



WESTTOWN TOWNSHIP
Chester County, Pennsylvania, United States

Goose Creek TMDL and Pollutant Reduction Plan

for Plum Run, Radley Run, Brandywine Creek, Chester Creek, East Branch Chester Creek, Hunters Run, Ridley Creek

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State Certified DBE/WBE**

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1.0 Purpose and Scope

Westtown Township is required to develop and implement a Total Maximum Daily Load (TMDL) Plan for phosphorous for Municipal Separate Storm Sewer System (MS4) discharges to Goose Creek and a Pollutant Reduction Plan (PRP) for sediment for MS4 discharges to Plum Run, Radley Run, Brandywine Creek, Chester Creek, East Branch Chester Creek, Hunters Run, and Ridley Creek. These plans are required as part of the 2018 National Pollutant Discharge Elimination System (NPDES) MS4 Individual Permit application to the Pennsylvania Department of Environmental Protection (PA DEP).

This document will serve as the single plan for both the TMDL and PRP. This plan has been prepared based on the best and most current guidance made available by PA DEP. Definitions of relevant regulatory terms are provided in Section 6.0.

2.0 Permit Requirements

To develop the Township's TMDL and Pollutant Reduction Plans, it is important to understand the Township's requirements. These are summarized in the following paragraphs.

Goose Creek TMDL

Goose Creek has a TMDL established by the United States Environmental Protection Agency (EPA) for total phosphorous (TP), documented in a report entitled "Nutrient Total Maximum Daily Load in Goose Creek Watershed, Pennsylvania", dated June 30, 2008. The report cites Westtown Township's existing TP load as 1.40 lb/day and allocates a TP load of 0.64 lb/day, which is a required reduction of 53.9 percent. Table 1 below lists each MS4 in the Goose Creek watershed and the corresponding TMDL requirements, taken from Table 3-3 of the Goose Creek TMDL report entitled "Land Based Non-Point TP Load in the Goose Creek Watershed by MS4 Area." This TMDL was developed based on the 2001 National Land Cover Dataset but does not cite pollutant loading rates by land cover.

Table 1: Goose Creek TMDL MS4 Allocations and Required Reductions

MS4 Permit Holder	Area by MS4 (acres)	Existing TP Load (lb/day)	Allocated TP Load (lb/day)	Required Reduction
West Goshen Township	1,488	1.16	0.54	53.9%
West Chester Borough	310	0.24	0.11	53.9%
Westtown Township	1,791	1.40	0.64	53.9%
Thornbury Township (Chester County)	772	0.60	0.28	53.9%
Thornbury Township (Delaware County)	113	0.09	0.04	53.9%
TOTAL:	4,474	3.49	1.61	53.9%

The Township's Goose Creek TMDL Plan must illustrate how the following two (2) objectives will be achieved through the implementation of projects or Best Management Practices (BMPs):

1) Short-term TP reduction

Per the PA DEP TMDL Plan Instructions (3800-PM-BCW0200d Rev. 3/2017), "short-term reduction" is defined as a plan for reducing TP by five (5) percent over the five (5) year permit term (March 16, 2018 to March 15, 2023), if the wasteload allocations (WLAs) or overall required percent reduction of 53.9 percent cannot be achieved during this timeframe.

2) Long-term TP reduction

"Long-term reduction" is defined by the PA DEP TMDL Plan Instructions as a general plan describing how WLAs or overall required percent reductions will ultimately be achieved.

Goose Creek drains to Chester Creek, which is listed as impaired for sediment. By complying with the Goose Creek TMDL requirements, the Township will simultaneously work towards achieving the required sediment reduction for Chester Creek, which is further described below.

PRP for Discharges to Waters Impaired for Sediment

Westtown has MS4 discharges or "outfalls" to Plum Run, Radley Run, Brandywine Creek, Chester Creek, East Branch Chester Creek, Hunters Run, and Ridley Creek, which are all listed by the 2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report (Integrated Report) as impaired for siltation (i.e. sediment) and highlighted in Table 2 below. Therefore, in addition to the Goose Creek TMDL requirement, Westtown Township is required by the PA DEP and Environmental Protection Agency (EPA) to reduce the sediment loading to Plum Run, Radley Run, Brandywine Creek, Chester Creek, East Branch Chester Creek, Hunters Run, and Ridley Creek by ten (10) percent within five (5) years of permit approval by implementing projects or Best Management Practices (BMPs).

Westtown has no outfalls that discharge directly to Brandywine Creek. Brandywine Creek is listed because the Township has outfalls that discharge to Plum Run and Radley Run, which ultimately flow into Brandywine Creek, and the main stem of the Brandywine Creek is listed as impaired for sediment within five (5) miles downstream of the Township's most downstream outfall.

Table 2: PA DEP MS4 Requirements Table (Municipal) Excerpt (last revised May 9, 2017)

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Westtown Twp, Chester County	PAI130528	Yes	TMDL Plan, SP, IP	Ridley Creek	Appendix E-Siltation (5)	Cause Unknown (5), Water/Flow Variability (4c)
				Radley Run	Appendix E-Siltation (4a)	Water Flow Variability (4c)
				Brandywine Creek	Appendix E-Siltation (4a)	
				Hunters Run	Appendix E-Siltation (5)	Cause Unknown (5), Water/Flow Variability (4c)
				Chester Creek	Appendix B-Pathogens (5), Appendix E-Siltation (5)	Cause Unknown (5), Flow Alterations, Other Habitat Alterations, Water Flow Variability (4c)
				East Branch Chester Creek	Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Goose Creek TMDL	TMDL Plan-Nutrients (4a)	Cause Unknown (4a)
				Plum Run	Appendix E-Siltation (4a)	Water/Flow Variability (4c)

3.0 Background/Setting

Westtown Township comprises approximately 8.8 square miles located near the eastern boundary of Chester County, in southeast Pennsylvania (Figure 1). The 2010 Urbanized Area (U.S. Census Bureau) covers the entire land area of the Township.

Figure 1: Westtown Township Location Map



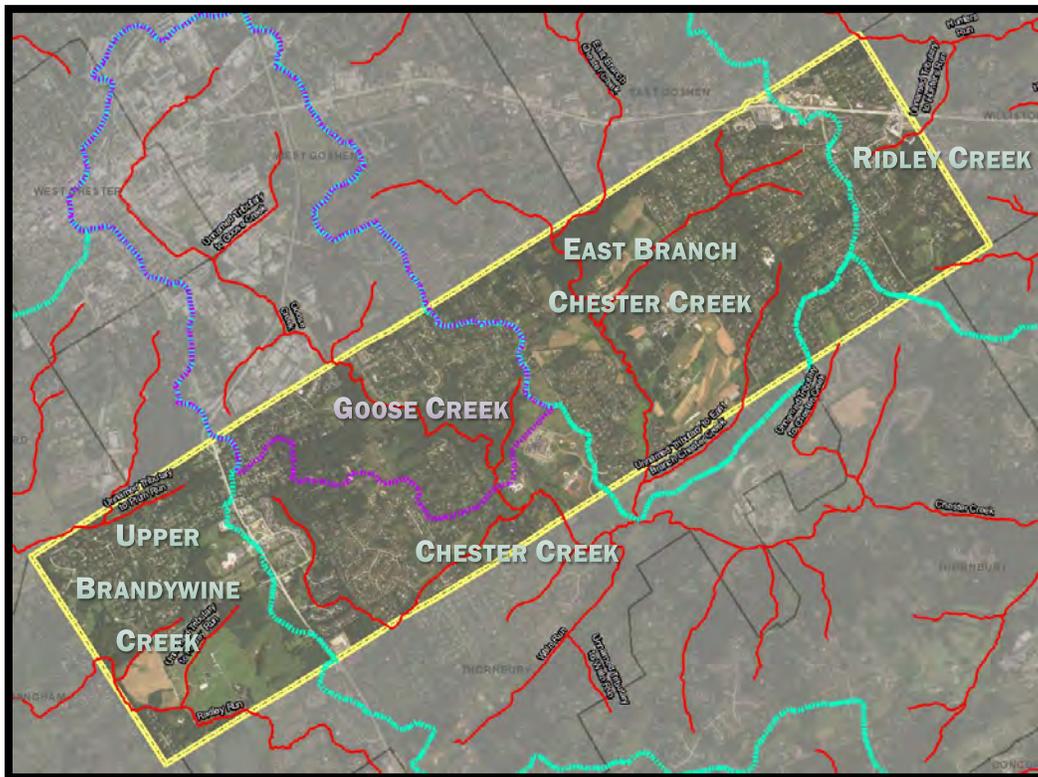
Figure 2 below displays a map of the streams that cross Westtown Township. Stream segments displayed in red indicate impaired streams. All streams mapped in Westtown and the surrounding communities are listed as impaired. The purple dashed line delineates the Goose Creek watershed

and the turquoise dashed lines delineate U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) Hydrologic Unit Code (HUC)-12 boundaries. From southwest to northeast, HUC-12s within Westtown include the following:

- Upper Brandywine Creek (contains Plum Run, Radley Run, and Brandywine Creek)
- Chester Creek (contains Goose Creek TMDL and Chester Creek)
- East Branch Chester Creek
- Ridley Creek (contains Hunters Run and Ridley Creek)

Westtown Township has 210 MS4 outfalls. These MS4 outfalls discharge to the sediment-impaired Plum Run, Radley Run, Brandywine Creek, Chester Creek (includes 45 outfalls that discharge to Goose Creek), East Branch Chester Creek, Hunters Run, and Ridley Creek. A total of forty-five (45) of these 210 MS4 outfalls discharge to Goose Creek.

Figure 2: Westtown Township Impaired Streams



3.1 Plum Run

An unnamed tributary (UNT) to Plum Run originates in the western portion of Westtown Township and flows in a southwesterly direction where it meets another tributary that enters the main stem of Plum Run west of the Township boundary in East Bradford Township. The UNT tributaries are listed as impaired for sediment and water flow variability. Table 3 below lists the impairment information for the UNTs from the 2014 Integrated Report.

There are fourteen (14) MS4 outfalls that discharge to the UNTs to Plum Run. Plum Run discharges to Brandywine Creek and is part of the Upper Brandywine Creek HUC12. Refer to Appendices for MS4 mapping.

Table 3: 2014 Integrated Report – Plum Run

Impairment Cause	Impairment Source	Category	Assessed Use	Date Listed
Water/Flow Variability	Urban Runoff/Storm Sewers	4c	Aquatic Life	1998
Siltation	Urban Runoff/Storm Sewers	4a	Aquatic Life	1998
Siltation	Agriculture	4a	Aquatic Life	1998

3.2 Radley Run

Radley Run flows in a northwesterly direction through the southwestern corner of Westtown Township. Two (2) UNTs originate in the west-central portion of the Township and flow in a southwesterly direction into Radley Run within the boundaries of the Township. Both Radley Run and its tributaries are listed as impaired for sediment and water/flow variability. Table 4 below lists the impairment information from the 2014 Integrated Report.

There are twenty-four (24) MS4 outfalls that discharge to Radley Run and its UNTs. Radley Run discharges to Brandywine Creek and is part of the Upper Brandywine Creek HUC12. Refer to Appendices for MS4 mapping.

Table 4: 2014 Integrated Report – Radley Run

Impairment Cause	Impairment Source	Category	Assessed Use	Date Listed
Water/Flow Variability	Urban Runoff/Storm Sewers	4c	Aquatic Life	2010
Siltation	Agriculture, Urban Runoff/Storm Sewers	4a	Aquatic Life	1998

3.3 Brandywine Creek

Brandywine Creek lies outside of the township to the west. Radley Run and UNTs to Plum Run flow through Westtown Township into Brandywine Creek, which is listed as impaired for sediment. Table 5 below lists the impairment information for Brandywine Creek from the 2014 Integrated Report.

No MS4 outfalls discharge directly to the Brandywine Creek; however, Radley Run and Plum Run both flow into the Brandywine Creek. Brandywine Creek is listed as impaired for sediment. Refer to Appendices for MS4 mapping.

Table 5: 2014 Integrated Report – Brandywine Creek

Impairment Cause	Impairment Source	Category	Assessed Use	Date Listed
Siltation (sediment)	Agriculture, Urban Runoff/Storm Sewers	4a	Aquatic Life	2010

3.4 Chester Creek

Chester Creek originates in the western portion of the Township where it flows in a south-southeasterly direction to the southern boundary of the Township, where it turns and begins flowing in a northeasterly direction. Goose Creek flows into Chester Creek before it turns south-southeast again and continues to flow out of the Township in a south-southeasterly direction. There are outfalls that drain to Chester Creek in the south-eastern half of the Township. Chester Creek is listed as impaired for sediment, other habitat alterations, water/flow variability and cause unknown. Table 6 below lists the impairment information from the 2014 Integrated Report.

There are ninety-four (94) MS4 outfalls that discharge to Chester Creek listed as impaired for sediment. Refer to Appendices for MS4 mapping.

Table 6: 2014 Integrated Report – Chester Creek

Impairment Cause	Impairment Source	Category	Assessed Use	Date Listed
Cause Unknown	Urban Runoff/Storm Sewers	4a	Aquatic Life	2014
Siltation	Urban Runoff/Storm Sewers	5	Aquatic Life	2014
Other Habitat Alterations	Habitat Modifications	4c	Aquatic Life	2014
Water/Flow Variability	Urban Runoff/Storm Sewers	4c	Aquatic Life	2014

3.5 Goose Creek (TMDL)

Goose Creek flows through the center of the Township in a southeasterly direction until it meets Chester Creek at the southern boundary of the Township. Goose Creek roughly parallels the railroad that transects the Township. Table 7 below lists the impairment information from the 2014 Integrated Report.

There are forty-five (45) MS4 outfalls that discharge to Goose Creek. Goose Creek has a TMDL for phosphorous as referenced in Section 2.0. It is also listed as impaired for sediment. Refer to Appendices for MS4 mapping.

Table 7: 2014 Integrated Report – East Branch Chester Creek

Impairment Cause	Impairment Source	Category	Assessed Use	Date Listed
Water/Flow Variability	Urban Runoff/Storm Sewers	4c	Aquatic Life	2014
Other Habitat Alterations	Habitat Modification	4c	Aquatic Life	2014
Cause Unknown	Urban Runoff/Storm Sewers	5	Aquatic Life	2014
Siltation	Urban Runoff/Storm Sewers	5	Aquatic Life	2014

3.6 East Branch Chester Creek

The East Branch Chester Creek flows through the center of the Township (east of Goose Creek), roughly paralleling the western side of Westtown Road. There are multiple unnamed tributaries to East Branch Chester Creek within the Township, all of which are listed as impaired for sediment, water/flow variability, other habitat alterations, and cause unknown. Table 8 below lists the impairment information from the 2014 Integrated Report.

There are one-hundred fifty-nine (159) MS4 outfalls that discharge to East Branch Chester Creek and its UNTs that are listed as impaired for sediment. Refer to Appendices for MS4 mapping.

Table 8: 2014 Integrated Report – East Branch Chester Creek

Impairment Cause	Impairment Source	Category	Assessed Use	Date Listed
Cause Unknown	Urban Runoff/Storm Sewers	5	Aquatic Life	2014
Other Habitat Alterations	Habitat Modification	4c	Aquatic Life	2014
Siltation	Urban Runoff/Storm Sewers	5	Aquatic Life	2014
Water/Flow Variability	Urban Runoff/Storm Sewers	4c	Aquatic Life	2014

3.7 Hunters Run

Hunters Run flows across the northeastern corner of the Township in a southeasterly direction. An unnamed tributary to Hunters Run originates in the eastern portion of the Township and flows in an east-northeasterly direction, eventually into Hunters Run outside of the Township boundary to the east. Hunters Run and its tributary are listed as impaired for sediment. This stream was listed as impaired for other water/flow variability, siltation and cause unknown in 2012. Table 9 below lists the impairment information from the 2014 Integrated Report.

There are ten (10) MS4 outfalls that discharge to Hunters Run and its UNT. Refer to Appendices for MS4 mapping.

Table 9: 2014 Integrated Report – Hunters Run

Impairment Cause	Impairment Source	Category	Assessed Use	Date Listed
Cause Unknown	Urban Runoff/Storm Sewers	5	Aquatic Life	2012
Water/Flow Variability	Urban Runoff/Storm Sewers	4c	Aquatic Life	2012
Siltation	Urban Runoff/Storm Sewers	5	Aquatic Life	2012

3.8 Ridley Creek

An unnamed tributary to Ridley Creek originates in the southeastern corner of the Township and flows in an easterly direction out of the Township eventually into Ridley Creek. This tributary is listed as impaired for sediment, water/flow variability, and cause unknown. Table 10 below lists the impairment information for the UNT from the 2014 Integrated Report.

There are three (3) MS4 outfalls that discharges to the UNT to Ridley Creek listed as impaired for sediment. Refer to Appendices for MS4 mapping.

Table 10: 2014 Integrated Report – Ridley Creek

Impairment Cause	Impairment Source	Category	Assessed Use	Date Listed
Cause Unknown	Urban Runoff/Storm Sewers	5	Aquatic Life	2012
Water/Flow Variability	Urban Runoff/Storm Sewers	4c	Aquatic Life	2012
Siltation	Urban Runoff/Storm Sewers	5	Aquatic Life	2012

4.0 Pollutant Reduction

Per the MS4 permit and PRP Instructions document (3800-PM-BCW0100k Rev. 3/2017), the following sections are addressed below: Public Participation, Storm Sewersheds, Pollutants of Concern, Existing Sediment Loading, Proposed Best Management Practices (BMPs), Funding Mechanisms, and Operations and Maintenance.

4.1 Public Participation

The TMDL-PRP was updated in May 2018 to address comments received from the PA DEP in a letter dated January 30, 2018. The proposed BMPs changed as a result of addressing these comments. The Township plans to go through the required public participation process once the updated TMDL-PRP is approved by PA DEP. Once complete, documentation will be forwarded to PA DEP under separate cover.

Westtown Township made the original TMDL-PRP available to the public to review and provide comment for thirty (30) days. A copy of the public notice published in the Daily Local News is in Appendix A. No comments were received.

The PRP was presented at the Board of Supervisors workshop meeting on June 5, 2017 and a regular Board of Supervisors meeting on June 19, 2017. Comments were accepted at this meeting from any interested members of the public.

4.2 Storm Sewersheds/Planning Area

Storm sewersheds, the areas which drain to each of the 210 outfalls, were manually delineated in ArcMap 10.6 using two (2) foot topographic contours from the 2006-2008 PAMAP Program data published by the Pennsylvania Department of Conservation and Natural Resources (DCNR), while referencing Google Street View and multiple sources of aerial imagery.

“Parsing” is defined by the PRP Instructions Attachment A, entitles “Parsing Guidelines for MS4s in Pollutant Reduction Plans”, as a “process in which land area is removed from a Planning Area in

order to calculate the actual or target pollutant loads that are applicable to an MS4.” The examples cited include:

- 1) The land area associated with non-municipal stormwater NPDES permit coverage that exists within the urbanized area of a municipality;
- 2) Land area associated with PennDOT roadways and the Pennsylvania Turnpike (roads and right of ways);
- 3) Lands associated with the production area of a Concentrated Animal Feeding Operation that is covered by an NPDES permit;
- 4) Land areas in which stormwater runoff does not enter the MS4. If an accurate storm sewershed map is developed, these lands may be parsed or excluded as part of that process.

Land areas that have been parsed from the Planning Area during the development of this PRP fall under category #2 and #4 as describe above. These parsed areas have been further categorized and identified on the Storm Sewershed/Planning Area Map in Appendix D.

Storm sewersheds that extend outside of the municipal boundary are not included in the overall planning area. The drainage areas to existing, and/or proposed, BMPs located outside of the storm sewersheds were added to the overall planning area.

Per the “Pollutant Aggregation Suggestions for MS4 Requirements Table Instructions” (dated April 4, 2017) and the “Pollutant Aggregation Suggestions for MS4 Requirements Table (Municipal)” (revised May 9, 2017), Westtown Township may achieve the ten (10) percent sediment pollutant reduction in the following aggregated Planning Areas, as opposed to a 10 percent reduction in the Planning Areas for each receiving impaired surface water.

Table 11: Pollutant Aggregation Suggestions for MS4 Requirements Table (Municipal) Excerpt

MS4 Name	NPDES ID	HUC-12	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)
Westtown Twp, Chester County	PA1130528	Middle Brandywine Creek, Upper Brandywine Creek	Brandywine Creek, Plum Run, Radley Run	Appendix E-Siltation
		Chester Creek	Chester Creek, Goose Creek TMDL	Appendix B-Pathogens, TMDL Plan-Nutrients
		Chester Creek, East Branch Chester Creek, Ridley Creek	Chester Creek, East Branch Chester Creek, Hunters Run, Ridley Creek	Appendix E-Siltation

To simplify planning and reporting efforts, from this point forward the report will reference the Middle Brandywine Creek/ Upper Brandywine Creek PRP Planning Area, the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area, and the Goose Creek TMDL Planning Area (which is also contained within the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area, since Goose Creek drains to Chester Creek).

4.3 Pollutants of Concern

Westtown Township is required to reduce total phosphorous loading for MS4 outfalls that discharge to Goose Creek per the TMDL. Additionally, for the PRPs, Westtown Township is required to reduce sediment loading for MS4 outfalls that discharge to waters impaired by sediment, which includes all receiving streams within the Township.

To meet the PRP requirements, a minimum of ten (10) percent sediment reduction within five (5) years of permit approval has been demonstrated in this plan. Though not required, existing loading and BMP reduction calculations were also provided for phosphorous and nitrogen in Appendix C.

To meet the short- and long-term Goose Creek TMDL reduction objectives, the entire 53.9 percent total phosphorous reduction required has been demonstrated as being implemented within five (5) years of permit approval in this plan.

4.4 Existing Pollutant Loading

To determine existing sediment loading to Plum Run, Radley Run, Brandywine Creek, Chester Creek, East Branch Chester Creek, Hunters Run, and Ridley Creek, the general methodology described in the DEP guidance document entitled “Pollution Reduction Plan: A Methodology” was used. To provide a consistent calculation methodology across the Goose Creek TMDL and the PRP requirements, the total phosphorous allocation for Goose Creek was recalculated for the Goose Creek Planning Area per the same methodology. The short and long-term reduction objectives of the TMDL were then applied to the recalculated load.

Utilizing ArcGIS 10.6, 2011 National Land Cover Dataset (NLCD) data, the acreage of each land cover classification type within the Planning Area was calculated.

The aggregate National Land Cover Data (NLCD) statistics within the Planning Areas for each aggregation group is compiled in Table 12 below with a breakdown of the area by land cover classification type. Refer to Appendix F for the Land Cover Map.

Table 12: NLCD 2011 Land Cover by PRP Planning Area

PRP Planning Area/Aggregated HUC-12s	Aggregated Receiving Sediment-Impaired Surface Waters	NLCD 2011 Land Cover Classification within Planning Area	Area (acres)	Percent Impervious	Impervious Area (acres)	Pervious Area (acres)
Middle Brandywine Creek/ Upper Brandywine Creek	Brandywine Creek, Plum Run, Radley Run	Developed, Open Space	306.80	19	58.29	248.51
		Developed, Low Intensity	14.12	49	6.92	7.20
		Developed, Medium Intensity	8.52	79	6.73	1.79
		Developed, High Intensity	3.16	100	3.16	0
		Deciduous Forest	70.04	0	0	70.04
		Evergreen Forest	2.03	0	0	2.03
		Mixed Forest	13.27	0	0	13.27
		Shrub/Scrub	33.76	0	0	33.76
		Hay/Pasture	45.87	0	0	45.87
		Cultivated Crop	10.03	0	0	10.03
		Woody Wetlands	1.36	0	0	1.36
		Grassland/Herbaceous	1.33	0	0	1.33
TOTAL:			510.29		75.10	435.19
Chester Creek/East Branch Chester Creek/Ridley Creek	Chester Creek, East Branch Chester Creek, Hunters Run, Ridley Creek, Goose Creek	Developed, Open Space	1494.95	19	284.04	1210.91
		Developed, Low Intensity	206.13	49	101.00	105.13
		Developed, Medium Intensity	77.20	79	60.99	16.21
		Developed, High Intensity	10.44	100	10.44	0
		Deciduous Forest	421.95	0	0	421.95
		Evergreen Forest	16.01	0	0	16.01
		Mixed Forest	38.24	0	0	38.24
		Shrub/Scrub	109.74	0	0	109.74
		Hay/Pasture	67.97	0	0	67.97
		Cultivated Crop	11.97	0	0	11.97
		Woody Wetlands	37.12	0	0	37.12
		Emergent Herbaceous Wetland	0.72	0	0	0.72
		Grassland/Herbaceous	1.56	0	0	1.56
TOTAL:			2494.00		456.47	2037.53

The Goose Creek TMDL Planning Area is located within and included in the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area. However, because Goose Creek has a separate TMDL requirement, this information is also provided separately in Table 13 below.

Table 13: NLCD 2011 Land Cover within Goose Creek TMDL Planning Area

TMDL Planning Area	NLCD 2011 Land Cover Classification within Planning Area	Area (acres)	Percent Impervious	Impervious Area (acres)	Pervious Area (acres)
Goose Creek	Developed, Open Space	332.55	19	63.18	269.37
	Developed, Low Intensity	28.73	49	14.08	14.65
	Developed, Medium Intensity	5.66	79	4.47	1.19
	Developed, High Intensity	0.67	100	0.67	0
	Deciduous Forest	154.02	0	0	154.02
	Evergreen Forest	2.65	0	0	2.65
	Mixed Forest	8.35	0	0	8.35
	Shrub/Scrub	35.28	0	0	35.28
	Hay/Pasture	17.35	0	0	17.35
	Woody Wetlands	6.64	0	0	6.64
	Grassland/Herbaceous	1.56	0	0	1.56
	Cultivated Crops	3.78	0	0	3.78
TOTAL:		597.24		82.40	514.84

“Developed” land cover classifications were then converted to percent impervious coverage based on the NLCD 2011 definitions. The impervious percentages used are as follows:

- Developed, Open Space – 19% impervious
- Developed, Low Intensity – 49% impervious
- Developed, Medium Intensity – 79% impervious
- Developed, High Intensity – 100% impervious

All other land cover classifications were assumed to be 100 percent pervious. The “Developed Land Loading Rates for PA Counties” (Attachment B of the PRP Instructions) for Chester County were then applied for impervious developed and pervious developed land categories. This table is attached as Appendix B.

The existing PRP sediment loading is in Table 14 below. Please refer to Appendix C for supporting calculations. Calculations for phosphorous and nitrogen loading have also been provided, though not required. The recalculated total phosphorous loading for Goose Creek is in Table 15 below.

The existing sediment loading quantified from the Middle Brandywine Creek/Upper Brandywine Creek PRP Planning Area is 193,571.35 lbs/yr. The existing sediment loading quantified from the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area is 1,064,074.48 lbs/yr. A more detailed breakdown is in the table below. Please refer to Appendix C for supporting calculations.

Table 14: Existing Sediment Loading for PRP Planning Areas

PRP Planning Area	Category	Area (ac)	TSS [Sediment] (lbs/yr)
Middle Brandywine Creek/ Upper Brandywine Creek	Impervious, Developed	75.10	113,008.98
	Pervious, Developed	435.19	80,562.37
SUBTOTAL:		510.29	193,571.35
Existing BMP Reduction:			4,422.48
TOTAL:			189,148.87
Required 10% Sediment Reduction			18,914.89
Chester Creek/East Branch Chester Creek/Ridley Creek/Goose Creek	Impervious, Developed	456.47	686,886.93
	Pervious, Developed	2,037.53	377,187.55
SUBTOTAL:		2,494.00	1,064,074.48
Existing BMP Reduction:			29,157.21
TOTAL:			1,034,917.27
Required 10% Sediment Reduction			103,491.73

The existing (recalculated) total phosphorous loading for the Goose Creek TMDL is 305.65 lbs/yr and is provided separately in Table 15 below. Please refer to Appendix C for supporting calculations.

Table 15: Existing Phosphorous Loading for Goose Creek TMDL Planning Area

TMDL Planning Area	Category	Area (ac)	TP [Phosphorous] (lbs/yr)
Goose Creek	Impervious, Developed	82.40	120.30
	Pervious, Developed	514.84	185.34
TOTAL:		597.24	305.65
Required Short-Term 5% Phosphorous Reduction			15.28
Required Long-Term 53.9% Phosphorous Reduction			164.75

Eight (8) existing BMPs were credited to reduce the existing loading to 189,148.87 lbs/yr for the Middle Brandywine Creek/Upper Brandywine Creek and 1,034,917.27 lbs/yr for the Chester Creek/East Branch Chester Creek/Ridley Creek, which resulted in a required 10 percent reduction of 18,914.89 lbs/yr for the Middle Brandywine Creek/Upper Brandywine Creek and 103,491.73 lbs/yr for the Chester Creek/East Branch Chester Creek/Ridley Creek. Each existing BMP is described below and summarized in Table 16. Please refer to Appendix C for supporting calculations and the Storm Sewershed Map in Appendix E for BMP locations. Individual maps of the existing BMPs and their drainage areas are located in Appendix D.

Westtown Reserve Dry Extended Detention Basin

This extended detention basin is located at the corner of Pleasant Grove Road and Skiles Boulevard. The basin is associated with Outfall #76. The basin is functioning and is operated and maintained by Westtown Apartments Property Owner, LLC. The total drainage area is 17.27 acres; it provides a total sediment pollutant load reduction of 10,810.08 lbs./yr.

Figure 3: Overall View of Westtown Reserve Dry Extended Detention Basin



Simon and Jude Detention Basin

This detention basin is located near the corner of Cavanaugh Court and Chester Road. The basin is associated with Outfall #45. The basin is functioning and is operated and maintained by Archdiocese of Philadelphia. The total drainage area is 6.00 acres; it provides a total sediment pollutant load reduction of 2,440.06 lbs./yr.

Figure 4: Overall View of Simon and Jude Detention Basin



Kolbe Lane Extended Detention Basin

This detention basin is located off of Kolbe Lane behind house #1128. The basin is associated with Outfall #161. The basin is functioning and is operated and maintained by John Zabilowicz and Maryann Rock-Zabilowicz. The total drainage area is 12.35 acres; it provides a total sediment pollutant load reduction of 3,224.54 lbs./yr.

Figure 5: Overall View of Kolbe Lane Extended Detention Basin



West Glen Extended Detention Basin

This detention basin is located near the corner of Piedmont Road and Dalmally Drive. The basin is associated with Outfall #77. The basin is functioning and is operated and maintained by West Glen Community Association. The total drainage area is 14.93 acres; it provides a total sediment pollutant load reduction of 5,134.29 lbs./yr.

Figure 6: Overall View of West Glen Extended Detention Basin



Kilduff Circle Extended Detention Basin

This detention basin is located behind 940 Kilduff Circle. The basin is associated with Outfall #24. The basin is functioning and is operated and maintained by Russell Hatton and Shirley Leclerc. The total drainage area is 35.39 acres; it provides a total sediment pollutant load reduction of 7,548.24 lbs./yr.

Figure 7: Overall View of Kilduff Circle Extended Detention Basin



Arborview Basin

This basin is located near the corner of Wilmington Pike and Pleasant Grove Road. The basin is associated with Outfall #58. The basin is functioning and is operated and maintained by Arborview HOA. The total drainage area is 13.42 acres; it provides a total sediment pollutant load reduction of 2,820.80 lbs./yr.

Figure 8: Overall View of Arborview Basin



Arborview Infiltration Trench

This infiltration trench is located between Hidden Pond Way and West Pleasant Grove Road. The basin is associated with Outfall #58. The basin is functioning and is operated and maintained by Arborview HOA. The total drainage area is 5.32 acres; it provides a total sediment pollutant load reduction of 2592.49 lbs./yr.

Figure 9: Overall View of Arborview Infiltration Trench



Stetson Middle School Basin

This basin is located on Stetson Middle School grounds; 1060 Wilmington Pike. The basin is associated with Outfall #20. The basin is functioning and is operated and maintained by West Chester Area School District. The total drainage area is 4.88 acres; it provides a total sediment pollutant load reduction of 1,009.19 lbs./yr.

Figure 10: Overall View of Stetson Middle School Basin



Table 16: Existing BMP Sediment Reduction

BMP Name	Drainage Area (ac)	TSS [Sediment] Reduction
Chester Creek/East Branch Chester Creek/Ridley Creek		
Westtown Reserve Dry Extended Detention Basin	17.27	10,810.08
Simon and Jude Detention Basin	6.00	2,440.06
Kolbe Lane Extended Detention Basin	12.35	3,224.54
West Glen Extended Detention Basin	14.93	5,134.29
Kilduff Circle Extended Detention Basin	35.39	7,548.24
SUBTOTAL:	85.94	29,157.21
Middle Brandywine Creek/Upper Brandywine Creek		
Arborview Basin	13.42	2,820.80
Arborview Infiltration Trench	5.32	592.49
Stetson Middle School Basin	4.88	1,009.19
SUBTOTAL:	23.62	4,422.48
TOTAL:	109.56	33,579.69

4.5 Proposed Best Management Practices (BMPs)

Proposed BMP locations were identified in coordination with the Township by analyzing the most fiscally responsible solutions that will provide a water quality improvement and real-world benefit, while meeting the mandated pollutant reduction requirements. This analysis was performed in ArcMap 10.6 using aerial imagery, two (2)-foot topographic contours, and hydrologic data. Site visits were conducted to verify project viability and to collect information and measurements of existing BMPs.

Where possible, BMPs that treat a larger drainage area were selected to reduce the number of BMPs to be implemented. Existing BMPs on Township-owned property within the Planning Areas were assessed for retrofit. After those opportunities were exhausted, existing BMPs on homeowner's association (HOA)-owned property within the Planning Areas were assessed for retrofit. Lastly, new BMPs on Township-owned and HOA-owned property within the Planning Area were explored.

Pollutant reductions resulting from the proposed BMPs were quantified using the same methodology described above for existing sediment loading within the drainage area for each BMP, then applying reduction rates. Reductions from new BMPs (infiltration trenches and bioretention swale) were calculated using the efficiency rates specified in the NPDES Stormwater Discharges from Small MS4s BMP Effectiveness Values table (May 2016). Reductions from retrofits of existing BMPs were calculated using the methodology in the "Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects" (revised January 20, 2015). Please refer to Appendix C for supporting calculations.

TMDL and PRP Objectives

Westtown Township proposes to meet the entire Goose Creek TMDL total phosphorous reduction requirement of 53.9 percent through an existing BMP, and four (4) basin retrofit projects within five (5) years of permit approval and approximately 1,750 linear feet of stream restoration (>5 years) for the Goose Creek TMDL Planning Area. The location(s) of the 1,750 linear feet of stream restoration have not yet been determined and will be explored as the next permit term approaches.

Because Goose Creek drains to Chester Creek, these BMPs will also satisfy a portion of the ten (10) percent sediment load reduction requirements within the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area. A stream restoration project along a reach of East Branch Chester Creek, referred to as Pleasant Grove Stream Restoration, will satisfy the remainder of these requirements.

The Township will meet its ten (10) percent sediment load reduction requirements within the Middle Brandywine Creek/Upper Brandywine Creek PRP Planning Area through the implementation of a stream restoration project along Radley Run along with three (3) basin retrofit projects.

Maps of the proposed BMPs and the land cover within their drainage areas are in Appendix D. The BMP locations are also illustrated on the Storm Sewershed/Planning Area Map in Appendix E and the Land Cover Map in Appendix F.

Pollutant Load Reductions through Proposed BMP Implementation

Phosphorous load reductions achieved through the implementation of the proposed BMPs in the Goose Creek TMDL Planning area are documented in Table 17.

Table 17: Goose Creek TMDL Planning Area: Total Phosphorous Load Reductions from Proposed BMPs

Timeline	BMP Name	Drainage Area (ac)	TP Reduction		
			lbs/yr	% Reduction	% of Required Reduction to meet 53.9%
2019-2024	Tyson Park Bioswale (installed 2015)	41.4	17.01	5.57	10.32
	Thorne Drive Basin Retrofit	19.86	9.02	2.95	5.47
	Sage Road Basin Retrofit	22.44	9.65	3.16	5.86
	Wild Goose Farms Basin B Retrofit	9.95	5.04	1.65	3.06
	Wild Goose Farms Basin A Retrofit	14.29	7.32	2.39	4.
SUB-TOTAL:		107.94	48.04	15.72	29.16
>2024	Stream Restoration	1750 LF	119.0	38.93	72.23
SUB-TOTAL:			115.6	38.93	72.23
TOTAL:		107.94	167.04	54.65	101.39

Sediment load reductions achieved through the implementation of the proposed BMPs in each PRP Planning Area are in Table 18 below. Because the Goose Creek TMDL Planning Area is contained within the Chester Creek/ East Branch Chester Creek/ Ridley Creek PRP Planning Area, these BMPs were also counted towards the PRP sediment reduction requirements.

Table 18: PRP Planning Areas: Sediment Load Reductions from Proposed BMPs

PRP Planning Area	BMP Name	Drainage Area (ac)	TSS Reduction		
			lbs/yr	% Reduction	% of Required Reduction
Chester Creek/ East Branch Chester Creek/ Ridley Creek (contains Goose Creek TMDL Planning Area)	Tyson Park	36.63	11,516.31	1.33	13.31
	Thorne Drive Basin Retrofit	19.86	7,389.28	0.72	7.23
	Sage Road Basin Retrofit	22.44	8,212.53	0.80	78.04
	Wild Goose Farms Basin B Retrofit	9.95	4,645.54	0.45	4.55
	Wild Goose Farms Basin A Retrofit	14.29	6,550.35	0.64	6.41
	Pleasant Grove Stream Restoration	1600 LF	71,808.00	7.03	70.30
TOTAL:		107.94	94,248.87	10.99	109.9
Middle Brandywine Creek/Upper Brandywine Creek	Dunvegan Road Basin Retrofit	9.9	3,342.41	1.77	17.67
	General Greene Basin B Retrofit	12.39	3,204.12	1.69	16.94
	General Greene Basin A Retrofit	9.76	3,857.06	2.04	20.39
	Radley Run Stream Restoration	190 LF	8,527.20	4.51	45.08
TOTAL:		32.04	18,930.79	10.01	100.08

Detailed BMP Descriptions – Short-Term (2019 – 2024)

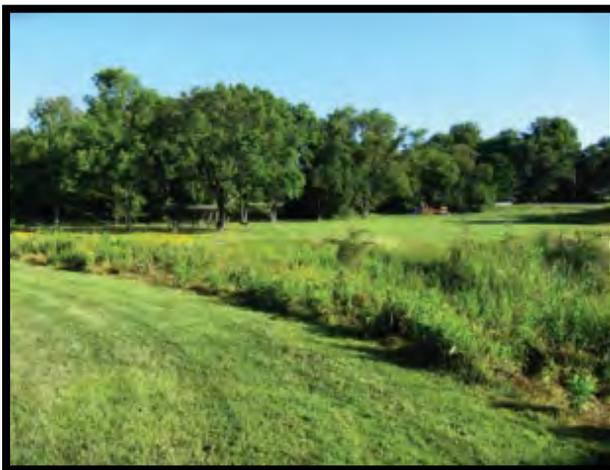
Each of the BMPs proposed to meet short-term objectives are described in more detail below.

Tyson Park Bioswale (Existing)

A bioswale was designed and constructed in Tyson Park, a Township-owned park property, in 2015, in anticipation of the TMDL Plan requirements. The drainage area to the bioswale is 41.4 acres. This existing BMP has been properly maintained by the Township as illustrated in the photograph below. The Township has also installed educational signage as a component of the project.

It is being credited as reducing the existing sediment loading for the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area and towards achieving the long-term total phosphorous reduction of 53.9 percent in the Goose Creek TMDL Planning Area, reducing total phosphorous loading by 17.01 lbs/year (5.57 percent).

Figure 11: Tyson Park Bioswale and Signage



Thorne Drive Basin Retrofit

This existing basin is located in the southwest quadrant of the intersection of Thorne Drive and Little Shiloh Road in the west-central portion of the Township on a Township-owned property. The basin has a drainage area of 19.86 acres. The existing basin is located outside of the Planning Area as the outfall is located to the north in West Goshen Township. Therefore, the drainage area has been added to the Goose Creek TMDL Planning Area and the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area and accounted for in the existing loading.

The basin is overgrown and has reduced volume capacity. In addition, a defined channel has eroded through it causing the basin to short-circuit. The existing outlet of the basin is an open pipe that is

the same elevation as the basin bottom. The basin effectively holds no water during smaller storm events, providing no water quality benefit.

The scope of the proposed retrofit includes removing the trees, vegetation, and sediment accumulation, regrading/removing the defined channel, and installing a new outlet structure that has a low-flow orifice to provide infiltration and extended detention. This project will provide an estimated removal of 7,389.28 lbs/yr of sediment (0.72 percent) within the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area and an estimated removal of 9.02 lbs/yr of total phosphorous (2.95 percent) within the Goose Creek TMDL Planning Area.

Sage Road Basin Retrofit

This existing basin is located at the southern end of a cul-de-sac off Sage Road on a Township-owned property. It has been proposed to retrofit this existing basin. The basin has a drainage area of 22.44 acres. Goose Creek is the receiving stream for this area, which lies within the Chester Creek Hydrologic Unit Code (HUC) 12.

The basin is overgrown and has accumulated mounds of sediment in some areas. The scope of the proposed retrofit includes removing trees and shrubs, accumulated sediment, as well as modifying the outlet structure orifice to increase volume treated through infiltration and extended detention. Assumptions for the preliminary calculations included reducing the orifice from 12 inches to 6 inches through the installation of a steel plate and coring 6-inch orifice 2 feet above the basin bottom. This project will provide an estimated removal of 8,212.53 lbs/yr of sediment (0.80 percent) within the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area and an estimated removal of 9.65 lbs/yr of total phosphorus (3.16 percent) within the Goose Creek TMDL Planning Area.

Radley Run Stream Restoration

The section of Radley Run proposed for restoration is located on the west side of S. New Street between W. Pleasant Grove Road and W. Street Road on private property. This reach has been identified for restoration based on the presence of bank erosion and the lack of tree removal required. Radley Run is the receiving stream for this area, which lies within the Upper Brandywine Creek Hydrologic Unit Code (HUC) 12.

For the purposes of this plan, it has been assumed that approximately 190 linear feet of restoration will be completed at a sediment reduction rate of 44.88/lbs/ft/yr. This project will provide an estimated removal of 8,527.20 lbs/yr of sediment (4.51 percent) within the Middle Brandywine Creek/Upper Brandywine Creek PRP Planning Area, far exceeding the total ten (10) percent sediment reduction required within this planning area.

Wild Goose Farms Basin B Retrofit

This existing basin is located to the west of the intersection of Picket Way and Trellis Lane on a property owned by Wild Goose Farms Homeowners Association (HOA). It has been proposed to retrofit this existing basin. The basin has a drainage area of 9.95 acres. Goose Creek is the receiving stream for this area, which lies within the Chester Creek Hydrologic Unit Code (HUC) 12.

The scope of the proposed retrofit includes the removal of a concrete low flow channel, regrading the basin bottom and a modification to the outlet structure orifice to increase volume treated through infiltration and extended detention. Assumptions for the preliminary calculations included sealing the basin outlet structure orifice, which is currently 6-inches, through the installation of a steel plate and coring a 6-inch orifice 1.5-feet above the basin bottom. This project will provide an estimated removal of 4,645.54 lbs/yr of sediment (0.45 percent) within the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area and an estimated removal of 5.04 lbs/yr of total phosphorus (1.65 percent) within the Goose Creek TMDL Planning Area.

Wild Goose Farms Basin A Retrofit

This existing basin is located to the west of the cul-de-sac on Picket Way on a property owned by Wild Goose Farms HOA. It has been proposed to retrofit this existing basin. The basin has a drainage area of 14.29 acres. Goose Creek is the receiver stream for this area, which lies within the Chester Creek Hydrologic Unit Code (HUC) 12.

There is currently minimal distance between the inlet and outlet of the basin, as well as a concrete low flow channel, which is causing the basin to short-circuit. The scope of the proposed retrofit includes the removal of a concrete low flow channel, regrading the basin bottom, creating a long meandering vegetated channel, and modifying the outlet structure orifice to increase volume treated through infiltration and extended detention. Assumptions for the preliminary calculations included sealing the existing 6-inch outlet structure orifice through the installation of a steel plate. This project will provide an estimated removal of 6,550.35 lbs/yr of sediment (0.64 percent) within the Chester Creek/East Branch Chester Creek/Ridley Creek PRP Planning Area and an estimates removal of 7.32 lbs/yr of total phosphorus (2.39 percent) within the Goose Creek TMDL Planning Area.

Pleasant Grove Stream Restoration

An approximately 1,600 linear foot section of East Branch Chester Creek is being proposed for floodplain restoration within the Pleasant Grove development. This section of East Branch Chester Creek flows through a large, open space property owned by the Township in an easterly direction. Chester Creek is the receiving stream for this area, which lies within the Chester Creek Hydrologic Unit Code (HUC) 12.

A feasibility study was completed in December 2018 by LandStudies, Inc. The recommended length and location of restoration includes two sections of East Branch Chester Creek totaling approximately

1,450 linear feet from Tower Course Road to Blenheim Road and from Blenheim Road to South Concord Road. An additional 150 linear feet of restoration on the tributary from the existing pond is recommended for an overall total restoration length of 1,600 linear feet. The feasibility study indicates that this reach demonstrates an excellent opportunity for floodplain restoration because of the following factors:

- 1) High degree of channel instability and overall need for restoration.
- 2) Adequate amount of available space (width) for use as floodplain exists on-site.
- 3) High potential for significant measurable ecological uplift.
- 4) Limited existing tree cover (mostly all invasive/undesirable); and well-defined tie-in locations (bridges).

The 1,600 linear feet of stream restoration implemented with a sediment reduction rate of 44.88/lbs/ft/yr will yield an estimated removal of 71,808 lbs/yr of sediment (7.03 percent) within the Chester Creek PRP Planning Area.

Dunvegan Road Basin Retrofit

This existing basin is located southeast of the intersection of S. New Street and Dunvegan Road on a private residential property. It has been proposed to retrofit this existing basin. The basin has a drainage area of 9.9 acres. Radley Run is the receiver stream for this area, which lies within the Upper Brandywine Creek Hydrologic Unit Code (HUC) 12.

The scope of the proposed retrofit includes removing trash and debris, regrading the basin bottom, and modifying the outlet structure orifice to increase volume treated through infiltration and extended detention. Assumptions for the preliminary calculations included sealing the existing 9-inch orifice, through the installation of a steel plate and coring a 4-inch orifice 2-feet above the basin bottom. This project will provide an estimated removal of 3,342.41 lbs/yr of sediment (1.77 percent) within the Middle Brandywine Creek/Upper Brandywine Creek PRP Planning Area.

General Greene B Basin Retrofit

This existing basin is located southwest of the intersection of General Greene Drive and S. New Street on a private residential property. It has been proposed to retrofit this existing basin. The basin has a drainage area of 12.38 acres. Radley Run is the receiver stream for this area, which lies within the Upper Brandywine Creek Hydrologic Unit Code (HUC) 12.

The scope of the proposed retrofit includes removal of sediment and debris, regrading the basin bottom, and modifying the outlet structure orifice to increase volume treated through infiltration and extended detention. Assumptions for the preliminary calculations included sealing an existing 4-inch orifice at the basin bottom through the installation of a steel plate. The existing 4-inch orifice located approximately 2 feet above the basin bottom will be utilized as the primary outlet. This project will

provide an estimated removal of 3,204.12 lbs/yr of sediment (1.69 percent) within the Middle Brandywine Creek/Upper Brandywine Creek PRP Planning Area.

General Greene A Basin Retrofit

This existing basin is located behind 1006 and 1008 General Green Drive on a private residential property. It has been proposed to retrofit this existing basin. The basin has a drainage area of 9.76 acres. Radley Run is the receiver stream for this area, which lies within the Upper Brandywine Creek Hydrologic Unit Code (HUC) 12.

The scope of the proposed retrofit includes the removal of trash and debris, regarding the existing basin bottom, and replacing the existing outlet structure, due to its age and vegetative overgrowth. Assumptions for the preliminary calculations of the new outlet structure included a new standard outlet structure box with a 4-inch orifice at an elevation of 2-feet above the basin bottom and top of grate approximately 5-feet from the existing ground elevation. This project will provide an estimated removal of 3,587.06 lbs/yr of sediment (2.04 percent) within the Middle Brandywine Creek/Upper Brandywine Creek PRP Planning Area.

Detailed BMP Descriptions – Long-Term (> 2024)

The BMP proposed to meet long-term objectives is described in more detail below.

Stream Restoration (Goose Creek Watershed)

Approximately 1,750 linear feet of stream restoration is proposed within the Goose Creek watershed to meet long-term TMDL objectives (>5 years). Location(s) of the stream restoration will be determined at a later date, as the next permit term approaches. These project(s) will provide an estimated removal of 76,296 lbs/yr of sediment and 115.60 lbs/yr of total phosphorus (37.82 percent) within the Goose Creek TMDL Planning Area for the long-term reduction.

4.6 Funding Mechanisms

The funding mechanisms and estimated costs for the implementation of each proposed BMP to be implemented within five (5) years of permit approval are included in Table 19. Note that the 1,700 linear feet of proposed stream restoration to meet the long-term (>5 years) objectives of the Goose Creek TMDL is not included. The costs provided are conceptual, to be utilized for preliminary planning purposes only, and subject to change.

Table 19: Proposed BMP Funding Mechanisms

Proposed BMP	Property Owner	Funding Mechanism	Total Estimated Cost (Low)	Total Estimated Cost (High)	Total Estimated Cost (Median)
Tyson Park Bioswale	Westtown Township	Existing BMP	n/a	n/a	n/a
Thorne Drive Basin Retrofit	Westtown Township	Westtown Township	\$98,728	\$148,093	\$123,411
Sage Road Basin Retrofit	Westtown Township	Westtown Township	\$47,625	\$71,438	\$59,532
Wild Goose Farms Basin B Retrofit	Wild Goose Farms HOA	Westtown Township	\$49,299	\$73,948	\$61,624
Wild Goose Farms Basin A Retrofit	Wild Goose Farms HOA	Westtown Township	\$37,290	\$55,936	\$46,613
Pleasant Grove Stream Restoration	Westtown Township	Westtown Township	\$438,811	\$658,217	\$548,514
Dunvegan Road Basin Retrofit	Perry & Anna Marie Cozzone	Westtown Township	\$64,324	\$96,486	\$80,405
General Greene Basin B Retrofit	Louis & Susan McCray	Westtown Township	\$52,837	\$79,256	\$66,046
General Greene Basin A Retrofit	Roman Chojnacki & Margaret Uttrodt	Westtown Township	\$58,672	\$88,008	\$73,340
Radley Run Stream Restoration	Brent & Celeste Celek	Westtown Township	\$58,222	\$69,866	\$72,778
TOTAL:			\$905,809	\$1,358,714	\$1,132,262

*Estimated Cost includes survey, design, engineering, any anticipated permitting, bid administration, construction inspection, construction, materials, and as-built survey. Developed based on 2019 costs/rates. It does NOT include costs associated with operations and maintenance (O&M).

4.7 Operations and Maintenance

To ensure the long-term effectiveness of these proposed BMPs, operation and maintenance (O&M) is crucial. Table 20 below outlines the responsible party and the necessary O&M practices required for each proposed BMP (Pennsylvania Stormwater BMP Manual, December 30, 2006).

Table 20: Proposed BMP O&M Responsibilities

BMP	Current Owner	Responsible Party for O&M	O&M Responsibilities
Tyson Park Bioswale (Installed in 2015)	Westtown Township	Westtown Township	<ul style="list-style-type: none"> Inspect at least 2x per year Pruning, weeding, watering Re-spread mulch every 2-3 years Remove sediment buildup Repair and re-stabilize areas of erosion Maintain vegetation
Stream Restoration (undetermined locations in Goose Creek Watershed)	Undetermined	Westtown Township	<ul style="list-style-type: none"> Inspect at least 2x per year Avoid excess use of fertilizers, pesticides, or other chemicals Mow surrounding area as appropriate (remove clippings) Remove invasive species Remove debris
Thorne Drive Basin Retrofit	Westtown Township	Westtown Township	<ul style="list-style-type: none"> Inspect at least 2x per year Clean inlets at least 2x per year Maintain vegetation

Table 20: Proposed BMP O&M Responsibilities

BMP	Current Owner	Responsible Party for O&M	O&M Responsibilities
			<ul style="list-style-type: none"> • Remove invasive species • Prohibit vehicular access • Avoid excessive compaction by mowers • Drain-down time < 72 hours • Mow as appropriate (remove clippings) • Remove accumulated sediment
Sage Road Basin Retrofit	Westtown Township	Westtown Township	<ul style="list-style-type: none"> • Inspect at least 2x per year • Clean inlets at least 2x per year • Maintain vegetation • Remove invasive species • Prohibit vehicular access • Avoid excessive compaction by mowers • Drain-down time < 72 hours • Mow as appropriate (remove clippings) • Remove accumulated sediment
Radley Run Stream Restoration	Brent & Celeste Celek	Brent & Celeste Celek	<ul style="list-style-type: none"> • Inspect at least 2x per year • Avoid excess use of fertilizers, pesticides, or other chemicals • Mow surrounding area as appropriate (remove clippings) • Remove invasive species • Remove debris
Wild Goose Farms Basin B Retrofit	Wild Goose Farms HOA	Wild Goose Farms HOA	<ul style="list-style-type: none"> • Inspect at least 2x per year • Clean inlets at least 2x per year • Maintain vegetation • Remove invasive species • Prohibit vehicular access • Avoid excessive compaction by mowers • Drain-down time < 72 hours • Mow as appropriate (remove clippings) • Remove accumulated sediment
Wild Goose Farms Basin A Retrofit	Wild Goose Farms HOA	Wild Goose Farms HOA	<ul style="list-style-type: none"> • Inspect at least 2x per year • Clean inlets at least 2x per year • Maintain vegetation • Remove invasive species • Prohibit vehicular access • Avoid excessive compaction by mowers • Drain-down time < 72 hours • Mow as appropriate (remove clippings) • Remove accumulated sediment
Pleasant Grove Stream Restoration	Westtown Township	Westtown Township	<ul style="list-style-type: none"> • Inspect at least 2x per year • Avoid excess use of fertilizers, pesticides, or other chemicals • Mow surrounding area as appropriate (remove clippings) • Remove invasive species • Remove debris

Table 20: Proposed BMP O&M Responsibilities

BMP	Current Owner	Responsible Party for O&M	O&M Responsibilities
Dunvegan Road Basin Retrofit	Perry & Anna Marie Cozzone	Perry & Anna Marie Cozzone	<ul style="list-style-type: none"> • Inspect at least 2x per year • Clean inlets at least 2x per year • Maintain vegetation • Remove invasive species • Prohibit vehicular access • Avoid excessive compaction by mowers • Drain-down time < 72 hours • Mow as appropriate (remove clippings) • Remove accumulated sediment
General Greene B Basin Retrofit	Louis & Susan McCray	Louis & Susan McCray	<ul style="list-style-type: none"> • Inspect at least 2x per year • Clean inlets at least 2x per year • Maintain vegetation • Remove invasive species • Prohibit vehicular access • Avoid excessive compaction by mowers • Drain-down time < 72 hours • Mow as appropriate (remove clippings) • Remove accumulated sediment
General Greene A Basin Retrofit	Roman Chojnacki & Margaret Uttrodt	Roman Chojnacki & Margaret Uttrodt	<ul style="list-style-type: none"> • Inspect at least 2x per year • Clean inlets at least 2x per year • Maintain vegetation • Remove invasive species • Prohibit vehicular access • Avoid excessive compaction by mowers • Drain-down time < 72 hours • Mow as appropriate (remove clippings) • Remove accumulated sediment

5.0 Conclusion

The required ten (10) percent sediment reduction for the PRP Planning Areas and the short-term objectives of the Goose Creek TMDL have been demonstrated through the existing bioswale and proposed implementation of two (2) stream restoration projects and seven (7) basin retrofits, a bioswale installed in 2015. These BMPs will be implemented within 5 years of PA DEP approval of this plan. An additional 1,700 linear feet of stream restoration is proposed within the Goose Creek watershed to meet the long-term objectives of the TMDL, which is a total phosphorous reduction of 53.9 percent.

6.0 Definitions

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, structural controls (e.g., infiltration trenches), design criteria, maintenance procedures, and other management practices to prevent or reduce pollution to the waters of the Commonwealth. BMPs include Erosion and Sedimentation Control Plans, Post Construction Stormwater Management Plans, MS4 TMDL Plans, Stormwater Management Act Plans, and other treatment requirements, operating procedures and practices to control runoff, spillage or leaks, sludge or waste disposal, drainage from raw material storage, and methods to reduce pollution, to recharge groundwater, to enhance stream base flow and to reduce the threat of flooding and stream bank erosion. [NPDES Stormwater Discharges from Small MS4s General Permit 5/2016 (PAG-13)]

Municipal Separate Storm Sewer System (MS4): All separate storm sewers that are defined as “large” or “medium” or “small” municipal separate storm sewer systems pursuant to 40 CFR §§ 122.26(b)(18), or designated as regulated under 40 CFR § 122.26(a)(1)(v). [PAG-13]

National Pollutant Discharge Elimination System (NPDES): A permit issued under 25 Pa. Code Chapter 92a (relating to National Pollutant Discharge Elimination System permitting, monitoring and compliance) for the discharge or potential discharge of pollutants from a point source to surface waters. [PAG-13]

Outfall: A “Point Source” as defined by 40 CFR § 122.2 is the point where an MS4 discharges stormwater to other surface waters of this Commonwealth. This does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream and are used to convey waters of the Commonwealth (40 CFR § 122.26 (b) (9)). [PAG-13]

Owner or operator: The owner or operator of any “facility” or “activity” subject to regulation under the NPDES program. [PAG-13]’

Parsing: A process in which land area is removed from a Planning Area in order to calculate the actual or target pollutant loads that are applicable to an MS4. [NPDES from Small MS4 PRP Instructions- Attachment A]

Planning Area: All of the storm sewersheds that an MS4 must calculate existing loads and plan load reductions for. [NPDES from Small MS4 PRP Instructions]

Pollutant: Any contaminant or other alteration of the physical, chemical, biological, or radiological integrity of surface water which causes or has the potential to cause pollution as defined in section 1 of The Clean Streams Law, 35 P.S. § 691.1. [PAG-13]

Storm Sewershed: The catchment area that drains into the storm sewer system based on the surface topography in the area served by the storm sewer. (Source: NPDES Stormwater Discharges from Small MS4s General Permit [PAG-13])

Stormwater: Runoff from precipitation, snow melt runoff and surface runoff and drainage. “Stormwater” has the same meaning as “Storm Water.” (Source: NPDES Stormwater Discharges from Small MS4s General Permit [PAG-13])

Urbanized Area (UA): Land area comprising one or more places (central place(s)) and the adjacent densely settled surrounding area (urban fringe) that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile, as defined by the United States Bureau of the Census and as determined by the latest available decennial census. The UA outlines the extent of automatically regulated areas. UA maps are available at: <http://www.epa.gov/npdes/stormwater/urbanmaps>, or at: <http://www.epa.gov/enviro/html/em/index.html>. [PAG-13]

Appendix A

Public Comment and Responses

CLASSIFIEDS

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LEGAL NOTICES

CHARLESTOWN MILL EXHIBIT AND SITE LIGHTING IMPROVEMENTS NOTICE - PUBLIC BIDS

Sealed proposals for **Charlestown Mill Exhibit and Site Lighting Improvements** will be received by the Board of Supervisors of Charlestown Township on **June 28, 2017 until 2:00 P.M.** at the Charlestown Township Municipal Office, 4030 Whitehorse Road, Devault, Pa. They will be publicly opened and read at 2:15 p.m. on this same date. The bid will be awarded at the July 10, 2017 business meeting of the Board of Supervisors, to be held at the Great Valley Middle School Choral Room, 255 N. Phoenixville Pike, Malvern, PA, 7:00 p.m., subject to entering into a contract with the successful bidder on terms satisfactory to the Township.

All Bidders are required to attend the mandatory pre-bid meeting which will be held on June 20, 2017 at 10:00 A.M. prevailing time at the Charlestown Mill, 2405 Charlestown Road, Phoenixville, PA. Bidders must evidence their attendance by making certain which will be made available at the pre-bid meeting. Failure to comply with this requirement will result in the rejection of a Bid. Bidder must submit proposal, which may be obtained from the Township Office along with bid specifications, general conditions and **complete bid information**. Bids must be submitted in a sealed envelope plainly marked "Charlestown Mill Exhibit and Site

LEGAL NOTICES

able for examination at the Administration Office of the School District.

The Bonds were awarded at a total purchase price of at least 99.25% of the principal amount of the Bonds, or such greater price as reflects a lower underwriting discount. The Bonds will bear interest at a maximum interest rate of 6% for the Bonds of any maturity.

No material amendments or insertions were made to the Resolution on final adoption.

The full text of the Resolution may be examined by any person in the Office of the Secretary of Downingtown Area School District, 540 Trestle Place, Downingtown, Pennsylvania 19335 on regular business days, between the hours of 8:00 a.m. and 4 p.m.

Virginia B. Warthay, Secretary
Downingtown Area School District
Lamb McErlane PC,
Bond Counsel
dln. 6/16 - 4a.

NOTICE OF SPECIAL MEETING

NOTICE IS GIVEN that the Chester County Health and Education Facilities Authority (the "Authority") will hold a special meeting to consider financing for the benefit of Immaculata University ("Immaculata") in an amount not to exceed \$39,000,000, which is a refinancing of prior debt issued by the Authority for the benefit of Immaculata.

BIDS & PROPOSALS

Contract documents and solicitation details are available at no cost at PennBid™ www.PennBid.net.

A Certified Check or Bid Bond drawn to the order of the Malvern Borough in the amount equal to Ten percent (10%) of the amount of the Bid must be submitted with the proposal as Bid security.

The project involves, but is not limited to: road milling and paving-in-place Super-pave Hot Mix Asphalt Wearing Course, 9.5 mm mix, 2-inch compacted depth for South Warren Avenue (full width - 7,950 square yards). Also included will be limited base repair (1,178 sq. yd), leveling course and furnishing and installing pavement reinforcement fabric.

A pre-bid meeting will be held on **Friday, July 7, 2017 at 9:00 A.M.** prevailing time at the Malvern Borough Municipal Building. Attendance at the pre-bid meeting is **strongly recommended**.

The successful bidder will be required to furnish a one hundred percent (100%) Performance Bond and a one hundred percent (100%) Labor and Materials Bond with an eighteen (18) month warranty within ten (10) days of the bid award, executed by a surety authorized to conduct business in the Commonwealth of Pennsylvania.

The work in connection with this project constitutes a Public Works by a Public Body under Pennsylvania Preval-

BIDS & PROPOSALS

Wallingford-Swarthmore School District
Location: Strath Haven High School and Middle School
Various Concrete Sidewalk and Curb Repairs

INVITATION TO BID

Sealed Bids are being requested for Various Concrete Site Repairs. Work includes sealing of sidewalk joints at the High School, and the installation of new gutter curb at the Middle School

Bids will be received in the Business Office of the Wallingford - Swarthmore School District until **10:00 AM, July 6, 2017** at which time, they will be publicly opened and read aloud immediately after the specified bid deadline at the **Business Office**. Bid award is anticipated to be on **July 17. All repair work must be completed by September 1, 2017.**

Instructions, Bidding Forms, plans and specifications may be obtained from the Business Office, Wallingford-Swarthmore School District, 200 South Providence Road, Wallingford, Pa., 19086, Monday - Thursday, 8:00 AM - 4:00 PM. (610) 892-3470 (ext. 1304). **A digital copy of plans and documents is available on the School District Website (<https://www.wssd.org>), go to Departments > Operations > Bid Documents.**

Each Bid must be submitted on forms included in the bidding documents and must be accompanied by bid security and non-collusion

BIDS & PROPOSALS

The Bids received will be publicly opened and read at the regularly scheduled Authority meeting.

The Project consists of replacement of the shingled roof, in-kind, for both the Control Building and shed at the Glenmoore Wastewater Treatment Plant.

The Issuing Office for the Bidding Documents is: Entech Engineering, Inc., 201 Penn Street, Suite 300, Reading, PA 19601 attention Mary Wyn-lawski (mwvnlawski@entecheng.com or 610-373-6667, ext.1112).

Bidding Documents are available on compact disc (as portable document format (PDF files) for a non-refundable charge of \$50.00, including shipping via overnight express service. Alternatively, printed Bidding Documents may be obtained from the Issuing Office either via in-person pick-up or via mail, upon Issuing Office's receipt of payment for the Bidding Documents. The non-refundable cost of printed Bidding Documents is \$250.00 per set, payable to Entech Engineering, Inc., plus a non-refundable shipping charge. Upon Issuing Office's receipt of payment, printed Bidding Documents will be sent via the prospective Bidder's delivery method of choice; the shipping charge will depend on the shipping method chosen. The date that the Bidding Documents are transmitted by the Issuing Office will be considered the prospective Bidder's date of receipt of the

BIDS & PROPOSALS

Wallingford-Swarthmore School District
Location: Strath Haven High School
Main Stair Tower Tread and Landing Tile Replacement

INVITATION TO BID

Sealed Bids are being requested for the **Replacement of the Stairway Treads and Landing Tiles for four (4) levels**. Work includes removal of the existing treads and landing coverings and replacement with a new surface.

Bids will be received in the Business Office of the Wallingford - Swarthmore School District until **10:30 AM, July 6, 2017** at which time, they will be publicly opened and read aloud immediately after the specified bid deadline at the **Business Office**. Bid award is anticipated to be on **July 17. All repair work must be completed by September 1, 2017.**

Instructions, Bidding Forms, plans and specifications may be obtained from the Business Office, Wallingford-Swarthmore School District, 200 South Providence Road, Wallingford, Pa., 19086, Monday - Thursday, 8:00 AM - 4:00 PM. (610) 892-3470 (ext. 1304). **A digital copy of plans and documents is available on the School District Website (<https://www.wssd.org>), go to Departments > Operations > Bid Documents.**

Each Bid must be submitted on forms included in the bidding documents and

open space master plan and will discuss the Paoli Pike Corridor Master Plan. Prior to the meeting there will be an open house at 6 pm for the Paoli Pike Corridor Master Plan.

Louis F. Smith, Jr.
Township Manager
dln. 6/16 - 1a

Legal Notice

For failure to pay rent, The following property will be auctioned **ONLINE AT WWW.STORAGESTREASURES.COM** by competitive bidding to satisfy the owner's lien. Bidding shall end on Wednesday June 28th, 2017 at 12:00 pm. The winning bidder shall consummate the sale and the property will be sold at Global Self Storage, Bellaire Business Center 21 Aim Blvd. P.O. Box 707 Sadsburyville, PA 19369. Cash only, unit/items sold as is:

Unit # 1006 Delet, Andres
Unit # 2259 Totaram, Neela
Unit # 3260 Gunther, Jeffery C
Unit # 4028 Hutton, Jennifer
dln. 6/14, 16 - 1a.

Notice of Public Meeting

The AVON GROVE CHARTER SCHOOL BOARD OF TRUSTEES will hold a Public meeting on **Tuesday, June 20, 2017 at 7:30 PM.**

The meeting will be held at the AVON GROVE CHARTER SCHOOL, 1769 New London Road, Landenberg, PA 19350 dln. 6/16 - 1a.

Notice of Public Meeting

The AVON GROVE CHARTER SCHOOL BOARD OF TRUSTEES will hold a Committee of the Whole Session on **Tuesday, June 20, 2017 at 6:15 PM.**

The meeting will be held at the AVON GROVE CHARTER SCHOOL, 1769 New London Road, Landenberg, PA 19350 dln. 6/16 - 1a.

LEGAL NOTICE

NOTICE IS HEREBY GIVEN that on Wednesday, June 14, 2017, the Board of School Directors (the "Governing Body") of Downingtown Area School District (the "School District") adopted a Resolution which, among other things, authorized incurrence of nonelectoral debt by the issuance of General Obligation Bonds, Series of 2017 of the School District in the maximum aggregate principal amount of \$23,000,000 (the "Bonds").

The School District awarded the sale of the Bonds to RBC Capital Markets, LLC within the parameters set forth in the Resolution. A summary of the Resolution was advertised on June 9, 2017 and the proposed text has been avail-

ware County Conservation District on Tuesday, July 11th at 9 AM. The meeting will be chaired by the USDA Natural Resources Conservation Service. The location will be at the Chester County Government Services Center located at 601 Westtown Road, Room 250, West Chester, PA 19380. The purpose of the meeting is to solicit input from local stakeholders on prioritizing local resource concerns in order for these concerns to be considered in the prioritizing of applications for federal conservation programs, such as the Environmental Quality Incentives Program (EQIP). For more information please contact Beth Sassaman, Supervisory District Conservationist, Coatesville Field Office, USDA-NRCS, 610-466-7502 extension 3, or email at Beth.Sassaman@pa.usda.gov. The USDA is an equal opportunity provider, employer, and lender.
DL-June 16-1a

WESTTOWN TOWNSHIP PUBLIC NOTICE

Westtown Township's Goose Creek MS4 TMDL and Pollutant Reduction Plan is available for public review on the Township website at www.westtownpa.org and by request at the Township Building at 1039 Wilmington Pike, West Chester, PA 19382. Written comments will be accepted for a period of 30 days from the date of this notice. A presentation will be made and comments accepted at the Board of Supervisors meeting scheduled for June 19, 2017 at 7:30pm at the Township Building. Comments will also be accepted during the Board of Supervisors meeting scheduled for July 17, 2017 at 7:30pm at the Township Building. The Plan describes proposed measures to reduce sediment and phosphorous wasteload in the Goose Creek Watershed per National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit requirements.
dln. 6/16 - 1a.

BIDS & PROPOSALS

ADVERTISEMENT FOR BIDS

NOTICE IS HEREBY GIVEN that Malvern Borough will receive bids online for the 2017 Malvern Borough Paving Program for South Warren Avenue.

Sealed bids shall be submitted and updated online via the PennBid™ Program until **10:00 A.M. prevailing time, Thursday, July 13, 2017** at which time they will be publicly opened and read aloud at the Malvern Borough Municipal Building, 1 E. First Avenue, Suite 3, Malvern PA 19355.

provided by law, no Bidder may withdraw his Bid within sixty (60) consecutive calendar days after the actual date of opening thereof.
Christopher Bashore
Borough Manager
dln. 6/16, 30 - 1a.

INVITATION TO BID

The Chichester School District's Board of Directors is accepting sealed bids for the following:

CONCRETE WORK AND TRENCH DRAINS

Bid specifications may be obtained electronically starting Friday, June 16, 2017 by contacting Mr. Paul Tobin, Director of Facilities at (610) 485-6881 ext. 6409 or at www.chichestersd.org from the link Invitation to Bid: Concrete Work and Trench Drains

Proposals will be accepted at Chichester School District - Attn: Anthony R. Testa, Business Administrator - Attn: Name of Specific Bid - 401 Cherry Tree Road - Aston, PA 19014 until 2:00 p.m., Tuesday, **July 11, 2017** and opened immediately thereafter.

The Chichester School District reserves the right to reject any or all proposals or parts thereof and to award the contract in the best interest of the Chichester School District. Contract will be awarded at the next regularly scheduled meeting of the Board of Directors.
dln. 6/16, 21, 28 - 1a.

NOTICE TO BIDDERS

Notice is hereby given that the West Whiteland Township ("Township") Board of Supervisors ("Board") is soliciting bids for:

Cured-in-Place Pipe
Repair Project
Spec #2017-04
Prevailing Wage Are In Effect

Sealed bids shall be submitted and updated online via the PennBid Program before Monday, July 10, 2017 at 11:00 a.m. at which time they will be opened and read aloud. A pre-bid meeting is scheduled for Thursday, June 29, 2017 at 9:00 a.m. at the Township Building 101 Commerce Dr., Exton. All documents and solicitation details are available at no cost at PennBid - www.PennBid.net.
Mimi Gleason
Township Manager
dln. 6/16, 19 - 1a.

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award of contract is delayed by the required approvals of another governmental agency, sale of bonds or award of grant or grants, in which case, proposals shall be irrevocable for one hundred twenty (120) days in accordance with Section 3911 of the Pennsylvania Commonwealth Procurement Code, 62 Pa.C.S. § 3911.

The Wallingford - Swarthmore School District reserves the right to waive any informality and to accept or reject all or any part of any or all bids.

Darlene Klingerman
Board Secretary
dln. 6/16, 19, 26 - 1a

WALLACE TOWNSHIP MUNICIPAL AUTHORITY WALLACE TOWNSHIP, CHESTER COUNTY, PA

GLENMOORE WASTEWATER TREATMENT PLANT ROOF REPLACEMENT ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of the Glenmoore WWTP Roof Replacement Project will be received by the Wallace Township Municipal Authority, 1250 Creek Road, Glenmoore, PA 19343 until 7:00 p.m. local time on Tuesday, July 11, 2017, at which time

Bid security shall be furnished in accordance with Instructions to Bidders Bidder is required to meet requirements of Public Employment Verification Act 127 of 2012.

The Wallace Township Municipal Authority hereby reserves the right, which is understood and agreed to by all bidders, to refuse and reject any bids submitted, and reserves the right to waive informality in bids received.

Except as otherwise provided by law, no bidder may draw his bid for sixty (60) days after the Bid Due Date. The contract award is subject to a required approval by the other government agency. Sale of bonds, or the award of a grant or grants, in which case the Bids shall be open to acceptance and may be irrevocable for a period of one hundred twenty days after the Bid Due Date.
dln. 6/16 - 1a.

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WESTTOWN TOWNSHIP BOARD OF SUPERVISORS REGULAR MEETING
Westtown Township Municipal Building, 1039 Wilmington Pike, Westtown
Monday, June 19, 2017 at 7:30 PM

In attendance were: Chair Mike Di Domenico, Vice Chair Carol De Wolf, Police Commissioner Tom Haws, Township Manager Rob Pingar, WEGO Police Chief Brenda Bernot, and P&R Commissioner Jen Masiko. There were 4 guests present.

I. Pledge of Allegiance & Call to Order

Mr. Di Domenico led the Pledge of Allegiance, and called the meeting to order at 7:37 PM. He asked if anyone was recording the meeting. There was no response.

II. Approval of Minutes (May 15, 2017)

Ms. De Wolf made a motion to approve the May 15, 2017 Board of Supervisors meeting minutes. Mr. Haws seconded the motion. There was no public comment and the motion was approved.

III. Workshop Meeting Summary (June 19, 2017)

Mr. Di Domenico stated that the Board held an executive session to interview candidates for two vacancies in the office staff.

The Board also heard from Andy Rau, Tom Galbally's attorney. He would like to amend the Conditional Use (CU) approval to allow the construction of the connector road only to the proposed Malvern School driveway. The current CU approval requires the connector road to be built in its entirety, concurrent with the Malvern School. If this amendment is not approved, Malvern School will walk away from this site. The Board is considering their request. Mr. Haws stated that any developer coming before the Board to request an amendment must be in good standing with the Township. Ms. De Wolf stated that the Board is not favorable to their request to fund only a portion of the connector road.

There were no other comments or questions from the public regarding the workshop.

IV. Departmental Reports

A. Westtown East Goshen Police (WEGO) – Chief Brenda Bernot

Chief Bernot invited residents to visit their website to read the police blotter for a synopsis of significant police activity in the community. She stated that the department is on course this year to have the highest number of DUI citations in the history of the department. She indicated that over 50% of the DUI's the department handles are due to illegal drugs, or prescription drugs that are being used improperly. She reminded everyone that possession of marijuana is a misdemeanor in Pennsylvania. She stated that when the department stops a vehicle for a traffic violation, if the officer smells marijuana, then they have probable cause to investigate and initiate a field sobriety test. She explained that PA is a zero tolerance state, meaning that any measurable amount of marijuana in the bloodstream can result in a DUI. The Chief also cautioned users of prescription drugs to heed the usage instructions regarding drug and alcohol interactions.

Jennifer Masiko, 1186 Fielding Drive, asked if prescription drug abuse could be investigated through the prescribing doctor. The Chief stated that prescriptions are now tracked, making availability more difficult, but there are always ways of getting around the system.

Marty O'Malley, 1126 Kolbe Lane, stated that she recently read an article in the New Yorker regarding the opioid crisis in West Virginia. She asked the Chief to comment on opioid use in Chester County. The Chief reported that opioid use has hit hard in Chester County, but since police can now use Narcan, they are experiencing a 90% save rate if they can reach the overdose victim in time. The Chief stated that anyone can get Narcan and administer it to a friend or family member in the event of an overdose. The Chief added that information about Narcan will be added to the Citizens' Police Academy curriculum this year, and that it is discussed in the public schools.

There were no additional questions or comments.

B. Parks & Recreation Commission (P&R) – Jen Masiko

Mrs. Masiko reported that at their last meeting, the commission decided upon coverage of the movie nights. Their movie schedule includes four events this year.

The commission has tentatively scheduled Sat. November 4 for decorating the mansion for the holidays. The Winter Festival is on Sunday, December 10, from 10am to 1pm. In addition to the photo booth, face painting, crafts, and refreshments, the commission is considering having reindeer at the event.

Mrs. Masiko stated that a 4-person subcommittee is working on the geocaching/scavenger hunt project. Mrs. De Wolf told Mrs. Masiko that the locations require Board approval. Mrs. Masiko stated they plan to put only one location on the online geocache application. A clue in that cache would then lead participants to the next cache. She also reported that three P&R commissioners continue working with the Historical Commission on planning Westtown Day.

The commission is considering a resident committee to help with the NWF Community Wildlife Certification process. Mr. Pingar stated that NWF signs have been ordered for Tyson Park and Oakbourne Park, which will earn the township points in the certification process. Mr. Haws suggested putting together a proposal for the Board so residents know what is required.

Allison Corcoran has been appointed secretary of the commission and will be preparing the monthly minutes.

Mrs. Masiko brought up the topic of having a P&R Facebook page to promote events. Mr. Haws commented that advertising on Facebook can be a double edged sword. He reported that the Chester County balloon festival used FB for the first time last year and was overwhelmed when over 65,000 people attended. The Board replied that they need to discuss the topic and also get input from the township solicitor.

There were no other comments or questions.

V. Public Comment Non Agenda Items

There was none.

VI. Old Business

A. Zoning Officer Appointment

Chris Patriarca was Westtown's Zoning Officer. With his departure, an interim Zoning Officer must be appointed until a replacement is hired. Ms. De Wolf made a motion to appoint the Township Manager, Rob Pingar, interim Zoning Officer. Mr. Haws seconded the motion. There was no public comment and the motion was unanimously approved.

VII. New Business

A. TMDL/Pollution Reduction Plan presentation by Cedarville Engineering

Beth Uhler of Cedarville Engineering gave a presentation on the Township's stormwater management efforts. She explained that municipalities that have NPDES Municipal Storm Sewer System (MS4) permits must address new requirements for the 2018 permit, which are due to the Pennsylvania Department of Environmental Protection (DEP) on September 16, 2017. These new requirements involve developing plans to design and construct stormwater projects or Best Management Practices (BMPs) to reduce pollutants from municipal storm sewer systems to impaired streams over the next 5 year permit term (March 16, 2018 – March 15, 2023). All streams in Westtown are impaired by sediment. Westtown is required to reduce sediment pollution by 10% by implementing BMPs, as well as address short and long-term (>5 years) goals for the Goose Creek watershed TMDL for phosphorous.

Cedarville has been working on a Plan to meet these requirements. The development of the Plan involved utilizing Geographic Information Systems (GIS) mapping, calculating existing pollutant loading, and pollutant reductions achieved through the implementation of BMPs. BMP locations were identified by analyzing what they believe are currently the most fiscally responsible solutions to provide water quality improvement and real-world benefit, while meeting the mandated pollutant reduction requirements. Site visits were conducted to verify project viability, and collect information and measurements of existing BMPs where applicable.

After analyzing all available information and assessing alternatives, Cedarville has been able to show that Westtown will meet pollutant reduction requirements for the 5 year permit term through the implementation of five BMPs on a combination of Township property and one Homeowners Association owned property.

Ms. Uhler briefly reviewed the five proposed BMPs to meet pollutant load reduction requirements:

1. Tyson Park Bioswale – existing BMP which reduces pollutant load and sediment in Goose Creek. Since Goose Creek drains to Chester Creek, this provides an 11% credit towards the 54% TMDL reduction.
2. Coventry Village Stream Restoration – approximately 1100 linear feet of mostly homeowner association owned property. Stream restoration may be possible on about 50% of the 1100 feet.
3. Thorne Drive Basin Retrofit – remove vegetation & sediment accumulation, and modify outfall structure to promote infiltration and extend detention.
4. Sage Road Basin Retrofit – same as Thorne Drive Basin
5. Radley Run Stream Restoration on Crebilly Farm property (drains to the Brandywine River)

The Board asked Ms. Uhler about the likelihood that the BMPs would meet DEP requirements. She replied that these BMP's should cover DEP's current requirements, but stated that the proposal first needs to be reviewed and accepted by DEP. She added that the DEP requirements may change in the next permit cycle. Mr. Haws stated that the Board needs to look at how to address these unfunded, state mandated stormwater requirements, which will cost hundreds of thousands of dollars to design and implement. He said the only options are to reduce current services, raise taxes, or charge a stormwater fee. The Board thanked Ms. Uhler for her work on the plan, and opened the topic up for public comment.

Tom Foster, 734 Westbourne Road, wanted to make residents aware of a stream restoration and riparian buffer program that Chester County has, which provides plants and cones to protect the plants, and pays homeowners to restore streams that run through private property. He encouraged the township to promote the program. Ms. De Wolf added that TreeVitalize is another way for residents to get free plants. Mr. Pingar stated that he would investigate the programs and get the information on the website/listserv.

Tom Haws, 1609 West Lynn Drive, spoke as a citizen, not a board member, restating that the Board needs to examine how to pay for unfunded mandates.

Mr. Di Domenico echoed Mr. Haws' concerns and frustrations with unfunded state mandates. He asked Ms. Uhler if the problem was due to the chemicals used in residential lawn maintenance, or fertilizers used by farmers. Ms. De Wolf replied that sediment load and chemical contamination are two separate issues. Ms. Uhler stated that chemical contaminants come from a combination of factors (e.g. farming, lawn maintenance, oil from vehicles, etc.). Sediment load comes from runoff caused by the reduction in impervious coverage (i.e. development).

There was no other public comment.

VIII. Announcements

Mr. Di Domenico made the following announcements:

1. Board of Supervisors Conditional Use Hearing - Crebilly Tract/Toll Brothers – Tuesdays, June 20 and July 25, 6:00 pm at Rustin High School.
2. Summer Movie Night at Oakbourne Park – 8 pm Friday, June 23 – “Zootopia”
3. Neighborhood University – NU of Greater West Chester is a free program offered by the West Chester Area Council of Governments to educate citizens about local government and increase awareness of available municipal services and resources. The goal of Neighborhood U. is to help citizens become more effective advocates for their community, which in turn helps local municipalities keep finding ways to improve. Classes are on Thursdays starting September 14 through November 16, 2017.

IX. Public Comment on All Topics

There was none.

X. Payment of Bills

Ms. De Wolf asked about the Carrol Engineering bills relative to projections for their engineering services. Mr. Pingar stated they are within budget for the Oakbourne Bridge and the Sewer Capital Improvement Plan (CIP). She then made a motion to approve the General Fund bills in the amount of \$307,180.88, Wastewater Fund bills in the amount of \$14,365.74, and Capital Projects fund bills in the amount of \$16,253.67, for a grand total of \$337,800.29. The motion was seconded by Mr. Haws. There was no public comment, and the check registers were approved.

XI. Adjournment

Ms. De Wolf made a motion to adjourn the meeting, seconded by Mr. Di Domenico. The meeting adjourned at 8:45 PM.

Respectfully submitted,

Robert Pingar
Township Manager

WESTTOWN TOWNSHIP BOARD OF SUPERVISORS REGULAR MEETING
Westtown Township Municipal Building, 1039 Wilmington Pike, Westtown
Monday, July 17, 2017 at 7:30 PM

In attendance were: Chair Mike Di Domenico, Vice Chair Carol De Wolf, Police Commissioner Tom Haws, Township Manager Rob Pingar, WEGO Police Chief Brenda Bernot, Township Solicitor Pat McKenna, and P&R Commissioner Ida Fritsche. There were 41 guests present.

I. Pledge of Allegiance & Call to Order

Mr. Di Domenico led the Pledge of Allegiance, and called the meeting to order at 7:37 PM. He asked if anyone was recording the meeting. There was no response.

II. Approval of Minutes (June 19, 2017)

Ms. De Wolf made a motion to approve the June 19, 2017 Board of Supervisors meeting minutes. Mr. Haws seconded the motion. There was no public comment and the motion was approved.

III. Workshop Meeting Summary (July 17, 2017)

Mr. Di Domenico stated that the Board held an executive session to discuss the police contract and several other matters not specified. The Board also discussed the proposed two lot subdivision at 967 S. New Street. There were no comments or questions from the public regarding the workshop.

IV. Departmental Reports

A. Westtown East Goshen Police (WEGO) – Chief Brenda Bernot

Chief Bernot invited residents to visit the WEGO website (www.westtownpolice.org) to read the police blotter for a synopsis of significant police activity in the community. She stated that the department has seen an increase in burglaries, particularly “cat burglars” who operate at night while the home is occupied. She encouraged residents to lock their houses at night. Mr. Haws added that entry for the two cat burglaries, one in East Goshen Township and one in Westtown, was gained via unlocked doors. Chief Bernot stated that was correct, and stressed the importance of locking your doors and being vigilant.

The Chief also invited residents to register for the Citizens’ Police Academy to learn how the Police Department operates. The 12-week program is held on Wednesday nights beginning September 6, 2017. For more information, please visit the police or township websites.

There were no questions or comments.

B. Township Solicitor – Patrick McKenna

Mr. McKenna stated he would defer his report, since it dealt with matters that are on the agenda.

C. Parks & Recreation Commission (P&R) – Ida Fritsche

Mrs. Fritsche stated that despite the absence of the Chair, the last meeting was very productive. She said the three new commissioners are a great addition to the team. She reported that attendance at the first movie night was sparse due to the threat of thunderstorms that evening, but hoped that future attendance will be better. At the September 29 movie night featuring “Casablanca,” the commission is hoping to hire an ice cream truck. Mrs. Fritsche stated that a

Facebook page would be helpful in advertising the movies. Mr. Di Domenico said that the Board is still discussing social media.

P&R continues to work with the Historical Commission on planning Westtown Day on Sunday, October 1st. Everyone is assuming this year's event will be even better attended than last year. The Winter Festival is on Sunday, December 10, from 10am to 1pm.

Mrs. Fritsche reported that Philip Garabedian is heading the effort to have the township certified by the National Wildlife Federation (NWF) as a Community Wildlife Habitat. The commission is hoping to form a small a resident committee to help with the certification process. Mr. Pingar stated that NWF signs have been ordered for Tyson Park and Oakbourne Parks. Ms. De Wolf asked about the sign placement. Mr. Pingar said they are small signs, and when they will come in, he will consult Ms. De Wolf regarding their placement.

There were no other comments or questions.

D. Planning Commission

There was no report from the Planning Commission, because they have not met since the last Board meeting.

Mr. Pingar introduced William Ethridge as the new Director of Planning & Zoning. Will started today. He came from the Delaware Office of Public Health, and is a AICP certified planner.

V. Public Comment Non Agenda Items

There was none.

VI. Old Business

A. Ordinance 2017-02 – Above Ground Pipeline Facilities Ordinance

This ordinance serves to address a deficiency present within the existing zoning ordinance as it relates to Above Ground Pipeline Facilities. The ordinance has been modeled on the Chester County Planning Commission ordinance. It was recommended for approval by the Westtown Planning Commission and was reviewed and approved by the Township Solicitor.

Ms. De Wolf made a motion to approve Ordinance 2017-02 for Above Ground Pipeline Facilities. Mr. Haws seconded the motion.

Nancy Harkins, 1521 Woodland Road, wanted to make sure the supervisors were aware of recent incidents regarding private water supplies in W. Whiteland Township during pipeline construction. She stated this is also a concern in Westtown, and this ordinance does nothing to address it. She asked if additional measures can be taken.

Township solicitor, Patrick McKenna stated that his review of related case law and recent Chester County decisions by which the township is bound, state that municipal zoning and subdivision ordinances do not apply to the pipeline below ground. He said that Delaware County courts have ruled likewise. He said that townships lack jurisdiction to regulate pipelines below ground. He stated that is why the model ordinance from the county which is being considered tonight only regulates surface structures.

Ms. De Wolf stated that the Board was informed by Sunoco that as a result of directional drilling, bentonite may appear in the water temporarily. She clarified that this ordinance has nothing to do with regulating the pipeline. It regulates construction activity above the pipeline to protect it from being damaged.

Mr. Haws stated that he shared Ms. Harkins' concerns regarding well water being compromised, but echoed what the township solicitor, Mr. McKenna, had stated. The courts in Chester and Delaware County have ruled that municipalities cannot regulate pipelines below ground. They can only regulate above ground facilities. He urged residents to put pressure on state regulators.

Ms. Harkins asked if the Board would write a letter to Senator Killion and Representative Comitta. Mr. Haws said the Board would write a letter, but added that letters coming from all the residents in the township and surrounding municipalities would be much more effective in getting their attention.

There were no other comments or questions. The motion passed 2-1, with Mr. Di Domenico dissenting.

B. Ordinance 2017-04 – Zoning Map Amendment for Westtown Woods Tract

This proposed Zoning Map Amendment will result in the rezoning of the C-2 portion of the property located at 1010 Wilmington Pike back to R-2 designation, in order to allow for the construction of 15 single-family homes. If this map amendment is granted, then action can be taken on the Westtown Woods Subdivision Application at a subsequent meeting.

Mr. Haws made a motion to approve Ordinance 2017-04 to execute the Zoning Map Amendment for the rezoning of the portion of the property located at 1010 Wilmington Pike from C-2 to R-2. Ms. De Wolf seconded the motion.

Doug Anderson, 606 Jacqueline Drive, asked if there was going to be an opportunity to comment regarding the subdivision. Ms. De Wolf stated that this ordinance is only addressing the zoning change. Mr. Haws stated that the application will be considered at a future meeting. Mr. Anderson felt that permitting the zoning change removes any leverage that residents might have to use against the developer.

There were no other comments or questions, and the motion to approve the zoning change passed unanimously.

C. Jacqueline Drive Traffic

Mr. Di Domenico began by stating that the Board received a petition circulated by Jim Cahill and signed by 26 residents on Jacqueline Drive requesting further traffic calming measures. Mr. Di Domenico said the Board is aware that Jacqueline Drive is a "cut-through" street. He said the Board wants to get a sense of how many residents support additional traffic calming measures. He invited Mr. Cahill to speak first. He reminded residents to state their name and address for the record.

Mr. Haws clarified that this item is on the agenda as a result of receiving the petition circulated by Mr. Cahill. He stated that although residents were notified by mail, the Board realizes it is summer, and people may be on vacation or unable to attend this meeting. He said that as with previous traffic calming measures made on Jacqueline Drive (the radar speed sign, and neighborhood sign), the process will take time. The Board needs to consult with traffic engineers, the police, and the Director of Public works before any new measures are implemented. The Board wants to hear resident concerns tonight, but also wants to make sure *all* residents on Jacqueline Drive are given the opportunity to be heard. There will be a subsequent meeting(s) on the topic before any additional measures are taken.

Ms. De Wolf prefaced the discussion by stating that the traffic calming measures for volume are different than for speed. She stated that measures have been implemented for speed, but not for volume.

Jim Cahill, 9 Jacqueline Drive, stated that he was not representing the homeowners on Jacqueline Drive. He was speaking only for himself. He said traffic on 202 is getting worse. He referenced several fatalities due to traffic. The Chief corrected the record, stating that the most recent accident, in which a motorcyclist was killed, resulted from a driver who lost control of his vehicle while suffering from a medical emergency. The accident was not traffic related. Mr. Cahill continued, stating that 202 traffic is a problem nonetheless. He said there have been 6 accidents on Jacqueline Drive in the past year. Chief Bernot respectfully stated that Jacqueline Drive has an "extraordinarily low" accident rate, and that Mr. Cahill's numbers are not accurate. The Chief said she would be happy to provide accident data to the residents. Mr. Cahill stated that he has asked for speed data, but has not received anything. He said cars come through the neighborhood at 40-60 mph, and the neighborhood is "being invaded" by cars from New York, Delaware, and New Jersey that come in "little entourages, mini train loads of 5 or 6 at a time." He provided information on traffic calming that has been implemented in Philadelphia to the Board.

Ms. De Wolf asked if trucks could be prohibited. Mr. Pingar stated that Jacqueline Drive is a public road, and has to remain open to all types of vehicles. He said that it would be impractical to ban truck traffic. Vehicles like delivery services, trash trucks, and school buses would have to be allowed, and it would be nearly impossible to enforce.

Mr. Haws stated that the traffic has increased exponentially since 2005. The Board wants to hear from the residents, and determine if they all agree with Mr. Cahill's concerns. He said the Board will then meet with their traffic engineers to see what calming measures are available and allowed by PennDOT, make a formal proposal of options, and allow all residents of Jacqueline Drive to give their feedback.

Megan Bruns, 4 Jacqueline Drive, stated that she would like to see the traffic data analyzed. She would like to know how traffic varies based on the time of day. She said that information would be helpful when evaluating different options such as landscaping, or making Jacqueline Drive one-way for a portion of the day. She stated that the children in the audience were brought to demonstrate that residents want their kids to be able to safely walk and ride bikes in the street.

Doug Anderson, 606 Jacqueline Drive, said that Google maps show Jacqueline Drive as an alternate route off 202. Mr. Di Domenico added that mobile apps like "Waze" also indicate Jacqueline Drive as a cut through. Ms. De Wolf stated that the bridge closure on 926 at Pocopson is also adding to people using Jacqueline Drive. The Board all agreed that traffic is a problem, not just on Jacqueline, but in many areas of the township, and they all want to find solutions that could be implemented on Jacqueline and elsewhere in the township. Mr. Anderson advocated for chicanes or bump outs, as they are more esthetically pleasing and safer than speed humps. He also suggested a "woonerf" (living street concept) used in more urban settings. Regarding trucks, he suggested a "No Thru Trucks" sign. Mr. Anderson also stated that the Westtown Woods developer, Southdown Homes, should be required to contribute to the traffic calming effort on Jacqueline Drive because they will be adding to the traffic.

Mr. Haws stated that signs require 24-hour enforcement. The Board wants to implement a long term solution that will get people to alter their traffic patterns.

Mr. Di Domenico asked how many people would like to change the bus stop be moved from 202 down to the stop sign. [Comments from the audience could not be heard because people did not approach the microphone.] Mr. Haws stated that Chief Bernot has worked to have that bus stop moved and have hit a brick wall with the West Chester Area School District (WCASD).

Dan Nerelli, 209 Jacqueline Drive, stated that he thought that speed humps are the only solution. He thanked the police for their presence, but said they can't be there 24/7 to enforce speed or other signs.

Joel Frankfurt, 200 Jacqueline Drive, said that West Chester University (WCU) shuttle buses circle the campus, using Jacqueline Drive instead of the other end of Tigue Road (Stadium Road). He wondered if the Township can force WCU to use that road. Mr. McKenna said the township could talk to the university, but he didn't think there is any legal way to prevent them from using Jacqueline Drive.

Ginger Gray, 706 Jacqueline Drive, echoed Mr. Frankfurt's comments about the WCU shuttle buses. She also said that two days ago a tandem tractor trailer came off 202 and down Jacqueline Drive. She said she has videoed constant traffic even at midday. She said when she slows down to turn into her driveway, motorists ride her bumper and nearly hit her. She reported that her mailbox had been hit so many times that she ultimately had to get approval from the Post Office to relocate it. She stated that she supports speed bumps and anything else that will make motorists slow down.

Mrs. Gray then stated that Mr. Haws suggested that residents contact state legislators about the pipeline, but when the residents of Jacqueline Drive submitted the petition to Mr. Pingar, he doubted the signatures. She said there has to be mutual respect, and that the residents on the west side of 202 deserve as much attention as the residents on the east side.

Mr. Haws stated that this topic was put on the agenda tonight as a result of the petition, and that the Board cares about the traffic situation on Jacqueline Drive. He said the Board has been working on the issue for several years, and had hoped that the calming measures previously implemented would help. He said that traffic data shows speed has dropped, but volume is an ongoing problem.

An unidentified member of the audience asked about the process for additional calming measures. Mr. Di Domenico responded that the Board will get the township traffic engineer involved and determine what measures are permitted by PennDOT. Mr. Haws stated that many people vacation in August so the topic will likely be on one of the September agendas. All residents on Jacqueline Drive will receive notification of the meeting. He added that once a decision is made, the Board will move swiftly to implement it.

Ginny Hassler, 12 Jacqueline Drive, stated that she is in favor of making Jacqueline Drive one-way east bound and Cheyney Drive one way west bound. She said speed bumps would be her second choice.

Sue Mutter, 604 Jacqueline Drive, thanked the Board for inviting residents to this meeting. She had not seen the petition. She stated she is in favor of any measures to calm traffic. She said she thought that streets with "No Thru Street" signs don't show up on navigation systems as an alternate route, and thought that was an option that should be considered.

Regarding the bus stop, Kathy Di Domenico, 1530 Woodland Road, suggested that everyone on Jacqueline Drive write a letter to the WCASD Board. They are the only ones who can change a bus stop. She stated that the residents on her street were successful in having the bus stopped moved off 352, but said that everyone on the street wrote to the school board and attended school board meetings.

Frank Hepner, 207 Jacqueline Drive, stated that he is in the trucking business. He said that 3 & 4 axle Class 8 trucks are using Jacqueline Drive. He said insurance for trucks of that class only covers travel on state roads. He says they have no right to be on Jacqueline Drive. He stated that dump trucks for WCU regularly use Jacqueline Drive. He said that his neighbor had difficulty selling his house due to traffic on Jacqueline Drive. Mr. Hepner stated his support of speed bumps, and if they don't work, then he supported making Jacqueline Drive one-way east bound.

Jim Mutter, 604 Jacqueline Drive, stated that he has been a police officer for 30 years. He has been trained by PennDOT and understands PennDOT limitations. He appealed more to the

people of Jacqueline Drive than to the Board, stating that the only solution to the traffic problem is to make the street one-way east bound. He said police enforcement of speed limits or other signed restrictions cannot be 24/7. He stated he is against speed bumps because they don't deter traffic volume, and cause more problems than they help, particularly for emergency. He encouraged the residents of Jacqueline Drive to support making the street one-way.

Ms. De Wolf asked Mr. Pingar what the traffic numbers are east bound vs. west bound. Mr. Pingar replied that the radar sign only collects west bound traffic data. She asked if we could collect data east bound for a period. Mr. Haws stated that regardless of the number, there is a traffic problem. He said July and August are vacation months and would not be a good barometer of traffic. Ms. De Wolf said it is important to get data to make a decision.

Ginny Hassler, 12 Jacqueline Drive, did not realize the traffic data was only west bound. She surmised that the traffic counts could be double. Ms. De Wolf agreed that the total traffic number is higher. Mrs. Hassler agreed with Mr. Haws that the traffic will increase considerably in September once school is open.

Mr. Di Domenico stated that one-way traffic was discussed in the previous traffic calming discussions two years ago. He said it is one option to be considered. A one-way street would dramatically change things for the residents of Jacqueline Drive, and that is why their input is important. He also stressed the need for the township to address traffic with neighboring townships and work on regional solutions.

Jim Cahill, 9 Jacqueline Drive, stated that he thinks a solution will require a team effort among surrounding townships, PennDOT, and WCU. He suggested contacting Senator Killion to gain an easement to use Stadium Road.

Marty O'Malley, 1126 Kolbe Lane, stated that where she previously lived, commercial vehicles over 5 tons were restricted on all residential streets. She said it was enforced with a stiff fine. Regarding navigation apps, she read about a town that was able to thwart the system by instituting turn restrictions during peak traffic times, which then removes the route from the app. Doug Anderson, 606 Jacqueline Drive, suggested that the township use a cord across the road for traffic count.

Mr. Di Domenico stated that the township will notify residents of the next meeting to evaluate traffic calming options. Mr. Haws suggested that the Board schedule a special meeting for the topic because it may be a long and difficult process to come to a consensus on a solution. Mr. Di Domenico asked the audience to be patient. Members of the Board have vacations scheduled in August, and September and October are very busy due to municipal contract renewals and budgeting. Ms. De Wolf reminded residents that the initial calming measures implemented on Jacqueline Drive were part of a phased approach, and the Board implemented what the residents voted for at that time. It was hoped that they would help, and they have helped reduce speed. She said the Board will re-examine the options, and form a plan in the coming months. The Board thanked everyone for coming tonight.

VII. New Business

A. Police Pension Plan – Rate of Return

The pension plan for the Westtown East Goshen Police Department has historically used an 8% assumed rate of return (ROR) on pension account investments. This rate is used to determine the Minimum Municipal Obligation (MMO). The 8% ROR is unrealistic and may be contributing to the pension plan's unfunded liability. Both Westtown and East Goshen Townships agree that a 7.5% ROR is more realistic. In order for the pension actuary to calculate the 2018 MMO for this plan at an assumed ROR of 7.5%, this change would need to be formally communicated to him by the end of July, 2108.

Ms. De Wolf made a motion to direct the Westtown representative to the Police Commission to vote in favor of lowering the assumed ROR of the police pension plan from 8% to 7.5%, effective with the 2018 MMO. Mr. Haws seconded the motion. There was no public comment and the motion was unanimously approved.

B. AME Cemetery Volunteer Committee Appointments

Ms. De Wolf made a motion to appoint the following individuals to the Shiloh AME Cemetery Volunteer Committee to undertake investigations of the abandoned and unmaintained cemetery to further the historical knowledge of the Westtown residents interred there:

Westtown Historical Commissioners: Dave Walter & Ray Sarnacki
Former Westtown Historical Commissioner: Jonathon Hoppe

West Chester University Veterans Group:
Richard Simpson
John Herman
William Todd
Jace Vienne
Heather Williams
Shontai Haley

Saving Hallowed Ground: Gene Hough & Mark Anderson

Mr. Haws asked that a supervisor be added to the list and volunteered himself. Mr. Pingar stated these appointments were being made for insurance purposes, so that these people are covered by the township's insurance. Mr. Haws stated that he would like to participate on the committee and asked to be named. Mr. Di Domenico agreed, and the motion was amended to include Tom Haws as the Board representative on the AME Cemetery committee. There was no public comment and the motion was unanimously approved.

C. 2017 MS4 TMDL/Pollution Reduction Plan – Public Comment

Cedarville Engineering has finalized the Total Maximum Daily Load (TMDL)/Pollutant Reduction Plan (PRP). The Plan has been made available for public review and comment for a period of thirty (30) days. Public notice of the Plan was made in the Daily Local News on June 16, 2017 and posted on the township website on June 15th under Stormwater Management. Tonight's meeting is the last opportunity for public comment. After tonight, the plan will be submitted to the Pennsylvania Department of Environmental Protection by the September 16, 2017 due date.

Kathy Di Domenico, 1530 Woodland Road, stated that tax exempt parties in the township such as schools should not also be exempt from paying a fee to help deal with Stormwater Management. Mr. Haws agreed that a Stormwater Management fee should be required of all township properties.

There was no other public comment.

D. 2017 Road Maintenance Program – Payment No. 1

Incon submitted Invoice #1 for the 2017 Road Program in the amount of \$150,220.00. In their July 6, 2017 memo, township engineer McCormick Taylor recommended payment of \$142,709.00 (95% of the request) withholding 5% retainage (\$7,511.00).

Ms. De Wolf made a to approve payment #1 to Inconn in the amount of \$142,709.00 for the 2017 Road Program. Mr. Haws seconded the motion. There was no public comment and the motion was approved.

E. Brewer Subdivision – Act 247 referral

The applicant proposes to subdivide a 2-acre lot containing one single-family house, into two one-acre lots, and then build a single-family house on the new lot.

Ms. De Wolf made a motion to forward the Brewer subdivision application to the Township and the Chester County Planning Commissions for Act 247 review. Mr. Haws seconded the motion.

Ginger Gray, 706 Jacqueline Drive, asked if this is the same plan posted several years ago. Mr. Haws stated that this is the first application for subdivision received on the property. Mr. McKenna noted that the plans indicate that variance relief was granted several years ago, so the posting was probably a zoning posting related to that. He stated that the date of that decision will need to be determined and documented in the application.

There was no further public comment and the motion was unanimously approved.

VIII. Announcements

Mr. Di Domenico made the following announcements:

1. Board of Supervisors Conditional Use Hearing - Crebilly Tract/Toll Brothers – Tuesdays, July 25 and August 29, 6:00 pm at Rustin High School.
2. Summer Movie Night at Oakbourne Park – 8 pm Friday, July 21 – “Fantastic Beasts and Where to Find Them”
3. Neighborhood University – Thursdays starting September 14, 2017 at 7:00 pm. Neighborhood University of Greater West Chester is a free program offered by the West Chester Area Council of Governments to educate citizens about local government and increase their awareness of available municipal services and resources. Go to the link on the township website for more information and to register or visit www.nugwc.org.

IX. Public Comment on All Topics

Kathy Di Domenico asked if the Comprehensive Plan Update Survey was still open. Mr. Pingar responded that a deadline has not been set.

There was no further public comment.

X. Payment of Bills

Ms. De Wolf asked about M&B Environmental and Univar invoices. Mr. Pingar stated they were related to the township sewage pump stations. She then made a motion to approve the General Fund bills in the amount of \$413,065.27, Wastewater Fund bills in the amount of \$44,636.38, and Capital Projects fund bills in the amount of \$23,298.15, for a grand total of \$480,999.80. The motion was seconded by Mr. Haws. There was no public comment, and the check registers were approved.

XI. Adjournment

Ms. De Wolf made a motion to adjourn the meeting, seconded by Mr. Di Domenico. The meeting adjourned at 9:10 PM.

Respectfully submitted,

Robert Pingar
Township Manager

Appendix B

Developed Land Loading Rates for PA Counties

ATTACHMENT B

DEVELOPED LAND LOADING RATES FOR PA COUNTIES^{1,2,3}

County	Category	Acres	TN lbs/acre/yr	TP lbs/acre/yr	TSS (Sediment) lbs/acre/yr
Adams	impervious developed	10,373.2	33.43	2.1	1,398.77
	pervious developed	44,028.6	22.99	0.8	207.67
Bedford	impervious developed	9,815.2	19.42	1.9	2,034.34
	pervious developed	19,425	17.97	0.68	301.22
Berks	impervious developed	1,292.4	36.81	2.26	1,925.79
	pervious developed	5,178.8	34.02	0.98	264.29
Blair	impervious developed	3,587.9	20.88	1.73	1,813.55
	pervious developed	9,177.5	18.9	0.62	267.34
Bradford	impervious developed	10,423	14.82	2.37	1,880.87
	pervious developed	23,709.7	13.05	0.85	272.25
Cambria	impervious developed	3,237.9	20.91	2.9	2,155.29
	pervious developed	8,455.4	19.86	1.12	325.3
Cameron	impervious developed	1,743.2	18.46	2.98	2,574.49
	pervious developed	1,334.5	19.41	1.21	379.36
Carbon	impervious developed	25.1	28.61	3.97	2,177.04
	pervious developed	54.2	30.37	2.04	323.36
Centre	impervious developed	7,828.2	19.21	2.32	1,771.63
	pervious developed	15,037.1	18.52	0.61	215.84
Chester	impervious developed	1,838.4	21.15	1.46	1,504.78
	pervious developed	10,439.8	14.09	0.36	185.12
Clearfield	impervious developed	9,638.5	17.54	2.78	1,902.9
	pervious developed	17,444.3	18.89	1.05	266.62
Clinton	impervious developed	7,238.5	18.02	2.80	1,856.91
	pervious developed	11,153.8	16.88	0.92	275.81
Columbia	impervious developed	7,343.1	21.21	3.08	1,929.18
	pervious developed	21,848.2	22.15	1.22	280.39
Cumberland	impervious developed	8,774.8	28.93	1.11	2,065.1
	pervious developed	26,908.6	23.29	0.34	306.95
Dauphin	impervious developed	3,482.4	28.59	1.07	1,999.14
	pervious developed	9,405.8	21.24	0.34	299.62
Elks	impervious developed	1,317.7	18.91	2.91	1,556.93
	pervious developed	1,250.1	19.32	1.19	239.85
Franklin	impervious developed	13,832.3	31.6	2.72	1,944.85
	pervious developed	49,908.6	24.37	0.76	308.31
Fulton	impervious developed	3,712.9	22.28	2.41	1,586.75
	pervious developed	4,462.3	18.75	0.91	236.54
Huntington	impervious developed	7,321.9	18.58	1.63	1,647.53
	pervious developed	11,375.4	17.8	0.61	260.15
Indiana	impervious developed	589	19.29	2.79	1,621.25
	pervious developed	972	20.1	1.16	220.68
Jefferson	impervious developed	21.4	18.07	2.76	1,369.63
	pervious developed	20.4	19.96	1.24	198.60
Juniata	impervious developed	3,770.2	22.58	1.69	1,903.96
	pervious developed	8,928.3	17.84	0.55	260.68
Lackawana	impervious developed	2,969.7	19.89	2.84	1,305.05
	pervious developed	7,783.9	17.51	0.76	132.98
Lancaster	impervious developed	4,918.7	38.53	1.55	1,480.43
	pervious developed	21,649.7	22.24	0.36	190.93
Lebanon	impervious developed	1,192.1	40.58	1.85	1,948.53
	pervious developed	5,150	27.11	0.4	269.81
Luzerne	impervious developed	5,857	20.43	3	1,648.22
	pervious developed	13,482.9	19.46	0.98	221.19
Lycoming	impervious developed	10,031.7	16.48	2.57	1,989.64
	pervious developed	19,995.5	16	0.84	277.38

County	Category	Acres	TN lbs/acre/yr	TP lbs/acre/yr	TSS (Sediment) lbs/acre/yr
McKean	impervious developed	38.7	20.93	3.21	1,843.27
	pervious developed	5.3	22.58	1.45	249.26
Mifflin	impervious developed	5,560.2	21.83	1.79	1,979.13
	pervious developed	16,405.5	21.13	0.71	296.07
Montour	impervious developed	5,560.2	21.83	1.79	1,979.13
	pervious developed	16,405.5	21.13	0.71	296.07
Northumberland	impervious developed	8,687.3	25.73	1.54	2,197.08
	pervious developed	25,168.3	24.63	0.54	367.84
Perry	impervious developed	5,041.1	26.77	1.32	2,314.7
	pervious developed	9,977	23.94	0.51	343.16
Potter	impervious developed	2,936.3	16.95	2.75	1,728.34
	pervious developed	2,699.3	17.11	1.09	265.2
Schuylkill	impervious developed	5,638.7	30.49	1.56	1,921.08
	pervious developed	14,797.2	29.41	0.57	264.04
Snyder	impervious developed	4,934.2	28.6	1.11	2,068.16
	pervious developed	14,718.1	24.35	0.4	301.5
Somerset	impervious developed	1,013.6	25.13	2.79	1,845.7
	pervious developed	851.2	25.71	1.14	293.42
Sullivan	impervious developed	3,031.7	19.08	2.85	2,013.9
	pervious developed	3,943.4	21.55	1.31	301.58
Susquehanna	impervious developed	7,042.1	19.29	2.86	1,405.73
	pervious developed	14,749.7	20.77	1.21	203.85
Tioga	impervious developed	7,966.9	12.37	2.09	1,767.75
	pervious developed	18,090.3	12.22	0.76	261.94
Union	impervious developed	4,382.6	22.98	2.04	2,393.55
	pervious developed	14,065.3	20.88	0.69	343.81
Wayne	impervious developed	320.5	18.69	2.89	1,002.58
	pervious developed	509	21.14	1.31	158.48
Wyoming	impervious developed	3,634.4	16.03	2.53	2,022.32
	pervious developed	10,792.9	13.75	0.7	238.26
York	impervious developed	10,330.7	29.69	1.18	1,614.15
	pervious developed	40,374.8	18.73	0.29	220.4
All Other Counties	impervious developed	-	23.06	2.28	1,839
	pervious developed	-	20.72	0.84	264.96

Notes:

- 1 These land loading rate values may be used to derive existing pollutant loading estimates under DEP's simplified method for PRP development. MS4s may choose to develop estimates using other scientifically sound methods.
- 2 Acres and land loading rate values for named counties in the Chesapeake Bay watershed are derived from CAST. (The column for Acres represents acres within the Chesapeake Bay watershed). For MS4s located outside of the Chesapeake Bay watershed, the land loading rates for "All Other Counties" may be used to develop PRPs under Appendix E; these values are average values across the Chesapeake Bay watershed.
- 3 For land area outside of the urbanized area, undeveloped land loading rates may be used where appropriate. When using the simplified method, DEP recommends the following loading rates (for any county) for undeveloped land:
 - TN – 10 lbs/acre/yr
 - TP – 0.33 lbs/acre/yr
 - TSS (Sediment) – 234.6 lbs/acre/yr

These values were derived by using the existing loads for each pollutant, according to the 2014 Chesapeake Bay Progress Run, and dividing by the number of acres for the unregulated stormwater subsector.

Appendix C

Supporting Calculations

Conversion from NLCD 2011 Land Use Designation to Impervious and Pervious Areas

MUNICIPALITY: Westtown Township
MS4 SEWER SHED: Chester Creek (Goose Creek + Ridley Creek + East Branch Chester)
COUNTY: Chester

Developed Land:

Land Use ¹	Area (ac)	% Impervious ²	Impervious Area (ac)	Pervious Area (ac)
Developed, Open Space	1494.95	19	284.04	1210.91
Developed, Low Intensity	206.13	49	101.00	105.13
Developed, Medium Intensity	77.20	79	60.99	16.21
Developed, High Intensity	10.44	100	10.44	
Hay/Pasture	67.97	0		67.97
Cultivated Crops	11.97	0		11.97
Grassland/Herbaceous	1.56	0		1.56
Shrub/Scrub	109.74	0		109.74
Woody Wetlands	37.12	0		37.12
Emergent Herbaceous Wetlands	0.72	0		0.72
Deciduous Forest	421.95	0		421.95
Evergreen Forest	16.01	0		16.01
Mixed Forest	38.24	0		38.24
Total	2494.00		456.47	2037.53



Conversion from NLCD 2011 Land Use Designation to Impervious and Pervious Areas

MUNICIPALITY: Westtown Township
 MS4 SEWER SHED: Upper Brandywine Creek
 COUNTY: Chester

Developed Land:

Land Use ¹	Area (ac)	% Impervious ²	Impervious Area (ac)	Pervious Area (ac)
Developed, Open Space	306.80	19	58.29	248.51
Developed, Low Intensity	14.12	49	6.92	7.20
Developed, Medium Intensity	8.52	79	6.73	1.79
Developed, High Intensity	3.16	100	3.16	
Hay/Pasture	45.87	0		45.87
Cultivated Crops	10.03	0		10.03
Grassland/Herbaceous	1.33	0		1.33
Shrub/Scrub	33.76	0		33.76
Woody Wetlands	1.36	0		1.36
Deciduous Forest	70.04	0		70.04
Evergreen Forest	2.03	0		2.03
Mixed Forest	13.27	0		13.27
Total	510.29		75.10	435.19



Conversion from NLCD 2011 Land Use Designation to Impervious and Pervious Areas

MUNICIPALITY: Westtown Township
MS4 SEWER SHED: Goose Creek
COUNTY: Chester

Developed Land:

Land Use ¹	Area (ac)	% Impervious ²	Impervious Area (ac)	Pervious Area (ac)
Developed, Open Space	332.55	19	63.18	269.37
Developed, Low Intensity	28.73	49	14.08	14.65
Developed, Medium Intensity	5.66	79	4.47	1.19
Developed, High Intensity	0.67	100	0.67	
Grassland/Herbaceous	1.56	0		1.56
Hay/Pasture	17.35	0		17.35
Cultivated Crops	3.78	0		3.78
Shrub/Scrub	35.28	0		35.28
Woody Wetlands	6.64	0		6.64
Deciduous Forest	154.02	0		154.02
Evergreen Forest	2.65	0		2.65
Mixed Forest	8.35	0		8.35
Total	597.24		82.40	514.84



Existing Loads using Chesapeake Bay Loading Rates without BMPs

MUNICIPALITY: Westtown Township
MS4 SEWER SHED: Chester Creek (Goose Creek + Ridley Creek + East Branch Chester)
COUNTY: Chester

Developed Land:

Land Use	Area (ac)	Pollutant Loading Rates ¹			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	456.47	21.15	1.46	1,504.78	9,654.34	666.45	686,886.93
Pervious, Developed	2,037.53	14.09	0.36	185.12	28,708.80	733.51	377,187.55
Chester Creek Total Pollutant Load					38,363.14	1,399.96	1,064,074.48



Existing Loads using Chesapeake Bay Loading Rates without BMPs

MUNICIPALITY: Westtown Township
 MS4 SEWER SHED: Upper Brandywine Creek
 COUNTY: Chester

Developed Land:

Land Use	Area (ac)	Pollutant Loading Rates ¹			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	75.10	21.15	1.46	1,504.78	1,588.37	109.65	113,008.98
Pervious, Developed	435.19	14.09	0.36	185.12	6,131.83	156.67	80,562.37
Upper Brandywine Total Pollutant Load					7,720.19	266.31	193,571.35



Existing Loads using Chesapeake Bay Loading Rates without BMPs

MUNICIPALITY: Westtown Township
 MS4 SEWER SHED: Goose Creek
 COUNTY: Chester

Developed Land:

Land Use	Area (ac)	Pollutant Loading Rates ¹			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	82.40	21.15	1.46	1,504.78	1742.76	120.30	123993.87
Pervious, Developed	514.84	14.09	0.36	185.12	7254.10	185.34	95307.18
Goose Creek Total Pollutant Load					8,996.86	305.65	219,301.05

1. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for Existing BMPs

BMP NAME: St Simon and Jude Dry Extended Detention Basin
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: East Branch Chester Creek
COUNTY: Chester
RETROFIT CLASS: Existing BMP
LOCATION: 1570 West Chester Pike West Chester, PA
GPS LOCATION: Lat: 39.9307/ Long: -75.5846
TOTAL DRAINAGE AREA TREATED (ac): 6
TYPE OF BMP: Dry Extended Detention Basin

Developed Land - Pollutant Reduction:

Land Use ^{1,2}	Area (ac)	Pollutant Loading Rates ³			BMP Effectiveness Value ⁴			Pollutant Load Reduction		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN	TP	Sediment	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	2.24	21.15	1.46	1,504.78	20%	20%	60%	9.48	0.65	2022.42
Pervious, Developed	3.76	14.09	0.36	185.12	20%	20%	60%	10.60	0.27	417.63
Total								20.07	0.92	2,440.06

1. NLCD 2011 Land Use and Areas
2. Highest % of impervious used from each NLCD 2011 definition per PADEP
3. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties
4. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for Existing BMPs

BMP NAME: Westtown Reserve Dry Extended Detention Basin
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: East Branch Chester Creek
COUNTY: Chester
RETROFIT CLASS: Existing BMP
LOCATION: 1228 Skiles Boulevard, West Chester, PA
GPS LOCATION: Lat: 39.9307/ Long: -75.5846
TOTAL DRAINAGE AREA TREATED (ac): 17.27
TYPE OF BMP: Dry Extended Detention Basin

Developed Land - Pollutant Reduction:

Land Use ^{1,2}	Area (ac)	Pollutant Loading Rates ³			BMP Effectiveness Value ⁴			Pollutant Load Reduction		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN	TP	Sediment	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	11.23	21.15	1.46	1,504.78	20%	20%	60%	47.50	3.28	10139.21
Pervious, Developed	6.04	14.09	0.36	185.12	20%	20%	60%	17.02	0.43	670.87
Total								64.52	3.71	10,810.08

1. NLCD 2011 Land Use and Areas
2. Highest % of impervious used from each NLCD 2011 definition per PADEP
3. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties
4. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for Existing BMPs

BMP NAME: West Glen Basin
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: East Branch Chester Creek
COUNTY: Chester
RETROFIT CLASS: Existing BMP
LOCATION:
GPS LOCATION:
TOTAL DRAINAGE AREA TREATED (ac): 14.93
TYPE OF BMP: Dry Extended Detention Basin

Developed Land - Pollutant Reduction:

Land Use ^{1,2}	Area (ac)	Pollutant Loading Rates ³			BMP Effectiveness Value ⁴			Pollutant Load Reduction		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN	TP	Sediment	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	4.39	21.15	1.46	1,504.78	20%	20%	60%	18.57	1.28	3963.59
Pervious, Developed	10.54	14.09	0.36	185.12	20%	20%	60%	29.70	0.76	1170.70
Total								48.27	2.04	5,134.29

1. NLCD 2011 Land Use and Areas
2. Highest % of impervious used from each NLCD 2011 definition per PADEP
3. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties
4. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for Existing BMPs

BMP NAME: Kilduff Circle Dry Extended Detention Basin
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: East Branch Chester Creek
COUNTY: Chester
RETROFIT CLASS: Existing BMP
LOCATION:
GPS LOCATION:
TOTAL DRAINAGE AREA TREATED (ac): 35.39
TYPE OF BMP: Dry Extended Detention Basin

Developed Land - Pollutant Reduction:

Land Use ^{1,2}	Area (ac)	Pollutant Loading Rates ³			BMP Effectiveness Value ⁴			Pollutant Load Reduction		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN	TP	Sediment	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	4.57	21.15	1.46	1,504.78	20%	20%	60%	19.33	1.33	4126.11
Pervious, Developed	30.81	14.09	0.36	185.12	20%	20%	60%	86.82	2.22	3422.13
Total								106.15	3.55	7,548.24

1. NLCD 2011 Land Use and Areas
2. Highest % of impervious used from each NLCD 2011 definition per PADEP
3. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties
4. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for Existing BMPs

BMP NAME: Arbor View Basin
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: Upper Brandywine
COUNTY: Chester
RETROFIT CLASS: Existing BMP
LOCATION: _____
GPS LOCATION: _____
TOTAL DRAINAGE AREA TREATED (ac): 13.42
TYPE OF BMP: Wet Pond

Developed Land - Pollutant Reduction:

Land Use ^{1,2}	Area (ac)	Pollutant Loading Rates ³			BMP Effectiveness Value ⁴			Pollutant Load Reduction		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN	TP	Sediment	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	1.68	21.15	1.46	1,504.78	20%	45%	60%	7.11	1.10	1516.82
Pervious, Developed	11.74	14.09	0.36	185.12	20%	45%	60%	33.08	1.90	1303.99
Total								40.19	3.01	2,820.80

1. NLCD 2011 Land Use and Areas
2. Highest % of impervious used from each NLCD 2011 definition per PADEP
3. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties
4. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for Existing BMPs

BMP NAME: Arbor View Infiltration Trench
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: Upper Brandywine
COUNTY: Chester
RETROFIT CLASS: Existing BMP
LOCATION:
GPS LOCATION:
TOTAL DRAINAGE AREA TREATED (ac): 5.32
TYPE OF BMP: Infiltration Trench

Developed Land - Pollutant Reduction:

Land Use ^{1,2}	Area (ac)	Pollutant Loading Rates ³			BMP Effectiveness Value ⁴			Pollutant Load Reduction		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN	TP	Sediment	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	0.00	21.15	1.46	1,504.78	20%	45%	60%	0.01	0.00	1.81
Pervious, Developed	5.318	14.09	0.36	185.12	20%	45%	60%	14.99	0.86	590.68
Total								14.99	0.86	592.49

1. NLCD 2011 Land Use and Areas
2. Highest % of impervious used from each NLCD 2011 definition per PADEP
3. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties
4. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for Existing BMPs

BMP NAME: Stetson Middle School Basin
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: Upper Brandywine
COUNTY: Chester
RETROFIT CLASS: Existing BMP
LOCATION: _____
GPS LOCATION: _____
TOTAL DRAINAGE AREA TREATED (ac): 4.88
TYPE OF BMP: Dry Extended Detention Basin

Developed Land - Pollutant Reduction:

Land Use ^{1,2}	Area (ac)	Pollutant Loading Rates ³			BMP Effectiveness Value ⁴			Pollutant Load Reduction		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN	TP	Sediment	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	0.59	21.15	1.46	1,504.78	20%	20%	60%	2.50	0.17	532.69
Pervious, Developed	4.29	14.09	0.36	185.12	20%	20%	60%	12.09	0.31	476.50
Total								14.58	0.48	1,009.19

1. NLCD 2011 Land Use and Areas
2. Highest % of impervious used from each NLCD 2011 definition per PADEP
3. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties
4. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for Existing BMPs

BMP NAME: Tyson Park Bioswale
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: Goose Creek
COUNTY: Chester
RETROFIT CLASS: Existing BMP
LOCATION: 901 Oakbourne Road
GPS LOCATION: Lat: 39.9463/ Long: -75.5628
TOTAL DRAINAGE AREA TREATED (ac): 41.4
TYPE OF BMP: Bioswale

Developed Land - Pollutant Reduction:

Land Use ^{1,2}	Area (ac)	Pollutant Loading Rates ³			BMP Effectiveness Value ⁴			Pollutant Load Reduction		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN	TP	Sediment	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	7.07	21.15	1.46	1,504.78	70%	75%	80%	104.67	7.74	8511.04
Pervious, Developed	34.33	14.09	0.36	185.12	70%	75%	80%	338.60	9.27	5084.14
Total								443.27	17.01	13,595.17

1. NLCD 2011 Land Use and Areas
2. Highest % of impervious used from each NLCD 2011 definition per PADEP
3. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties
4. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for New BMPs

BMP NAME: Pleasant Grove Stream Restoration
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: Chester Creek/East Branch/Ridley
COUNTY: Chester
RETROFIT CLASS: New Retrofit Facility
LOCATION: Pleasant Grove
GPS LOCATION:
TOTAL DRAINAGE AREA TREATED (ac):
TYPE OF BMP: Stream Restoration

Stream Restoration - Pollutant Reduction:

Location	Restoration Length (ft)	BMP Effectiveness Value ¹			Pollutant Load Reduction		
		TN (lbs/ft/yr)	TP (lbs/ft/yr)	Sediment (lbs/ft/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
East Branch Chester Creek	1,600	0.075	0.068	44.88	120.00	108.80	71808.00
Total					120.00	108.80	71,808.00

1. Per PADEP NPDES BMP Effectiveness Values Table



Efficiency Rates for Stormwater Retrofit Projects using Chesapeake Bay Panel Report

BMP NAME:	Dunvegan Road Stormwater Retrofit
MUNICIPALITY:	Westtown Township
MS4 SEWERSHED:	Upper Brandywine
COUNTY:	Chester
RETROFIT CLASS:	Existing BMP Conversion
LOCATION:	Dunvegan Road and South New Street
GPS LOCATION:	Lat: 39.9275/ Long: -75.5976
TOTAL DRAINAGE AREA TREATED (ac):	9.9
TYPE OF BMP:	Ex. Surface Basin to be retrofitted with Outlet Structure Modification
CLASSIFICATION OF BMPs BASED ON RUNOFF REDUCTION CAPABILITY:	Runoff Reduction Practice (RR)

$$\text{Amount of Runoff Volume treated (in)} = \frac{RS \times 12}{IA} \quad \text{where:}$$

RS = Runoff Storage Volume (ac-ft)
IA = Impervious Area (ac)

Impervious area treated (ac)	Runoff Storage Volume (ac-ft)	Amount of Runoff Volume treated (in)	Projected Removal Rates ¹		
			TN (%)	TP (%)	TSS [Sediment] (%)
1.70	0.220	1.553	65	75	82

Pollutant Load to Dunvegan Road Basin Retrofit:

Land Use	Area (ac)	Pollutant Loading Rates ²			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	1.70	21.15	1.46	1,504.78	35.96	2.48	2,558.13
Pervious, Developed	8.20	14.09	0.36	185.12	115.54	2.95	1,517.98
Total					151.49	5.43	4,076.11

Pollutant Load reduced with Dunvegan Road Basin Retrofit:		
TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
98.47	4.08	3,342.41

Note: The basin outlet structure must be modified to detain runoff from the stormwater quality design storm for extended periods. The 9" orifice at the bottom of the outlet is proposed to be sealed, and a new 4" orifice to be cored at an elevation of 2.0'. Currently, the endwall draining to the basin is clogged. The trash will be removed and will be regraded to form a channel to safely discharge into the basin. Raising the orifice, increases the storage volume capacity of the basin. Additionally, water quality benefits were assumed minimal as the basin was only designed for peak flow control, the existing basin has zero removal rate. It was assumed that since the basin was dry during inspection, the soils beneath the basin have naturally good infiltration rate and do not require an infiltration bed.

1. Percentages determined by using Expert Panel Report for Urban Stormwater Retrofit Projects - Figures 3, 4, & 5 Removal Adjustor Curves



BMP Name: Dunvegan Road Basin Retrofit

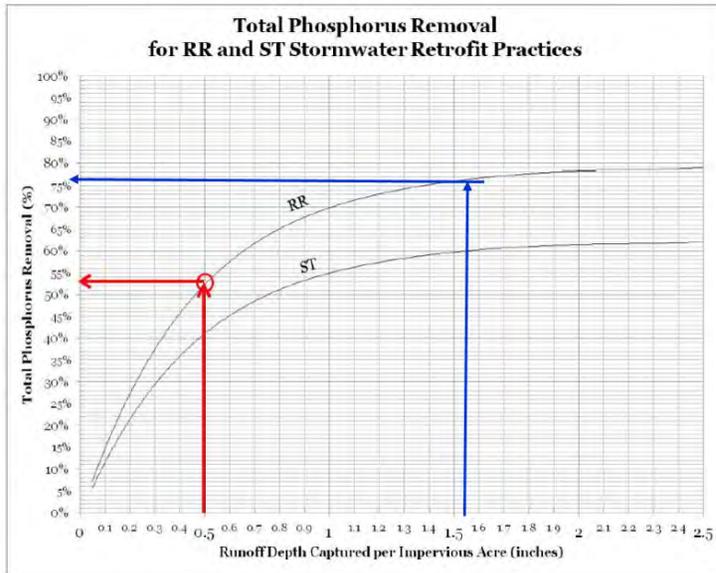


Figure 3. Retrofit Removal Adjustor Curve for Total Phosphorus

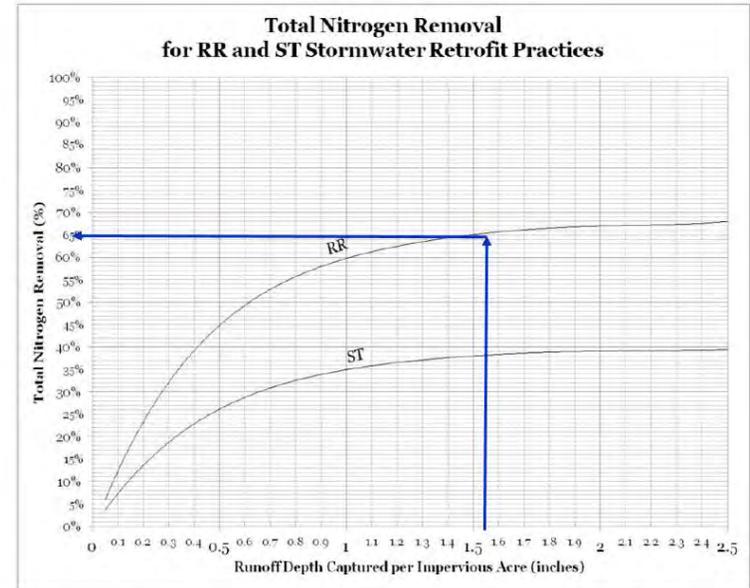


Figure 4. Retrofit Removal Adjustor Curve for Total Nitrogen

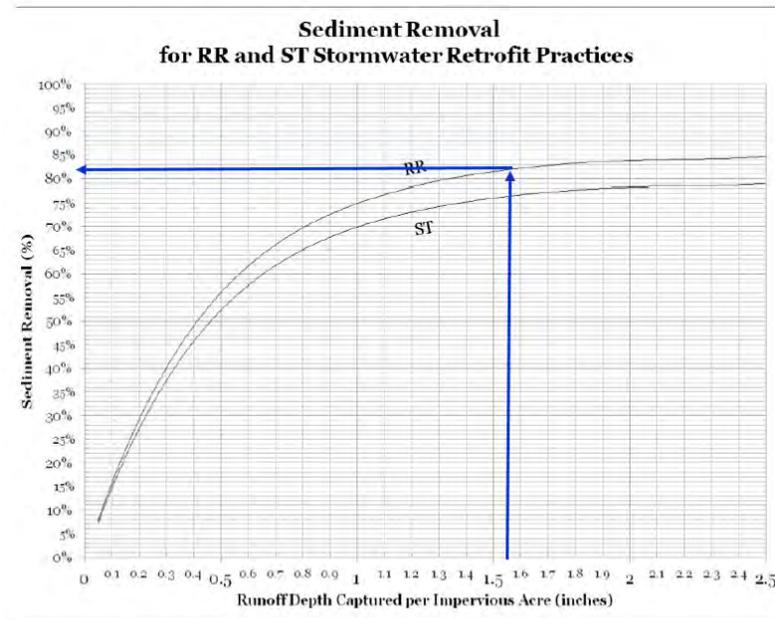


Figure 5. Retrofit Removal Adjustor Curve for Sediment

Efficiency Rates for Stormwater Retrofit Projects using Chesapeake Bay Panel Report

BMP NAME:	General Green Basin B Stormwater Retrofit
MUNICIPALITY:	Westtown Township
MS4 SEWERSHED:	Upper Brandywine
COUNTY:	Chester
RETROFIT CLASS:	Existing BMP Conversion
LOCATION:	General Green Drive
GPS LOCATION:	39.9257, -75.5992
TOTAL DRAINAGE AREA TREATED (ac):	12.38
TYPE OF BMP:	Ex. Surface Basin to be retrofitted with Outlet Structure Modification
CLASSIFICATION OF BMPs BASED ON RUNOFF REDUCTION CAPABILITY:	Runoff Reduction Practice (RR)

$$\text{Amount of Runoff Volume treated (in)} = \frac{RS \times 12}{IA} \quad \text{where:}$$

RS = Runoff Storage Volume (ac-ft)
IA = Impervious Area (ac)

Impervious area treated (ac)	Runoff Storage Volume (ac-ft)	Amount of Runoff Volume treated (in)	Projected Removal Rates ¹		
			TN (%)	TP (%)	TSS [Sediment] (%)
2.31	0.100	0.519	48	55	60

Pollutant Load to General Greene Drive Basin Retrofit:

Land Use	Area (ac)	Pollutant Loading Rates ²			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	2.31	21.15	1.46	1,504.78	48.86	3.37	3476.04
Pervious, Developed	10.07	14.09	0.36	185.12	141.89	3.63	1864.16
Total					190.74	7.00	5,340.20

Pollutant Load reduced with General Greene Drive Basin Retrofit:		
TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
91.56	3.85	3204.12

Note: The basin outlet structure must be modified to detain runoff from the stormwater quality design storm for extended periods. The 4" orifice at the bottom of the outlet is proposed to be sealed, and existing 4" orifice will be used at an elevation of 2'. Currently, the endwall draining to the basin is clogged. The trash will be removed and will be regraded to form a channel to safely discharge into the basin. Raising the orifice, increases the storage volume capacity of the basin. Additionally, water quality benefits were assumed minimal as the basin was only designed for peak flow control, the existing basin has zero removal rate. It was assumed that since the basin was dry during inspection, the soils beneath the basin have naturally good infiltration rate and do not require an infiltration bed.

1. Percentages determined by using Expert Panel Report for Urban Stormwater Retrofit Projects - Figures 3, 4, & 5 Removal Adjustor Curves



BMP Name: General Greene Basin B Retrofit

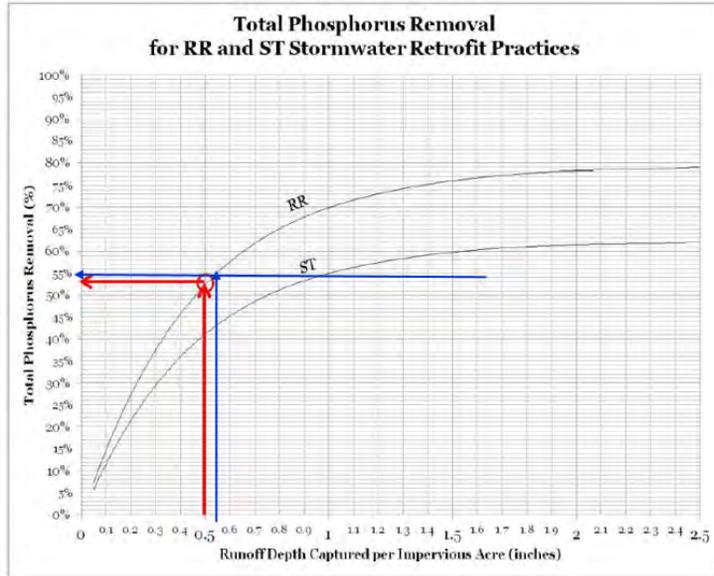


Figure 3. Retrofit Removal Adjustor Curve for Total Phosphorus

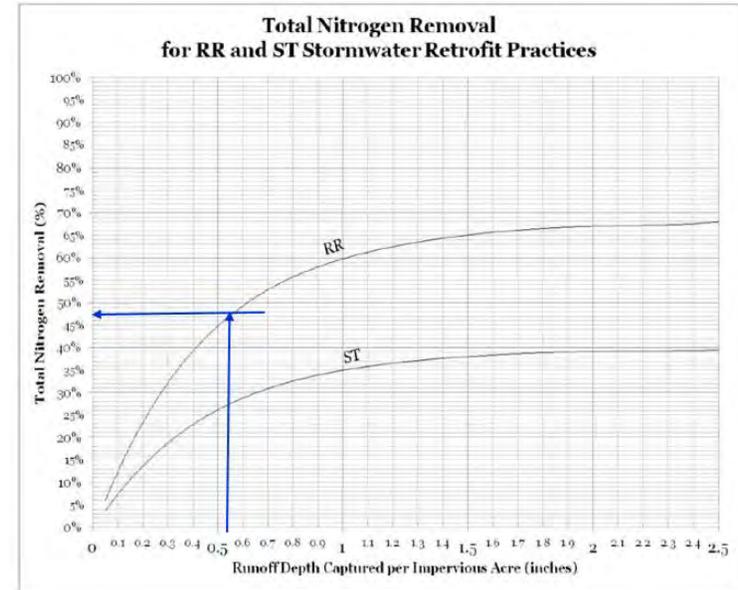


Figure 4. Retrofit Removal Adjustor Curve for Total Nitrogen

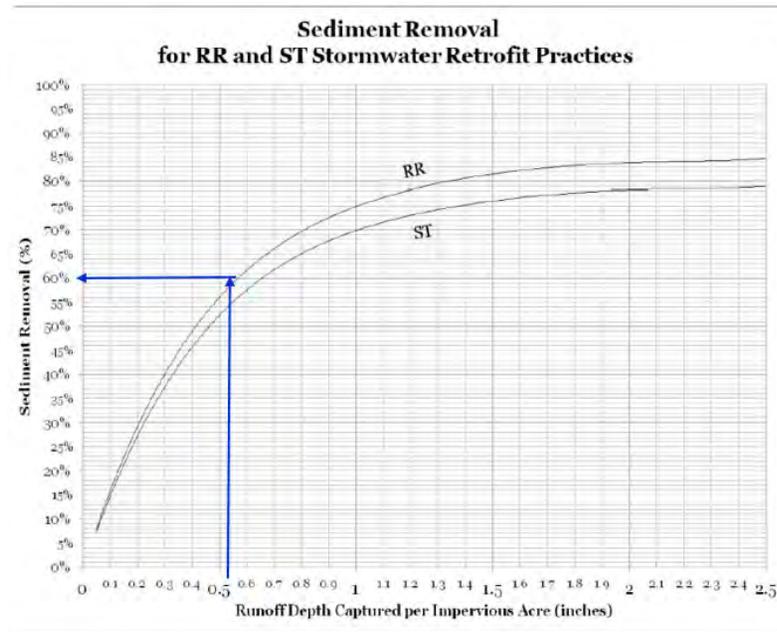


Figure 5. Retrofit Removal Adjustor Curve for Sediment

Efficiency Rates for Stormwater Retrofit Projects using Chesapeake Bay Panel Report

BMP NAME:	General Green Basin A Stormwater Retrofit
MUNICIPALITY:	Westtown Township
MS4 SEWERSHED	Upper Brandywine
COUNTY:	Chester
RETROFIT CLASS:	Existing BMP Conversion
LOCATION:	General Green Drive
GPS LOCATION:	39.9245, -75.6022
TOTAL DRAINAGE AREA TREATED (ac):	9.76
TYPE OF BMP:	Ex. Surface Basin to be retrofitted with Outlet Structure Modification
CLASSIFICATION OF BMPs BASED ON RUNOFF REDUCTION CAPABILITY:	Runoff Reduction Practice (RR)

$$\text{Amount of Runoff Volume treated (in)} = \frac{RS \times 12}{IA} \quad \text{where:}$$

RS = Runoff Storage Volume (ac-ft)
IA = Impervious Area (ac)

Impervious area treated (ac)	Runoff Storage Volume (ac-ft)	Amount of Runoff Volume treated (in)	Projected Removal Rates ¹		
			TN (%)	TP (%)	TSS [Sediment] (%)
2.03	0.250	1.478	65	75	80

Pollutant Load to General Greene Drive Basin Retrofit:

Land Use	Area (ac)	Pollutant Loading Rates ²			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	2.03	21.15	1.46	1,504.78	42.93	2.96	3054.70
Pervious, Developed	7.72	14.09	0.36	185.12	108.77	2.78	1429.13
Total					151.71	5.74	4,483.83

Pollutant Load reduced with General Greene Drive Basin Retrofit:

TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
98.61	4.31	3587.06

Note: The basin outlet structure must be modified to detain runoff from the stormwater quality design storm for extended periods. The entire outlet structure is proposed to be removed since it is very old and the vegetation has overgrown and a new standard outlet structure box with 4" orifice will be used at an elevation of 2' from existing ground will be used. Additionally, the top of grate would be at 5' from existing ground. Currently, the endwall draining to the basin is clogged. The trash will be removed and will be regraded to form a channel to safely discharge into the basin. Raising the orifice, increases the storage volume capacity of the basin. Additionally, water quality benefits were assumed minimal as the basin was only designed for peak flow control, the existing basin has zero removal rate. It was assumed that since the basin was dry during inspection, the soils beneath the basin have naturally good infiltration rate and do not require an infiltration bed.

1. Percentages determined by using Expert Panel Report for Urban Stormwater Retrofit Projects - Figures 3.4, & 5 Removal Adjustor Curves
2. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties



BMP Name: General Greene Basin A Retrofit

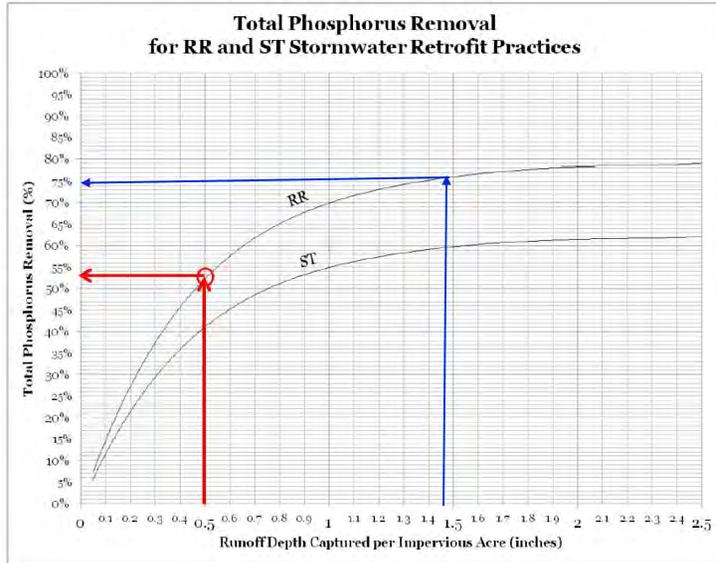


Figure 3. Retrofit Removal Adjustor Curve for Total Phosphorus

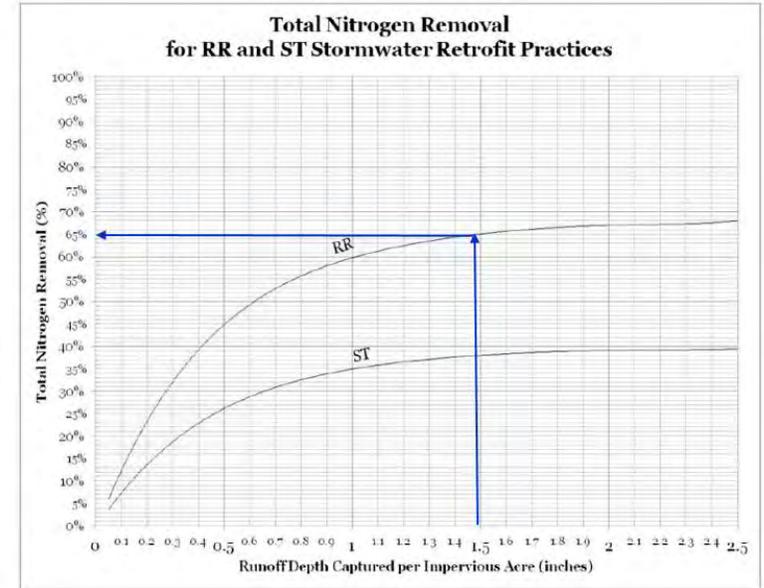


Figure 4. Retrofit Removal Adjustor Curve for Total Nitrogen

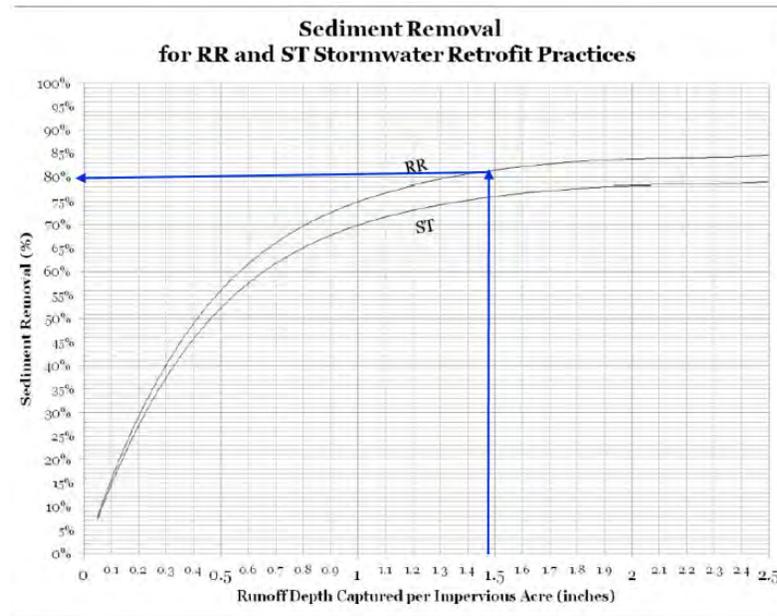


Figure 5. Retrofit Removal Adjustor Curve for Sediment

Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for New BMPs

BMP NAME: Radley Run Stream Restoration
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: Upper Brandywine
COUNTY: Chester
RETROFIT CLASS: New Retrofit Facility
LOCATION:
GPS LOCATION:
TOTAL DRAINAGE AREA TREATED (ac):
TYPE OF BMP: Stream Restoration

Stream Restoration - Pollutant Reduction:

Location	Restoration Length (ft)	BMP Effectiveness Value ¹			Pollutant Load Reduction		
		TN (lbs/ft/yr)	TP (lbs/ft/yr)	Sediment (lbs/ft/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Radley Run	190	0.075	0.068	44.88	14.25	12.92	8527.20
Total					14.25	12.92	8,527.20

1. Per PADEP NPDES BMP Effectiveness Values Table



Efficiency Rates for Stormwater Retrofit Projects using Chesapeake Bay Panel Report

BMP NAME:	Thorne Drive Basin Retrofit
MUNICIPALITY:	Westtown Township
MS4 SEWERSHED:	Goose Creek
COUNTY:	Chester
RETROFIT CLASS:	Existing BMP
LOCATION:	901 Thorne Drive
GPS LOCATION:	Lat: 39.9477 / Long: -75.5703
TOTAL DRAINAGE AREA TREATED (ac):	19.86
TYPE OF BMP:	Ex. Surface Basin
CLASSIFICATION OF BMPs BASED ON RUNOFF REDUCTION CAPABILITY:	Runoff Reduction Practice (RR)

$$\text{Amount of Runoff Volume treated (In)} = \frac{RS \times 12}{IA} \quad \text{where:}$$

RS = Runoff Storage Volume (ac-ft)
IA = Impervious Area (ac)

Impervious area treated (ac)	Runoff Storage Volume (ac-ft)	Amount of Runoff Volume treated (in)	Proposed Removal Rates ¹		
			TN (%)	TP (%)	TSS [Sediment] (%)
3.94	0.620	1.888	67	79	84

Pollutant Load to Thorne Drive Basin Retrofit:

Land Use	Area (ac)	Pollutant Loading Rates ²			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	3.88	21.15	1.46	1,504.78	82.06	5.66	5838.55
Pervious, Developed	15.98	14.09	0.36	185.12	225.16	5.75	2958.22
Total					307.22	11.42	8,796.76

Pollutant Load reduced with Thorne Drive Basin Retrofit:			
	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
	205.84	9.02	7389.28

Note: Existing basin is overgrown and has reduced volume capacity. Basin also has a defined channel which is causing short circuiting of the basin. There is also no low-flow orifice. Existing efficiency rate considered to be zero. It is proposed to clean out the basin, remove built up sediment and vegetation to create meandering channels to increase the storage capacity, as well as replace outflow structure to a riser with a low flow orifice.

1. Percentages determined by using Expert Panel Report for Urban Stormwater Retrofit Projects - Figures 3.4, & 5 Removal Adjustor Curves
2. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties



BMP Name: Thorne Drive Basin Retrofit

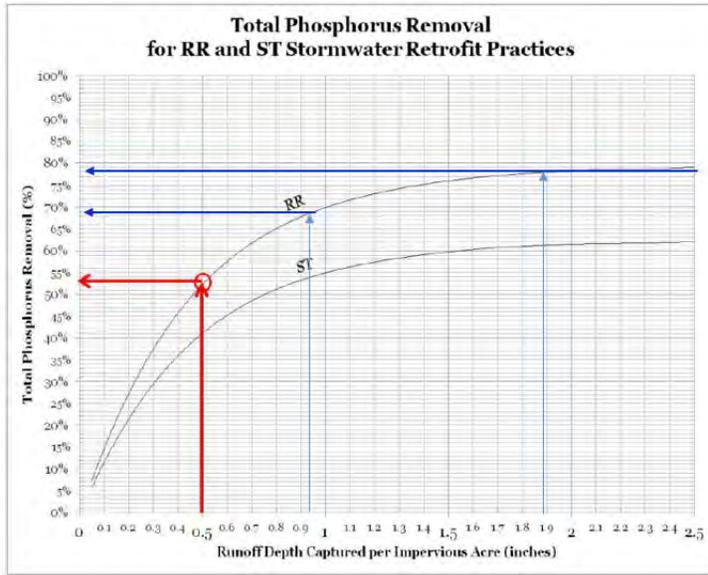


Figure 3. Retrofit Removal Adjustor Curve for Total Phosphorus

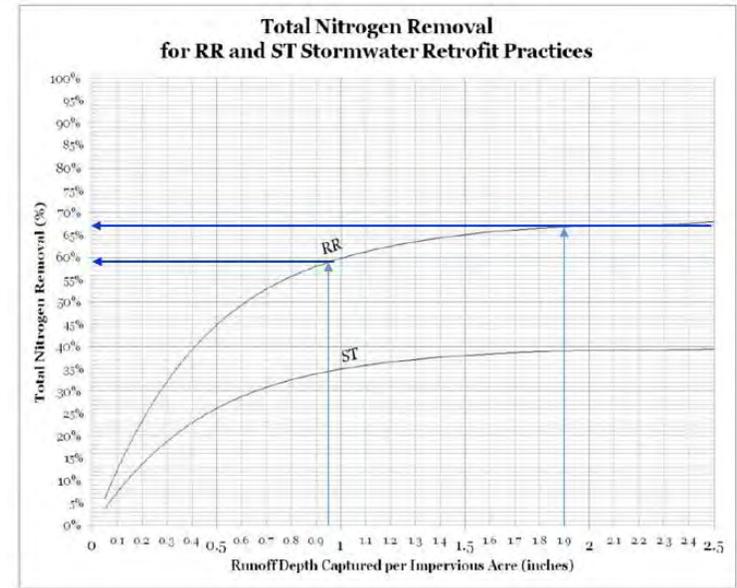


Figure 4. Retrofit Removal Adjustor Curve for Total Nitrogen

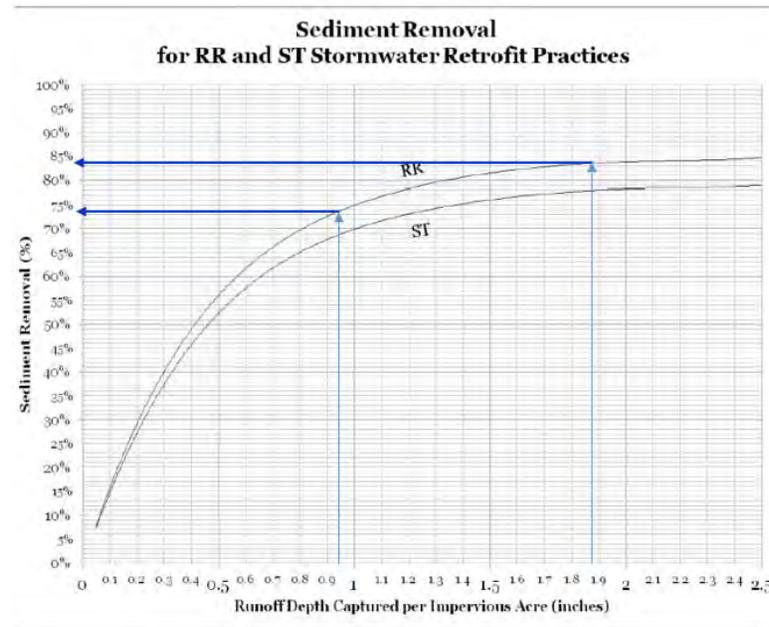


Figure 5. Retrofit Removal Adjustor Curve for Sediment

Efficiency Rates for Stormwater Retrofit Projects using Chesapeake Bay Panel Report

BMP NAME:	Sage Road Basin Retrofit
MUNICIPALITY:	Westtown Township
MS4 SEWERSHED:	Goose Creek
COUNTY:	Chester
RETROFIT CLASS:	Existing BMP Conversion
LOCATION:	Sage Road, West Chester, Pa
GPS LOCATION:	Lat: 39.9432 / Long: -75.5653
TOTAL DRAINAGE AREA TREATED (ac):	20.59
TYPE OF BMP:	Ex. Surface Basin to be retrofitted to extended detention basin
CLASSIFICATION OF BMPs BASED ON RUNOFF REDUCTION CAPABILITY:	Runoff Reduction Practice (RR)

$$\text{Amount of Runoff Volume treated (In)} = \frac{RS \times 12}{IA} \quad \text{where:}$$

RS = Runoff Storage Volume (ac-ft)
IA = Impervious Area (ac)

Impervious area treated (ac)	Runoff Storage Volume (ac-ft)	Amount of Runof Volume treated (In)	Projected Removal Rates ¹		
			TN (%)	TP (%)	TSS [Sediment] (%)
4.35	0.560	1.545	65	75	83

Pollutant Load to Sage Road Basin Retrofit:

Land Use	Area (ac)	Pollutant Loading Rates ²			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	4.35	21.15	1.46	1,504.78	92.00	6.35	6545.79
Pervious, Developed	18.09	14.09	0.36	185.12	254.89	6.51	3348.82
Total					346.89	12.86	9,894.61

	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Pollutant Load reduced with Sage Road Basin Retrofit:	225.48	9.65	8212.53

Note: The basin outlet structure must be modified to detain runoff from the stormwater quality design storm for extended periods. Since the 12" orifice at the bottom of the outlet structure is large for water quality improvements, we will be suggesting to remove the orifice by utilizing a steel plate. A new 6" orifice will be cored at an elevation of 2 feet, increasing the storage volume capacity of the basin. Furthermore, the earthen mound created by deposition of sediments will be graded to ensure clear pathway to the outlet structure. It is also recommended to remove the vegetation within the basin. Additionally, water quality benefits were assumed minimal as the basin was only designed for peak flow control, the existing basin has zero removal rate. It was assumed that since the basin was dry during inspection, the soils beneath the basin have naturally good infiltration rate and do not require an infiltration bed.

1. Percentages determined by using Expert Panel Report for Urban Stormwater Retrofit Projects - Figures 3.4, & 5 Removal Adjustor Curves
2. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties



BMP Name: Sage Road Basin Retrofit

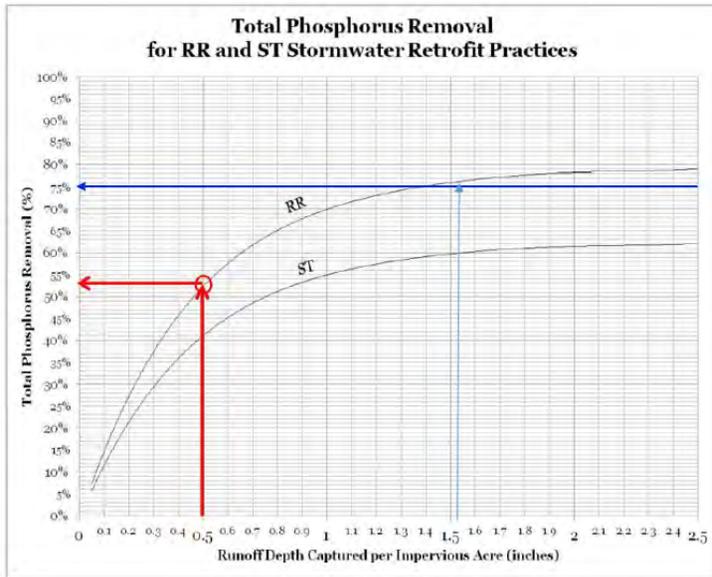


Figure 3. Retrofit Removal Adjustor Curve for Total Phosphorus

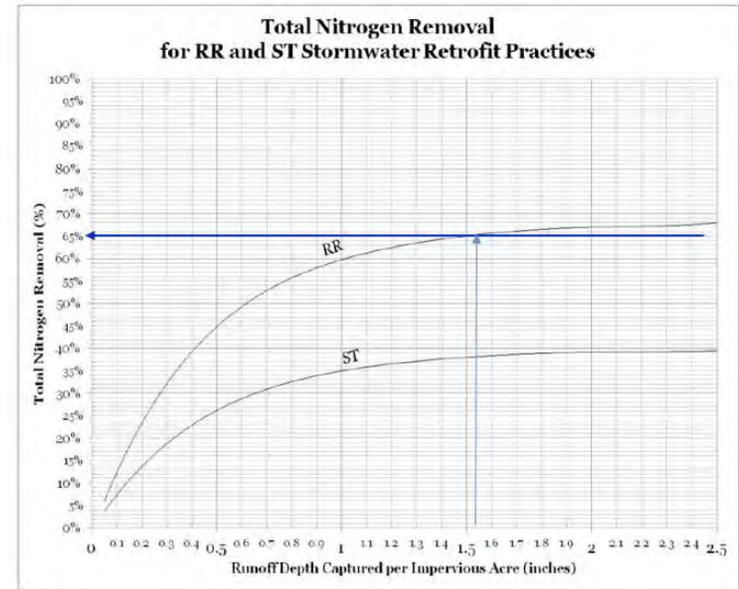


Figure 4. Retrofit Removal Adjustor Curve for Total Nitrogen

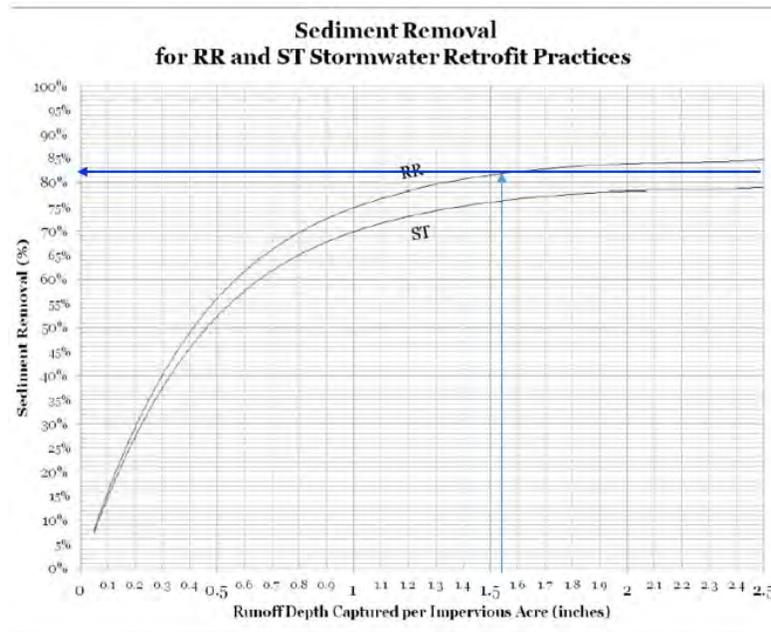


Figure 5. Retrofit Removal Adjustor Curve for Sediment

Efficiency Rates for Stormwater Retrofit Projects using Chesapeake Bay Panel Report

BMP NAME:	Wild Goose Farms Basin B Retrofit
MUNICIPALITY:	Westtown Township
MS4 SEWERSHED:	Goose Creek
COUNTY:	Chester
RETROFIT CLASS:	Existing BMP Conversion
LOCATION:	Trellis Lane and Picket Way
GPS LOCATION:	Lat: 39.9447 / Long: -75.5731
TOTAL DRAINAGE AREA TREATED (ac):	9.25
TYPE OF BMP:	Ex. Surface Basin to be retrofitted with Outlet Structure Modification
CLASSIFICATION OF BMPs BASED ON RUNOFF REDUCTION CAPABILITY:	Runoff Reduction Practice (RR)

$$\text{Amount of Runoff Volume treated (in)} = \frac{RS \times 12}{IA} \quad \text{where:}$$

RS = Runoff Storage Volume (ac-ft)
IA = Impervious Area (ac)

Impervious area treated (ac)	Runoff Storage Volume (ac-ft)	Amount of Runoff Volume treated (in)	Projected Removal Rates ¹		
			TN (%)	TP (%)	TSS [Sediment] (%)
4.02	0.234	0.699	54	63	65

Pollutant Load to Trellis Lane North Basin Retrofit:

Land Use	Area (ac)	Pollutant Loading Rates ²			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	4.02	21.15	1.46	1,504.78	85.02	5.87	6049.22
Pervious, Developed	5.93	14.09	0.36	185.12	83.55	2.13	1097.76
Total					168.58	8.00	7,146.98

Pollutant Load reduced with Trellis Lane North Basin Retrofit:		
TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
91.03	5.04	4645.54

Note: The basin outlet structure must be modified to detain runoff from the stormwater quality design storm for extended periods. The 6" orifice at the bottom of the outlet is proposed to be sealed, and a new 6" orifice to be cored at an elevation of 1.5'. Currently, the path between inlet and outlet pipe is concrete preventing infiltration, it is proposed to remove this low flow channel and regrade the basin bottom. Raising the orifice, increases the storage volume capacity of the basin. Additionally, water quality benefits were assumed minimal as the basin was only designed for peak flow control, the existing basin has zero removal rate. It was assumed that since the basin was dry during inspection, the soils beneath the basin have naturally good infiltration rate and do not require an infiltration bed.

1. Percentages determined by using Expert Panel Report for Urban Stormwater Retrofit Projects - Figures 3, 4, & 5 Removal Adjustor Curves



BMP Name: Wild Goose Farms Basin B Retrofit

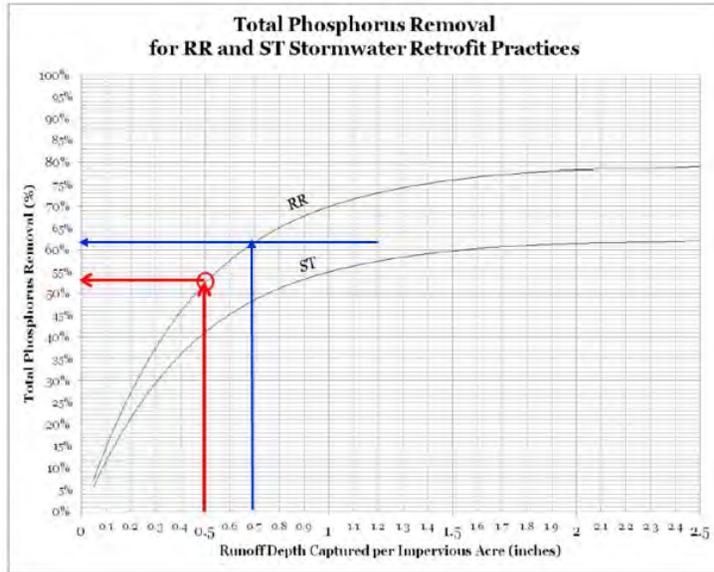


Figure 3. Retrofit Removal Adjustor Curve for Total Phosphorus

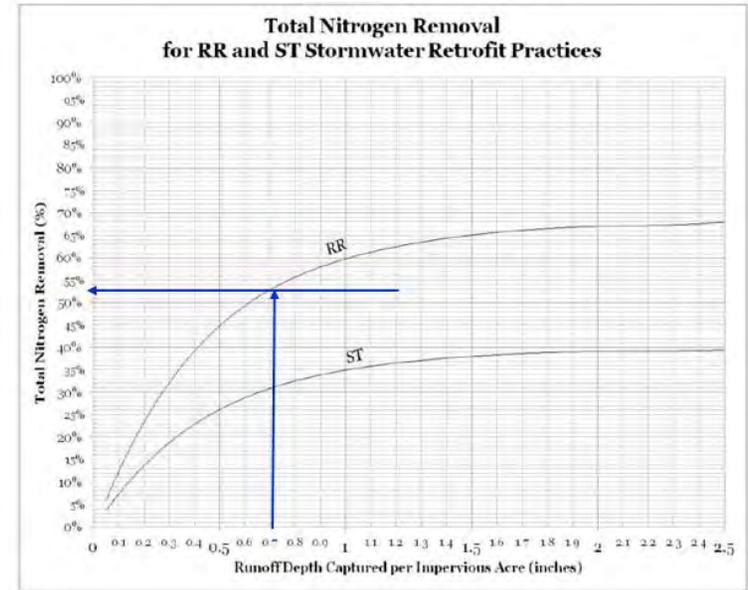


Figure 4. Retrofit Removal Adjustor Curve for Total Nitrogen

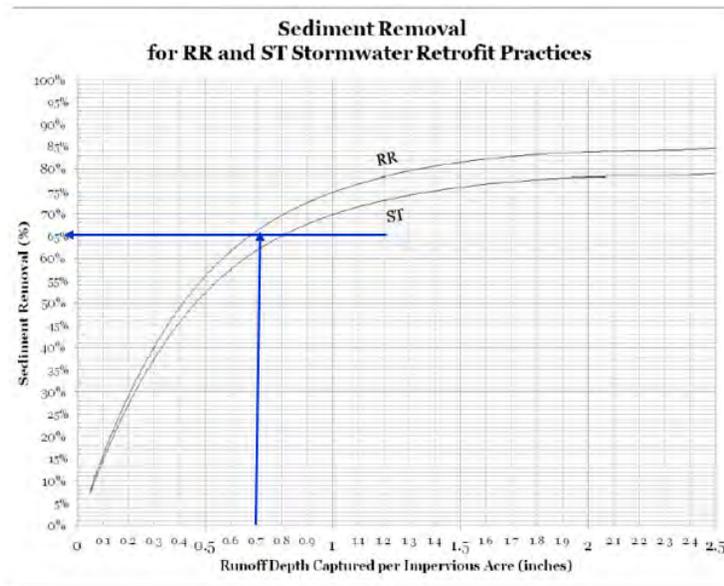


Figure 5. Retrofit Removal Adjustor Curve for Sediment

Efficiency Rates for Stormwater Retrofit Projects using Chesapeake Bay Panel Report

BMP NAME:	Wild Goose Farms Basin A Retrofit
MUNICIPALITY:	Westtown Township
MS4 SEWERSHED	Goose Creek
COUNTY:	Chester
RETROFIT CLASS:	Existing BMP Conversion
LOCATION:	Trellis Lane and Oakborne Rd
GPS LOCATION:	Lat: 39.9426 / Long: -75.5717
TOTAL DRAINAGE AREA TREATED (ac):	5.21
TYPE OF BMP:	Ex. Surface Basin to be retrofitted with Outlet Structure Modification
CLASSIFICATION OF BMPs BASED ON RUNOFF REDUCTION CAPABILITY:	Runoff Reduction Practice (RR)

$$\text{Amount of Runoff Volume treated (in)} = \frac{RS \times 12}{IA} \quad \text{where:}$$

RS = Runoff Storage Volume (ac-ft)
IA = Impervious Area (ac)

Impervious area treated (ac)	Runoff Storage Volume (ac-ft)	Amount of Runoff Volume treated (in)	Projected Removal Rates ¹		
			TN (%)	TP (%)	TSS [Sediment] (%)
4.20	0.460	1.314	64	75	80

Pollutant Load to Trellis Lane South Basin Retrofit:

Land Use	Area (ac)	Pollutant Loading Rates ²			Pollutant Load		
		TN (lbs/ac/yr)	TP (lbs/ac/yr)	TSS [Sediment] (lbs/ac/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Impervious, Developed	4.20	21.15	1.46	1,504.78	88.83	6.13	6320.08
Pervious, Developed	10.09	14.09	0.36	185.12	142.17	3.63	1867.86
Total					231.00	9.76	8,187.94

Pollutant Load reduced with Trellis Lane South Basin Retrofit:		
TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
147.84	7.32	6550.35

Note: The basin outlet structure must be modified to detain runoff from the stormwater quality design storm for extended periods. Since the 6" orifice at the bottom of the outlet structure is large for water quality improvements, we will be suggesting to remove the orifice by utilizing a steel plate. Furthermore, the minimal distance between inlet and outlet pipe is creating short circuiting. The existing concrete channel will be removed and regrading of the basin will be performed to create a meandering channel to increase infiltration. Removing the orifice and creating a meandering channel, increases the storage volume capacity of the basin. Additionally, water quality benefits were assumed minimal as the basin was only designed for peak flow control, the existing basin has zero removal rate. It was assumed that since the basin was dry during inspection, the soils beneath the basin have naturally good infiltration rate and do not require an infiltration bed.

1. Percentages determined by using Expert Panel Report for Urban Stormwater Retrofit Projects - Figures 3, 4, & 5 Removal Adjustor Curves
2. From PADEP PRP Instructions Attachment B - Developed Land Loading Rates for PA Counties



BMP Name: Wild Goose Farms Basin A Retrofit

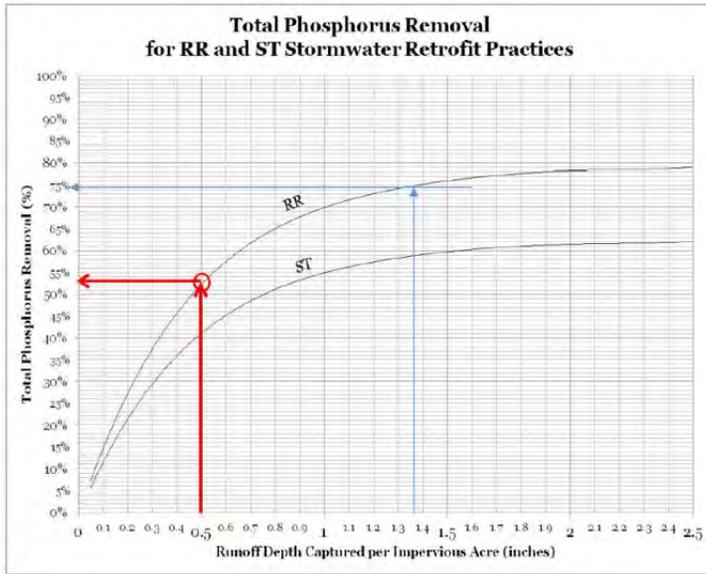


Figure 3. Retrofit Removal Adjustor Curve for Total Phosphorus

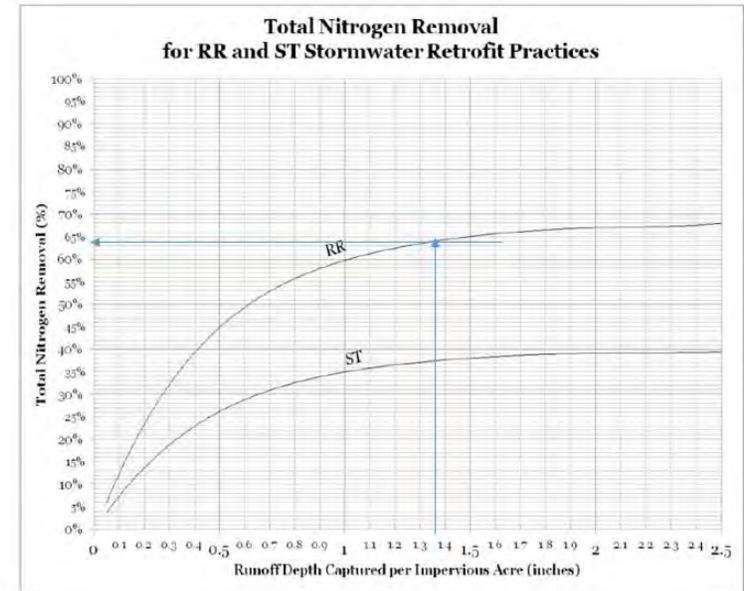


Figure 4. Retrofit Removal Adjustor Curve for Total Nitrogen

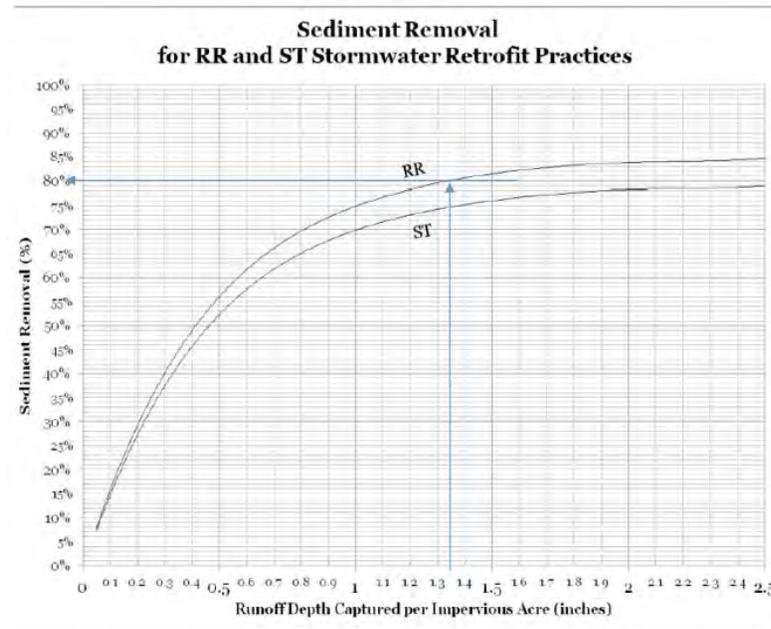


Figure 5. Retrofit Removal Adjustor Curve for Sediment

Pollutant Removal Reductions using PADEP BMP Effectiveness Value Table for New BMPs

BMP NAME: Stream Restoration (Long-Term BMP)
MUNICIPALITY: Westtown Township
MS4 SEWERSHED: Goose Creek
COUNTY: Chester
RETROFIT CLASS: New Retrofit Facility
LOCATION: Undetermined at this time
GPS LOCATION:
TOTAL DRAINAGE AREA TREATED (ac):
TYPE OF BMP: Stream Restoration

Stream Restoration - Pollutant Reduction:

Location	Restoration Length (ft)	BMP Effectiveness Value ¹			Pollutant Load Reduction		
		TN (lbs/ft/yr)	TP (lbs/ft/yr)	Sediment (lbs/ft/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Undetermined at this time	1,750	0.075	0.068	44.88	131.25	119.00	78540.00
Total					131.25	119.00	78,540.00

1. Per PADEP NPDES BMP Effectiveness Values Table



Pollutant Load Reduction by BMPs

MUNICIPALITY:

Westtown Township

MS4 SEWER SHED:

Chester Creek, East Branch of Chester Creek, Goose Creek, Ridley Creek, Upper Brandywine Creek

COUNTY:

Chester

Existing BMP Name	BMP Drainage Area (ac)	Pollutant Reduction by BMPs		
		TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Westtown Reserve Dry Extended Detention Basin	17.27	64.52	3.71	10810.08
Simon and Jude Detention Basin	6.00	20.07	0.92	2440.06
Kolbe Lane Extended Detention Basin	12.35	38.11	1.4	3224.54
West Glen Extended Detention Basin	14.93	48.27	2.04	5134.29
Kilduff Circle Extended Detention Basin	35.39	106.15	3.55	7548.24
Total	85.94	277.12	11.62	29157.21

PRP MS4 Sewershed	Storm sewershed Area (ac)	Existing Pollutant without BMPs			Pollutant Load with BMPs		
		TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Chester Creek	2,494.00	38,363.14	1,399.96	1,064,074.48	38,086.02	1,388.34	1,034,917.27
Total	2,494.00	38,363.14	1,399.96	1,064,074.48	38,086.02	1,388.34	1,034,917.27

Existing BMP Name	BMP Drainage Area (ac)	Pollutant Reduction by BMPs		
		TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Arborview Basin	13.42	40.19	3.01	2820.8
Arborview Infiltration Trench	5.32	14.99	0.86	592.49
Stetson Middle School Basin	4.88	14.58	0.48	1009.19
Total	23.62	69.76	4.35	4422.48

PRP MS4 Sewershed	Storm sewershed Area (ac)	Existing Pollutant without BMPs			Pollutant Load with BMPs		
		TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Upper Brandywine	510.29	7,720.19	266.31	193,571.35	7,650.43	261.96	189,148.87
Total	510.29	7,720.19	266.31	193,571.35	7,650.43	261.96	189,148.87



Pollutant Load Reduction by BMPs

MUNICIPALITY:
MS4 SEWER SHED:
COUNTY:

Westtown Township
 Chester Creek, East Branch of Chester Creek, Goose Creek, Ridley Creek, Upper Brandywine Creek
 Chester

BMP Name	BMP Drainage Area (ac)	Pollutant Reduction by BMPs		
		TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)
Chester Creek				
Tyson Park	41.4	443.27	17.01	13,595.17
Thorne Drive Basin Retrofit	19.86	205.84	9.02	7,389.28
Sage Road Basin Retrofit	22.44	225.48	9.65	8,212.53
Wild Goose Farms Basin B Retrofit	9.95	91.03	5.04	4,645.54
Wild Goose Farms Basin A Retrofit	14.29	147.84	7.32	6,550.35
Pleasant Grove Stream Restoration	1600 l.f.	120.00	108.80	71,808.00
Chester Creek Total	107.94	1233.46	156.84	112,200.87
Upper Brandywine Creek				
Dunvegan Road Basin Retrofit	9.9	98.47	4.08	3,342.41
General Greene Basin B Retrofit	12.38	91.56	3.85	3,204.12
General Greene Basin A Retrofit	9.76	98.61	4.31	3,857.06
Radley Run Stream Restoration	190 lf	14.25	12.92	8,527.20
Upper Brandywine Total	32.04	302.89	25.16	18,930.79

PRP Planning Area	Planning Area (ac)	Existing Pollutant without BMPs			Pollutant Load with BMPs			% Reduction		
		TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)	TN	TP	TSS [Sediment]
Chester/East Branch/Ridley (includes Goose)	2,494.00	38,086.02	1,388.34	1,034,917.27	36,852.56	1,231.50	922,716.40	3.24%	11.30%	10.84%
Upper Brandywine (Plum/Radley)	510.29	7,650.43	261.96	189,148.87	7,347.54	236.80	170,218.08	3.96%	9.60%	10.01%



**Long Term Goose Creek
Phosphorous Load Reduction by BMPs**

MUNICIPALITY: Westtown Township
 MS4 SEWER SHED: Goose Creek
 COUNTY: Chester

BMP Name	BMP Drainage Area (ac)	Pollutant Reduction by BMPs			
		TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)	
Goose Creek Years 1-5					
Tyson Park Bioswale	41.4	443.27	17.01	13,595.17	5.57%
Thorne Drive Basin Retrofit	19.86	205.84	9.02	7,389.28	2.95%
Sage Road Basin Retrofit	22.44	225.48	9.65	8,212.53	3.16%
Wild Goose Farms Basin B Retrofit	9.95	91.03	5.04	4,645.54	1.65%
Wild Goose Farms Basin A Retrofit	14.29	147.84	7.32	6,550.35	2.39%
Subtotal	107.94	1113.46	48.04	40,392.87	
Goose Creek Long-Term (>5 Years)					
Stream Restoration	1750 l.f.	131.25	119.00	78,540.00	38.93%
Subtotal		131.25	119.00	78,540.00	
Total	107.94	1244.71	167.04	118,932.87	

TMDL	Storm sewershed Area (ac)	Existing Pollutant without BMPs			Pollutant Load with BMPs			% Reduction		
		TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS [Sediment] (lbs/yr)	TN	TP	TSS [Sediment]
MS4 Sewershed										
Goose Creek - Years 1-5	597.24	8,996.66	305.65	219,301.05	7,883.20	257.60	178,908.18	12.38%	15.72%	18.42%
Goose Creek - Long Term		8,996.66	305.65	219,301.05	8,865.41	186.65	140,761.05	1.46%	38.93%	35.81%
Total Reduction	597.24	8,996.66	305.65	219,301.05	7,751.95	138.61	100,368.18	13.84%	54.65%	54.23%

53.9% TP reduction required by Goose Creek TMDL



Appendix D

Existing and Proposed BMP Maps

NOTES:

1. Drainage area to the proposed BMP is within the planning area.

2. Property Owners:
-Westtown Apartments Property Owner, LLC
67-4-40.1A

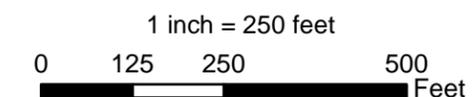
**CHESTER CREEK PRP
EXISTING BMP**



Legend

- Outfalls
- Drainage Area
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- Inflow, Township
- Outflow, Township
- Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- Inflow, State
- Outflow, State
- Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- Inflow, Private
- Outflow, Private
- Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- Index Contours
- Roads**
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary

**Westtown Reserve Dry
Extended Detention Basin**

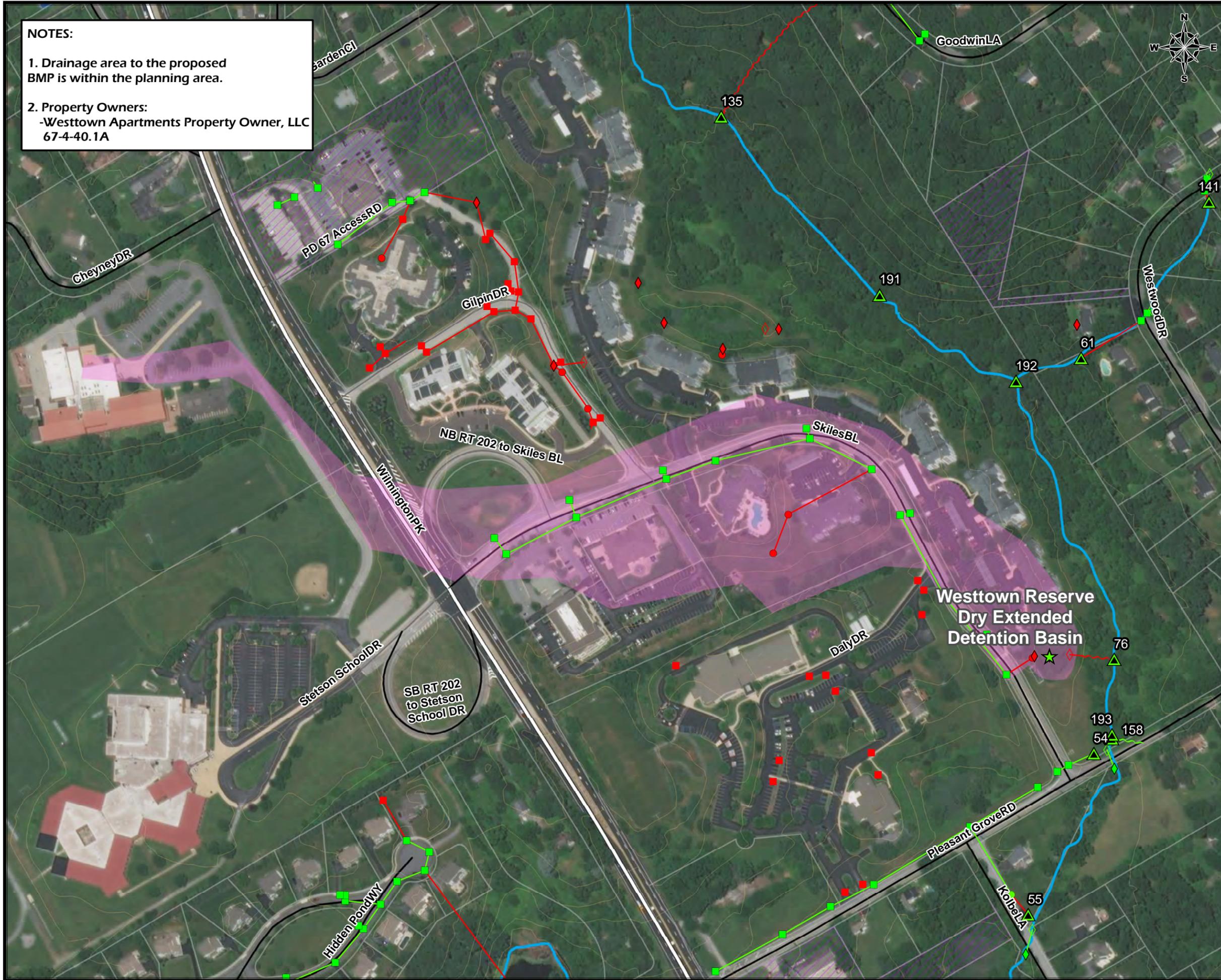


DISCLAIMER:
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.



Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: March 2019



NOTES:

1. Drainage area to the proposed BMP is within the planning area.

2. Property Owners:
-Archdiocese of Philadelphia
67-2-42.3



**CHESTER CREEK PRP
EXISTING BMP**

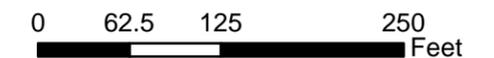
Legend

- Outfalls
- Drainage Area
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- Inflow, Township
- Outflow, Township
- Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- Inflow, State
- Outflow, State
- Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- Inflow, Private
- Outflow, Private
- Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- Index Contours
- Roads**
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary

**Simon and Jude
Detention Basin**

**Simon and Jude
Detention Basin**

1 inch = 125 feet



DISCLAIMER:

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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: March 2019

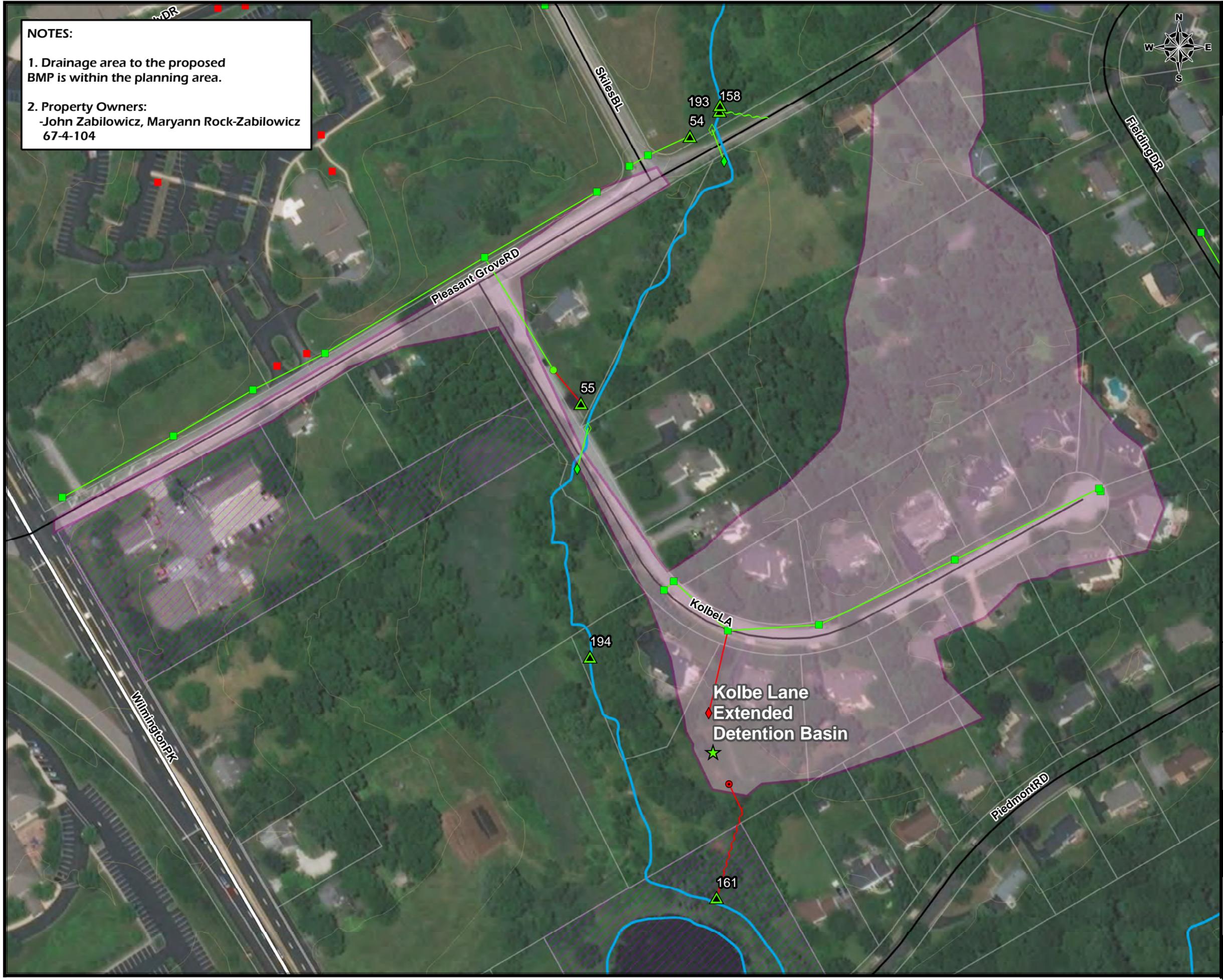
NOTES:

1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-John Zabilowicz, Maryann Rock-Zabilowicz
67-4-104

**CHESTER CREEK PRP
EXISTING BMP**

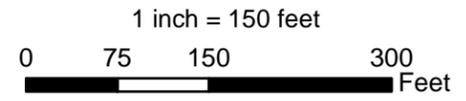


- Legend**
- ▲ Outfalls
 - Drainage Area
 - Stormwater Structures**
 - Inlet, Township
 - Manhole, Township
 - ◇ Inflow, Township
 - ◇ Outflow, Township
 - + Inflow/Outflow, Township
 - Riser, Township
 - Inlet, State
 - Manhole, State
 - ◇ Inflow, State
 - ◇ Outflow, State
 - + Inflow/Outflow, State
 - Inlet, Private
 - Manhole, Private
 - ◇ Inflow, Private
 - ◇ Outflow, Private
 - + Inflow/Outflow, Private
 - Riser, Private
 - Stormwater Conveyances**
 - Private, Pipe
 - Private, Swale
 - State, Pipe
 - Township, Pipe
 - Township, Swale
 - Stream
 - Located Surface Waters
 - Index Contours
 - Roads**
 - Private
 - State
 - Township
 - Parcels
 - Township Owned Parcels
 - Township Boundary



**Kolbe Lane
Extended
Detention Basin**

**Kolbe Lane
Extended Detention Basin**



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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: March 2019

NOTES:

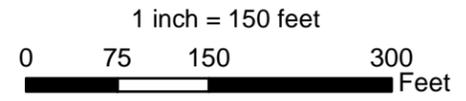
1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-West Glen Community Assoc.
67-4Q-43

**CHESTER CREEK PRP
EXISTING BMP**

Legend

- ▲ Outfalls
- Drainage Area
- Stormwater Structures
- Inlet, Township
- Manhole, Township
- ◇ Inflow, Township
- ◇ Outflow, Township
- + Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- ◇ Inflow, State
- ◇ Outflow, State
- + Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- ◇ Inflow, Private
- ◇ Outflow, Private
- + Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- Index Contours
- Roads
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary

**West Glen
Extended Detention Basin**

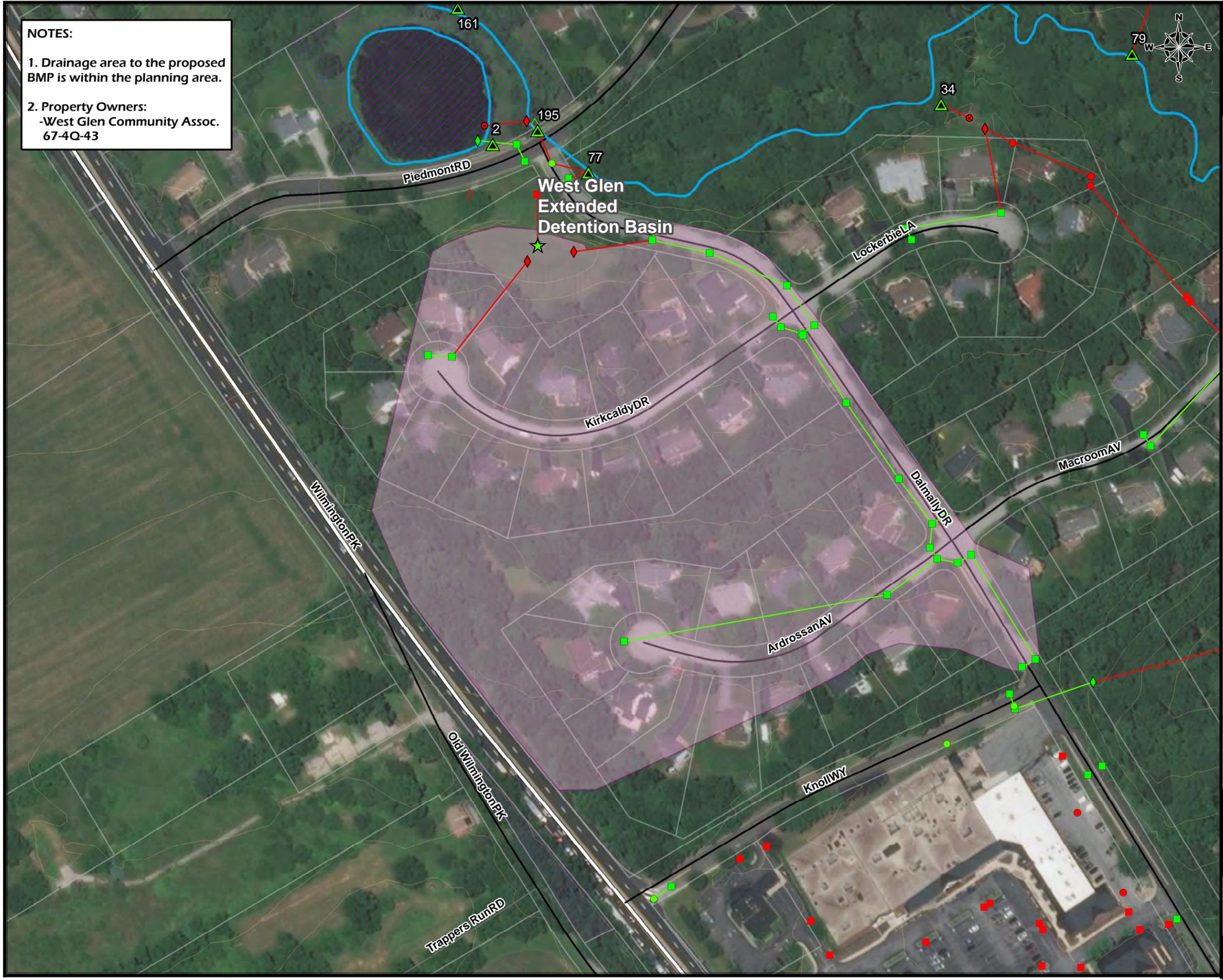


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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: March 2019



NOTES:

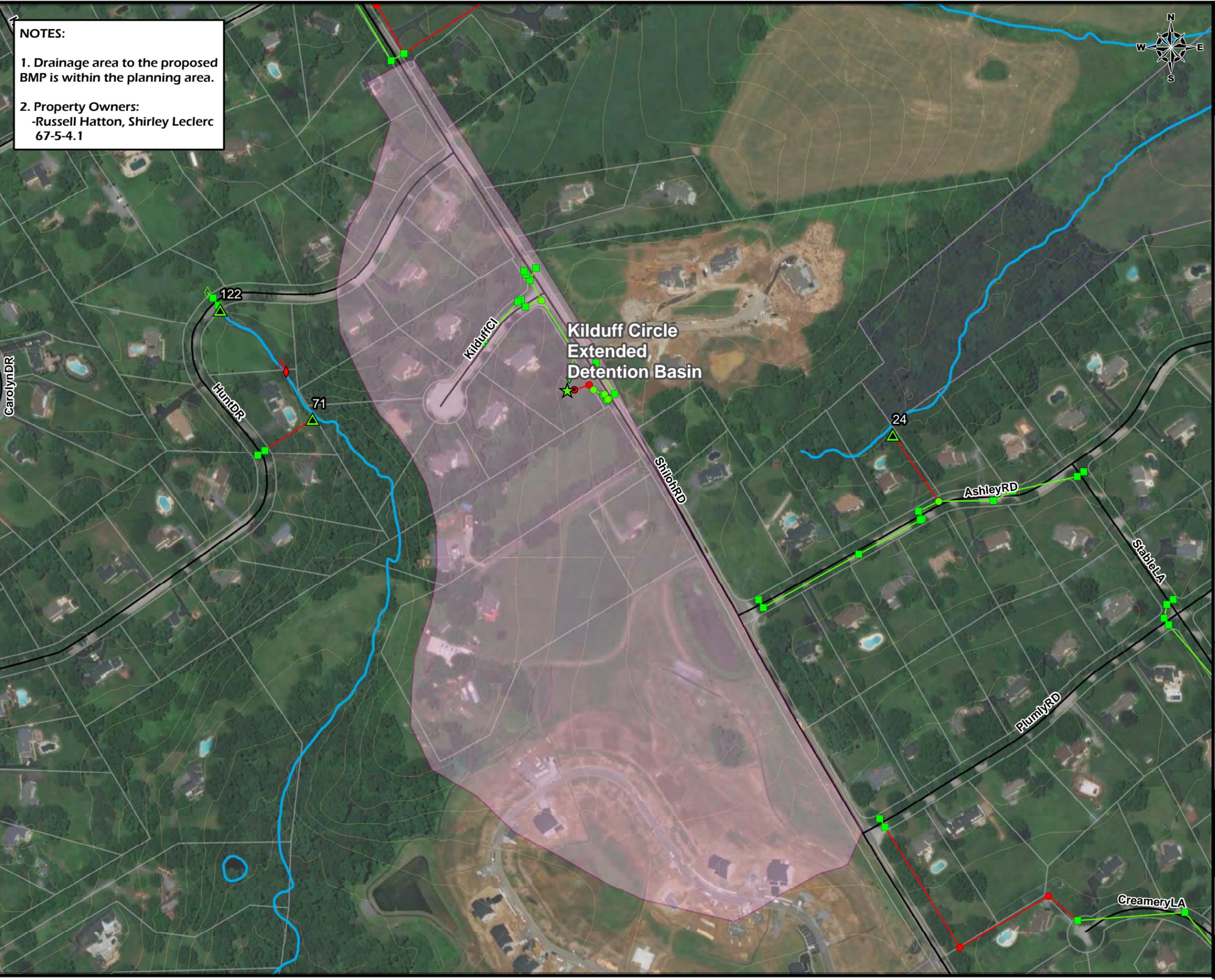
1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-Russell Hatton, Shirley Leclerc
67-5-4.1

**CHESTER CREEK PRP
EXISTING BMP**



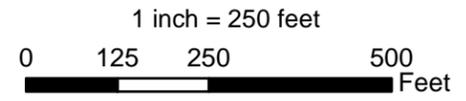
Legend

- ▲ Outfalls
- Drainage Area
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- ◇ Inflow, Township
- ◇ Outflow, Township
- + Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- ◇ Inflow, State
- ◇ Outflow, State
- + Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- ◇ Inflow, Private
- ◇ Outflow, Private
- + Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- Index Contours
- Roads**
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary



**Kilduff Circle
Extended
Detention Basin**

**Kilduff Circle
Extended Detention Basin**



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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: March 2019

NOTES:

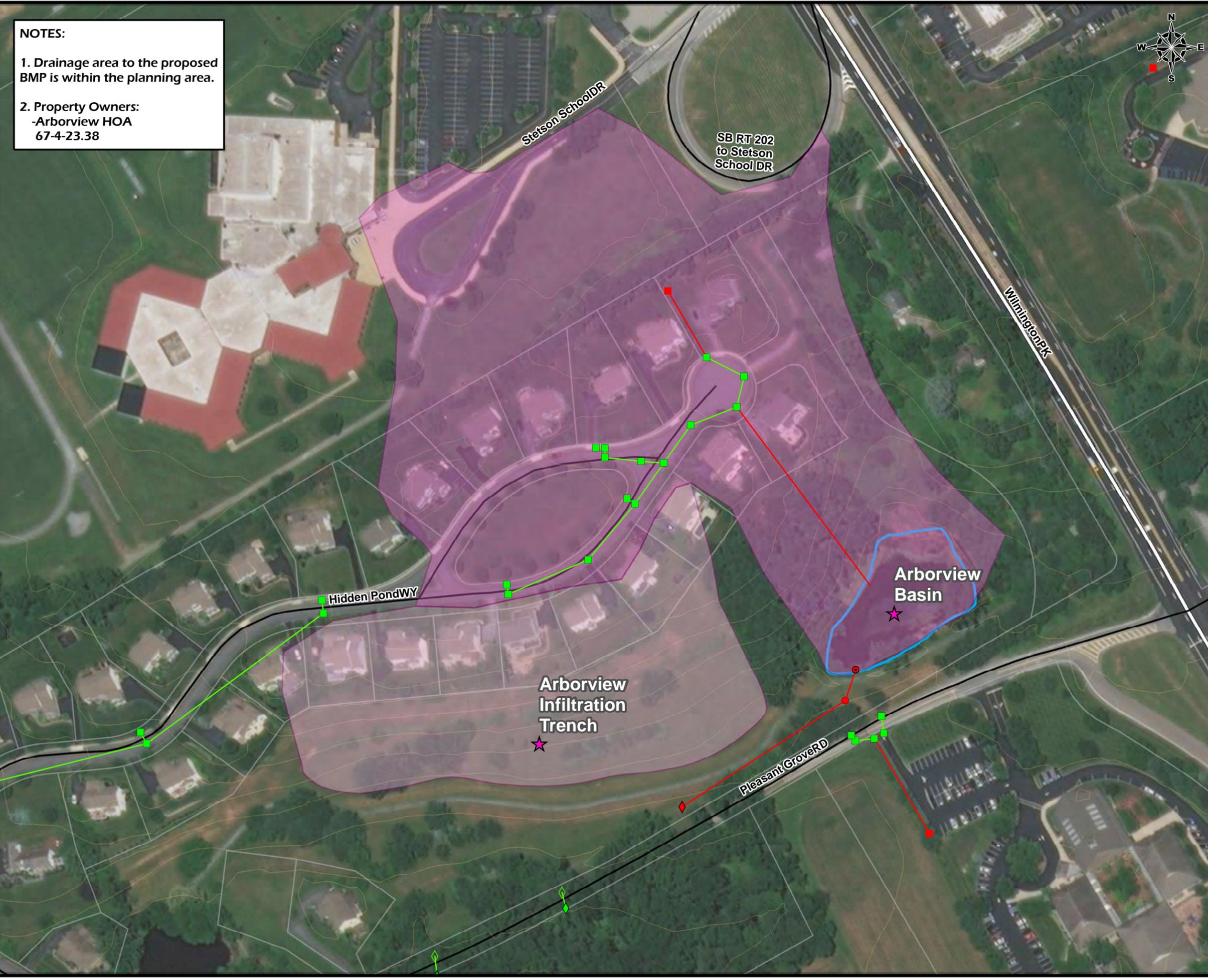
1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-Arborview HOA
67-4-23.38



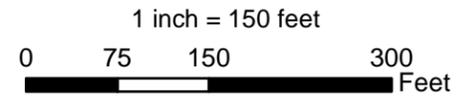
**UPPER BRANDYWINE CREEK PRP
EXISTING BMP**

Legend

- ▲ Outfalls
- Drainage Area
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- ◇ Inflow, Township
- ◇ Outflow, Township
- + Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- ◇ Inflow, State
- ◇ Outflow, State
- + Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- ◇ Inflow, Private
- ◇ Outflow, Private
- + Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- Index Contours
- Roads**
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary



**Arborview Basin
Arborview Infiltration Trench**



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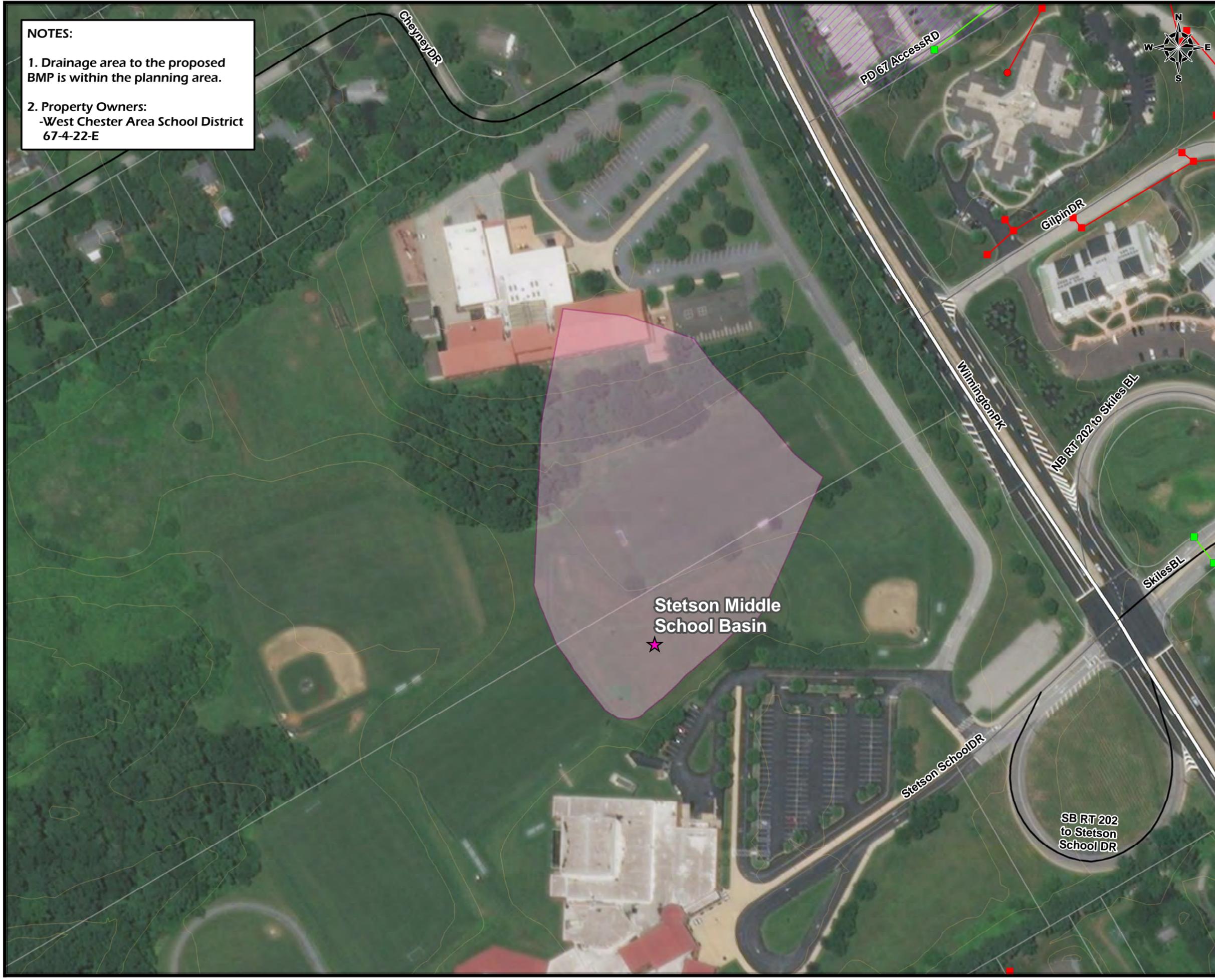
Westtown Township,
Chester County,
Pennsylvania

NOTES:

1. Drainage area to the proposed BMP is within the planning area.

2. Property Owners:

-West Chester Area School District
67-4-22-E

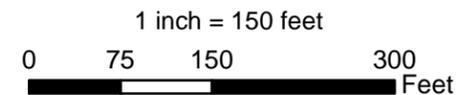


**UPPER BRANDYWINE CREEK PRP
EXISTING BMP**

Legend

- ▲ Outfalls
- Drainage Area
- Stormwater Structures
- Inlet, Township
- Manhole, Township
- ◇ Inflow, Township
- ◇ Outflow, Township
- ⊕ Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- ◇ Inflow, State
- ◇ Outflow, State
- ⊕ Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- ◇ Inflow, Private
- ◇ Outflow, Private
- ⊕ Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- ▬ Located Surface Waters
- Index Contours
- Roads
- Private
- State
- Township
- Parcels
- ▨ Township Owned Parcels
- ▬ Township Boundary

**Stetson Middle
School Basin**



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Westtown Township,
Chester County,
Pennsylvania

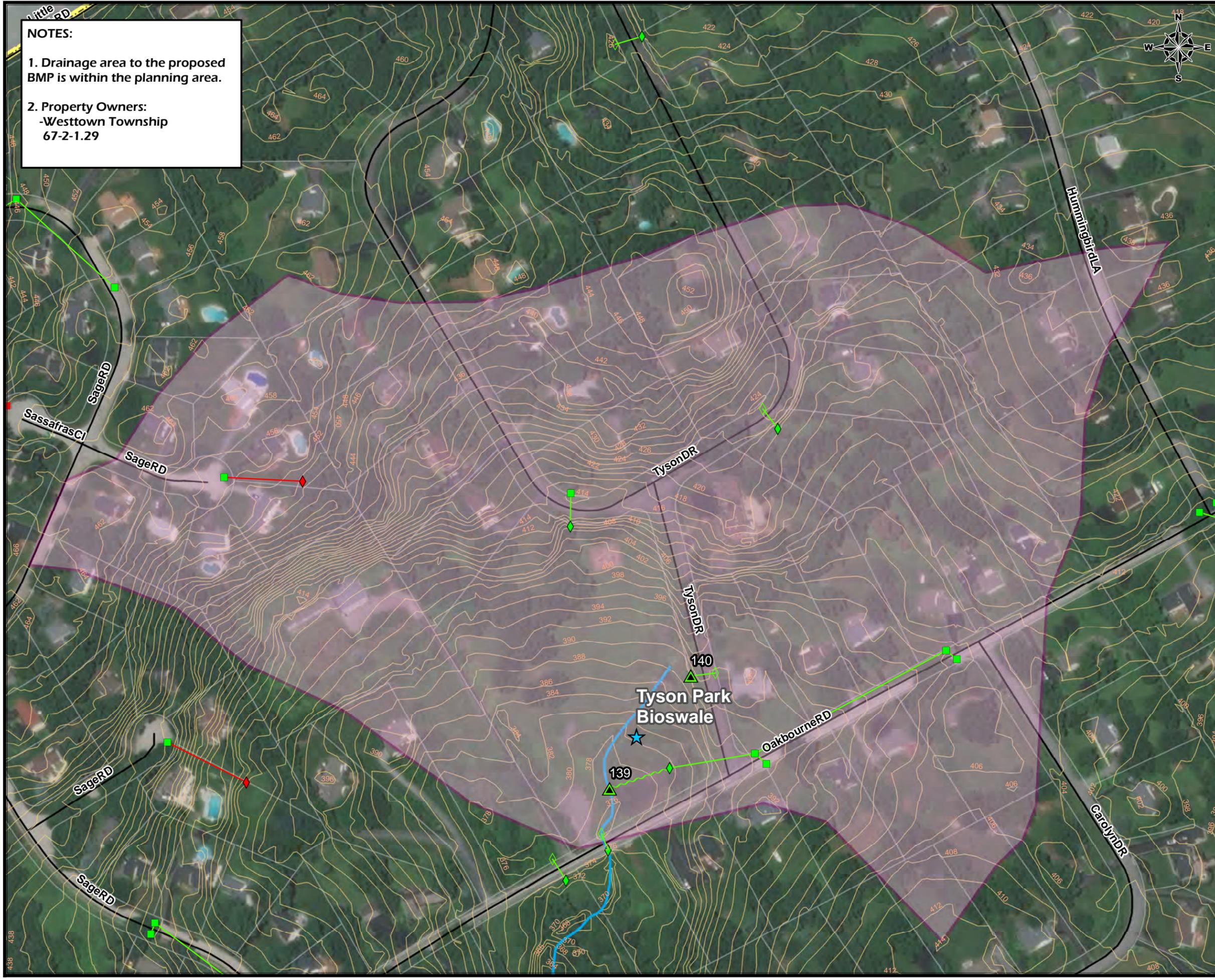
MAP UPDATED: March 2019

NOTES:

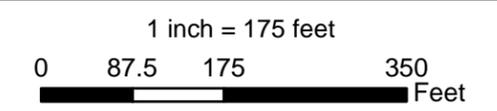
1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-Westtown Township
67-2-1.29

CHESTER CREEK/GOOSE CREEK TMDL/PRP EXISTING BMP

- Legend**
- ▲ Outfalls
 - Tyson Park Bioswale Drainage Area
 - Stormwater Structures**
 - Inlet, Township
 - Manhole, Township
 - ◇ Inflow, Township
 - ◇ Outflow, Township
 - + Inflow/Outflow, Township
 - Riser, Township
 - Inlet, State
 - Manhole, State
 - ◇ Inflow, State
 - ◇ Outflow, State
 - + Inflow/Outflow, State
 - Inlet, Private
 - Manhole, Private
 - ◇ Inflow, Private
 - ◇ Outflow, Private
 - + Inflow/Outflow, Private
 - Riser, Private
 - Stormwater Conveyances**
 - Private, Pipe
 - Private, Swale
 - State, Pipe
 - Township, Pipe
 - Township, Swale
 - Stream
 - Located Surface Waters
 - 2ft Contours
 - Roads**
 - Private
 - State
 - Township
 - Parcels
 - Township Owned Parcels
 - Township Boundary



Tyson Park Bioswale



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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: January 2019

NOTES:

1. Drainage area to the proposed BMP is within the planning area.
2. Stream restoration length of approximately 1,600 L.F.
3. Property Owners:
-Westtown Township
-67-4M-43.1

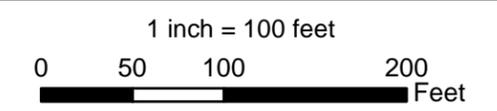
CHESTER CREEK PRP

Legend

- Outfalls
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- Inflow, Township
- Outflow, Township
- Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- Inflow, State
- Outflow, State
- Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- Inflow, Private
- Outflow, Private
- Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- 2ft Contours
- Roads**
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary



Pleasant Grove Stream Restoration



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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: January 2019

NOTES:

1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-James & Colleen Brookover,
James & Katherine McDermott
-67-4-28.65, 67-4-28.64

UPPER BRANDYWINE CREEK PRP



Legend

- Outfalls
- Dunvegan Road Basin Retrofit
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- Inflow, Township
- Outflow, Township
- Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- Inflow, State
- Outflow, State
- Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- Inflow, Private
- Outflow, Private
- Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- 2ft Contours
- Roads**
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary

Dunvegan Road Basin Retrofit

Dunvegan Road Basin Retrofit

1 inch = 120 feet

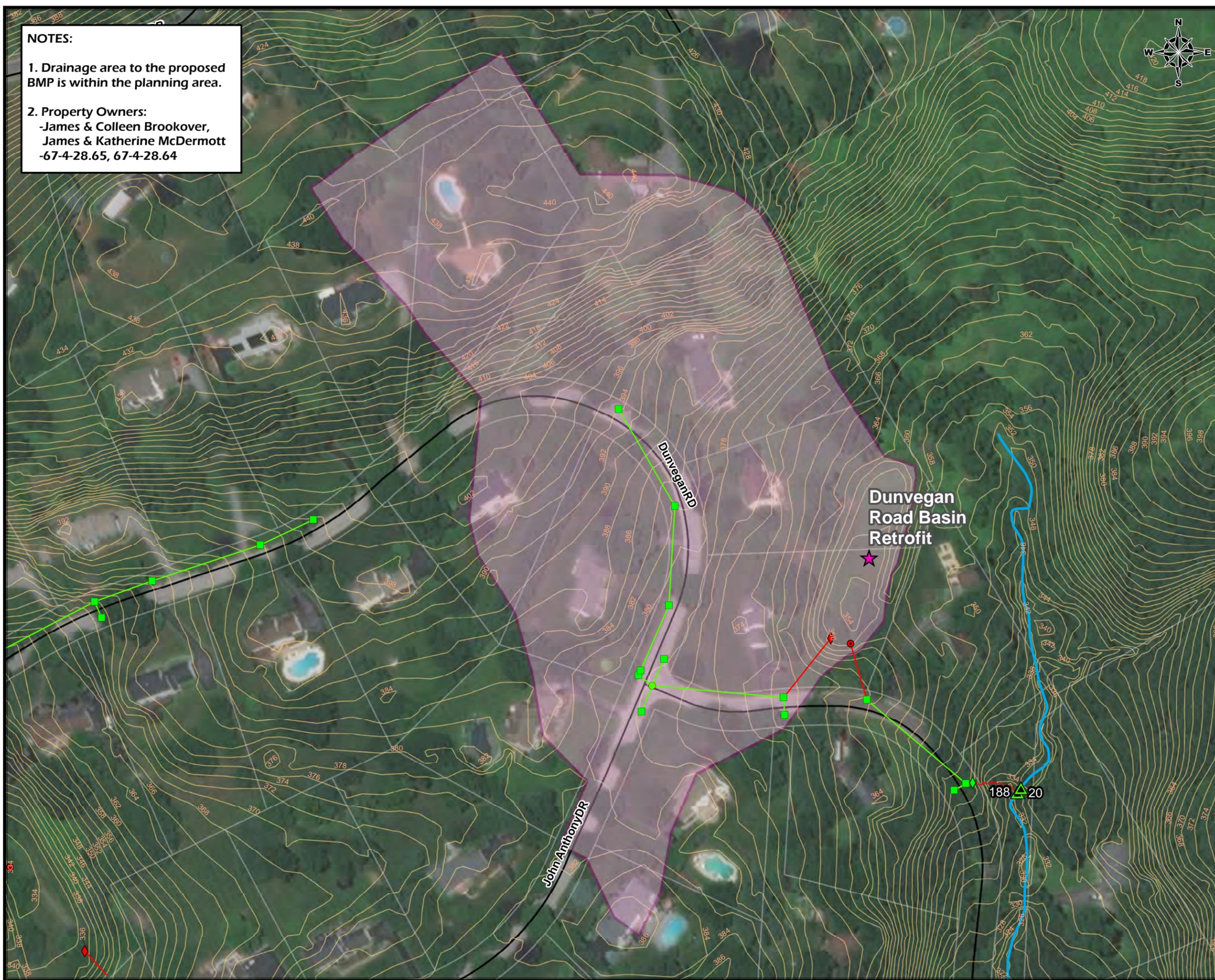


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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: January 2019

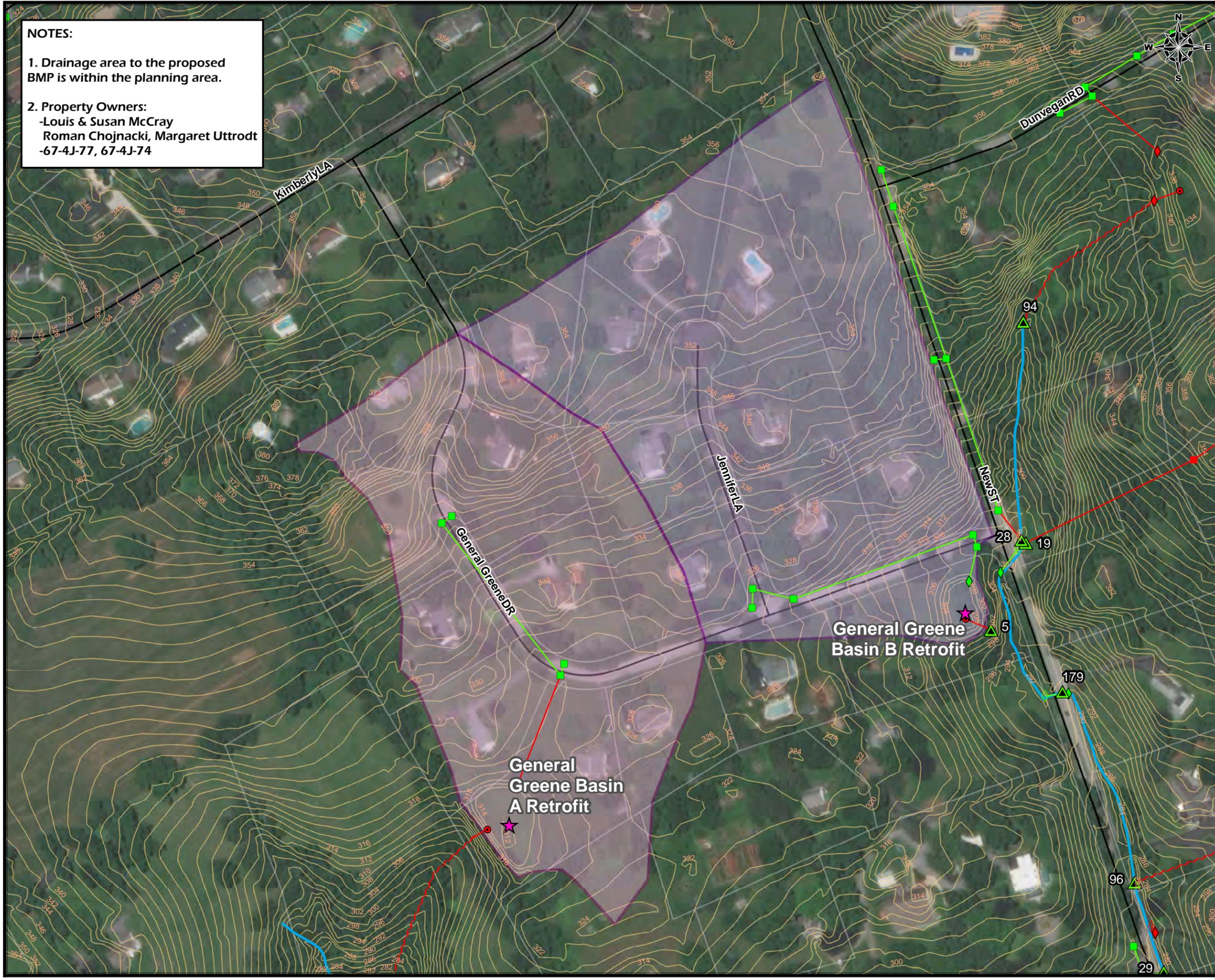


NOTES:

1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-Louis & Susan McCray
Roman Chojnacki, Margaret Uttrodt
-67-4J-77, 67-4J-74

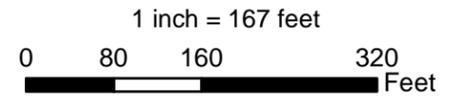
UPPER BRANDYWINE CREEK PRP

- Legend**
- ▲ Outfalls
 - General Greene Basin B Retrofit Drainage Area
 - General Greene Basin A Retrofit Drainage Area
 - Stormwater Structures**
 - Inlet, Township
 - Manhole, Township
 - ◇ Inflow, Township
 - ◇ Outflow, Township
 - ⊕ Inflow/Outflow, Township
 - Riser, Township
 - Inlet, State
 - Manhole, State
 - ◇ Inflow, State
 - ◇ Outflow, State
 - ⊕ Inflow/Outflow, State
 - Inlet, Private
 - Manhole, Private
 - ◇ Inflow, Private
 - ◇ Outflow, Private
 - ⊕ Inflow/Outflow, Private
 - Riser, Private
 - Stormwater Conveyances**
 - Private, Pipe
 - Private, Swale
 - State, Pipe
 - Township, Pipe
 - Township, Swale
 - Stream
 - Located Surface Waters
 - 2ft Contours
 - Roads**
 - Private
 - State
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 - Parcels
 - Township Owned Parcels
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General Greene Drive Basin A Retrofit

General Greene Drive Basin B Retrofit



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MAP UPDATED: January 2019

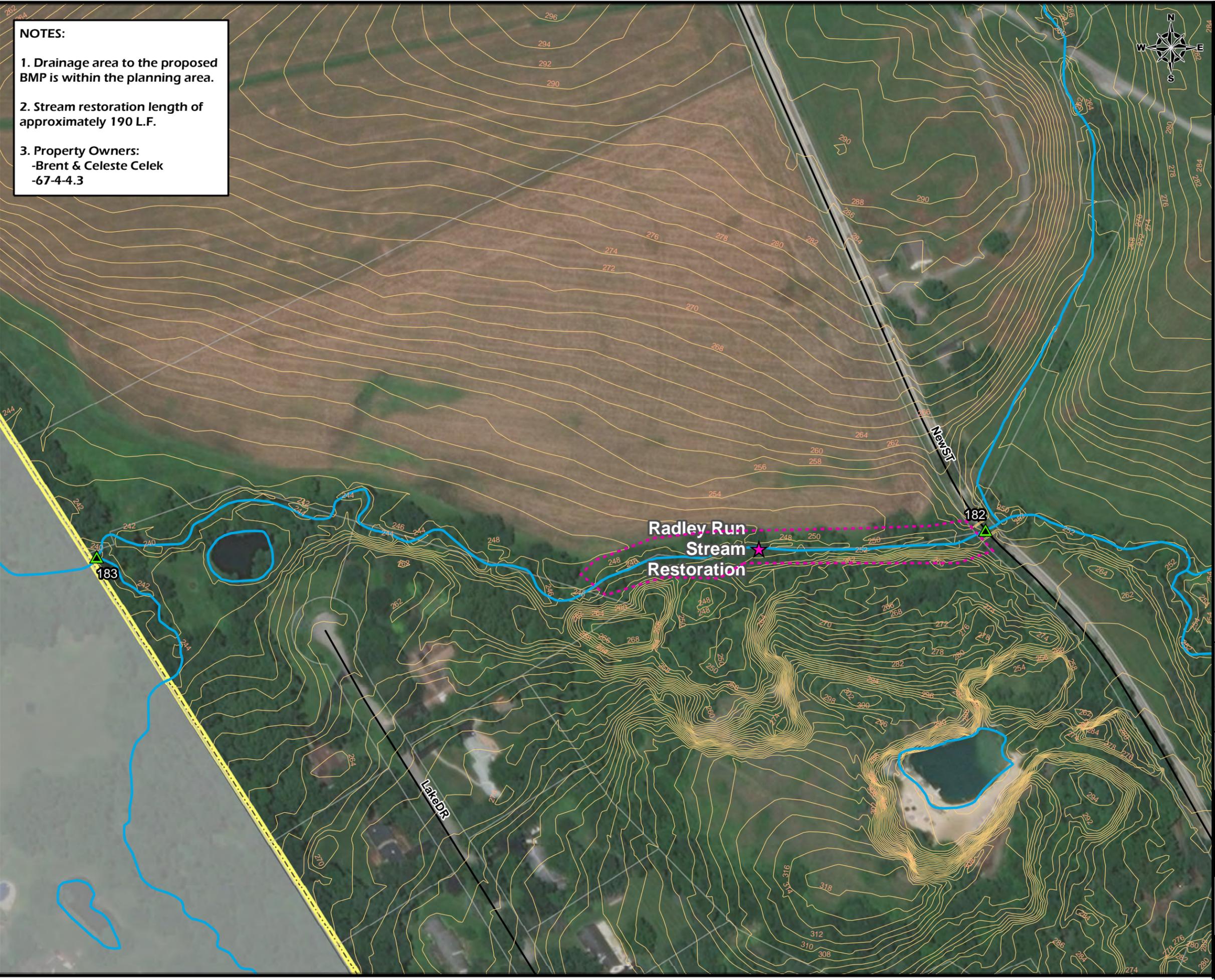
NOTES:

1. Drainage area to the proposed BMP is within the planning area.
2. Stream restoration length of approximately 190 L.F.
3. Property Owners:
-Brent & Celeste Celek
-67-4-4.3

UPPER BRANDYWINE CREEK PRP

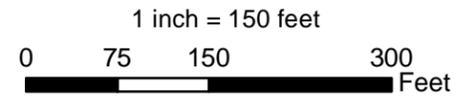
Legend

- Outfalls
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- Inflow, Township
- Outflow, Township
- Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- Inflow, State
- Outflow, State
- Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- Inflow, Private
- Outflow, Private
- Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- 2ft Contours
- Roads**
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary



**Radley Run
Stream
Restoration**

Radley Run Stream Restoration



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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: January 2019

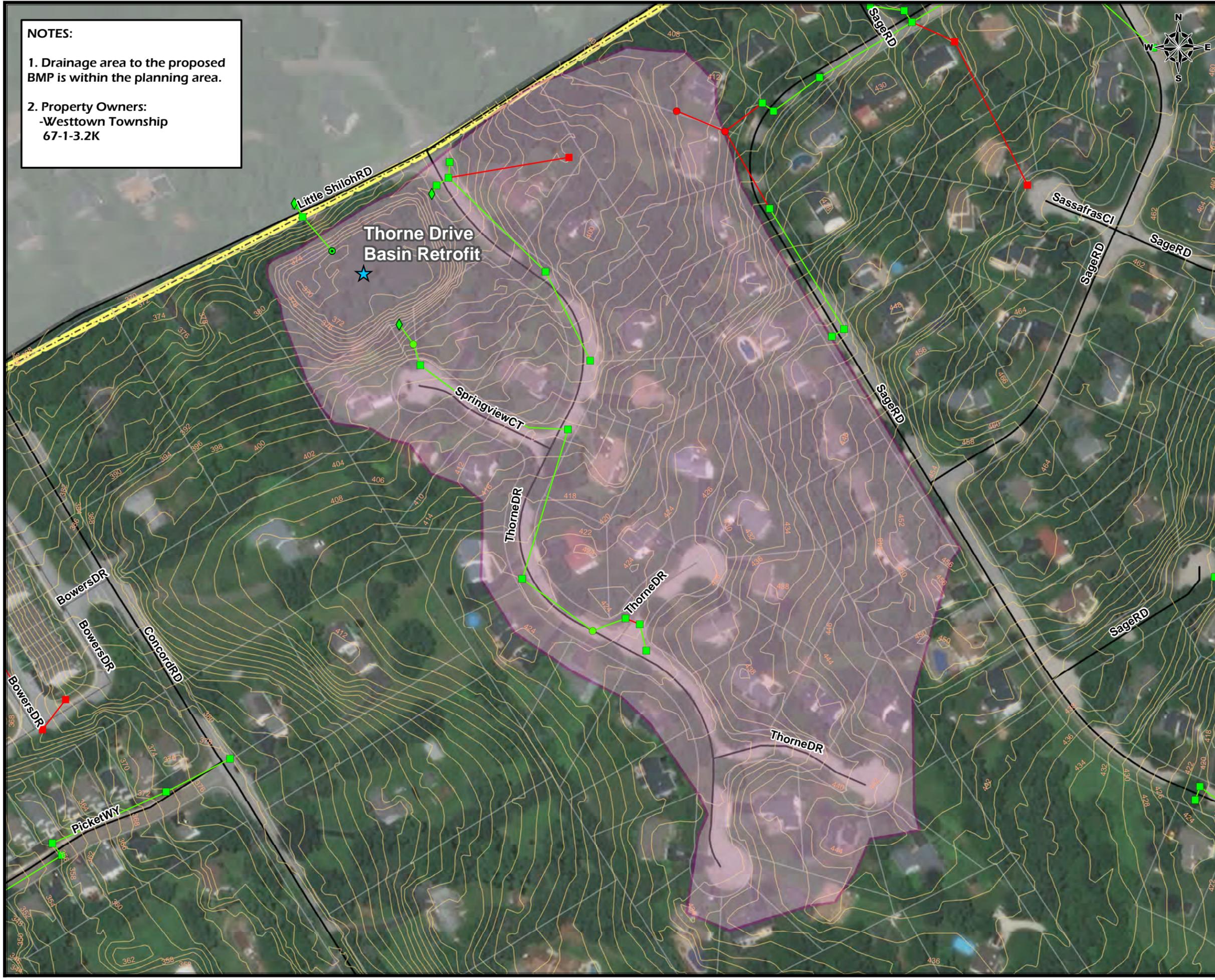
NOTES:

1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-Westtown Township
67-1-3.2K

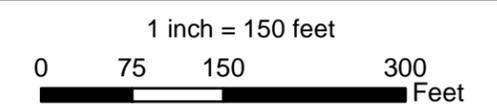
CHESTER CREEK/GOOSE CREEK TMDL/PRP

Legend

- Outfalls
- Thorne Drive Basin Drainage Area
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- Inflow, Township
- Outflow, Township
- Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- Inflow, State
- Outflow, State
- Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- Inflow, Private
- Outflow, Private
- Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- 2ft Contours
- Roads**
- Private
- State
- Township
- Parcels
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- Township Boundary



Thorne Drive Basin Retrofit



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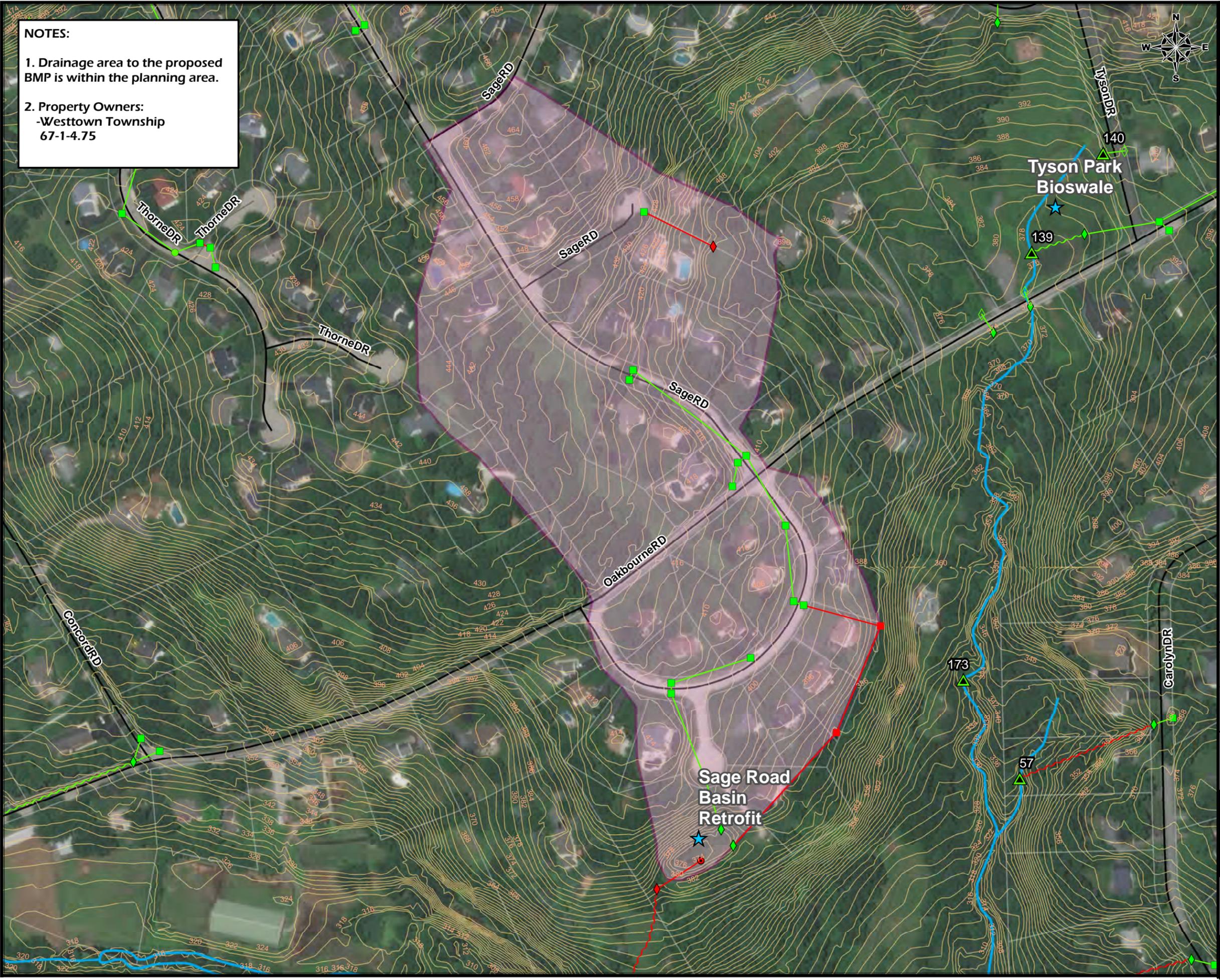


Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: January 2019

NOTES:

1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-Westtown Township
67-1-4.75

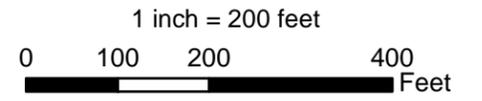


CHESTER CREEK/GOOSE CREEK TMDL/PRP

Legend

- ▲ Outfalls
- Sage Road Basin Drainage Area
- Stormwater Structures**
- Inlet, Township
- Manhole, Township
- ◇ Inflow, Township
- ◇ Outflow, Township
- ⊕ Inflow/Outflow, Township
- Riser, Township
- Inlet, State
- Manhole, State
- ◇ Inflow, State
- ◇ Outflow, State
- ⊕ Inflow/Outflow, State
- Inlet, Private
- Manhole, Private
- ◇ Inflow, Private
- ◇ Outflow, Private
- ⊕ Inflow/Outflow, Private
- Riser, Private
- Stormwater Conveyances**
- Private, Pipe
- Private, Swale
- State, Pipe
- Township, Pipe
- Township, Swale
- Stream
- Located Surface Waters
- 2ft Contours
- Roads**
- Private
- State
- Township
- Parcels
- Township Owned Parcels
- Township Boundary

Sage Road Basin Retrofit



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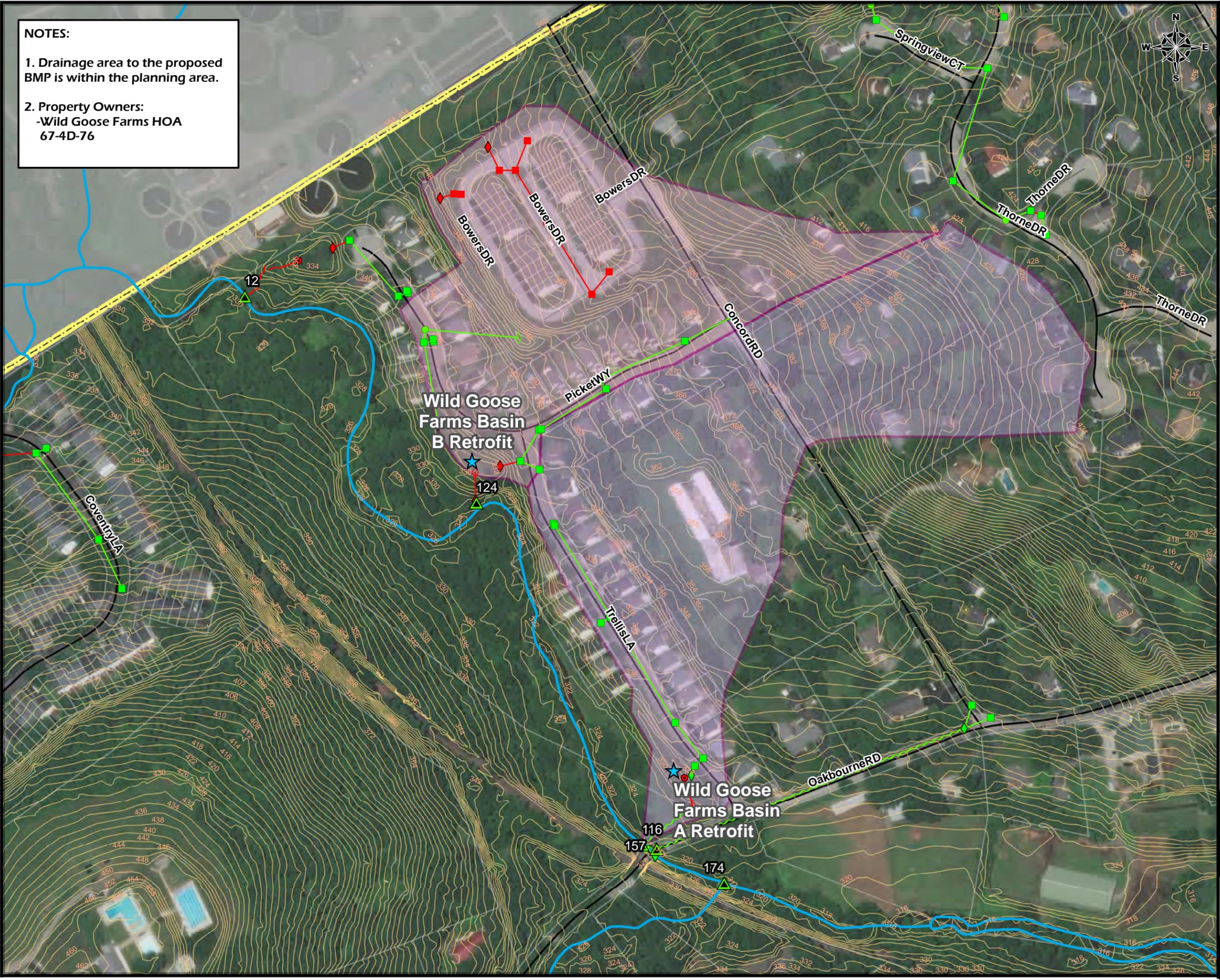


Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: January 2019

NOTES:

1. Drainage area to the proposed BMP is within the planning area.
2. Property Owners:
-Wild Goose Farms HOA
67-4D-76

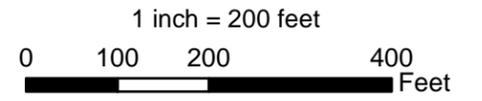


CHESTER CREEK/GOOSE CREEK TMDL/PRP

- Legend**
- ▲ Outfalls
 - Wild Goose Farms Basin B Drainage Area
 - Wild Goose Farms Basin A Drainage Area
 - Stormwater Structures**
 - Inlet, Township
 - Manhole, Township
 - ◇ Inflow, Township
 - ◇ Outflow, Township
 - ⊕ Inflow/Outflow, Township
 - Riser, Township
 - Inlet, State
 - Manhole, State
 - ◇ Inflow, State
 - ◇ Outflow, State
 - ⊕ Inflow/Outflow, State
 - Inlet, Private
 - Manhole, Private
 - ◇ Inflow, Private
 - ◇ Outflow, Private
 - ⊕ Inflow/Outflow, Private
 - Riser, Private
 - Stormwater Conveyances**
 - Private, Pipe
 - Private, Swale
 - State, Pipe
 - Township, Pipe
 - Township, Swale
 - Stream
 - Located Surface Waters
 - 2ft Contours
 - Roads**
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 - Township
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Wild Goose Farms Basin A Retrofit

Wild Goose Farms Basin B Retrofit



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Westtown Township,
Chester County,
Pennsylvania

MAP UPDATED: January 2019

Appendix E

Storm Sewershed/Planning Area Map

PROPOSED BMPs						
BMP Number	BMP Name	Parcel Number	Local Address	Owner	Owner Type	Designation
1	Trison Park Basin Retrofit	67-2-1.29	901 Oakbourne Rd	Westtown Township	Township	Chester Creek/Goose Creek TMDL/PRP Short Term BMP
2	Thorne Drive Basin Retrofit	67-1-3.2K		Westtown Township	Township	Chester Creek/Goose Creek TMDL/PRP Short Term BMP
3	Sage Road Basin Retrofit	67-1-4.75		Westtown Township	Township	Chester Creek/Goose Creek TMDL/PRP Short Term BMP
4	Wild Goose Farms Basin A Retrofit	67-4D-76		Wild Goose Farms HOA	HOA	Chester Creek/Goose Creek TMDL/PRP Short Term BMP
5	Wild Goose Farms Basin B Retrofit	67-4D-76		Wild Goose Farms HOA	HOA	Chester Creek/Goose Creek TMDL/PRP Short Term BMP
6	Pleasant Grove Stream Restoration	67-4M-43.1	1190 Blenheim Rd	Westtown Township	Township	Chester Creek PRP Proposed BMP
7	Dunvegan Road Basin Retrofit	67-4-28.65, 67-4-28.64	1027/1025 Dunvegan Rd	James & Colleen Brookover, James & Katherine McDermott	Private	Upper Brandywine Creek PRP Proposed BMP
8	General Greene Drive Basin B Retrofit	67-4I-77	1014 General Greene Dr	Louis & Susan McCray	Private	Upper Brandywine Creek PRP Proposed BMP
9	General Greene Drive Basin A Retrofit	67-4I-74	1008 General Greene Dr	Roman Chojnacki, Margaret Uttrodt	Private	Upper Brandywine Creek PRP Proposed BMP
10	Radley Run Stream Restoration	67-4-4.3	1130 S New St	Brent & Celeste Celek	Private	Upper Brandywine Creek PRP Proposed BMP
Not Represented	Stream Restoration					Chester Creek/Goose Creek TMDL/PRP Long Term BMP

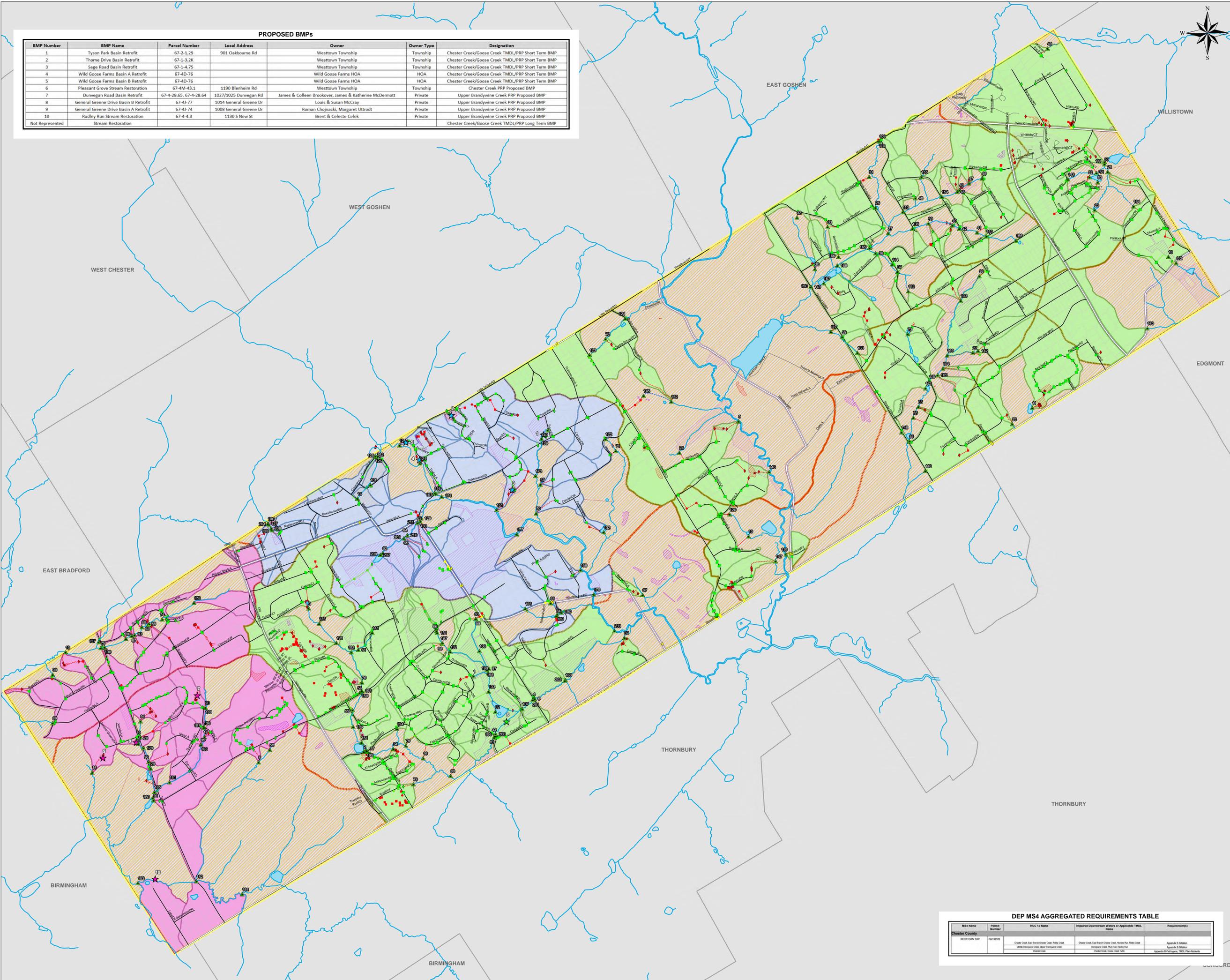
NOTES:
 1. Land cover data is derived from the National Land Cover Database 2011 (NLCD 2011).
 2. The entire Township is within the 2010 Urbanized Area.

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Date: 1/17/2019
 DRAWN BY: AR
 1 inch = 700 feet
 0 700 1,400 Feet



Westtown Township
 TMDL/POLLUTANT REDUCTION PLAN
 PLANNING AREA MAP
 CHESTER COUNTY, PA



- Legend**
- Outfalls
 - BMPs
 - Chester Creek PRP Proposed BMP
 - Chester Creek/Goose Creek TMDL/PRP Short Term BMP
 - Upper Brandywine Creek PRP Proposed BMP
 - Planning Area
 - East Branch
 - Goose Creek
 - Plum Run; Radley Run; Upper Brandywine
 - Parceled Areas
 - Private/Other
 - Stormwater Structures
 - Inlet, Township
 - Manhole, Township
 - Inflow, Township
 - Outflow, Township
 - Inflow/Outflow, Township
 - Riser, Township
 - Inlet, State
 - Manhole, State
 - Inflow, State
 - Outflow, State
 - Inflow/Outflow, State
 - Inlet, Private
 - Manhole, Private
 - Inflow, Private
 - Outflow, Private
 - Inflow/Outflow, Private
 - Riser, Private
 - Stormwater Conveyances
 - Private, Pipe
 - Private, Swale
 - State, Pipe
 - Township, Pipe
 - Township, Swale
 - Pre-2003 Basins
 - Existing PCSM BMPs
 - Roads
 - Private
 - State
 - Township
 - Stream
 - Located Surface Waters
 - Waterbodies
 - HUC12 Boundaries
 - Subwatersheds
 - Parcels
 - Township Owned Parcels
 - Township Boundary

DEP MS4 AGGREGATED REQUIREMENTS TABLE

MS4 Name	Permit Number	HUC 12 Name	Impaired Downstream Waters or Applicable TMDL Name	Requirements
Chester County	PA013028			
Westtown TWP				
		Chester Creek, East Branch, Goose Creek, Plum Run, Radley Run	Chester Creek, East Branch, Goose Creek, Plum Run, Radley Run	Appendix E, Section 1
		Upper Brandywine Creek, Upper Brandywine Creek	Upper Brandywine Creek, Plum Run, Radley Run	Appendix E, Section 1
		Upper Brandywine Creek	Upper Brandywine Creek, Plum Run, Radley Run	Appendix E, Section 1

Appendix F

Land Cover Map

NOTES:
 1. Land cover data is derived from the National Land Cover Database 2011 (NLCD 2011).
 2. The entire Township is within the 2010 Urbanized Area.

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Date: 1/17/2019

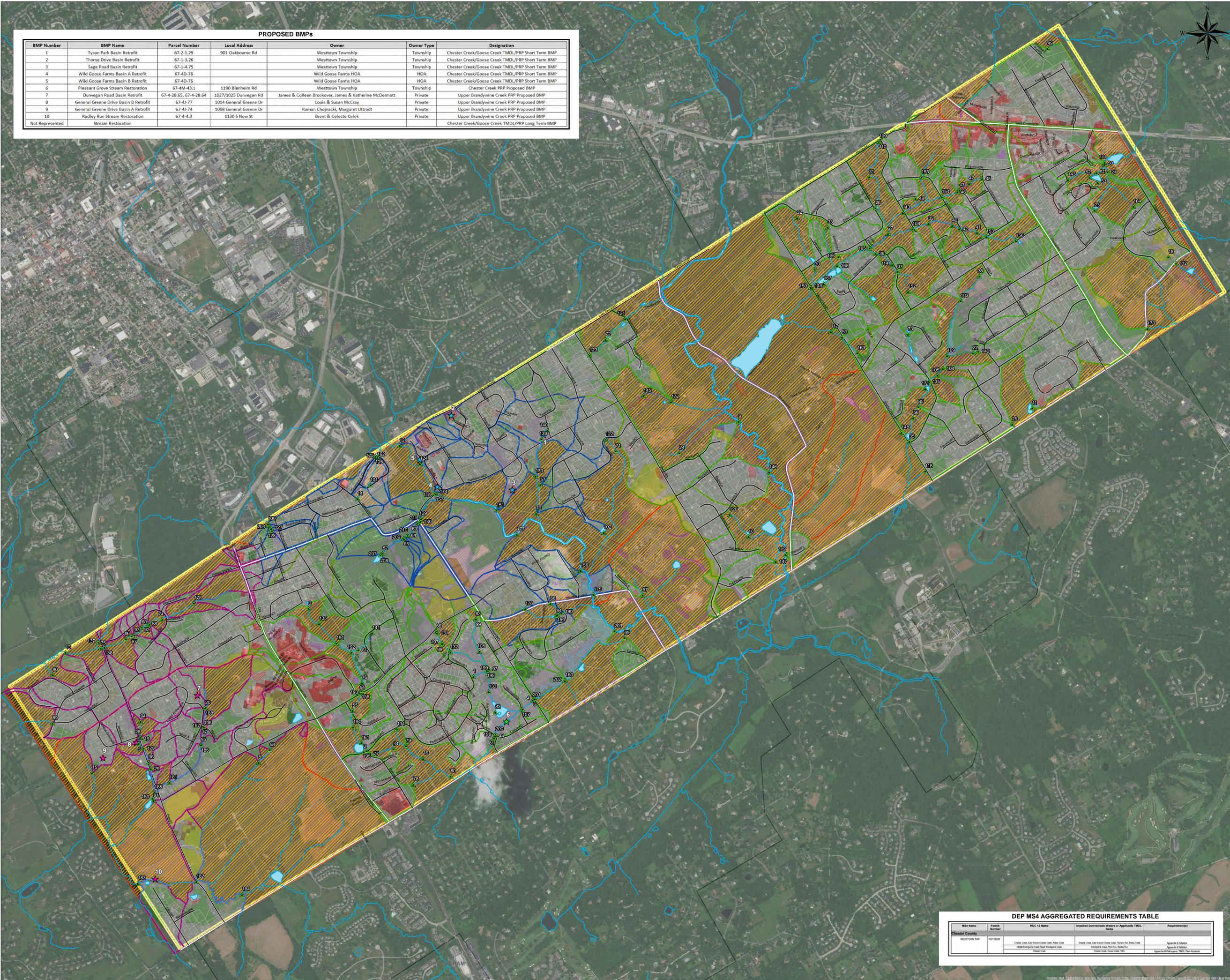
DRAWN BY: AR

1 inch = 700 feet



Westtown Township
TMDL/POLLUTANT REDUCTION PLAN
LAND COVER MAP
 CHESTER COUNTY, PA

PROPOSED BMPs						
BMP Number	BMP Name	Parcel Number	Local Address	Owner	Owner Type	Designation
1	Tyson Park Basin Retrofit	67-2-1.29	901 Oakbourne Rd	Westtown Township	Township	Chester Creek/Goose Creek TMDL/PRP Short Term BMP
2	Thorne Drive Basin Retrofit	67-1-3.2K		Westtown Township	Township	Chester Creek/Goose Creek TMDL/PRP Short Term BMP
3	Sage Road Basin Retrofit	67-1-4.75		Westtown Township	Township	Chester Creek/Goose Creek TMDL/PRP Short Term BMP
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8	General Greene Drive Basin B Retrofit	67-4I-77	1014 General Greene Dr	Louis & Susan McCray	Private	Upper Brandywine Creek PRP Proposed BMP
9	General Greene Drive Basin A Retrofit	67-4I-74	1008 General Greene Dr	Roman Chojnacki, Margaret Utrodt	Private	Upper Brandywine Creek PRP Proposed BMP
10	Radley Run Stream Restoration	67-4-4.3	1130 S New St	Brent & Celeste Celek	Private	Upper Brandywine Creek PRP Proposed BMP
Not Represented	Stream Restoration					Chester Creek/Goose Creek TMDL/PRP Long Term BMP



- Legend**
- ▲ Outfalls
 - ★ Chester Creek PRP Proposed BMP
 - ★ Chester Creek/Goose Creek TMDL/PRP Short Term BMP
 - ★ Upper Brandywine Creek PRP Proposed BMP
 - Planning Area
 - East Branch
 - Goose Creek
 - Plum Run, Radley Run, Upper Brandywine
 - Proposed Areas
 - Penndel
 - Private/Other
 - Land Cover
 - 21: Developed, Open Space
 - 22: Developed, Low Intensity
 - 23: Developed, Medium Intensity
 - 24: Developed, High Intensity
 - 41: Deciduous Forest
 - 42: Evergreen Forest
 - 43: Mixed Forest
 - 52: Shrub/Scrub
 - 71: Grassland/Herbaceous
 - 81: Hay/Pasture
 - 83: Cultivated Crops
 - 90: Woody Wetlands
 - 95: Emergent Herbaceous Wetlands
 - Pre-2003 Basins
 - Existing PCSM BMPs
 - Roads
 - Private
 - State
 - Township
 - Stream
 - Located Surface Waters
 - Waterbodies
 - HUC12 Boundaries
 - Subwatersheds
 - Parcels
 - Township Owned Parcels
 - Township Boundary

DEP MS4 AGGREGATED REQUIREMENTS TABLE

MS4 Name	Parcel Number	HUC 12 Name	Impaired Downstream Waters or Applicable TMDL Name	Requirements
Chester County	FACTS08			
WESTTOWN TWP				