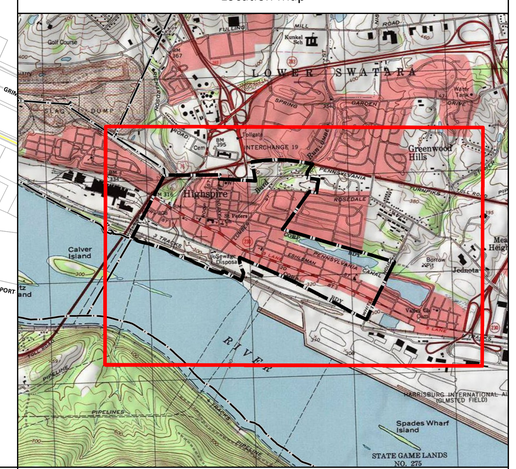
Location Map



Note: The 2010 Urban Area covers the entire area of the map. It is not shown for the sake of clarity.

Outfall
Culvert Pipe End
Basin
Headwall/Endwall
Inlet
Manhole
Pipe
Swale Channel
State/US Highway
Road
Non-Attaining Stream (for Aquatic Life)
Attaining Stream
Parcel Boundary
Highspire Borough Boundary
Municipal Boundary

Service Layer Credits:
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Project No: 039352015

Revised: 6/23/2017

RETTEW

N
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S

0 150 300 600 Feet

1 inch = 300 feet

MAP 2

Stormwater System Map

Pollutant Reduction Plan
Stormwater Management Program

Highspire Borough — Dauphin County, PA

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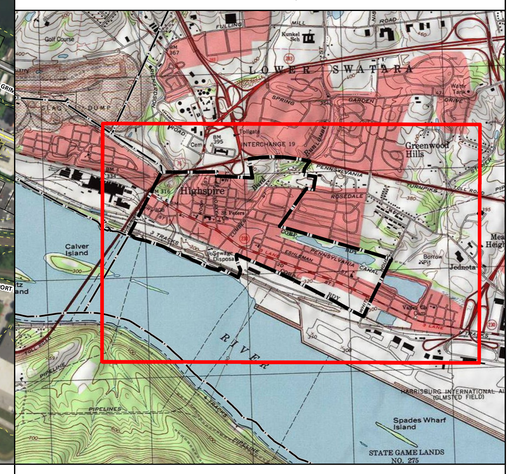
Attachment B3: Proposed Stormwater BMP Map

BMP Option 1: Streambank Stabilization

Location Map



BMP	Headwall/Endwall	Pipe	Non-Attaining Stream (for Aquatic Life)	Municipal Boundary
Outfall	Inlet	Swale Channel	Attaining Stream	
Culvert Pipe End	Manhole	State/US Highway	Parcel Boundary	
Basin	Contour (10' interval)	Road	Highspire Borough Boundary	

Service Layer Credits:
Copyright:© 2013 National Geographic Society, i-cubed
Source: Esri, DigitalGlobe, GeoEye,

Project No: 039352015

Revised: 6/23/2017

RETTEW

N W E S

0 150 300 600 Feet

1 inch = 300 feet

MAP 3

Proposed Stormwater BMPs

Pollutant Reduction Plan
Stormwater Management Program

Highspire Borough — Dauphin County, PA

N:\Shared\Projects\039352015\GIS\MapDocs\Pollutant Reduction Plan\039352015_Map3_30x42.mxd

Section C

SECTION C - POLLUTANTS OF CONCERN

The identified pollutants of concern for the Chesapeake Bay are based on the impairment listing provided in the MS4 Requirements Table provided by PA DEP:

- Chesapeake Bay (Appendix D): Nutrients and Siltation

The pollutants of the concern for the Chesapeake Bay are sediment, phosphorus, and nitrogen. Per the PA DEP MS4 Requirements Table, Highspire Borough must complete and submit a Chesapeake Bay Pollutant Reduction Plan (Appendix D - Nutrients, Siltation) that achieves pollutant reductions of sediment (10%), phosphorus (5%), and nitrogen (3%), over the 5-year period following PA DEP's approval of coverage. PA DEP allows using a presumptive approach in which it is assumed that a 10% reduction in sediment will accomplish a 5% reduction in phosphorus and a 3% reduction in nitrogen.

Attachment
C1: MS4 Requirements Table for Dauphin County Municipalities

C1: MS4 Requirements Table for Dauphin County Municipalities

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Dauphin County						
CONEWAGO TWP	PAG133621	No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Iron Run	Appendix E-Siltation (5)	
				Spring Creek	Appendix E-Siltation (5)	Flow Alterations, Other Habitat Alterations (4c)
				Conewago Creek	Appendix E-Nutrients, Siltation, Suspended Solids (4a), Appendix B-Pathogens (5)	
DAUPHIN BORO	PAG133550*	No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Susquehanna River	Appendix C-PCB (5)	
DERRY TWP	PAG133637	No		Unnamed Tributaries to Spring Creek		Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Iron Run	Appendix E-Siltation (5)	
				Susquehanna River	Appendix C-PCB (5)	
				Unnamed Tributaries to Swatara Creek	Appendix E-Siltation (5)	
				Spring Creek	Appendix E-Siltation (5)	Flow Alterations, Other Habitat Alterations (4c)
EAST HANOVER TWP	PAG133551*	No		Unnamed Tributaries to Raccoon Creek	Appendix B-Pathogens (5)	
				Bow Creek	Appendix E-Siltation (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Manada Creek	Appendix B-Pathogens (5)	
				Raccoon Creek	Appendix E-DO/BOD (4a)	Flow Alterations (4c)
				Unnamed Tributaries to Bow Creek	Appendix E-Nutrients (4a), Appendix C-Priority Organics (5)	
				Unnamed Tributaries to Manada Creek	Appendix B-Pathogens (5)	
HARRISBURG CITY	PAG133642*	Yes	TMDL Plan, IP	Wildwood Lake	Appendix E-Nutrients, Suspended Solids (4a)	
				Unnamed Tributaries to Spring Creek	Appendix E-Siltation (5)	
				Susquehanna River	Appendix C-PCB (5)	
				Spring Creek		Cause Unknown (5)
				Paxton Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
				Paxton Creek	Appendix B-Pathogens (5)	Other Habitat Alterations, Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Asylum Run	Appendix B-Pathogens (5)	Water/Flow Variability (4c)
HIGHSPIRE BORO	PAG133544	No		Susquehanna River	Appendix C-PCB (5)	
				Burd Run		Cause Unknown (5)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
HUMMELSTOWN BORO	PAG133556	No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Dauphin County						
LONDONDERRY TWP	PAG133547	No		Iron Run	Appendix E-Siltation (5)	
				Lynch Run	Appendix E-Siltation (4a)	Cause Unknown, Turbidity (4a)
				Unnamed Tributaries to Conewago Creek	Appendix E-Organic Enrichment/Low D.O. (4a)	Other Habitat Alterations (4c)
				Susquehanna River	Appendix C-PCB (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Conewago Creek	Appendix E-Nutrients, Siltation, Suspended Solids (4a)	
				Unnamed Tributaries to Swatara Creek	Appendix E-Siltation (5)	
LOWER PAXTON TWP	PAG133643	Yes	TMDL Plan	Slotznick Run		Cause Unknown (5)
				Unnamed Tributaries to Nyes Run		Flow Alterations, Other Habitat Alterations (4c)
				Susquehanna River	Appendix C-PCB (5)	
				Nyes Run	Appendix B-Pathogens (5)	
				Asylum Run	Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Paxton Creek	Appendix B-Pathogens (5)	Other Habitat Alterations, Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Paxton Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
				Spring Creek		Cause Unknown (5)
LOWER SWATARA TWP	PAG133543	No		Unnamed Tributaries to Sherman Creek	Appendix E-Siltation (5)	Other Habitat Alterations (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Burd Run		Cause Unknown (5)
				Susquehanna River	Appendix C-PCB (5)	
				Unnamed Tributaries to Susquehanna River	Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations (4c)
MIDDLE PAXTON TWP	PAG133688*	Yes	SP	Susquehanna River	Appendix C-PCB (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
MIDDLETOWN BORO	PAG133645	No		Unnamed Tributaries to Sherman Creek	Appendix E-Siltation (5)	Other Habitat Alterations (4c)
				Unnamed Tributaries to Susquehanna River	Appendix E-Siltation (5)	Other Habitat Alterations (4c)
				Susquehanna River	Appendix C-PCB (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
PAXTANG BORO	PAG133554	No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Unnamed Tributaries to Spring Creek	Appendix E-Siltation (5)	
				Susquehanna River	Appendix C-PCB (5)	
				Spring Creek		Cause Unknown (5)

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Dauphin County						
PENBROOK BORO	PAG133555	Yes	TMDL Plan	Asylum Run	Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Paxton Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
				Paxton Creek	Appendix B-Pathogens (5)	Other Habitat Alterations, Water/Flow Variability (4c)
				Spring Creek		Cause Unknown (5)
				Unnamed Tributaries to Spring Creek	Appendix E-Siltation (5)	
				Susquehanna River	Appendix C-PCB (5)	
ROYALTON BORO	PAG133641*	No		Susquehanna River	Appendix C-PCB (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
SOUTH HANOVER TWP	PAG133500	No		Unnamed Tributaries to Beaver Creek	Appendix E-Siltation (5)	Flow Alterations (4c)
				Manada Creek	Appendix B-Pathogens (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
STEELTON BORO	PAG133625	No		Unnamed Tributaries to Swatara Creek	Appendix E-Siltation (5)	
				Unnamed Tributaries to Spring Creek	Appendix E-Siltation (5)	
				Susquehanna River	Appendix C-PCB (5)	
				Pennsylvania Canal	Appendix E-Siltation (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Unnamed Tributaries to Susquehanna River	Appendix E-Siltation (5)	
SUSQUEHANNA TWP	PAG133633	Yes	TMDL Plan	Slotznick Run		Cause Unknown (5)
				Paxton Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
				Paxton Creek	Appendix B-Pathogens (5)	Other Habitat Alterations, Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Asylum Run	Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Susquehanna River	Appendix C-PCB (5)	
				Spring Creek		Cause Unknown (5)
				Wildwood Lake	Appendix E-Nutrients, Suspended Solids (4a)	
				Unnamed Tributaries to Spring Creek	Appendix E-Siltation (5)	
				Unnamed Tributaries to Asylum Run		Other Habitat Alterations (4c)

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Dauphin County						
SWATARA TWP	PAG133615	No		Slotznick Run		Cause Unknown (5)
				Unnamed Tributaries to Spring Creek	Appendix E-Siltation (5)	Other Habitat Alterations (4c)
				Unnamed Tributaries to Sherman Creek		Cause Unknown (5)
				Susquehanna River	Appendix C-PCB (5)	
				Unnamed Tributaries to Susquehanna River	Appendix E-Siltation (5)	
				Unnamed Tributaries to Swatara Creek	Appendix E-Siltation (5)	
				Pennsylvania Canal	Appendix E-Siltation (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Spring Creek		Cause Unknown (5)
WEST HANOVER TWP	PAG133545	No		Manada Creek	Appendix B-Pathogens (5)	
				Walnut Run	Appendix B-Pathogens (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Unnamed Tributaries to Beaver Creek	Appendix E-Siltation (5)	Flow Alterations (4c)
				Unnamed Tributaries to Manada Creek	Appendix E-Nutrients (5)	

Section D

SECTION D - DETERMINE EXISTING LOADING FOR POLLUTANTS OF CONCERN

A. Base Pollutant Load Calculation

Highspire Borough used the PA DEP Simplified Method to calculate the existing pollutant loading rates (lbs/year) for sediment, phosphorus, and nitrogen, generated within their municipal boundary in April, 2017. Per the State MS4 Land Cover Estimates table, the Borough consists of 469.1 acres, 49% of which is impervious cover and 51% pervious cover. The process used to calculate the baseline pollutant loads is as follows:

1. Calculate the total impervious area within the Borough by multiplying the total acreage by 49% as indicated in the MS4 Land Cover Estimates table.
2. Calculate the total pervious area within the Borough by subtracting the impervious area from the total area.
3. Multiply the impervious area and the pervious area by the pollutant loading rates identified for Dauphin County per Attachment B - Developed Land Loading Rates for PA Counties in the PRP Instruction document.
4. Reduce the existing baseline pollutant loads by removing pollutant loads from parcels with NPDES MS4 permits and Rights-of-Way (R-O-W) areas of State Roads, Railroads, PA Turnpike, airports, and any other parcel owned/operated by another MS4 permittee.
    a. Analyze parcel information on a GIS map to identify any State Right-of-Way, Railroad Right-of-Way, or private MS4s. Mark the area within each sewershed area that falls under those categories. Calculate the area in each sewershed using GIS.
    b. Calculate the impervious and pervious areas within each R-O-W. For this PRP, we have applied the medium density impervious area rate of 49% to these areas.
    c. Multiply the total impervious and pervious areas by the Chesapeake Bay Derived Developed Land Loading Rates for PA Counties.
    d. Subtract the calculated Right-of-Way/private MS4 pollutant loads from the baseline pollutant load.

Using the method described above, Highspire Borough has identified the baseline pollutant loads to the Chesapeake Bay for sediment, phosphorus, and nitrogen as follows:

Watershed	Sediment (lbs/year)	Phosphorus (lbs/year)	Nitrogen (lbs/year)
Chesapeake Bay	488,171	301	10,709

Attachments

D1: Statewide MS4 Land Cover Estimates
D2: Attachment B - Developed Land Loading Rates for PA Counties
D3: Pollutant Load Calculations

Attachment D1: Statewide MS4 Land Cover Estimates

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATEWIDE MS4 LAND COVER ESTIMATES

The Pennsylvania Department of Environmental Protection (DEP) has developed this table of impervious and pervious land cover percentages within and outside of urbanized areas (UAs) to assist municipal MS4 permittees and applicants in developing estimates of existing pollutant loading for Pollutant Reduction Plans (PRPs) and TMDL Plans. DEP does not require that the data in this table be utilized and offers it only as a possible resource to MS4s. An MS4 may determine based on its own analysis that different percentages of impervious and pervious surfaces exist within the municipality. In addition, this table was developed without consideration to whether a PRP and/or TMDL Plan must be developed by an MS4; the MS4 Requirements Table identifies DEP's expectations for development of a PRP and/or TMDL Plan. In other words, the presence of a municipality in this table does not mean a PRP and/or TMDL Plan must be developed.

For those MS4s that do need to develop a plan, this table may be used to streamline the existing pollutant loading calculation. After determining the planning area (i.e., the storm sewershed(s) that drain to the Chesapeake Bay and/or locally impaired waters), DEP's simplified method of calculating existing pollutant loads as described in its PRP Instructions document calls for the determination of the percentages of impervious and pervious land cover within the planning area. The planning area will consist of the UA (or a portion thereof) and may include areas outside of the UA (if stormwater drains into the MS4 from outside the UA).

An example of how this table can be used is as follows:

Abbottstown Boro determines that its planning area for a Chesapeake Bay PRP is 500 acres. This includes all of the UA (321 acres) as well as 179 acres that drain into the MS4 from outside the UA. Abbottstown would like to determine its existing load of sediment (prior to any consideration of existing structural BMPs). Using Attachment B of DEP's PRP Instructions for sediment loading rates, Abbottstown calculates the following existing load:

321 acres UA x 0.3 (30% UA Impervious from table below) x 1,398.77 lbs/acre/yr =	134,702 lbs/yr
321 acres UA x 0.7 (70% UA Pervious from table below) x 207.67 lbs/acre/yr =	46,663 lbs/yr
179 acres outside UA x 0.28 (28% Outside UA Impervious from table below) x 1,398.77 lbs/acre/yr =	70,106 lbs/yr*
179 acres outside UA x 0.72 (72% Outside UA Pervious from table below) x 207.67 lbs/acre/yr =	26,765 lbs/yr*
Total:	278,236 lbs/yr

* MS4s may also elect to use loading rates for undeveloped land presented in Attachment B of DEP's PRP Instructions for areas outside of the UA.

The column for "UA Acres" in the table may or may not be useful in this calculation. If only a portion of the UA is part of the planning area, the MS4 will need to determine the applicable area using different methods.

DEP developed this table using the following methods:

Cartographic Boundary Shapefiles - Urban Areas 2010 were overlain on NLCD 2011 Land Cover (2011 Edition, amended 2014) - National Geospatial Data Asset (NGDA) Land Use/Land Cover data in order to calculate the percentages in the table. The High, Medium and Low Density Residential and mixed land uses were parsed to account for pervious and impervious surfaces within each land use classification. High Density is considered 87% impervious, Medium Density is 52% impervious, and Low Density is 15% impervious. This analysis was performed for entire municipalities but broken out into areas within the UA and outside of the UA.

Statewide MS4 Land Cover Estimates

County	Municipality	UA % Impervious	UA % Pervious	Outside of UA % Impervious	Outside of UA % Pervious	UA Acres
Allegheny	GLEN OSBORNE BORO	13%	87%	13%	87%	354.1
York	GOLDSBORO BORO	30%	70%	28%	72%	249.0
Susquehanna	GREAT BEND BORO	44%	56%	40%	60%	178.2
Susquehanna	GREAT BEND TWP	37%	63%	2%	98%	390.0
Franklin	GREENCASTLE BORO	52%	48%	52%	48%	1,007.5
Erie	GREENE TWP	10%	90%	3%	97%	282.4
Franklin	GREENE TWP	25%	75%	9%	91%	7,998.1
Montgomery	GREEN LANE BORO	35%	65%	35%	65%	212.1
Westmoreland	GREENSBURG CITY	33%	67%	33%	67%	2,605.9
Allegheny	GREEN TREE BORO	42%	58%	42%	58%	1,318.0
Franklin	GUILFORD TWP	32%	68%	10%	90%	5,023.7
York	HALLAM BORO	42%	58%	35%	65%	342.4
Susquehanna	HALLSTEAD BORO	44%	56%	42%	58%	251.9
Berks	HAMBURG BORO	39%	61%	39%	61%	1,279.9
Adams	HAMILTON TWP	9%	91%	4%	96%	422.2
Franklin	HAMILTON TWP	24%	76%	6%	94%	3,370.1
Monroe	HAMILTON TWP	16%	84%	6%	94%	3,406.5
Cumberland	HAMPDEN TWP	40%	60%	36%	64%	9,885.5
Allegheny	HAMPTON TWP	20%	80%	19%	81%	9,826.7
Lehigh	HANOVER TWP	40%	60%	40%	60%	2,697.2
Luzerne	HANOVER TWP	25%	75%	14%	86%	6,048.8
Northampton	HANOVER TWP	37%	63%	35%	65%	4,018.6
Washington	HANOVER TWP	29%	71%	3%	97%	290.0
York	HANOVER BORO	61%	39%	61%	39%	2,368.9
Erie	HARBORCREEK TWP	28%	72%	11%	89%	5,516.0
Allegheny	HARMAR TWP	30%	70%	22%	78%	2,335.3
Beaver	HARMONY TWP	26%	74%	26%	74%	1,951.1
Butler	HARMONY BORO	29%	71%	28%	72%	249.4
Centre	HARRIS TWP	32%	68%	4%	96%	1,344.8
Dauphin	HARRISBURG CITY	41%	59%	41%	59%	7,473.4
Allegheny	HARRISON TWP	23%	77%	21%	79%	4,426.2
Luzerne	HARVEYS LAKE BORO	18%	82%	11%	89%	1,524.5
Montgomery	HATBORO BORO	67%	33%	67%	33%	909.9
Montgomery	HATFIELD BORO	52%	48%	52%	48%	410.3
Montgomery	HATFIELD TWP	41%	59%	41%	59%	6,376.5
Delaware	HAVERFORD TWP	39%	61%	39%	61%	6,372.1
Allegheny	HAYSVILLE BORO	9%	91%	9%	91%	147.4
Luzerne	HAZLE TWP	25%	75%	10%	90%	4,772.8
Luzerne	HAZLETON CITY	41%	59%	42%	58%	3,847.7
Allegheny	HEIDELBERG BORO	59%	41%	60%	40%	183.8
Berks	HEIDELBERG TWP	22%	78%	5%	95%	876.7
Lebanon	HEIDELBERG TWP	23%	77%	5%	95%	250.4
Lehigh	HEIDELBERG TWP	15%	85%	4%	96%	392.2
York	HEIDELBERG TWP	21%	79%	7%	93%	421.5
York	HELLAM TWP	24%	76%	6%	94%	1,365.3
Northampton	HELLERTOWN BORO	48%	52%	48%	52%	845.9
Columbia	HEMLOCK TWP	24%	76%	6%	94%	913.3
Westmoreland	HEMPFIELD TWP	17%	83%	11%	89%	20,777.6
Lycoming	HEPBURN TWP	17%	83%	4%	96%	332.2
Berks	HEREFORD TWP	35%	65%	4%	96%	251.9
Mercer	HERMITAGE CITY	28%	72%	16%	84%	8,105.8
Dauphin	HIGHSPIRE BORO	49%	51%	49%	51%	469.1
Bucks	HILLTOWN TWP	17%	83%	13%	87%	8,349.8
Blair	HOLLIDAYSBURG BORO	38%	62%	38%	62%	1,483.9