# New Sewickley Township Pollutant Reduction Plan

Rochester, PA September 5, 2017





Prepared for: New Sewickley Township 233 Miller Road Rochester, PA 15074

> Prepared by: LandStudies, Inc. 315 North Street Lititz, PA 17543 717-627-4440 www.landstudies.com



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# Introduction

This pollutant reduction plan (PRP) was developed for New Sewickley Township as a requirement of Permit PAG#136280 for their municipal separate storm sewer system (MS4). The PRP outlines the actions the Township will take to address pollutant loads to the waterbodies within the MS4 that drain to impaired waters within the municipality. These actions include public participation, mapping of outfalls and other discharges, pollutant load calculations, best management practices (BMPs) selection, identification of potential funding sources and partners, and operations and maintenance (O&M) activities.

# A. Public Participation

Public participation is an essential part of the PRP because it enhances buy-in from landowners that may have an impact on pollutant discharges, can uncover missing elements or errors in calculations, and builds cooperative partnerships among the municipality and other entities.

A copy of the draft PRP was released via public notice on July 20, 2017 in the Beaver County Times, Ellwood City Ledger. The notice ran for one (1) day. A copy of the public notice is included as Item A-1. The public was given over 30 days to provide commentary on the contents of the PRP. No written comments were received regarding the PRP. New Sewickley Township held a public meeting on August 1, 2017 to receive verbal commentary on the contents of the PRP. No comments were received at the August 1 meeting. No details were changed from the draft PRP to the final PRP due to the fact that no public comments were received on the draft plan.

# B. Map

New Sewickley Township is located entirely within the Ohio River Basin. Figure 1 below identifies the subwatersheds of the Beaver River-Ohio River, Big Sewickley Creek, Brush Creek, Connoquenessing Creek, and the Crows Creek-Ohio River within the municipality. The Brush Creek watershed comprises approximately 53 percent of the Township (11,204 acres). The Connoquenessing Creek–Beaver Creek watershed covers only about 2.5 percent of the municipality with 539.5 acres. The Crows Run-Ohio River watershed covers 43 percent of the municipality with 8,979 acres. The Beaver River-Ohio River and the Big Sewickley Creek watersheds cover one percent or less of New Sewickley Township's land area. Figure 1 identifies the subwatershed basins within New Sewickley Township, as well as impaired and attaining streams from the DEP 2014 Integrated List and the location of the 2010 Census Urban Area (UA). Additional maps are provided in Appendix B.

Map B1 in Appendix B identifies the MapShed 2011 Southwest Land Use types throughout the Township, the MS4 outfall locations, the storm sewershed boundaries grouped into the



Brush Creek Planning Area. Although New Sewickley Township covers nearly 21,000 acres, less than 12 percent of it (2,452 acres) is within the UA based on the 2010 U.S. Census data.

The total impervious cover within the UA totals 441.4 acres or 18 percent based on DEP's Statewide MS4 Land Cover Estimates for New Sewickley Township.

An additional map, Map B2 in Appendix B, identifies a single planning area, the Brush Creek Planning Area, for the municipality. It also includes the proposed location(s) of structural BMPs that will be implemented to achieve the required pollutant load reductions per watershed during the current permit cycle. Due to small size of the planning area in comparison to the entire Township, Map B2 focuses on the main portion of the Brush Creek Planning Area so that the location of the proposed BMPs within the planning area can be easily viewed on the map.

In accordance with DEP's guidelines, New Sewickley Township used the following process to parse areas and establish their MS4 planning area for the PRP. Prior to beginning PRP development, New Sewickley went through a desktop and field verification exercise to establish inlets, outlets, pipes, swales and outfalls ("system") within the Township.

As part of PRP development, New Sewickley's system mapping was added to a base map with National Hydrology Dataset (NHD) streams, topography, and watershed boundaries in order to aid in the field drainage boundary assessment to establish MS4 planning areas for the PRP. Mapping also included areas that could be parsed out such as state-owned road right-of-way's.

The field review then continued to field verify outfalls on NHD streams with matching observed general drainage flow to the map; or to determine that the regulated system (inlets, curb and gutter, etc.) tied to the end point adequately collects stormwater run-off from the drainage areas reviewed. This process involves a visual tracing against the system map. The field review is supported by a condensed desktop reconfirmation analysis, where a topographic map with an aerial image, as well as the "system" map, are reviewed to determine the areas draining to outfalls and how these areas could be combined into a planning area that could be mapped in GIS and analyzed for pollutant loading rates.

The UAs within the Crows Run-Ohio River and the Big Sewickley Creek watersheds were not identified as planning areas for this PRP because these watersheds were not identified as Appendix E impaired waters as will be discussed further in Section C below.

The Brush Creek Planning Area was then drawn to capture the drainage areas that are collected into the system and discharge via the outfall or group of outfalls within the watershed. Since New Sewickley's UA and the area draining to the MS4 system only covered small pockets of land interspersed throughout the Brush Creek watershed, these areas were merged into a single planning area.



Within the UA for the Brush Creek watershed, there are over 100 acres of forested and open land that do not contain any MS4 infrastructure. These pervious areas that do not drain to the MS4 system have been parsed out of the planning areas. Additionally, there are pockets of development that do not drain to New Sewickley's MS4 infrastructure, but drain as sheet flow or incidental dispersion into surrounding lands; thus, these areas have been parsed out of the planning areas. There is a small subdivision in the southeastern corner of the municipality that has approximately 29 acres within the Brush Creek watershed; however, the stormwater system from this subdivision is directed to Crows Run which is not impaired. Therefore, this area was also excluded from the Brush Creek Planning Area. In total, 269.5 acres of UA within the Brush Creek watershed in New Sewickley Township were excluded from the planning areas based on the aforementioned rational (see Excluded Areas in Maps B1 and B2).



# C. Pollutants of Concern

New Sewickley Township discharges stormwater to local impaired waters, including the Brush Creek. Less than five miles downstream, the Brush Creek connects to the Connoquenessing Creek which is also identified as impaired. Therefore, the municipality must address pollutant loads associated with those impairments in both watersheds and prepare an impaired waters PRP in accordance with Appendix E in the PAG-13 General Permit.

Table 1 shows the affected subwatersheds within New Sewickley Township and the pollutant(s) that are of concern to the municipality as shown on the DEP MS4 requirements table revised 4/7/2017. Other impairments listed in Table 1 that are not addressed in this upcoming permit cycle will be considered in future permit cycles.

Watershed	Pollutant(s) of Concern
Brush Creek	Appendix E – Nutrients, Organic
	Enrichment / Low DO <sup>1</sup> , Suspended
	Solids (4a); Appendix B – Pathogens (5)
Connoquenessing Creek	Appendix E – Nutrients, Organic
	Enrichment / Low DO, Suspended
	Solids (5); Appendix B – Pathogens (5)
Ohio River	Appendix C- PCBs (4a); Appendix B –
	Pathogens (5)

Table 1. New Sewickley Township MS4 Requirements Table

NOTE1: The MS4 Requirements Table identifies "Organic Enrichment / Low D.O." as Appendix E Pollutants of Concern for Brush Creek and Connequenessing Creek. Organic Enrichment and Low D.O. are surrogates for nutrient impairment.

In accordance with DEP's PRP Instructions, this report is required specifically for stormwater discharges of nutrients and sediment to impaired surface waters (Appendix E).

Separate from the PRP, Pollutant Control Measures (PCMs) described in DEP's General Permit (3800-PM-BCW0100d) are to be implemented for Appendix A, B, and/or C pollutants of concern identified in the MS4 Requirements Table. Since the New Sewickley's UA within the Crows Run-Ohio River basin is only identified for Appendix B and C pollutants of concern (not Appendix E pollutants of concern), loading rates for this watershed are not addressed in the PRP.

Pollutant loading for the UA within the Big Sewickley Creek watershed is not reported in this PRP because it is not identified in DEP's MS4 Requirements Table for New Sewickley Township.



To address the Appendix E requirements, New Sewickley Township will select BMPs to reduce the sediment pollutant load by ten percent, which is assumed to then reduce the TN and TP by three percent and five percent respectively according to DEP's PRP Instructions (3800-PM-BCW0100k). Therefore, only sediment load reductions within the MS4 planning area are reported in this PRP.

# D. Existing Load for Pollutants of Concern

New Sewickley's Brush Creek watershed is the only watershed with sediment and nutrient impairments within the municipality that is also within the UA and contains MS4 infrastructure.

New Sewickley Township has a total of 151.18 acres in the Brush Creek Planning Area of which 18.95 acres are impervious and 132.23 acres are pervious. The existing loading rate for the Brush Creek Planning Area are shown in Table 2 below. These loading rates were calculated by using DEP's "Simplified Method" based on developed land loading rates for Pennsylvania counties from Attachment B of the PRP Instructions, 3800-PM-BCW0100K (See Appendix C for details).

			Urban Area		Non-	Final Existing Load	
Planning Area Name	UA Acreage	non-UA acreage	Acres Impervious	Acres Pervious	Acres Impervious	Acres Pervious	Sediment Load (lbs)
Brush Creek Planning Area	76.08	75.10	13.69	62.39	5.26	69.84	59,332.15
Planning Areas Total Acreage:	151.18						
		Reduction Red	uirement	5.933.22			

Table 2. Existing Loading Rates

The small portion of the Connoquenessing Creek–Beaver River basin within New Sewickley Township is not impaired and is approximately two miles outside of the UA. The Connequenessing Creek is impaired further downstream, and therefore New Sewickley Township must consider pollutant loading within the Connoquenessing Creek–Beaver River basin. There is no UA or MS4 infrastructure within this watershed within the township, and Brush Creek confluences with the Connoquenessing approximately four miles downstream of the Township boundary. Sediment load reductions in the Brush Creek watershed will directly reduce sediment loads downstream in the Connoquenessing. Therefore, New Sewickley Township will meet its obligation to consider sediment loading in the Connoquenessing by reducing sediment loads in Brush Creek.



New Sewickley Township has not identified any existing BMPs in place to be utilized to reduce the existing sediment loading rate in the Brush Creek Planning Area.

# E. BMPs Selected to Achieve the Minimum Required Reductions in Pollutant Loading

Based on the ten percent sediment reduction targets established above, New Sewickley Township has identified a strategy to meet the minimum load reductions within five years following DEP's approval of permit coverage. The nutrient reduction requirements for the impaired waters are assumed to be addressed by the ten percent sediment reductions.

BMP load reduction values for Proposed BMPs were calculated using the Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects (Schueler and Lane, 2015, hereafter referred to as the Expert Panel) report in conjunction with loading rates from Attachment B of the PRP instructions referenced above.

#### Summary of Alternatives and Selection of BMPs

New Sewickley Township evaluated several stormwater BMP projects considering the following criteria:

- Sediment reductions
- Cost per pound of pollutant reduction
- Ownership (public versus private land)
- Funding and Workforce availability
- Community benefit (site accessibility, visibility to the public, ability of public to experience benefits)
- Connectivity to other completed or proposed stormwater BMPs
- Timeframe to implement

The purpose of the evaluation was to determine the BMPs that would reduce the most pollutants for the least amount of money while getting closer to the goal of removing streams from the impaired waters list. The highest priority BMPs evaluated by New Sewickley Township are summarized in Table 3 as potential BMPs that could be implemented to satisfy the load reduction requirements.

New Sewickley Township is not committing to implementing all of the projects listed in this report as that would exceed their required deduction. The final selection of BMPs to be implemented will be based on detailed design criteria and cost. The chosen BMP(s) will meet the ten percent required sediment reduction and will be implemented by the end of the five-year permit cycle.



BMP ID	BMP Project	Sediment Load
Number		Reduction (lbs)
1	Green Valley Twp Park Rain Garden	2,538
2A	Snyder Drive Wet Meadow – South Lot	3,678
2B	Snyder Drive Wet Meadow – North Lot	2,330
3	Willowmere Park Road Right-of-Way Bioswale	1,956
	Total:	10,502
	10% Reduction Requirement:	5,933

Table 3. Proposed BMPs for New Sewickley Township

# BMP 1- Green Valley Park Rain Garden

New Sewickley Township is considering to develop a 500-square foot rain garden at the Township's Green Valley Park. The preliminary proposed location for the rain garden receives 5.8 acres of drainage (0.42 impervious acres and 5.39 pervious acres). Although the park is located directly outside of the UA, it was included within the Brush Creek Planning Area. The rain garden was identified in a 2017 master plan for the park. This BMP will serve as a Runoff Reduction practice as described by the Expert Panel. The load reduction calculations for this BMP were completed using Expert Panel guidelines, as detailed in Appendix D.

# BMP 2A – Snyder Drive Wet Meadow – South Lot

New Sewickley Township is considering to develop a wet meadow on approximately 2 acres (87,000 square feet) of floodplain off of Snyder Drive across from the entrance to Green Valley Park. The 3-acre drainage area contains 0.54 impervious acres and 2.46 pervious acres. The wet meadow BMP will serve as a Stormwater Treatment practice as described by the Expert Panelfor this drainage area directly adjacent to Brush Creek. Implementation of this BMP would require coordination with a private landowner. The load reduction calculations for this BMP were completed using Expert Panel guidelines, as detailed in Appendix D.

#### BMP 2B – Snyder Drive Wet Meadow – North Lot

New Sewickley Township is considering to develop another wet meadow located on the parcel directly to the north of BMP 2A. This proposed wet meadow is on approximately 1.3 acres (56,600 square feet) of floodplain off of Snyder Drive. The 1.9-acre drainage area contains 0.34 impervious acres and 1.56 pervious acres. The wet meadow BMP will serve as a Stormwater Treatment practice for this drainage area directly adjacent to Brush Creek. Implementation of this BMP would require coordination with a private landowner. The proposed 2A and 2B wet meadow BMPs could be implemented independently of each other, or could be developed jointly. The load reduction calculations for this BMP were completed using Expert Panel guidelines, as detailed in Appendix D.



# BMP 3 – Willowmere Park Road Right-of-Way Bioswale

There is a swale along Willowmere Park Road that drains approximately 4.8 acres of UA. New Sewickley Township proposes creating a 3,000-square foot bioswale within the Township's road right-of-way to treat runoff. This BMP will serve as a Stormwater Treatment practice. The load reduction calculations for this BMP were completed using Expert Panel guidelines, as detailed in Appendix D.

# F. Funding Mechanism Identification

In order to install and maintain the BMPs listed in Section E, New Sewickley proposes the following sponsors/partners and funding sources.

BMP#	Sponsor/Partner/Funding Sources
1	New Sewickley budget funds, local business tax; DCNR, DEP, NFWF are potential
	grant sources for installation;
24	New Sewickley budget funds, local business tax; DCNR, DEP, NFWF are potential
28	grant sources for installation;
2B	New Sewickley budget funds, local business tax; DCNR, DEP, NFWF are potential
20	grant sources for installation;
3	New Sewickley budget funds, local business tax; DCNR, DEP, NFWF are potential
5	grant sources for installation;

Table 1 PMD funding Sources

# G. Responsible Parties for Operation and Maintenance (O&M) of BMPs

All stormwater BMPs installed under this PRP are subject to New Sewickley's stormwater management ordinance.

The Operation and Maintenance (0&M) activities for each BMP are included in the table below. If the BMP is located on private land, the landowner must convey an easement to the Township to allow for access for periodic inspections and maintenance, as needed. Actual O&M activities will be listed in the Annual MS4 Status Report sent to the PADEP under the General Permit.



BMP #	Parties Responsible for O&M	O&M Activities	Frequency for O&M Activities			
1	Township Public Works Department and maintenance staff;	Inspection, weeding, plant replacement, rock replacement, trash/sediment cleanout	Monthly inspection and weeding (during the growing season); Plant and rock replacement (if needed); Trash and sediment cleanout (if needed); Additional O&M activities will be detailed in the final design;			
2A	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection, mowing and weeding, plant replacement;	Monthly inspection, Mowing (during the growing season depending on inspection results); Plant replacement (if needed); Additional O&M activities will be detailed in the final design;			
2B	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection, mowing and weeding, plant replacement;	Monthly inspection, Mowing (during the growing season depending on inspection results); Plant replacement (if needed); Additional O&M activities will be detailed in the final design;			
3	Township Public Works Department and maintenance staff;	Inspection, mowing and weeding, plant replacement	Monthly inspection, Mowing (during the growing season depending on inspection results); Plant replacement (if needed); Additional O&M activities will be detailed in the final design;			

Table 5. BMP O&M Activities



# H. Works Cited

Integrated Water Quality Report 2014 – 2014 Integrated List of All Waters (formerly 303(d) Report). Retrieved February 8, 2017, from http://www.dep.pa.gov/Business/Water/CleanWater/WaterQuality/Pages/Integrated-Water-Quality-Report-2014.aspx. Office of Water Management, Bureau of Water Supply &

Wastewater Management, Water Quality Assessment and Standards Division.

Schueler, T. and C. Lane. January 20, 2015. Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit. Chesapeake Bay Program Urban Stormwater Workgroup.

Pennsylvania Department of Environmental Protection (PADEP). 2016. PRP / TMDL Plans MS4 Workshop. Harrisburg, PA.

Appendix A Public Participation: Item A1. Public Notice;



ACCOUNT #	INVOICE DATE	DESCRIPTION	LINES	TIMES	PROOF	TOTAL CHARGES			
7247747822	7/26/2017	NOTICE OF OPPORTUNITY FOR PL	2.00 x 53Lines	1	\$ 18.00				
7/20/2017									
DATES APPEARED									

#### PROOF OF PUBLICATION

# The Beaver County Times, Ellwood City Ledger

a daily newspaper of general circulation, published by BEAVER NEWSPAPERS, INC., a Pennsylvania corporation, 400 Fair Avenue, West Bridgewater, Beaver County, Pennsylvania, was established in 1946, and has been issued regularly, except legal holidays since said date.

The attached advertisement, which is exactly as printed and published, appeared in the regular issue on 7/20/2017

BEAVER NEWSPAPERS, INC. By

#### STATE OF PENNSYLVANIA, COUNTY OF BEAVER,

Before me, a Notary Public in and for such county and state, personally appeared LORI L. HOLTZ , who being duly sworn according to law says that she is CONTROLLER of BEAVER NEWSPAPERS, INC.; that neither affiant nor said corporation is interested in the subject matter of the attached advertisement; and that all of the allegations of the foregoing statement including those as to the time, place and character of publication are true.

SS:

Sworn to and subscribed before me this 26th day of July 2017

COMMONWEALTH OF PENNSYLVANIA NOTARIAL SEAL Susan K. Miller, Notary Public Bridgewater Boro, Beaver County My Commission Expires Oct. 1, 2018 MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES BEAVER NEWSPAPERS INC. The costs of advertising and proof, has been paid. BEAVER NEWSPAPERS, INC.

\$ 499.70

By

400 FAIR AVE.

**BEAVER, PA. 15009** 

#### Ad Content Proof

#### NOTICE OF OPPORTUNITY FOR PUBLIC REVIEW AND COMMENT

PROPOSED NUTRIENTS/SEDIMENT POLLUTANT REDUCTION PLAN (PRP) OF GENERAL PERMIT FOR STORM WATER DISCHARGES FROM THE SMALL

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) NOTICE IS HEREBY GIVEN that the Supervisors of New Sewickley Township will receive public comment(s) on the proposed Nutrient/Sediment Pollutant Reduction Plan (PRP) and Chesapeake Bay Pollutant Reduction Plan (CBPRP) required for the 2018-2023 General MS4 Permit. The proposed PRP and CBPRP include:

(1) Identification and locations of structural Best Management Practices (BMPs) for implementation during the permit period to reduce loadings of nutrients and sediment as required by Appendix E of the MS4 Permit, which applies to both General and Individual MS4 Permits.

(2) Explanation of the methodology used to calculate existing nutrients/sediment loadings and corresponding reductions from applicable watersheds with regulated MS4; and (3) Locations of local waterways with nutrients/sediment impairments.

The proposed PRP are available for review at the Township office located at 233 Miller Road from 8:00 a.m. to 4:00 p.m. Monday-Friday during the period of July 20th to August 24th.

The proposed PRP are available to view or download at www.newsewickley.com

Interested parties may request a paper copy or electronic copy of the proposed PRP and CBPRP by contacting Township Manager, Walter Beighey Jr. at 724-774-7822 or manage r@newsewickley.com

The Township shall accept written comments for a minimum of 30 days from the date of public notice. Interested parties may submit written comments electronically, by mail, or hand delivery. All comments must be received by 12:00 noon on August 24th and addressed to: Walter Beighey Jr.

Manager New Sewickley Township

233 Miller Road Rochester, PA 15074 724-774-7822

Comments may be submitted electronically, in PDF text format (if less than megabytes in total size), to Walter Beighey Jr., via email at manager@newsewickley.com. If the file is greater than megabytes in total size, then the comment letter may be submitted either by hand deliver or mail. Please also indicate in the subject line, "Comments-New Sewickley Township PRP."

The Township Supervisors will also provide an opportunity for interested parties to provide comments during the regularly scheduled meeting to be held on August 1, 2017.

7/20/17

Appendix B

Map B1. New Sewickley Township Land Use Types and Planning Areas; Map B2. New Sewickley Township MS4 PRP Map



# Map B1. New Sewickley Township Land Use Types and Planning Areas

# Legend



Brush Creek Planning Area

Excluded Area

- MUNICIPAL ROAD

STATE ROAD

Stream

NewSewickleyTwp





# Map B2. New Sewickley Township MS4 PRP Map

# Area of Proposed BMPs



Appendix C Baseline Load Calculations



#### EXISTING LOAD DEP SIMPLIFIED METHOD SUMMARY TABLE

#### Statewide MS4 Land Cover Estimates for New Sewickley Township

UA % Impervious	18%
UA % Pervious	82%
Non-UA %Impervious	7%
Non-UA % Pervious	93%

### PRP Instructions (05/2016) Attachment B - Developed Land Use Loading Rates for PA Counties - Beaver County

	Sediment
	(lb/ac/yr)
UA Impervious Loading	1839
UA Pervious Loading	264.96
Undeveloped (Non UA) Loading	234.6

			Urban Area Non-UA			Final Existing Load			
Planning Area Name	UA Acreage	non-UA acreage	Acres Impervious	Acres Pervious	Acres Impervious	Acres Pervious	Sediment Load (lbs)		
Brush Creek Planning Area	76.08	75.10	13.69	13.69 62.39		69.84	59,332.15		
Planning Area Total Acreage: 151.18									
	5,933.22								

Appendix D Proposed BMP Reduction Calculations



# New Sewickley Township Proposed BMPs - Sediment Reduction Calculations

BMP #	Site	BMP	RR or ST	BMP Area (sq. ft)	BMP Area (Acres)	Runoff Storage (RS) (ac ft)	Impervious Area (IA) (ac)	(RS)(12)/IA (Min=0, Max=2.5)	Pervious Area (ac)	Sediment Removal %**	Sediment Load (lb)	Sediment Removal (Ib)	Sediment Removal (T)
1	Green Valley Twp Park	Rain Garden	RR	500	0.01147842	0.01	0.41	0.17	5.39	0.25	10,027.14	2,538.34	1.27
2A	Snyder Drive - South Lot	Wet Meadow / Constructed Wetland	ST	87000	1.99724518	0.40	0.54	2.50	2.46	0.79	4,667.02	3,678.16	1.84
2B	Snyder Drive - North Lot	Wet Meadow / Constructed Wetland	ST	56600	1.29935721	0.26	0.34	2.50	1.56	0.79	2,955.78	2,329.50	1.16
3	Willowmere Park Road Right-of-Way	Bioswale	ST	3000	0.06887052	0.01	0.86	0.19	3.94	0.26	7,467.23	1,956.04	0.98

**Loading Rates from DEP PRP Instructions, Attachement B "Developed Land Loading Rates for PA Counties" May, 2016; All Other Counties values used								
	N	Р	TSS					
Pervious Surface Loading (lb/ac/yr) =	20.72	0.84	264.96					
Impervious Surface Loading (Ib/ac/yr)=	23.06	2.28	1,839.00					
Undeveloped (Non UA) Surface Loading (lb/ac/yr)=	10	0.33	234.60					

\* Based on Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects. Chesapeake Stormwater Network. January 20, 2015

\*\* From Retrofit Adjustor Curves, p 14, 15 - Forumulas form Peft Standards and Retrofits\_FAQ Document\_090913

Total Proposed BMP Reductions for New	
Sewickley Twp:	10,502.05
10% Reduction Requirement for New	
Sewickley Twp:	5,933.22

New Sewickley Township Pollutant Reduction Plan Technical Response to DEP's PRP Review February 1, 2018



# Introduction

Per a January 29, 2018 telephone conversation with Jim Vaneck from DEP's Southwest Regional Office, additional details have been requested regarding the calculation methodology for the four proposed BMPs that were identified as options for New Sewickley Township to achieve their 10% sediment reduction requirement (5,933 pounds) in accordance with their 2018 small MS4 permit (PAG#136280).

Mr. Vaneck requested an explanation of how the numbers shown in Appendix D of the PRP were obtained to determine the proposed sediment load reductions to be achieved from implementation of these BMPs. The details herein aim to clarify how the BMP areas, runoff storage volumes, etc. were determined to calculate the sediment removal.

Of note, the BMP dimensions (e.g. square footage, storage volume, etc.) identified in the PRP are intended to be conservative planning numbers. The actual BMP dimensions and their corresponding load reductions will be finalized after BMP implementation is underway. For example, the acreage for the proposed rain garden in BMP #1 was a conservative estimate based on a master plan concept. BMP #1 was estimated to be a 500 square foot rain garden with a storage volume of 0.5 foot. It is possible that once New Sewickley Township approaches a final design phase for the rain garden, that the BMP Area could be 1,000 square feet with a storage volume of 0.6 feet; thus, increasing sediment removal beyond the calculations shown in Appendix D.

Please use Appendix D from New Sewickley Township's PRP as a reference to follow along with this Technical Response narrative.

# BMP #1 - Green Valley Twp Park Rain Garden

Green Valley Township Park is a municipally-owned property located less than 500 feet outside of New Sewickley Township's Urban Area. It does not directly receive drainage from New Sewickley Township's MS4 system; however, it was added to the Brush Creek Planning Area because it drains to Brush Creek and because it is one of the few municipally owned properties with opportunities for stormwater BMPs. A 2017 New Sewickley Township master plan proposed a rain garden to be installed at the park between various ballfields and parking lots. Based on the master plan, LandStudies estimated that the rain garden will be 500 square feet (see BMP Area column in Appendix D).

In accordance with the Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects, as cited in the PRP, the Runoff Storage (RS) volume in



acre-feet was calculated by multiplying the BMP Area (500 square feet for BMP #1) by the anticipated depth or increased storage capacity of the BMP, and then divided by 43,560 to convert square feet to acres. For a rain garden and many other Runoff Reduction (RR) BMPs, 0.5 foot is a common depth to use for the RS calculation if there are no project specific details available. The RS for the Green Valley Twp Park was calculated at (500 square feet \* 0.5 feet) / 43560 square feet = 0.00574 acre-feet<sup>A</sup>.

ANOTE: This was displayed as 0.01 in Appendix D.

The area draining to the proposed rain garden area was estimated at 5.8 acres based on the existing two-foot contours. The Impervious Area (IA) as shown in Appendix D was calculated by multiplying 5.8 acres by 7% based on the Statewide MS4 Land Cover Estimates for Outside of UA % Impervious Cover. The Pervious Area was calculated by multiplying 5.8 acres by 93% (100%-7%).

As identified by the Expert Panel, the (RS \* 12) / IA represents the depth of impervious area runoff treated by the BMP. This runoff captured ((0.00574 acre-feet\*12 inches)/0.41 acres = 0.17 inches) for the Green Valley Twp Park Rain Garden, was then used to determine the sediment removal rate as shown in the Expert Panel's Retrofit Removal Adjustor Curve. The Sediment Removal Rate for this BMP equals 25%.

The Sediment Load (lb), as shown in Appendix D, was calculated by multiplying the Impervious Area (0.41 acres) and the Pervious Area (5.39) draining to the BMP multiplied by the Impervious Surface Loading (1,839) and Pervious Surface Loading (264.96) (lb/ac/yr), respectively, as defined in Appendix B of DEP's PRP Instructions for Developed Land Loading Rates for All Other Counties. The sediment load for the drainage area to the proposed Green Valley Twp Park Rain Garden is 10,027.14 lbs per year. The Sediment Removal anticipated from the proposed rain garden equals  $10,027.14 \times 25\% = 2,538.34$  lbs per year.

# BMP #2A - Snyder Drive - South Lot Wet Meadow / Constructed Wetland

The BMP Area of the proposed Snyder Drive South Lot Wet Meadow / Constructed Wetland was estimated at 87,000 square feet based on the assumption that the majority of this parcel of land located on the northeast side of Brush Creek could be utilized for a BMP.

The Runoff Storage (RS) volume in acre-feet was calculated by multiplying the BMP Area (87,000 square feet for BMP #2A) by the anticipated depth or increased storage capacity of the BMP, and then divided by 43,560 to convert square feet to acres. For a wet meadow / constructed wetland and many other Stormwater Treatment (ST) BMPs, there is often less runoff reduction capability than an RR BMP. Therefore, it is common to use a smaller storage capacity factor (0.2 feet in this instance) to calculate the RS volume (unless site specific designs indicate otherwise). The RS for the South Lot Wet Meadow / Constructed Wetland was calculated at (87,000 square feet \* 0.2 feet) / 43560 square feet = 0.4 acrefeet.



The area draining to the proposed BMP was estimated at 3 acres based on the existing twofoot contours. The Impervious Area (IA) as shown in Appendix D was calculated by multiplying 3 acres by 18% based on the Statewide MS4 Land Cover Estimates for UA % Impervious Cover. The Pervious Area was calculated by multiplying 3 acres by 82% (100%-18%).

As identified by the Expert Panel, the (RS \* 12) / IA represents the depth of impervious area runoff treated by the BMP. This runoff captured ((0.4 acre-feet\*12 inches)/0.54 acres = 8.89 inches)<sup>B</sup> for the Snyder Drive South Lot Wet Meadow / Constructed Wetland, is then used to determine the sediment removal rate as shown in the Expert Panel's Retrofit Removal Adjustor Curve. The Sediment Removal Rate for this BMP equals 79%.

<sup>B</sup> NOTE: The Expert Panel's Retrofit Removal Adjustor curves have a maximum runoff depth captured (RS\*12/IA) of 2.5 inches where removal efficiencies level off. Therefore, runoff capture equations calculating greater than 2.5 show a value of 2.5 in Appendix D.

The Sediment Load (lb) for BMP #2A was calculated using the same methodology as described for BMP #1 above. The sediment load for the drainage area to the proposed Snyder Drive South Lot Wet Meadow / Constructed Wetland is 4,667.02 lbs per year. The Sediment Removal anticipated from the proposed rain garden equals 4,667.02 \* 79% = 3,678.16 lbs per year.

# BMP #2B - Snyder Drive - North Lot Wet Meadow / Constructed Wetland

The BMP Area of the proposed Snyder Drive North Lot Wet Meadow / Constructed Wetland was estimated at 56,600 square feet based on the assumption that the majority of this parcel of land outside of the immediate lawn and building could be utilized for a BMP.

The same assumption on storage capacity was used for this Snyder Drive North Lot as was used for the South Lot (BMP #2A). The RS for the Snyder Drive North Lot Wet Meadow / Constructed Wetland was calculated at (56,600 square feet \* 0.2 feet) / 43560 square feet = 0.26 acre-feet.

The area draining to the proposed BMP was estimated at 1.9 acres based on the existing two-foot contours. The Impervious Area (IA) and Pervious Area as shown in Appenxdix D was calculated by multiplying 1.9 acres by the Statewide MS4 Land Cover Estimates.

The runoff captured ((0.26 acre-feet\*12 inches)/0.34 acres= 9.18 inches) <sup>B</sup> for the Snyder Drive North Lot Wet Meadow / Constructed Wetland, is then used to determine the sediment removal rate as shown in the Expert Panel's Retrofit Removal Adjustor Curve. The Sediment Removal Rate for this BMP equals 79%. The Sediment Load (lb) for BMP #2B was calculated using the same methodology as described above. The sediment load for the drainage area to the proposed North Lot Wet Meadow / Constructed Wetland is 2,955.78 lbs per year. The Sediment Removal anticipated from the proposed rain garden equals  $2,955.78 \times 79\% = 2,329.50$  lbs per year.

### BMP #3 - Willowmere Park Road Right-of-Way - Bioswale

The BMP Area of the proposed Willomere Park Road Right-of-Way Bioswale was estimated at 3,000 square feet based on the assumption that approximately 300 feet by 10 feet paralleling the Willowmere Park Road Right-of-Way could be utilized for a bioswale BMP.

The same assumption on storage capacity was used for this BMP #3 as was used for BMPs #2A and #2B. The RS for the Willowmere Park Road Right-of-Way Bioswale was calculated at  $(3,000 \text{ square feet} * 0.2 \text{ feet}) / 43560 \text{ square feet} = 0.01377 \text{ acre-feet}^{c}$ .

°NOTE: This is displayed as 0.01 in Appendix D.

The area draining to the proposed BMP was estimated at 4.8 acres based on the existing two-foot contours. The Impervious Area (IA) and Pervious Area as shown in Appendix D was calculated by multiplying 4.8 acres by the Statewide MS4 Land Cover Estimates.

The runoff captured ((0.01377 acre-feet\*12 inches)/0.86 acres = 0.19 inches) for the Willowmere Park Road Right-of-Way, is then used to determine the sediment removal rate as shown in the Expert Panel's Retrofit Removal Adjustor Curve. The Sediment Removal Rate for this BMP equals 26%.

The Sediment Load (lb) for BMP #3 is calculated using the same methodology as described above. The sediment load for the drainage area to the proposed Willowmere Park Road Right-of-Way Bioswale is 7,467.23 lbs per year. The Sediment Removal anticipated from the proposed rain garden equals 7,467.23 \* 26% = 1,956.04 lbs per year.



New Sewickley Township Pollutant Reduction Plan Technical Response #2 to DEP's PRP Review March 2, 2018



Per a February 27, 2018 telephone conversation with Jim Vaneck from DEP's Southwest Regional Office, modifications to New Sewickley's Brush Creek Planning Area are requested.

The original Brush Creek Planning Area that was submitted to DEP in September 2017 PRP parsed out ("Excluded Area") acreage along Snyder Drive (Urban Area) that does not have any MS4 system. Proposed BMPs #2A and 2B (Snyder Drive Wet Meadow – South Lot and North Lot) covered a total of approximately 3.3 acres in this area with no MS4 system. Per Fall 2016 DEP PRP / TMDL Mapping guidance, "BMPs may be located in the area outside of the planning area that drains the Urban Area." LandStudies asserted that the location of BMPs #2A and #2B met these DEP BMP location guidelines. These 3.3 acres were not included in the existing load in the September 2017 PRP.

Per the directive of Mr. Vaneck and follow up coordination with Lee Murphy of the DEP Central Office, LandStudies has modified the existing load calculations and the Map B2. New Sewickley Township MS4 PRP Map to include the 3.3 acres around BMPs #2A and 2B in the Brush Creek Planning Area. This increased the acreage of the Brush Creek Planning Area to 154.48 acres and decreased the Excluded Area to 266.2 acres, accordingly. The modified Map B2. is attached herein.

The modified existing load table and the load reduction requirements are as follows:

			Urban Area		Non-UA		Final Existing Load
Planning Area Name	UA Acreage	non-UA acreage	Acres Impervious	Acres Pervious	Acres Impervious	Acres Pervious	Sediment Load (lbs)
Brush Creek							
Planning							
Area	79.38	75.10	14.29	65.09	5.26	69.84	61,141.50
Planning							
Area Total							
Acreage:	154.48						
10% Sediment Reduction Requirement						6,114.15	

Revised Existing Loading Rates



BMP ID	BMP Project	Sediment Load
Number		Reduction (lbs)
1	Green Valley Twp Park Rain Garden	2,538
2A	Snyder Drive Wet Meadow – South Lot	3,678
2B	Snyder Drive Wet Meadow – North Lot	2,330
3	Willowmere Park Road Right-of-Way Bioswale	1,956
	Total:	10,502
	10% Reduction Requirement:	6,114.15

Proposed BMPs for New Sewickley Township

With the addition of these 3.3 acres of land along Snyder Drive into the Brush Creek Planning Area, the existing load for New Sewickley Township increases by 1,809.35 pounds to 61,141.50 pounds of sediment. Accordingly, the sediment load reduction requirement increases by 180.93 pounds to 6,114.15 pounds of sediment reduction. Therefore, New Sewickley Township will still achieve their load reduction requirement with the proposed BMPs shown above.

As identified in the September PRP, New Sewickley is committing to meeting the sediment reduction requirements within the five-year permit cycle. Given that the PRP is a planning level document and not a detailed design, the actual load reductions which can be achieved from these proposed BMPs may change with detailed design. For example, BMP #1 may only achieve 2,000 pounds of sediment reduction once constructed, compared to the 2,538 pounds identified herein. Hence the rational for including enough BMPs to achieve over 4,000 pounds more than the 10% sediment reduction requirement in case the circumstances in the design / implementation phase modify the sediment reduction efficacy. That way New Sewickely can still satisfy their 10% sediment reduction requirement despite "real-world" implementation issues.

