to the Toby Creek Impoundment includes multiple municipalities, both within and outside of the WVSA planning area. The conceptual design for the proposed basin most closely resembles a wet pond and therefore the BMP effectiveness value<sup>15</sup> for this type of BMP (60%) was used to estimate the pollutant load reduction for the Toby Creek Impoundment. As the UA outside of the WVSA planning area is regulated by separate MS4 permits, it was assumed that the stormwater runoff from this drainage area will already have a reduced sediment loading (10% in accordance with the 2018 PAG-13) when it reaches the Toby Creek Impoundment for further treatment.

Therefore, the proposed basin will provide secondary treatment to the stormwater runoff from outside the WVSA planning area and primary treatment for the stormwater runoff from the drainage area within the WVSA regional planning area.

#### **Primary Treatment Area**

Pollutant Load to Toby Creek Impoundment	1,443,559 lbs/TSS/yr
<u>Toby Creek Impoundment BMP Efficiency</u>	<u>x 60 %</u>
Pollutant Load Reduction	866,135 lbs/TSS/yr

<sup>15</sup> PADEP Document 3800-PM-BCW010m, NPDES Stormwater Discharges from Small MS4s BMP Effectiveness Values (Rev. 5/2016)

**Secondary Treatment Area**

Initial Pollutant Load	4,080,031 lbs/TSS/yr
Assumed Primary Treatment Reduction (10%)	- 408,003 lbs/TSS/yr
Reduced Pollutant Load to Toby Creek Impoundment	3,672,028 lbs/TSS/yr
Toby Creek Impoundment BMP Efficiency	x 60 %
Pollutant Load Reduction	2,203,217 lbs/TSS/yr

Total Load Reduction for Toby Creek Impoundment

Primary Treatment Area	866,135 lbs/TSS/yr
Secondary Treatment Area	+ 2,203,217 lbs/TSS/yr
<b>Total Treatment Area</b>	<b>3,069,352 lbs/TSS/yr</b>

**Appendix VI - Table 4B: BMP Strategy, Pollutant Load Reduction Calculations – Local Projects, Stream Restoration Summary**

Planning Area	Stream Name	Restoration Length (ft)	Pollutant Load Reduction TSS (lb/yr)
Newport Creek	Newport Creek	1,541	69,160
Warrior Creek/Susquehanna River	Warrior Creek	3,135	140,699
Sugar Notch Run/Solomon Creek	Spring Run	1,600	71,808
City of Wilkes-Barre/Mill Creek	Laurel Run	300	13,464
Lackawanna River/Susquehanna River	Unnamed Tributary	200	8,976
City of Wilkes-Barre/Mill Creek	Gardner Creek	250	11,220
Harveys Creek/Harveys Lake	East Fork Harveys Creek	20	898
<b>Total</b>			<b>316,225</b>

**Appendix VI - Table 5: BMP Strategy - Local Projects, Stream Restoration by Planning Area**

Site #	Municipality	Lat	Long	Length of Restoration	Description
<b>Gardner's Creek (City of Wilkes-Barre/Mill Creek Planning Area)</b>					
GC - 1	Plains Twp.	-75.8127	41.27878	50 ft	Major Erosion Area (left bank)
GC - 2	Plains Twp.	-75.812	41.27951	200 ft (100 section, both sides of bank)	Major Erosion Area (pipe outlet to stream)
<b>Lackawanna River (Lackawanna River/Susquehanna River Planning Area)</b>					
LWR - 1	Duryea Boro	-75.7728	41.34969	200 ft (100 section, both sides of bank)	Major Erosion Area (left bank)
<b>Laurel Run (City of Wilkes-Barre/Mill Creek Planning Area)</b>					
LR - 1	Plains Twp.	-75.8268	41.25429	150 ft	Major Erosion Area (right bank)
LR - 2	Plains Twp.	-75.829	41.25492	150 ft	Major Erosion Area (right bank)

<b>Spring Run (Sugar Notch Run/Solomon Creek Planning Area)</b>					
SR - 1	Wilkes-Barre City	-75.8914	41.22602	100 ft	Major Erosion along Anthracite St
SR - 2	Hanover Twp.	-75.903	41.22341	300 ft (width 50ft)	Major Erosion Area, (stream cutback)
SR - 3	Hanover Twp.	-75.8268	41.25429	500 ft	Major Erosion Area (left bank)
SR - 4	Hanover Twp.	-75.9047	41.223	50 ft	Downstream end of culvert blocked
SR - 5	Hanover Twp.	-75.9053	41.22276	500 ft	Major erosion area
SR - 6	Hanover Twp.	-75.9096	41.22966	150 ft	Major erosion area

**Appendix VI - Table 5: BMP Strategy - Local Projects, Stream Restoration by Planning Area (Continued)**

Site #	Municipality	Lat	Long	Length of Restoration (ft)	Description
<b>Warrior Creek (Warrior Creek/Susquehanna River Planning Area)</b>					
WC - 1	Wilkes-Barre City	-75.9502	41.20555	40 ft	Major Erosion area
WC - 2	Hanover Twp.	-75.9563	41.20564	40 ft	Major Erosion area
WC - 3	Hanover Twp.	-75.9566	41.20628	50 ft	Major Erosion area
WC - 4	Hanover Twp.	-75.9561	41.20633	120 ft	Major Erosion area
WC - 5	Hanover Twp.	-75.9561	41.20653	80 ft	Major Erosion area
WC - 6	Hanover Twp.	-75.9562	41.20673	60 ft	Major Erosion area
WC - 7	Hanover Twp.	-75.956	41.20723	80 ft	Major Erosion area
WC - 8	Hanover Twp.	-75.9559	41.20743	40ft	Major Erosion area
WC - 9	Hanover Twp.	-75.9554	41.20814	100 ft	Major Erosion area (left bank)
WC - 10	Hanover Twp.	-75.9552	41.20884	75 ft	Major erosion area (right bank)
WC - 11	Hanover Twp.	-75.955	41.21006	50 ft	Major erosion area (right bank)
WC - 12	Hanover Twp.	-75.9549	41.20998	50 ft	Major erosion area (right bank)
WC - 13	Hanover Twp.	-75.9554	41.20985	150 ft	Major Erosion area (left bank)
WC - 14	Hanover Twp.	-75.9628	41.21030	50 ft	Major Erosion (left side of culvert)
WC - 15	Hanover Twp.	-75.9743	41.21153	800 ft (both sides of 400 ft length of stream)	Trib to Warrior Creek Erosion (both sides)
WC - 16	Hanover Twp.	-75.974	41.21233	1,350 ft	Major Erosion area
<b>Newport Creek (Newport Creek Planning Area)</b>					
NC - 1	Newport Twp.	-76.0134	41.18772	86 ft	Major Erosion area
NC - 2	Newport Twp.	-76.0121	41.19123	244 ft	Major Erosion area
NC - 3	Newport Twp.	-76.0138	41.20165	1,211 ft	Major Erosion area
<b>East Fork Harvey's Creek (Harveys Lake/Harveys Creek Planning Area)</b>					
HC - 1	Jackson Twp.	-76.0151	41.28330	20 ft	Minor Erosion area (left bank)

**Appendix VI - Table 6: BMP Strategy, Pollutant Load Reduction Calculations – Prior PRP Projects**

Planning Area	BMP Type	Map Reference	Location	Length (ft)	Drainage Area (acres)	Pollutant Load Reduction TSS (lb/yr)
Harveys Creek/ Harveys Lake	Riparian Buffer Restoration	BMP-2	East Fork Harveys Creek	1,000	80	15,697
CBPRP	Tree Planting	BMP-3	Plains Twp. (Hilldale Park)	n/a	1.67	37
CBPRP	Stream Restoration	BMP-4	Forty Forty Boro (Toby Creek)	460	n/a	20,645
CBPRP	Rain Garden	BMP-5	Plains Twp. (South Beech St at Pine Rd)	n/a	2.5	1,270
CBPRP	Rain Garden		Plains Twp (Beech St at Cedar Rd)	n/a	1.62	823
Total						38,472

**Appendix VI - Table 7: BMP Strategy, Pollutant Load Reduction Calculations – Local Cost Share**

Planning Area	BMP Type	Location	Length (ft)	Drainage Area (acres)	Pollutant Load Reduction TSS (lb/yr)
CBPRP	Bioretention (Rain Gardens)	To be determined	n/a	5	3,243
<b>Total for 25 similar-scale projects</b>					<b>81,073</b>

\*BMP type assumes an average BMP size and drainage area, actual treatment areas will depend on site conditions.

**Appendix VI - Table 8: BMP Strategy, Pollutant Load Reduction Calculations – Stormwater Parks**

Planning Area	BMP Type	Location	Length (ft)	Drainage Area (acres)	Pollutant Load Reduction TSS (lb/yr)
CBPRP	Bioretention (Stormwater Park)	To be determined	n/a	20	12,972
<b>Total for 4 similar-scale projects</b>					<b>51,887</b>

\*BMP type assumes an average BMP size and drainage area, actual treatment areas will depend on site conditions.

The public is invited to review this document and provide written comments to the Executive Director.

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The 30-day public comment period begins August 1, 2017 and ends August 31, 2017.

The Plan will be discussed at a public meeting on August 10, 2017 starting at 4PM at the offices of WVSA located at 1000 Wilkes-Barre Street, Hanover Township, PA 18706.