

**SMITHFIELD TOWNSHIP**

**MS-4 INDIVIDUAL PERMIT**  
**POLLUTANT REDUCTION PLAN**

Project No. 1632168

June 30, 2017

**Prepared For:**

Smithfield Township  
1155 Red Fox Road  
East Stroudsburg, PA 18301

Prepared By:



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## **INTRODUCTION**

This narrative has been prepared on behalf of Smithfield Township to address the Pollution Reduction Plan requirements of the PADEP MS-4 program.

Smithfield Township has been identified by the PADEP as containing 5,120 acres of urbanized area. The designation is based on the 2010 U.S. Census. Many of the tributaries to, and streams within Smithfield Township carry a designation of “high quality” or “exceptional value.” These two criteria require the Township to obtain an Individual NPDES Permit under the Clean Water Act, 33 U.S.C. Section 1251, et seq. and the PA Clean Streams Law, as amended 35 P.S. Section 691.1 et seq.

The PADEP has made a determination that stormwater runoff from the urbanized areas is contributing to sediment loading, and pathogen and mercury pollution of tributaries and streams within the Township. This Pollution Reduction Plan focuses specifically on addressing reduction of the sediment loading. Reduction of pathogens must be addressed before the end of three years once the NPDES Permit is issued.

## **SAMBO CREEK**

A portion (2,177.98 acres) of the PADEP Urbanized Area in Smithfield Township partly discharges stormwater to two (2) unnamed tributaries to Sambo Creek, or partly discharges stormwater to Sambo Creek alone. Sambo Creek extends approximately four (4) miles north to the East Stroudsburg Reservoir located within Middle Smithfield Township and traverses the northwestern corner of Smithfield Township prior to it entering Stroud Township and East Stroudsburg Borough. Sambo Creek has a Chapter 93 Classification of Cold Water Fishery (CWF) and PADEP states that it is impaired by sediment. The drainage area to the two (2) unnamed tributaries to Sambo Creek and to Sambo Creek is 2,864.92 acres, which includes 2,177.98 acres of Urbanized Area. This is the Sambo Creek PRP Planning Area. Boucher & James, Inc. has calculated that the sediment loading from this PRP Planning Area is 769,297 pounds per year utilizing PADEP methodology.

The existing sediment loading has been reduced by 15,013 pounds per year by removing land uses discharging into existing best management practices located within the PRP Planning Area. Therefore, the sediment loading that must be removed from Sambo Creek is 754,282 pounds per year.

## **REQUIRED REDUCTIONS**

The PADEP is mandating that sediment loading be reduced by 10%. Best management practices including, but not limited to stream restoration, forest buffers, infiltration, and/or basin retrofitting may be implemented by the Township to reduce the sediment existing in Sambo Creek by ten percent (10%), or 75,428 pounds per year.

## **PATHOGENS AND MERCURY**

The remainder of the PADEP Urbanized Area (2,942.02 acres) in Smithfield Township partly discharges stormwater to the Brodhead Creek which drains to the Delaware River, or partly discharges stormwater to the Delaware River alone. PADEP has identified Brodhead Creek as being impaired by pathogens. Under the MS-4 Individual Permit, the Township will be required to investigate suspected sources of existing pathogens and address any illegal connections or discharges to the Brodhead Creek. The investigation of pathogens and the implementation of measures to control pathogens are not part of this Pollutant Reduction Plan. In addition, PADEP has identified the Delaware River as being impaired by mercury. Mercury is not regulated by the PADEP MS-4 program and the Township is not required to take any action at this time.

The following Pollutant Reduction Plan includes Sections A through G for Public Participation, Pollutant Reduction Planning Area Map, Pollutants of Concern, Existing Pollutant Loading Calculations, Proposed Best Management Practices for Pollutant Loading Reductions, Funding Sources, and Operation and Maintenance of Proposed Best Management Practices.

**SECTION A**  
PUBLIC PARTICIPATION

PUBLIC NOTICE OF POLLUTANT REDUCTION PLAN

The Smithfield Township Board of Supervisors will accept comments from the public beginning on August 3, 2017 and extending through September 4, 2017 associated with the Township's Pollutant Reduction Plan as required by the Pennsylvania Department of Environmental Protection as a component of the Township's National Pollutant Discharge Elimination System (NPDES) Individual Permit to Discharge Stormwater from Small Separate Storm Sewer Systems (MS4s). The Pollutant Reduction Plan outlines in general terms the Township's 5-year plan between 2018 and 2023 to reduce sediment loadings from the MS4 stormwater discharges to Sambo Creek. The Pollutant Reduction Plan will be available for public review Monday through Friday between the hours of 8:00 AM and 4:30 PM at the municipal offices of Smithfield Township at 1155 Red Fox Road, East Stroudsburg, Pennsylvania 18301. Comments may be provided in writing and delivered in person or via e-mail or regular mail addressed to Brian Barrett, Board of Supervisor Chairman, Smithfield Township. The Township will accept comments from any interested member of the public at the regularly scheduled meeting of Smithfield Township on August 22, 2017.

**Public Questions, Comments, and Concerns**

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**SECTION B**  
POLLUTANT REDUCTION  
PLANNING AREA MAP



**SECTION C**

**POLLUTANTS OF CONCERN**

### **Pollutants of Concern**

The Pennsylvania Department of Environmental Protection has determined that Sambo Creek is impaired by sediment. A ten percent (10%) reduction of the existing sediment loading is required.

**SECTION D**

**EXISTING POLLUTANT LOADING CALCULATIONS**

### **Existing Pollutant Loading Calculations Summary**

The existing sediment loading was calculated utilizing the Simplified Method, as suggested by the PADEP. The Simplified Method calculates the existing sediment loading by multiplying existing impervious and pervious land use areas within, and outside of the identified Urbanized Area with the Loading Rates listed below. Existing land use areas were obtained from Wiki Watershed which is a GIS based program that identifies and quantifies land uses within the Township.

The following Loading Rates were provided by the Pennsylvania Department of Environmental Protection and were utilized with the Simplified Method to calculate the existing sediment loading:

Developed Impervious Area	1,839.00 pounds/acre/year
Developed Pervious Area	264.96 pounds/acre/year
Other Pervious Areas (outside the Urbanized Area)	234.60 pounds/acre/year

The sediment loading based upon the existing land uses within the Sambo Creek PRP Planning Area is 769,297 pounds per year.

Milford Road (Business Route 0209, State Route 2012) and areas of private development were “parsed out” (removed) from the existing sediment loading. In addition, three (3) developments that include best management practices were utilized to reduce the existing sediment loading further.

As a result, the existing sediment loading that must be reduced is 754,284 pounds per year.

See Spreadsheets on the following pages for calculations.

Existing Sediment Loading Calculations																
	Land Use Area (Ac)	Parsed Out Area (Ac) <sup>1</sup>	PRP Planning Area (Ac)	% impervious	Developed Impervious Area (Ac)	Developed Pervious Area (Ac)	Other Pervious Area (Ac)	Developed Impervious Area Loading Rate (lbs/yr)	Developed Pervious Area Loading Rate (lbs/yr)	Other Pervious Area Loading Rate (lbs/yr)	Developed Impervious Area Loading (lbs/yr)	Developed Pervious Area Loading (lbs/yr)	Other Pervious Area Loading (lbs/yr)	Total Loading (lbs/yr)		
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)			
			(a) - (b)		(c) x (d)	(c) - (e)					(e) x (h)	(f) x (i)	(g) x (j)			
<b>Developed Land Uses</b>																
Developed Open Space	566.48	0.00	566.48	10%	56.65	509.83	-	1839.00	264.96		104,176	135,085	-			
Developed Low Intensity	130.85	72.94	57.91	35%	20.27	37.64	-	1839.00	264.96		37,273	9,973	-			
Developed Medium Intensity	44.01	44.01	0.00	65%	0.00	0.00	-	1839.00	264.96		0	0	-			
Developed High Intensity	10.84	10.84	0.00	90%	0.00	0.00	-	1839.00	264.96		0	0	-			
<b>Developed Pervious Land Uses</b>																
Cultivated Crops	20.02	0.00	20.02	-	-	20.02	-		264.96		-	5,305	-			
Shrub/Scrub	17.14	0.00	17.14	-	-	17.14	-		264.96		-	4,542	-			
Pasture/Hay	9.47	0.00	9.47	-	-	9.47	-		264.96		-	2,510	-			
Woody Wetlands	268.27	0.00	268.27	-	-	268.27	-		264.96		-	71,081	-			
Open Water	22.75	0.00	22.75	-	-	22.75	-		264.96		-	6,027	-			
Forest	1088.15	0.00	1088.15	-	-	1088.15	-		264.96		-	288,315	-			
<b>Land Uses Outside of Urbanized Area</b>																
Open Water	4.43	0.00	4.43	0%	-	-	4.43			234.60	-	-	1,040			
Developed Open Space	137.77	137.77	0.00	0%	-	-	0.00			234.60	-	-	0			
Developed Low Intensity	24.83	24.83	0.00	0%	-	-	0.00			234.60	-	-	0			
Developed Medium Intensity	15.30	15.30	0.00	0%	-	-	0.00			234.60	-	-	-1			
Developed High Intensity	3.99	0.55	3.44	0%	-	-	3.44			234.60	-	-	807			
Forest	458.73	60.89	397.84	0%	-	-	397.84			234.60	-	-	93,333			
Woody Wetlands	27.27	0.00	27.27	0%	-	-	27.27			234.60	-	-	6,397			
Shrub/Scrub	5.10	0.00	5.10	0%	-	-	5.10			234.60	-	-	1,196			
Grassland	4.43	0.00	4.43	0%	-	-	4.43			234.60	-	-	1,040			
Pasture/Hay	2.88	0.00	2.88	0%	-	-	2.88			234.60	-	-	676			
Cultivated Crops	2.22	0.00	2.22	0%	-	-	2.22			234.60	-	-	520			
<b>Total Land Use Area</b>											<b>2,864.92</b>					
												<b>Existing Total Sediment Loading</b>	<b>141,448</b>	<b>522,839</b>	<b>105,008</b>	<b>769,295 lbs/yr</b>
												<b>Sediment Loading Removed by Existing BMPs<sup>2</sup></b>	<b>11,235</b>	<b>3,778</b>	<b>-</b>	<b>15,013 lbs/yr</b>
												<b>Existing Total Sediment Loading with Reduction from Existing BMPs</b>	<b>130,213</b>	<b>519,061</b>	<b>-</b>	<b>754,282 lbs/yr</b>
												<b>Required Reduction of Sediment Loading (10%)</b>				<b>75,428 lbs/yr</b>

<sup>1</sup> Parsed Out Areas include Milford Road (State Route 2012) and private developments.

<sup>2</sup> Refer to Sediment Loading Removal by Existing BMPs



**SECTION E**

PROPOSED BEST MANAGEMENT PRACTICES FOR  
POLLUTANT LOADING REDUCTIONS

## **Summary of Best Management Practices to Reduce Pollutant Loading**

The amount of sediment loading reduction required within the Sambo Creek PRP Planning Area is 75,428 pounds per year (10% of 754,284 pounds per year). Various best management practices may be implemented by the Township to reduce the existing sediment loading in Sambo Creek. The following options are provided as part of this Pollutant Reduction Plan. Over the next 5 years, Smithfield Township will take the appropriate steps to implement one, or more of the following options.

### **Option 1 – Stream Restoration**

The existing sediment loading in Sambo Creek can be reduced by the implementation of stream restoration.

An analysis to identify erosive conditions along Sambo Creek and the two (2) unnamed tributaries to Sambo Creek will be completed to determine the appropriate location(s) for stream restoration along the 2,350 feet of Sambo Creek, and/or along the 22,811 feet the two (2) unnamed tributaries, within the PRP Planning Area. Design of the proposed stream restoration will be completed, and any required state or federal permits will be obtained prior to performing any work.

It should be noted that Sambo Creek and the two (2) unnamed tributaries within the PRP Planning Area are not located on property owned by Smithfield Township. Therefore, the Township must obtain easements through private property in order to construct the stream restoration and to maintain it in perpetuity. Also, it may be necessary to partner with Stroud Township and/or Stroudsburg Borough if insufficient area is present within the boundaries of Smithfield Township to develop this option.

### **Option 2 – Forest Buffer**

The existing sediment loading in the Sambo Creek can be reduced by the implementation of a forest buffer. The forest buffer may be created anywhere along the 2,350 feet of Sambo Creek, and/or anywhere along the 22,811 feet of the two (2) unnamed tributaries to the Sambo Creek, within the PRP Planning Area that is not already forested. The forest buffer is required to be located adjacent to Sambo Creek or the two (2) unnamed tributaries to Sambo Creek and have a minimum width of 35-feet. The forest buffer must include trees, shrubs and other vegetation to provide filtration of the stormwater prior to it entering Sambo Creek or the two (2) unnamed tributaries.

To implement the forest buffer option, the Township will determine locations to plant trees, shrubs, and other vegetation along Sambo Creek and/or the two (2) unnamed tributaries. Existing areas of forest along Sambo Creek and/or the two (2) unnamed tributaries may not be utilized to reduce the existing sediment loading. Design of the proposed forest buffer will be completed, and any required state or federal permits will be obtained prior to performing any work.

It should be noted that Sambo Creek and the two (2) unnamed tributaries within the PRP Planning Area are not located on property owned by Smithfield Township. Therefore, the Township must obtain easements through private property in order to install a forest buffer and to maintain it in



perpetuity. Also, it may be necessary to partner with Stroud Township and/or Stroudsburg Borough if insufficient area is present with the boundaries of Smithfield Township to develop this option.

### Option 3 – Stream Restoration and Forest Buffer

The existing sediment loading in Sambo Creek can also be reduced by the implementation of both stream restoration and forest buffer. Stream restoration and forest buffers are harmonious and can achieve sediment loading reduction more efficiently than establishing a forest buffer alone.

To implement the stream restoration and forest buffer option, the Township will determine locations to provide stream restoration based upon an analysis of existing erosive conditions along the 2,350 feet of Sambo Creek and/or along the 22,811 feet of the two (2) unnamed tributaries to Sambo Creek, within the PRP Planning Area. The forest buffer must be 35-foot wide, and may be located along the stream restoration, and/or other areas along the 2,350 feet of Sambo Creek or along the 22,811 feet of the two (2) unnamed tributaries within the PRP Planning Area, that are not already forested. The forest buffer must include trees, shrubs and other vegetation to provide filtration of the stormwater prior to it entering Sambo Creek or the two (2) unnamed tributaries. Existing areas of forest along Sambo Creek or the two (2) unnamed tributaries may not be utilized to reduce the existing sediment loading. Design of the proposed stream restoration and forest buffer will be completed, and any required state or federal permits will be obtained prior to performing any work.

It should be noted that Sambo Creek and the two (2) unnamed tributaries within the PRP Planning Area are not located on property owned by Smithfield Township. Therefore, the Township must obtain easements through private property in order to construct the stream restoration and install the forest buffer, and to maintain these in perpetuity. While the Township will still be required to obtain easements, the number of private properties affected may be reduced with the double benefit of stream restoration and forest buffers. Also, it may be necessary to partner with Stroud Township and/or Stroudsburg Borough if insufficient area is present with the boundaries of Smithfield Township to develop this option.

### Option 4 – Stream Restoration, Forest Buffer, and Infiltration

The existing sediment loading in the Sambo Creek can also be reduced by the implementation of both stream restoration and a forest buffer, with infiltration facilities. The infiltration can be accomplished by constructing a berm to provide an opportunity for the stormwater to infiltrate prior to it entering the forest buffer, and the Sambo Creek or the two (2) unnamed tributaries to Sambo Creek.

To implement the stream restoration, forest buffer and infiltration option, the Township will determine locations to provide stream restoration based upon an analysis of existing erosive conditions along the 2,350 feet of Sambo Creek and/or along the 22,811 feet of the two (2) unnamed tributaries to Sambo Creek, within the PRP Planning Area. The forest buffer must be 35-foot wide, and may be located along the stream restoration, and/or other areas along the 2,350 feet of Sambo Creek or along the 22,811 feet of the two (2) unnamed tributaries within the PRP

Planning Area, that are not already forested. The forest buffer must include trees, shrubs and other vegetation to provide filtration of the stormwater prior to it entering Sambo Creek or the two (2) unnamed tributaries. Existing areas of forest along Sambo Creek or the two (2) unnamed tributaries may not be utilized to reduce the existing sediment loading.

The areas of infiltration may occur anywhere along the 2,350 feet of Sambo Creek or along the 22,811 feet of the two (2) unnamed tributaries, or other approved areas within the PRP Planning Area. The location of the infiltration facilities, and the use of infiltration will be dependent upon identifying areas with favorable infiltration rates. Prior to construction of the infiltration area, testing will be performed to confirm infiltration is a viable option. Design of the proposed stream restoration, forest buffer, and infiltration facilities will be completed, and any required state or federal permits will be obtained prior to performing any work.

It should be noted that Sambo Creek and the two (2) unnamed tributaries within the PRP Planning Area are not located on property owned by Smithfield Township. Therefore, the Township must obtain easements through private property in order to construct these best management practices, and to maintain them in perpetuity. While the Township will still be required to obtain easements, the number of private properties affected may be reduced with the triple benefit of stream restoration, forest buffers, and infiltration. Also, it may be necessary to partner with Stroud Township and/or Stroudsburg Borough if insufficient area is present with the boundaries of Smithfield Township to develop this option.

#### Option 5 –Basin Retrofitting

The existing sediment loading in Sambo Creek can also be reduced by the implementation of infiltration best management practices. The Township will explore the possibility of attaining easements over existing detention basins to retrofit these detention basins into infiltration best management practices.

Prior to retrofitting an existing detention basin, testing will be performed to confirm infiltration is a viable option. Design of the proposed infiltration best management practices will be completed prior to performing any work.

**SECTION F**  
FUNDING SOURCES

### **Funding Sources Narrative**

Possible funding sources include, but are not limited to, Township funds (i.e. General Fund and possibly Stormwater Management fees), the Pennsylvania Department of Environmental Protection's Growing Greener Program, and the Pennsylvania Department of Community and Economic Development's Watershed Restoration and Protection Program. The Township will actively seek other funding sources as well for the implementation of this PRP Plan.

**SECTION G**

OPERATION AND MAINTENANCE OF PROPOSED  
BEST MANAGEMENT PRACTICES

## **Operation and Maintenance of Proposed Best Management Practices**

Any selected best management practice will require Smithfield Township to obtain an easement on private property in order to construct, operate and maintain the selected best management practices. The easement will be held in perpetuity on each property.

### **Stream Restoration**

The operation and maintenance of the stream restoration will be conducted by Smithfield Township and will include the following:

1. Periodic inspections to assess erosion, bank stability, sediment and debris accumulation, and vegetative conditions including the presence of invasive species. Maintain/correct erosion, bank instability as required. Remove sediment and debris, and undesirable species as required.
2. Water, weed, mulch and replant any vegetation, as required during the first 2 to 3 years. Remove undesirable species and plant replacements as necessary.

### **Forest Buffer**

The operation and maintenance of the forest buffer will be conducted by Smithfield Township and will include the following:

1. Watering:
  - a. Plantings need deep regular watering during the first growing season, either natural watering via rainfall, or planned watering by Smithfield Township.
  - b. Planting in the fall increases likelihood of sufficient rain during planting establishment.
2. Mulching:
  - a. Mulch will assist in moisture retention in the root zone of plantings, moderate soil temperature, provide some weed suppression, and retard evaporation.
  - b. Use coarse, organic mulch that is slow to decompose in order to minimize repeat application.
  - c. Apply 2 to 4-inch layer, leaving air space around tree trunk to prevent fungus growth.
  - d. Use combination of woodchips, leaves, and twigs that are stockpiled for six months to a year.

### 3. Weed Control:

- a. Weed competition limits buffer growth and survival, therefore weeds should be controlled by either herbicide, mowing, or weed mats.
  - i. Herbicides – This is a short-term maintenance technique (2 to 3 years) that is generally considered less expensive and more flexible than mowing, and will result in a quicker establishment of the buffer. Herbicide use is regulated by the Pennsylvania Department of Agriculture. Proper care should be taken to ensure that proximity to water features is considered.
  - ii. Mowing – Mowing controls the height of the existing grasses, yet increases nutrient uptake, therefore competition for nutrients will persist until the canopy closure shades out lower layers. A planting layout similar to a grid format will facilitate ease of mowing yet yield an unnaturally spaced community. Mowing may result in strikes on the trunk unless protective measures are utilized. Mowing should occur twice each growing season. Mower height should be set between 8 to 12 inches.
  - iii. Weed Mats – Weed mats are geo-textile fabrics that are used to suppress weed growth around newly planted vegetation by providing shade and preventing seed deposition. Weed mats are installed after planting, and should be removed once the trees have developed a canopy that will naturally shade out weeds.

### 4. Deer Damage:

- a. Deer will browse all vegetation within reach, generally between 5 and 6 feet above the ground.
- b. Approaches to minimize damage include i) selecting plants that deer do not prefer (i.e., Paper Birch, Beech, Ash, Common Elderberry), ii) homemade deer repellents, iii) tree shelters

### 5. Tree Shelters

- a. Repair broken stakes.
- b. Tighten stake lines.
- c. Straighten leaning tubes.
- d. Clean debris from tube.
- e. Remove netting as tree grows.
- f. Remove when tree is approximately 2-inches wide.

## 6. Invasive Plants

- a. Monitor restoration sight regularly for any signs of invasive plants.
- b. Choice of control method is based on a variety of considerations, but falls into three general categories: i) mechanical, ii) mechanical with application of herbicide, iii) herbicide.

### Infiltration

If selected, infiltration will be accomplished through the construction of infiltration berms. The operation and maintenance of the berms will be conducted by Smithfield Township and will include the following:

1. Inspection to ensure infiltration will occur two (2) times per year; monitor drawdown time after major storm events.
2. Inspect any structural components.
3. Maintain mowing. Other vegetation will require less maintenance. Trees and shrubs may require annual mulching, while meadow planting requires annual mowing and clippings removal.
4. Avoid running heavy equipment over the infiltration area at the base of the berm. The crest of the berm may be used as access for heavy equipment when necessary to limit disturbance of the infiltration area.
5. Routinely remove accumulated trash and debris.
6. Remove invasive plants as needed.
7. Inspect for signs of flow channelization; restore level gradient immediately after deficiencies are observed.

### Basin Retrofitting

If selected, infiltration will be accomplished through retrofitting existing detention basins into infiltration best management practices (BMP). The operation and maintenance of the infiltration best management practices will be conducted by Smithfield Township and will include the following:

1. Catch basins and inlets (upgradient of the infiltration BMP) should be inspected and cleaned at least two (2) times per year and after runoff events.
2. The vegetation along the surface of the infiltration BMP should be maintained in good condition, and any bare spots vegetated as soon as possible.



3. Vehicles should not be parked or drive on an infiltration BMP, and care should be taken to avoid excessive compaction by mowers.
4. Inspect the BMP after runoff events and make sure that runoff drains down within 72 hours. Mosquito's should not be a problem if the water drains in 72 hours. Mosquitoes require a considerably long breeding period with relatively static water levels.
5. Inspect for accumulation of sediment, damage to outlet structures, erosion control measures, signs of water contamination/spills, and slope stability in the berms.
6. Mow only as appropriate for vegetative cover species.
7. Remove accumulated sediment from the BMP as required. Restore original cross section and infiltration rate. Properly dispose of sediment.