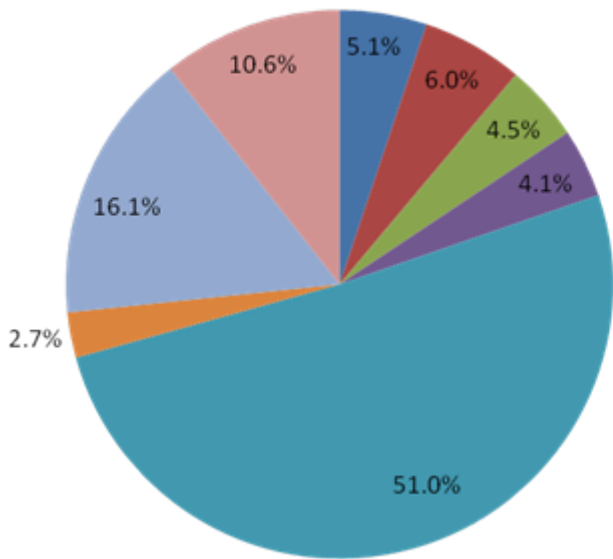


“Green” Scenario Calculations

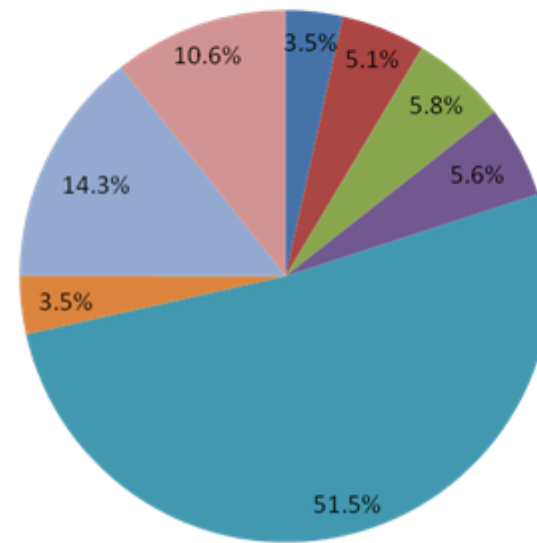
Jurisdiction	Units Needed	Suitability Scenario Density Ratio	Residential Acreage Need	Non-Residential Acreage Need (1500 sq ft/person)	Total Acreage Need for Development	Total Acreage Saved
Abington Township	436.15	6.00	72.69	38.85	111.54	60.03
Bryn Athyn Borough	29.55	6.00	4.93	3.65	8.58	14.29
Hatboro Borough	213.06	6.00	35.51	17.84	53.35	10.02
Horsham Township	866.50	6.00	144.42	79.84	224.26	242.04
Jenkintown Borough	7.03	6.00	1.17	0.53	1.71	-0.13
Lower Moreland Township	9.15	6.00	1.52	0.86	2.39	4.40
Rockledge Borough	29.88	6.00	4.98	2.50	7.48	0.10
Upper Dublin Township	50.74	6.00	8.46	4.94	13.39	19.00
Upper Moreland Township	535.73	6.00	89.29	45.62	134.90	64.11
Upper Southampton Township	147.66	6.00	24.61	13.29	37.90	43.26
Warminster Township	722.22	6.00	120.37	68.77	189.13	118.75
TOTAL			507.95	276.69	784.63	575.86

1990

2005



- Agriculture
- Commercial
- Parking Total
- Recreation
- Residential Total
- Vacant
- Wooded
- Other



- Agriculture
- Commercial
- Parking Total
- Recreation
- Residential Total
- Vacant
- Wooded
- Other

1990, 2000, 2005 Land Use Changes (in acres)



Scenario Factors

Trend Scenario (out of 40)

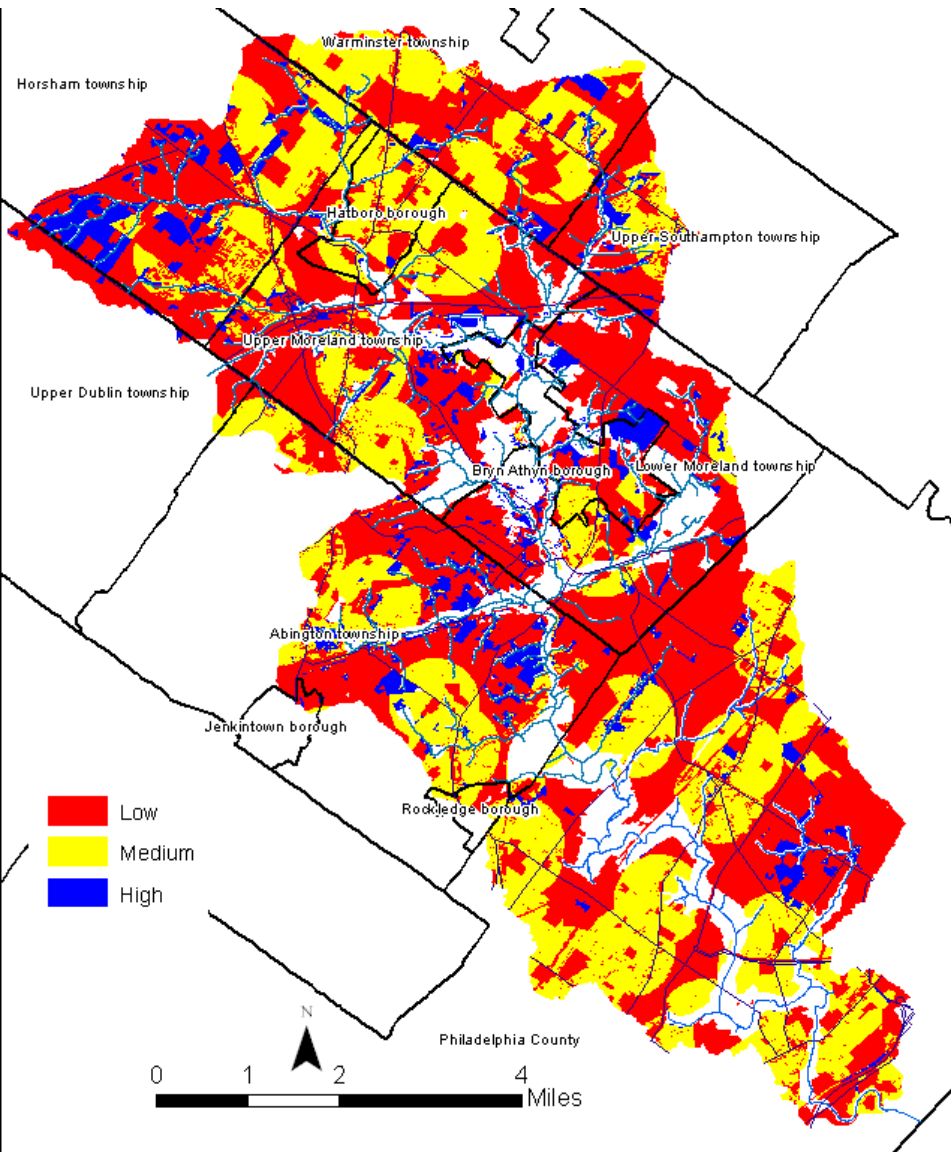
- **25%: Current Land Use**
 - Agriculture, Wooded: 10
 - Residential, Commercial, Vacant: 2
 - Other: 0
- **25%: Slope**
 - 0 – 15%: 10
 - 15 – 25%: 4
 - 25% and higher: 0
- **25%: Proximity to Schools**
 - Within half mile: 10
 - Outside half mile: 7
- **25%: Proximity to Major Roads**
 - Within half mile: 10
 - Outside half mile: 5
- Additional “restricted” layer

“Green” Scenario (out of 10)

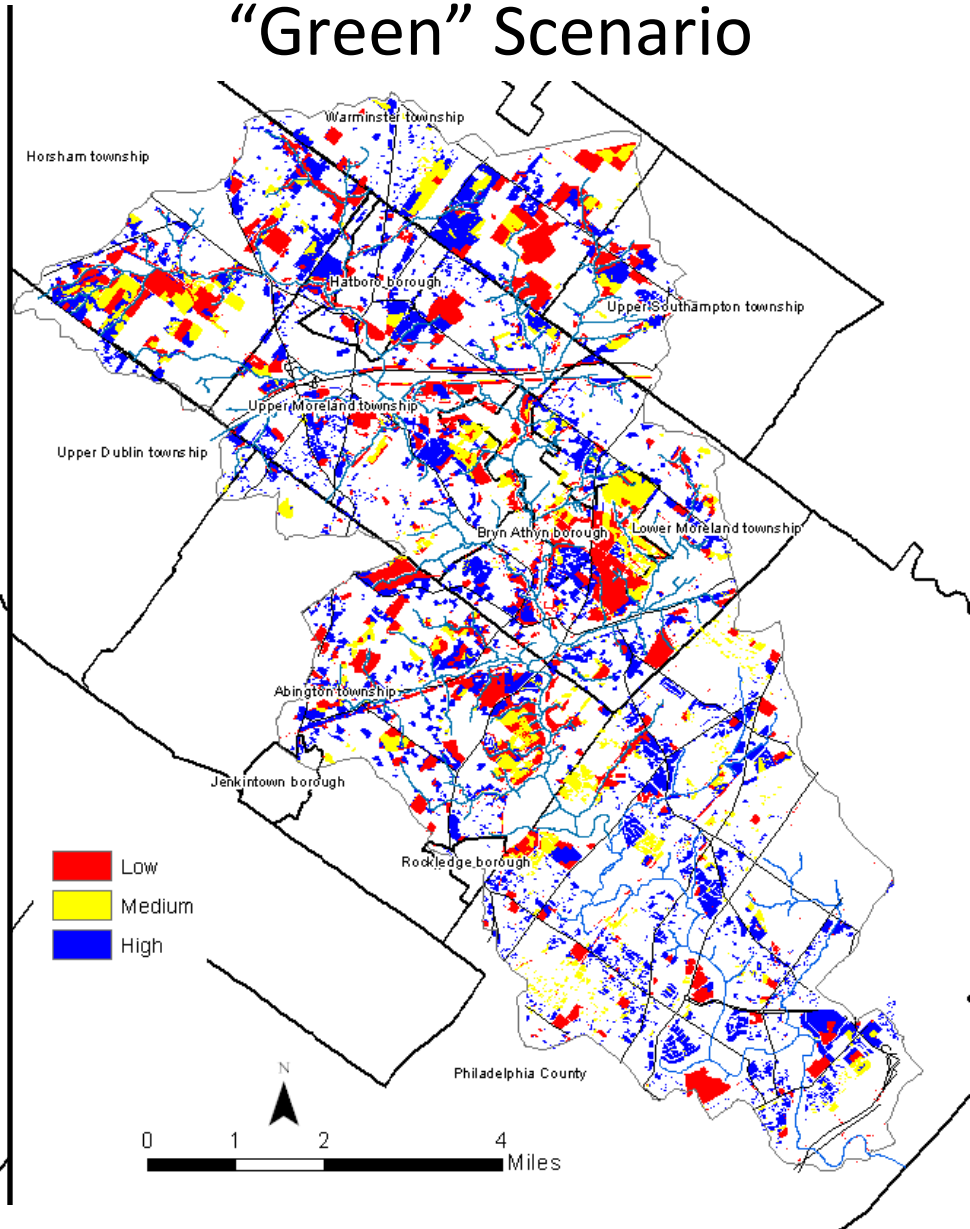
- **25%: Water** (areas outside of floodplain, wetlands, ponds, streams)
 - **24%: Subdividable Parcels**
 - **10%: Suitable building soils**
 - **10%: Current Land Use**
 - **5%: Slope**
- Proximity to:
- **10%: Roads**
 - **10%: Rail Stations**
 - **2%: Institutions** (schools, hospitals, employment centers, religious sites)
 - **4%: Open Space** (includes trails)

Suitability Score Comparison

Trend Scenario



“Green” Scenario



Allocation Explanations

- Trend scenario:
 - Chose largest parcels with highest score for residential use, then non-residential use
 - Did not choose areas smaller than 0.25 acres
 - Would choose larger parcels than needed if necessary
- “Green” scenario:
 - Chose largest parcels scoring 8, 9, or 10
 - Subdivided areas as necessary to meet exact need
 - Rockledge: located all allocated development in Philadelphia

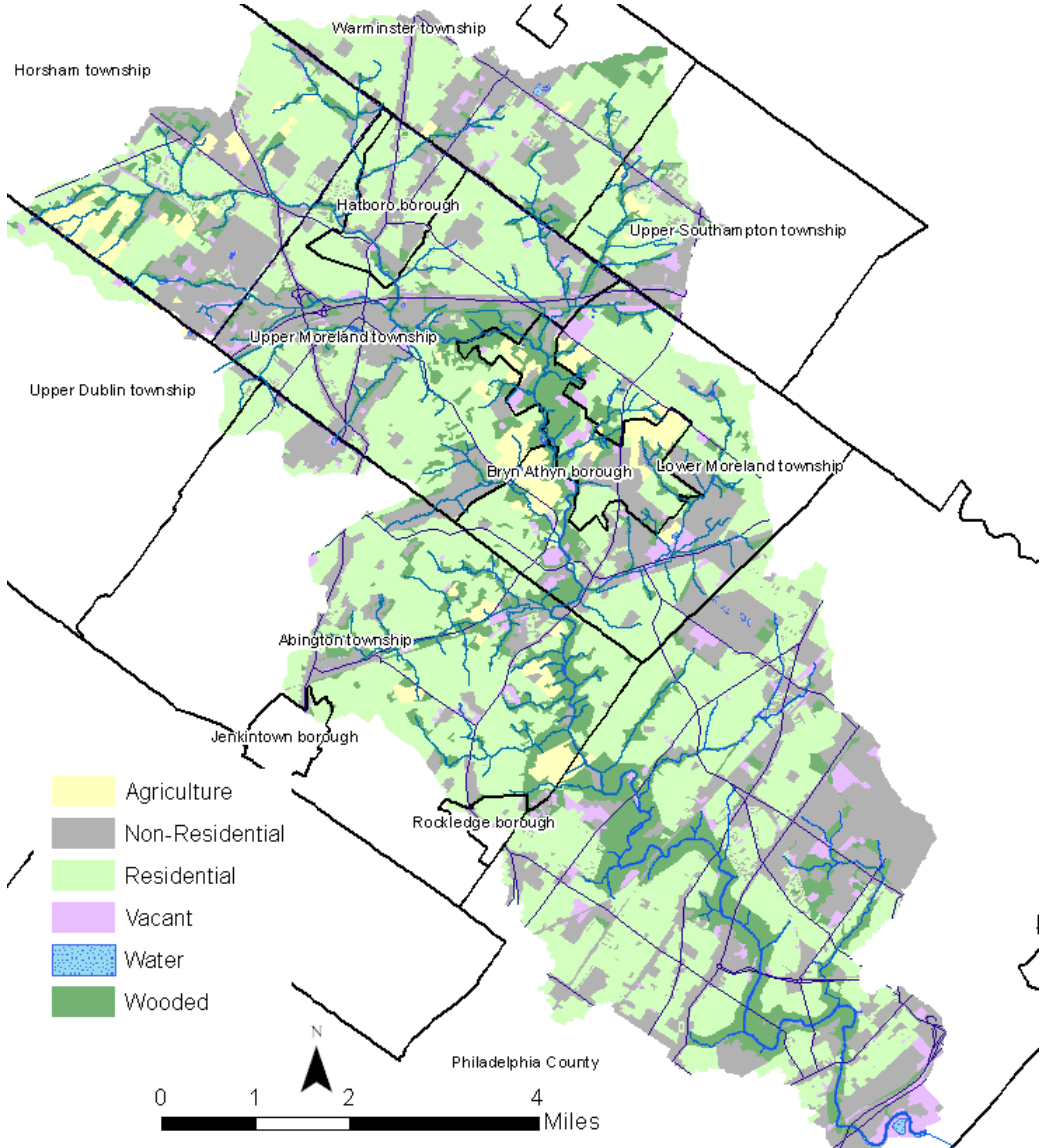
Trend Scenario Allocation

	Res Need	Non Res Need	Total Acreage Need	40	37 (No School)	35 (No Roads)	33 (Vacant Land)	32	30	27	25	22	Total Allocated	Difference from Need
Abington	119.78	51.79	171.57	54.84	117.33								172.18	0.60
Bryn Athyn	18.00	4.87	22.86	23.90									23.90	1.04
Hatboro	39.59	23.78	63.37	12.11			9.93		41.9				63.96	0.59
Horsham	359.84	106.46	466.30	105.81	287.62	72.88							466.31	0.01
Jenkintown	0.87	0.71	1.58		2.53								2.53	0.96
Lower Moreland	5.64	1.15	6.79	6.99									6.99	0.20
Rockledge	4.24	3.34	7.58	0.36	0.76			1.1					2.23	0.01
Upper Dublin	25.81	6.58	32.39		24.08				7.8	1.8			33.66	1.26
Upper Moreland	138.19	60.82	199.01	38.23	160.82								199.05	0.04
Upper Southampton	63.44	17.72	81.16	34.85	27.90	18.32							81.07	-0.09
Warminster	216.20	91.69	307.89	62.62	45.07	44.72	35.05	55.6	12.5	35.7	13.4	3.2	307.90	0.01
				5.36	(in Philadelphia from Rockledge)									
Totals	991.58	368.91	1360.50	339.72	666.11	135.92	44.98	56.7	62.2	37.5	13.4	3.2	1365.14	4.65
				25%	49%	10%	3%	4%	5%	3%	1%	0%		

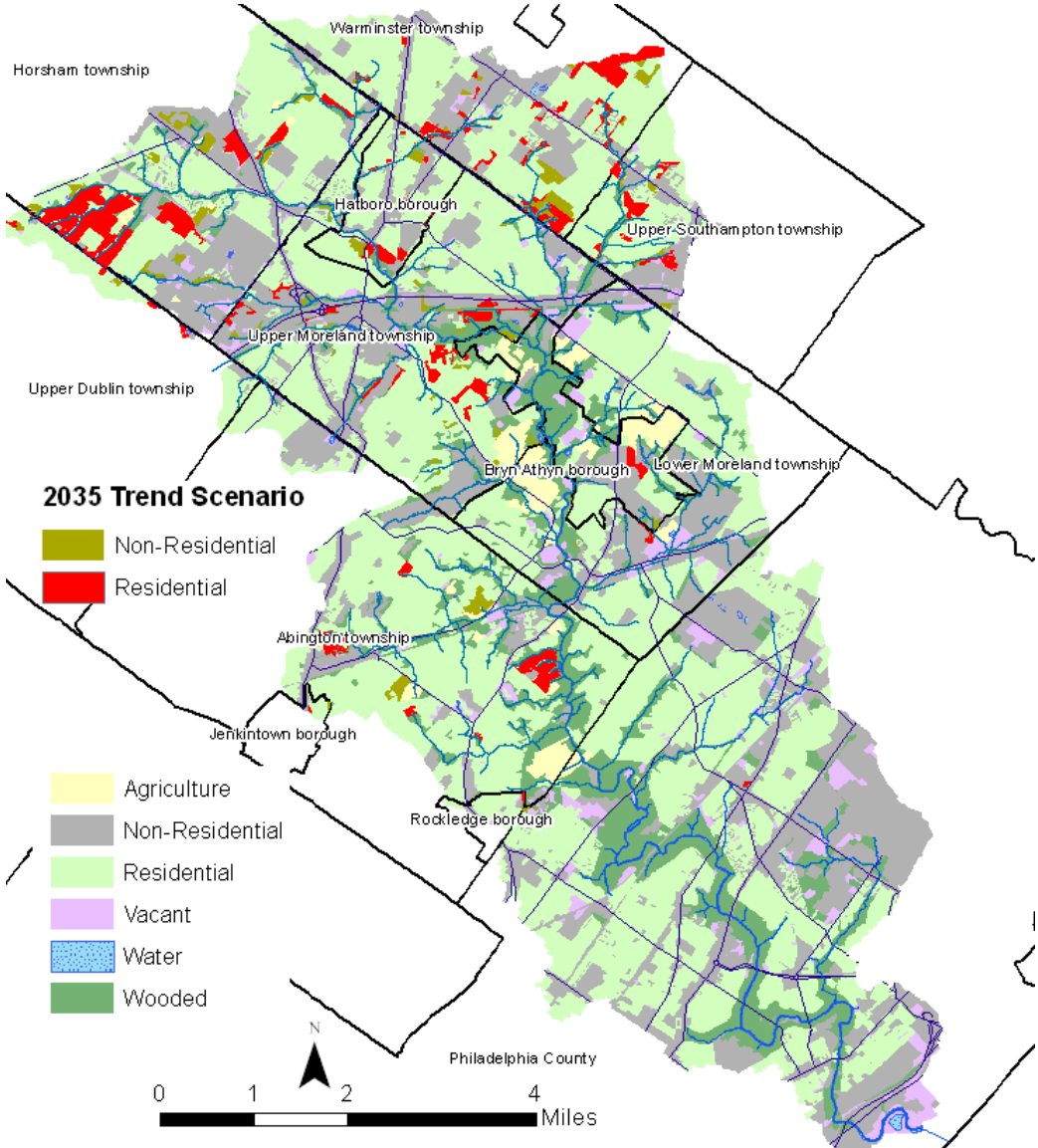
“Green” Scenario Allocation

	Res Need	Non-Res Need	Total Acreage Need	9	8	7	Total Allocated	Difference from Need
Abington	72.69	38.85	111.54	8.71	102.76		111.47	-0.07
Bryn Athyn	4.93	3.65	8.58	5.19	3.42		8.61	0.04
Hatboro	35.51	17.84	53.35	14.93	38.44		53.37	0.02
Horsham	144.42	79.84	224.26	20.90	203.32		224.22	-0.04
Jenkintown	1.17	0.53	1.71		1.71		1.71	0.01
Lower Moreland	1.52	0.86	2.39	2.38			2.38	-0.01
Rockledge	4.98	2.50	7.48	7.48	(PHILADELPHIA)		7.48	0.00
Upper Dublin	8.46	4.94	13.39	4.93	8.49		13.42	0.03
Upper Moreland	89.29	45.62	134.90	19.53	115.38		134.91	0.00
Upper Southampton	24.61	13.29	37.90		37.83	0.05	37.88	-0.02
Warminster	120.37	68.77	189.13	4.76	119.23	65.16	189.15	0.01
Totals	507.95	276.69	784.63	88.81	630.58	65.21	784.60	-0.03
				11%	80%	8%		

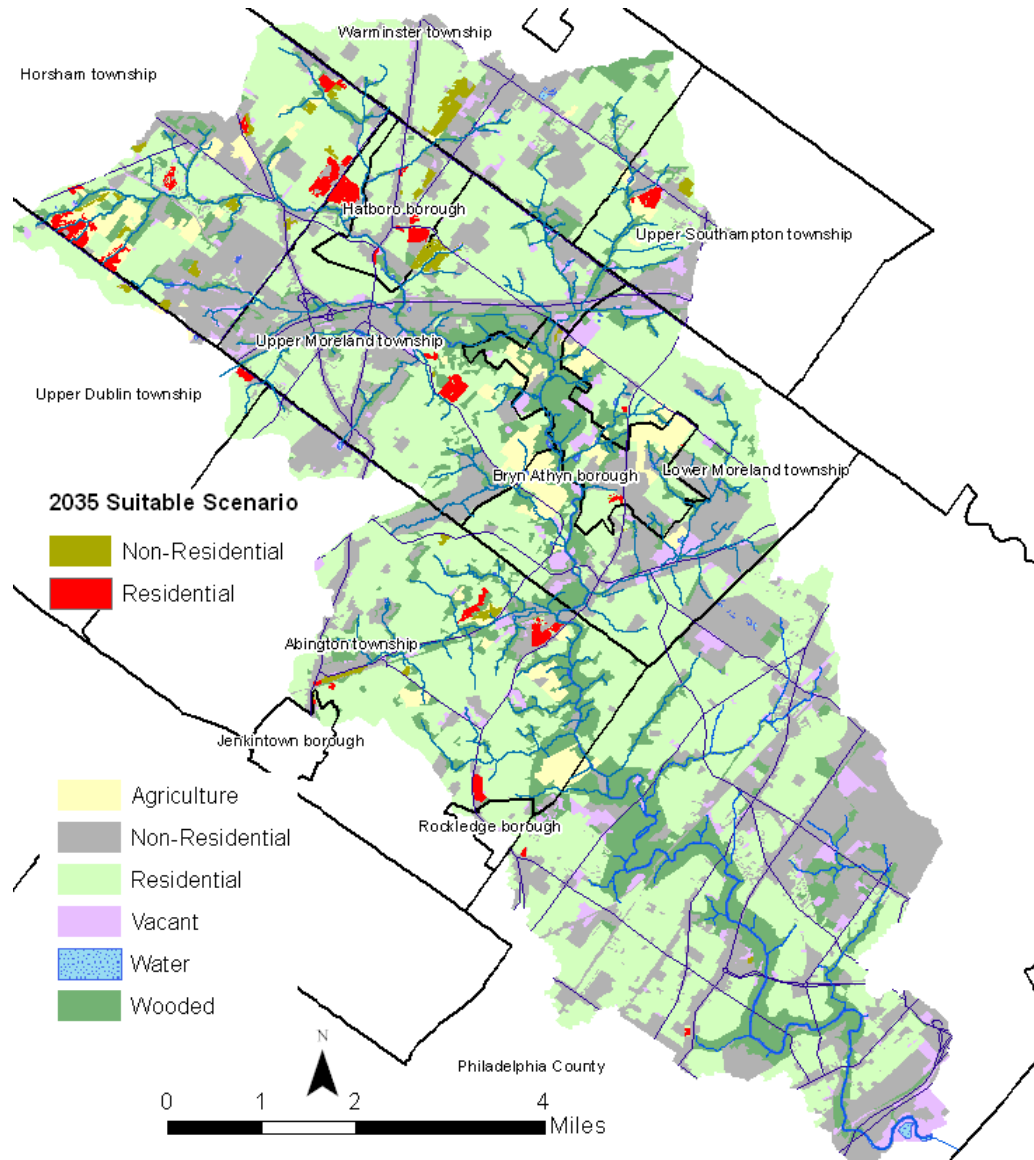
Current Land Use



Trend Scenario Model Output



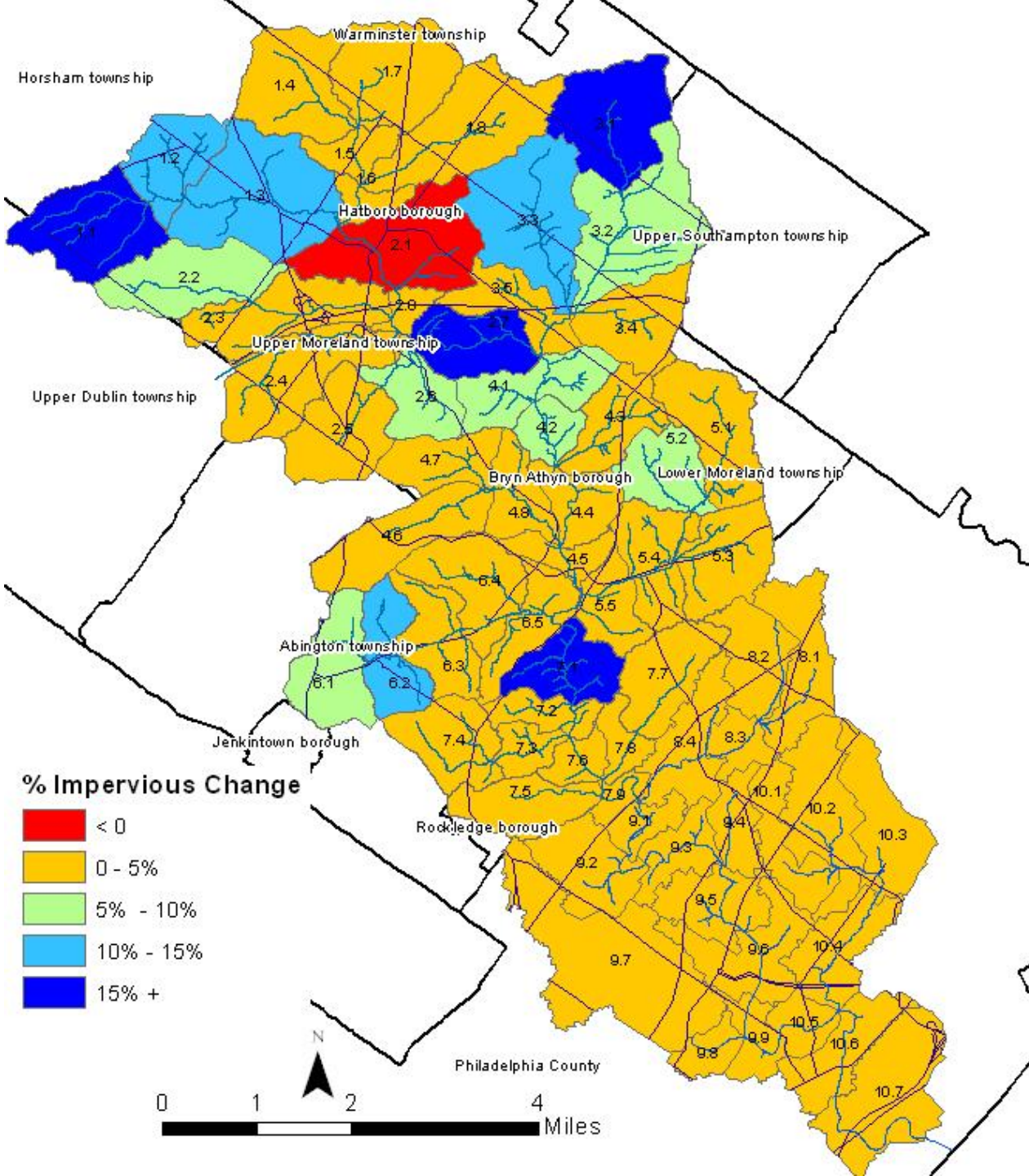
“Green” Scenario Model Output



Hydrologic Impacts of Land Use Scenarios

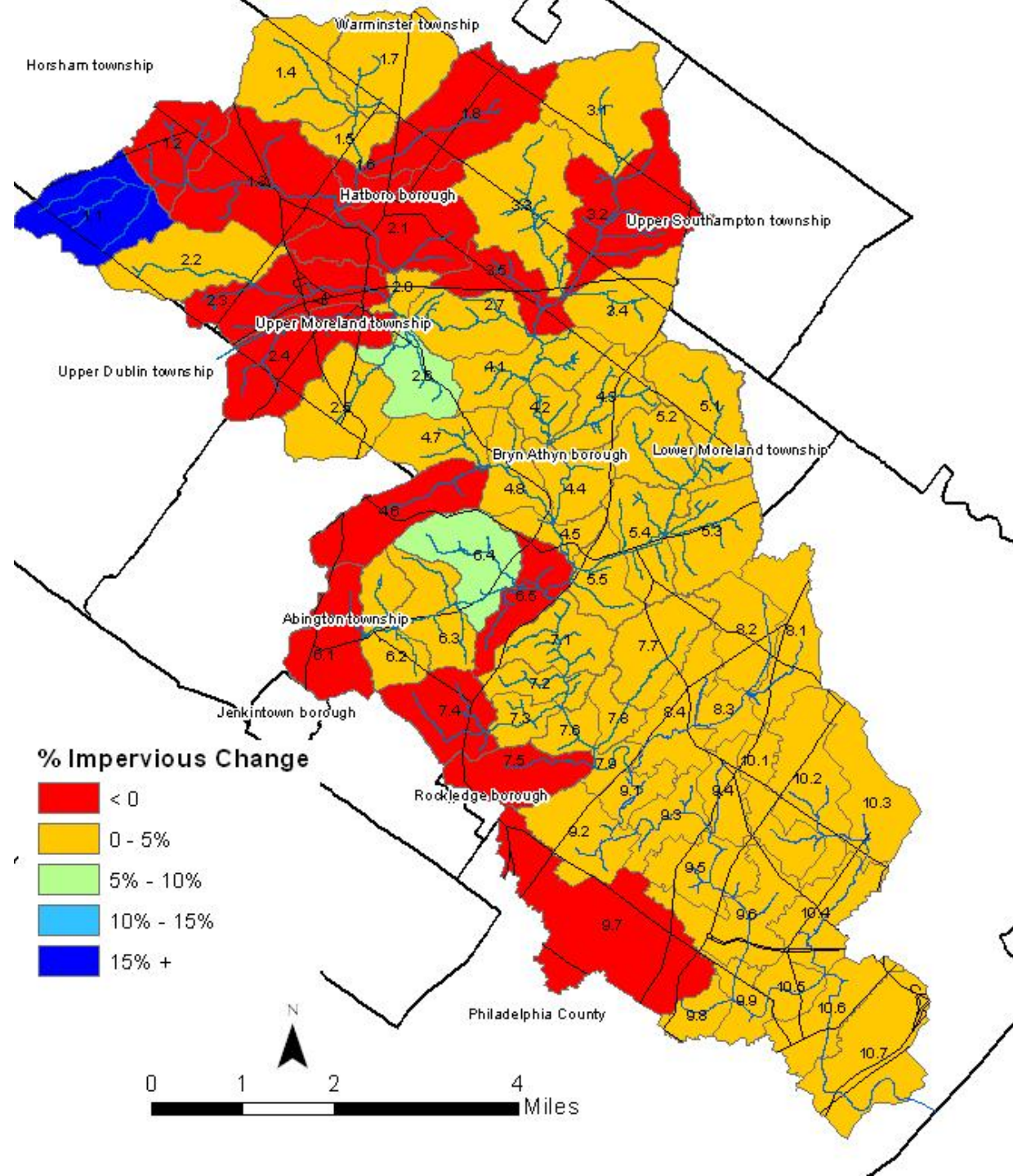
Trend Scenario

Change in Impervious Cover



Green Scenario

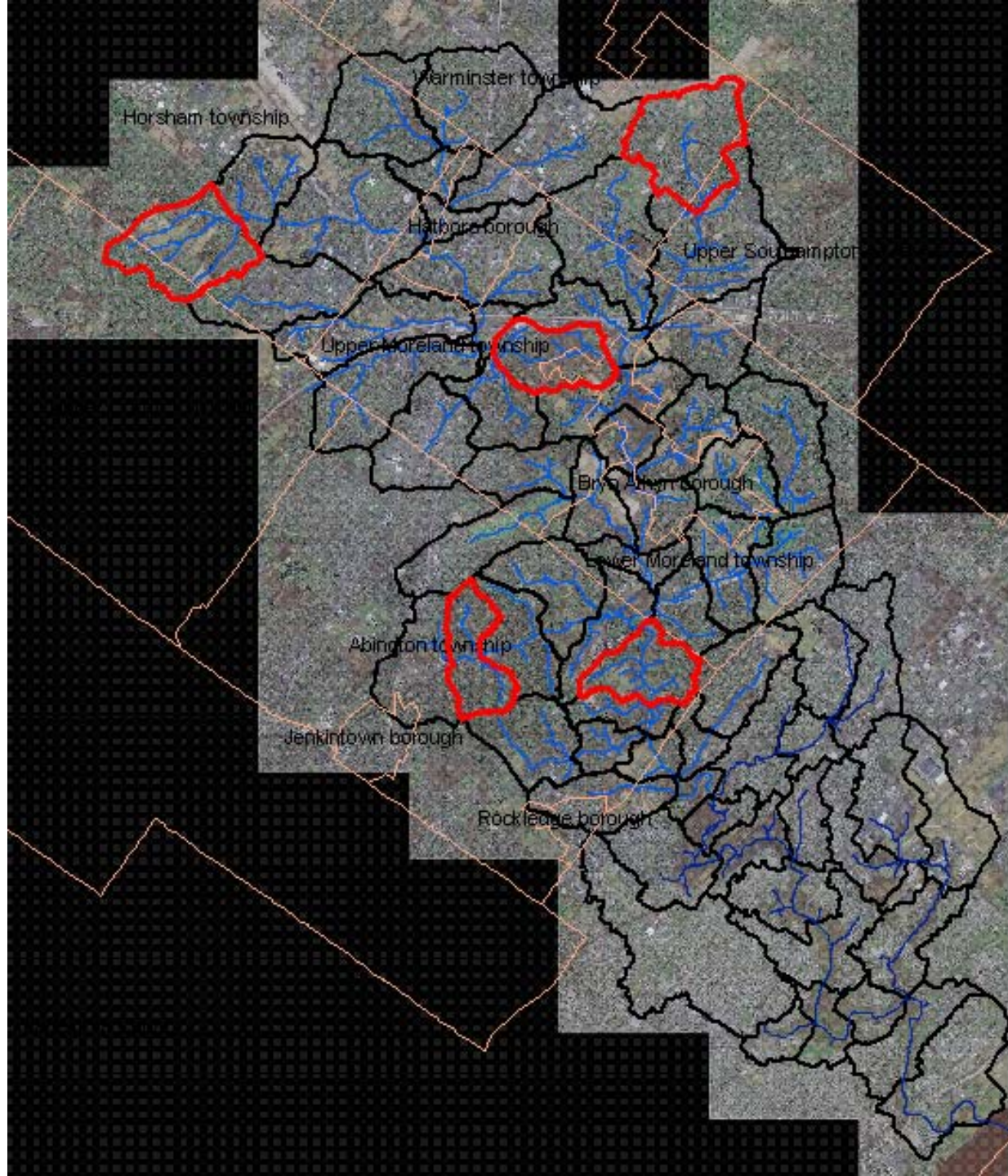
Change in Impervious Cover



◻ Subbasins with highest increase in peak outflow and volume for Trend.

Increases range from 7 % to 17 % for these subbasins.

For the Green scenario, peak flow and volume increases in all but one subbasin are less than 5 %.



Water Quality Impairment

Section 303 (d) – Clean Water Act

Four Designated Use Categories

- Aquatic Life
- Water Supply
- Fish Consumption
- Recreation

Summary of 303 (d) List Impairments In the Pennypack Watershed

Impairment	Total Miles
Agriculture	0.4
Industrial/Municipal Point Source	9.5
Residential Runoff	7.3
Urban Runoff	61.8

Reference: Table 2.12 and Figure 2.10 of the Comprehensive Characterization Report for the Pennypack Creek Watershed – Philadelphia Water Department, 2009

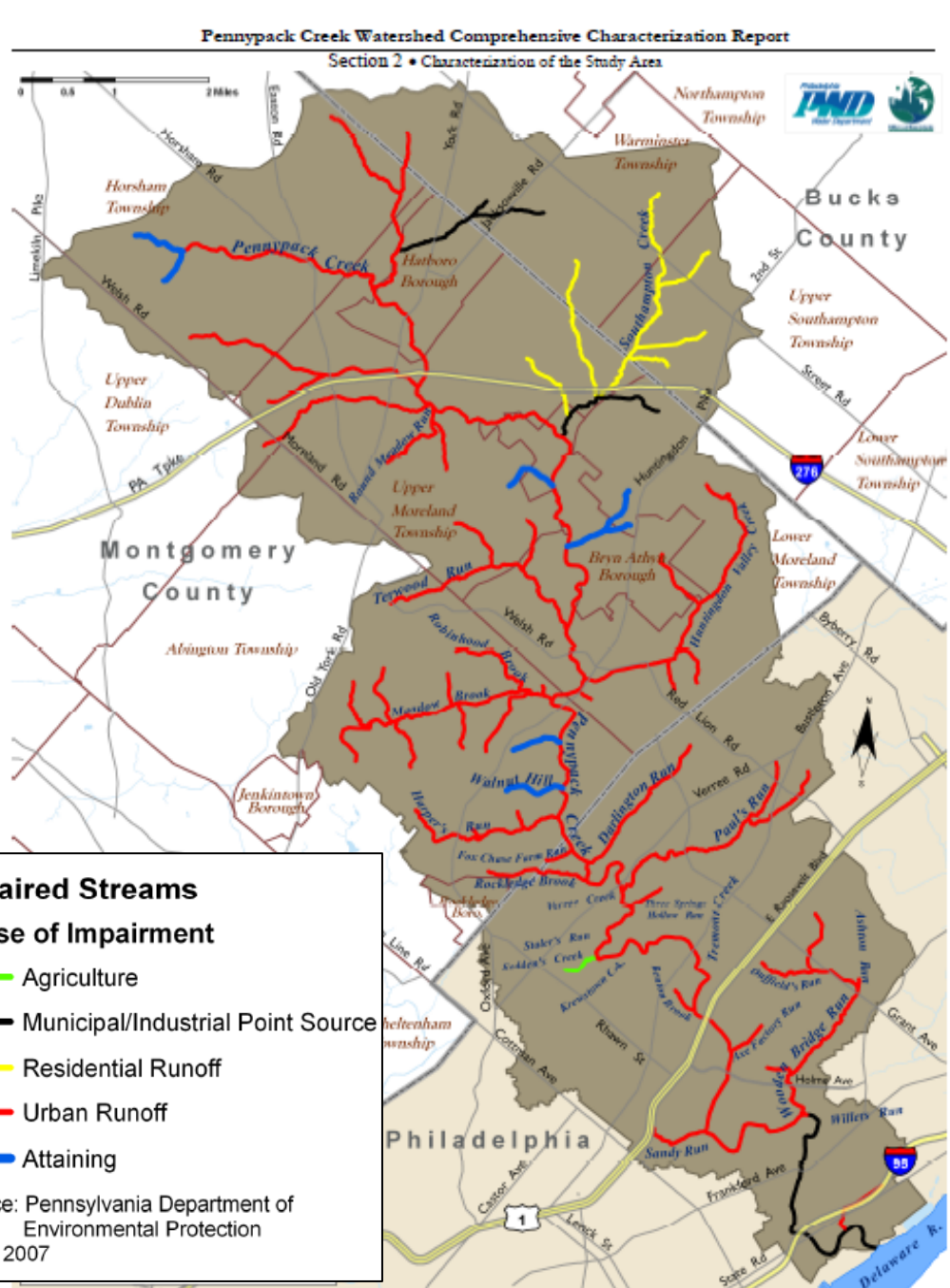
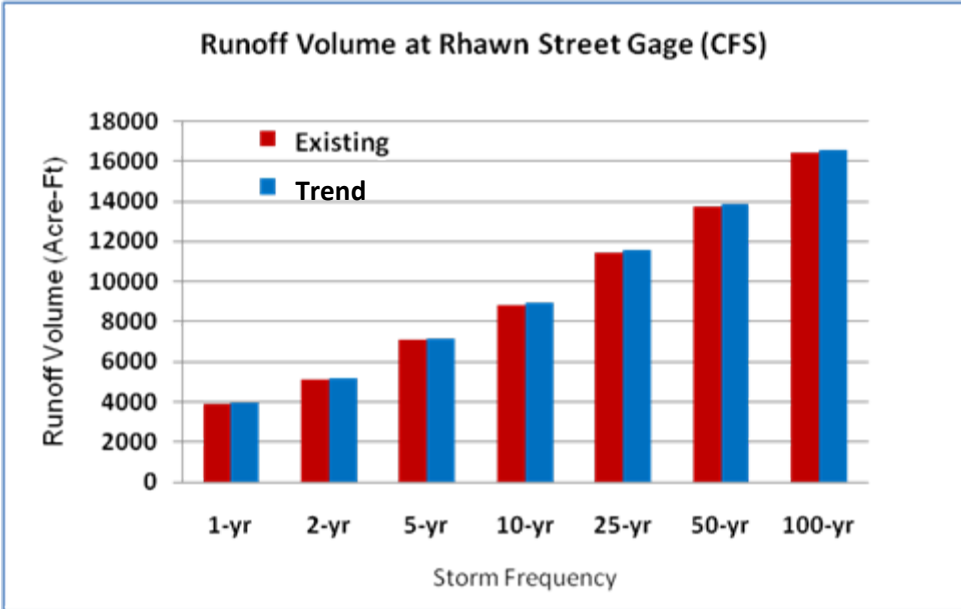
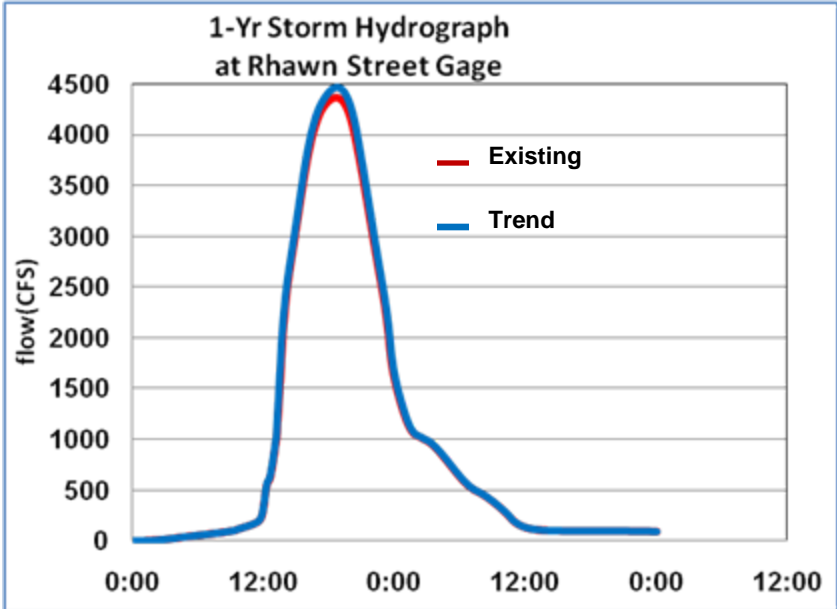
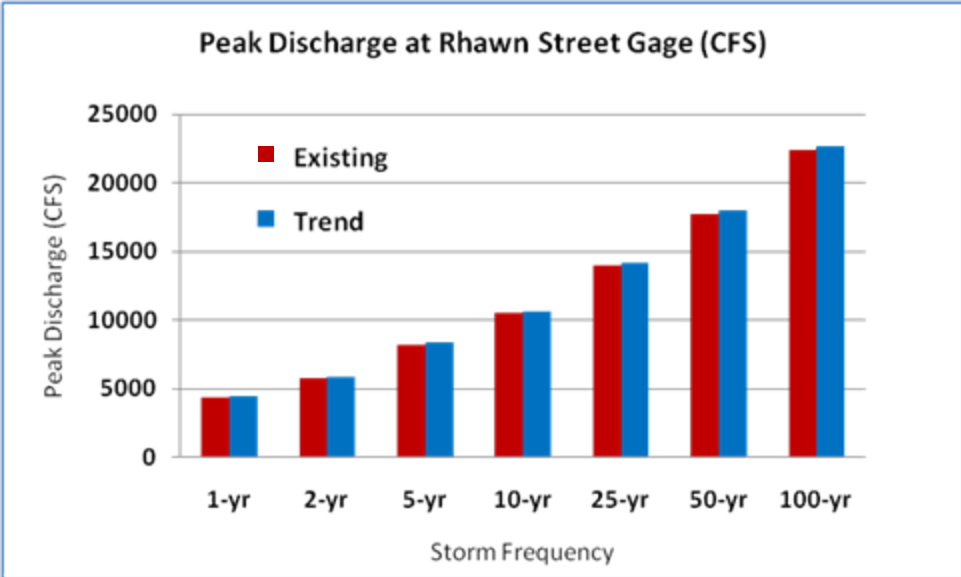


Figure 2.10 Pennypack Creek 303(d) List Stream Impairments

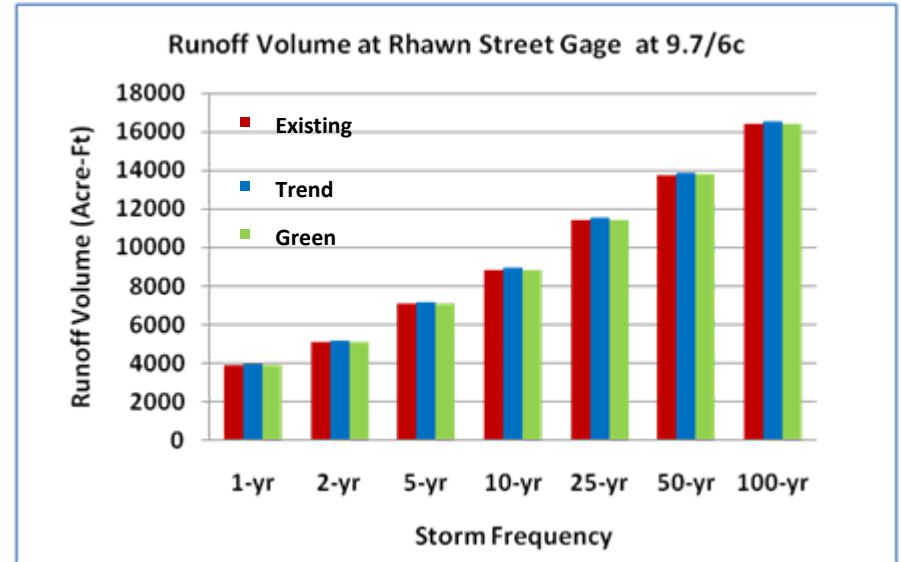
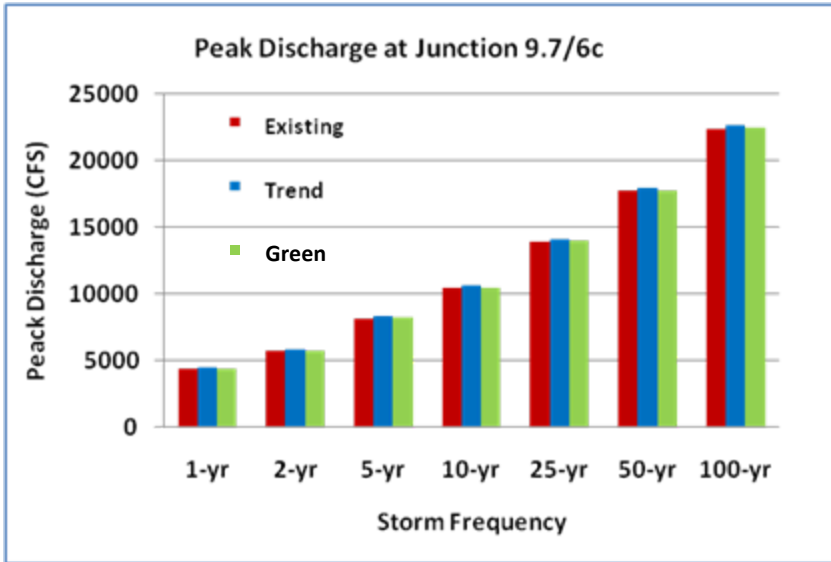
Existing vs. Trend thru 2035

- Location: Pennypack Creek at Rhawn Street
- Total Precipitation for 1-Yr Storm = 2.98 inches
- Trend projection for year 2035 assumes continuation of current trends without additional detention storage for new development.



Existing vs. Trend vs. "Green" Development Pattern thru 2035

- Suitability projection based on medium density residential and open space preservation.
- Location: Pennypack Creek at Rhawn Steet



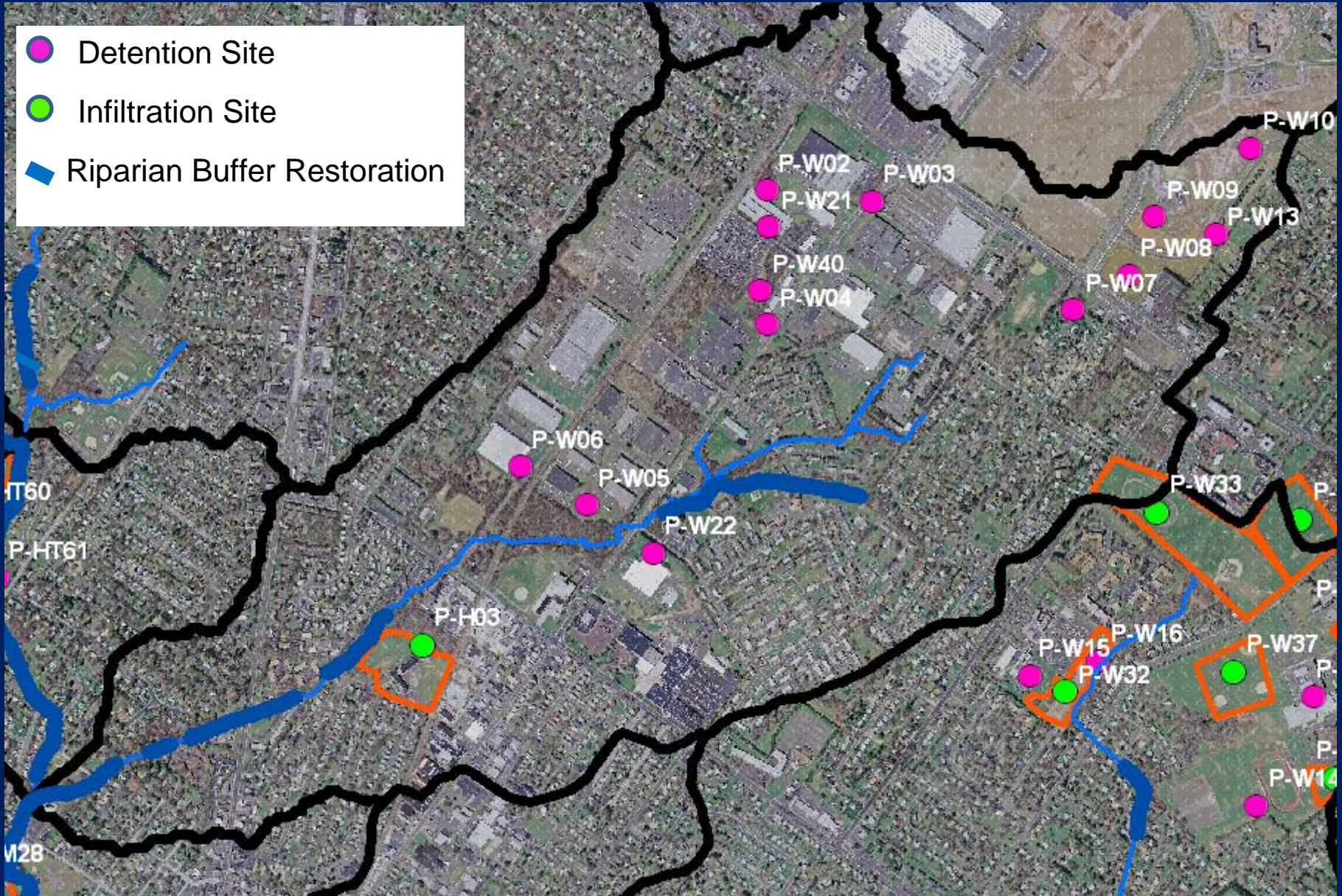
Junction 9.7/6C		Peak discharge (CFS)			
Storm	Existing condition	Trend	Green	% Difference Trend	% Difference Green
1-yr	4368.00	4461.50	4374.80	2.14	0.16
2-yr	5737.30	5862.20	5749.10	2.18	0.21
5-yr	8198.90	8344.20	8216.10	1.77	0.21
10-yr	10485.90	10628.40	10505.40	1.36	0.19
25-yr	13971.10	14143.10	13998.10	1.23	0.19
50-yr	17772.40	17981.50	17807.30	1.18	0.20
100-yr	22403.10	22650.90	22450.60	1.11	0.21

Junction 9.7/6C		Volume Acre-FT			
Storm	Existing Condition	Trend	Green	% Difference Trend	% Difference Green
1-yr	3908.80	3994.30	3915.70	2.19	0.18
2-yr	5107.20	5201.40	5116.50	1.84	0.18
5-yr	7072.90	7177.30	7085.80	1.48	0.18
10-yr	8818.60	8929.60	8834.00	1.26	0.17
25-yr	11427.50	11545.90	11446.20	1.04	0.16
50-yr	13768.00	13891.30	13788.60	0.90	0.15
100-yr	16399.40	16527.50	16422.90	0.78	0.14

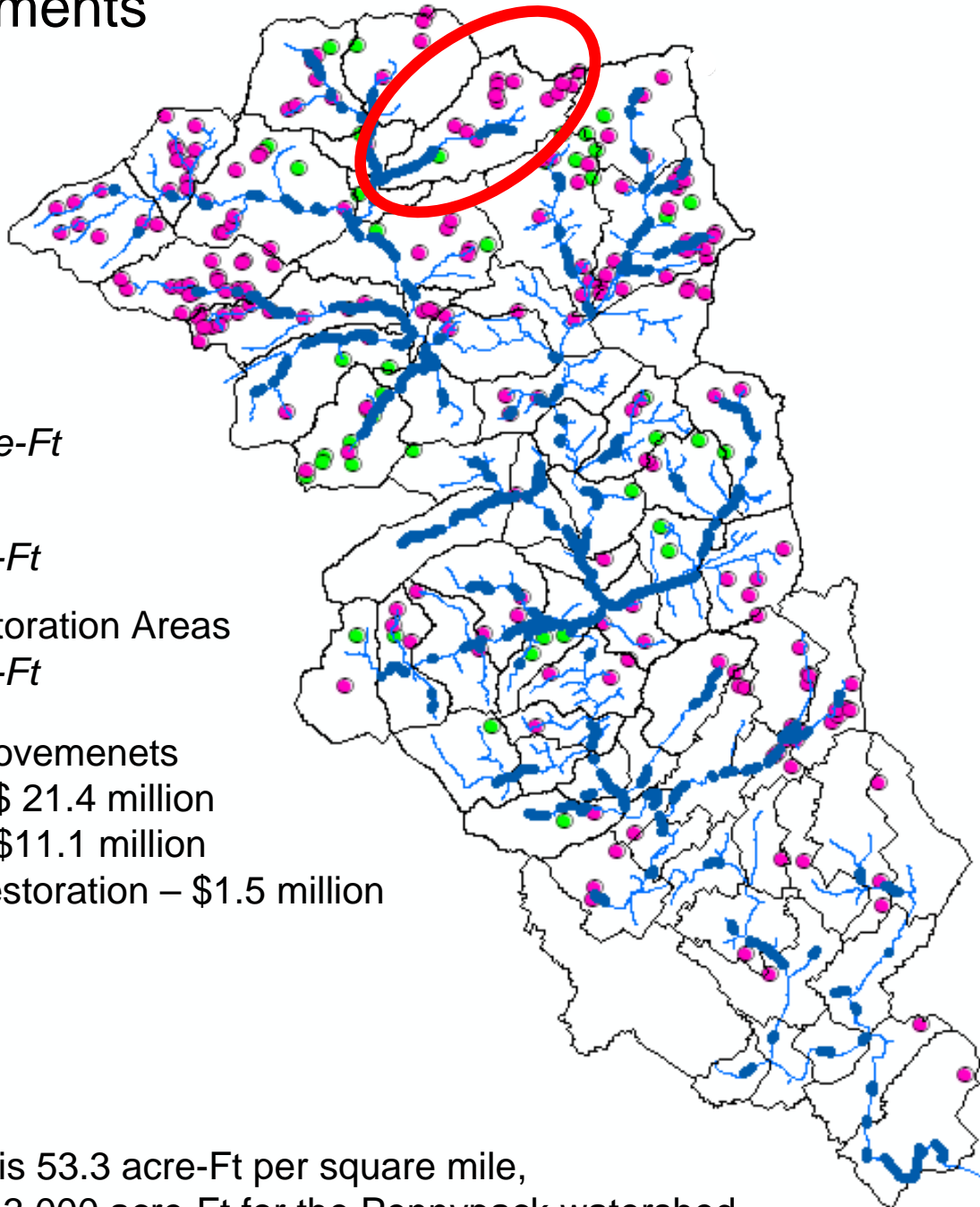
Potential Improvements

Potential Improvements

Tributary to Blair Mill Run – Warminster Township



Potential Improvements



- Detention Sites
Additional 300 Acre-Ft
- Infiltration Sites
Additional 56 Acre-Ft
- ▬ Riparian Buffer Restoration Areas
Additional 27 Acre-Ft

Estimated Cost of Improvements
Detention Sites – \$ 21.4 million
Infiltration Sites – \$11.1 million
Riparian Buffer Restoration – \$1.5 million

Note: 1 inch of storage is 53.3 acre-Ft per square mile,
or approximately 3,000 acre-Ft for the Pennypack watershed.

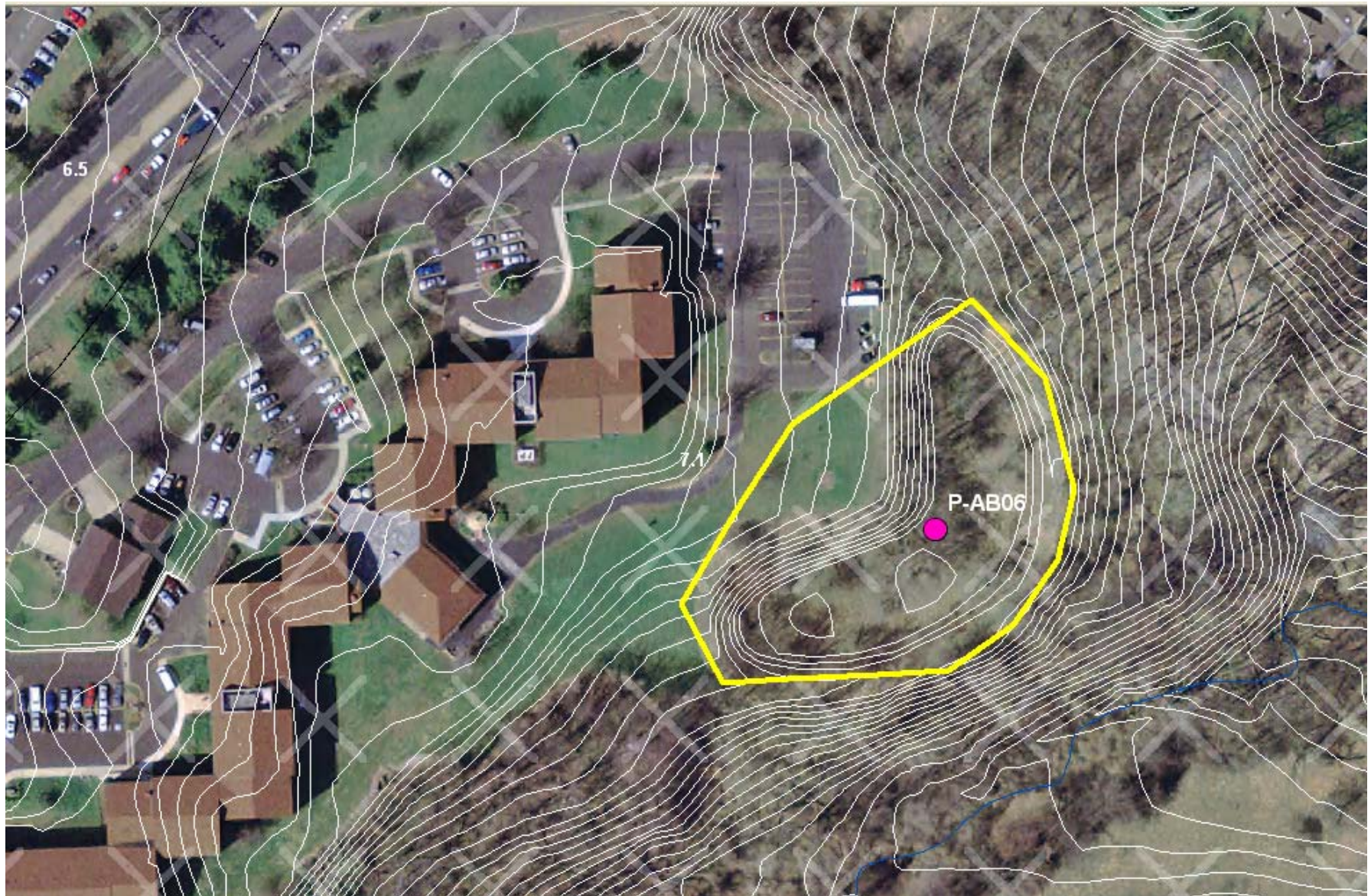
Detention Site Inventory

New_ID	ExistingBasinDepthFt	ExistingStorageVolume_AcreFt	PotentialAdditionalExtendedDetention_AcreFt	EstimatedCost
P-AB01	9.0	13.85	2.31	\$145,000
P-AB02	5.0	0.79	0.95	\$46,000
P-AB03	10.0	3.15	1.42	\$59,000
P-AB05	0.0	0.00	0.00	
P-AB06	7.0	2.80	1.80	\$108,000
P-AB07	6.0	1.10	0.55	\$29,000
P-AB08	2.0	0.41	0.00	
P-AB09	2.0	0.28	0.42	\$32,000
P-AB10	2.0	0.76	1.13	\$72,000
P-AB11	2.0	0.13	0.19	\$18,000
P-AB12	2.0	0.12	0.18	\$17,000
P-AB13	4.0	1.17	0.87	\$57,000
P-AB14	2.0	0.13	0.19	\$18,000
P-AB15	2.0	0.05	0.07	\$10,000
P-AB16	4.0	0.99	0.75	\$41,000
P-AB17	2.0	0.13	0.20	\$18,000
P-BA01	0.0	0.00	0.00	
P-BA02	2.0	0.20	1.26	\$131,000
P-BA03	2.0	0.14	0.20	\$20,000
P-H01	7.0	1.87	1.20	\$55,000

Site P-AB06: Holy Redeemer Village – Abington Township

Recommendation- Raise berm 1 ft. Lower floor 2 ft. Modify outlet and piping.

Estimated cost = \$108,000 Additional Volume = 1.80 Acre-Ft



Infiltration Site Inventory

New ID	Municipality	Infiltration Area (acres)	Infiltration Volume (Acre-Ft)	Estimated Construction Cost
P-AB04	Abington	6.80	0.57	\$109,000.00
P-AB18	Abington	85.00	7.08	\$1,312,000.00
P-AB19	Abington	10.00	0.83	\$158,000.00
P-AB20	Abington			
P-AB21	Abington	12.00	1.00	\$189,000.00
P-AB22	Abington	11.60	0.97	\$183,000.00
P-AB23	Abington	1.80	0.15	\$32,000.00
P-AB23A	Abington	8.60	0.72	\$137,000.00
P-AB24	Abington	8.70	0.73	\$138,000.00
P-AB25	Abington	17.00	1.42	\$266,000.00
P-BA04	Bryn Athyn	16.00	1.33	\$251,000.00
P-BA05	Bryn Athyn	47.60	3.97	\$736,000.00
P-BA06	Bryn Athyn	75.00	6.25	\$1,158,000.00
P-BA07	Bryn Athyn	21.20	1.77	\$331,000.00
P-H02	Hatboro Boro	3.40	0.28	\$57,000.00
P-H03	Hatboro Boro	8.40	0.70	\$134,000.00
P-HT59	Horsham	7.20	0.60	\$115,000.00
P-HT60	Horsham	8.40	0.70	\$134,000.00
P-HT62	Horsham	29.40	2.45	\$457,000.00

Site P-AB04: Penn State Abington Campus

Recommendation- Install infiltration trenches for roof and parking drainage. 1" infiltration

Estimated cost = \$109,000 Volume = 0.57 Acre-Ft



Riparian Buffer Restoration

Based on Survey by Heritage Conservancy

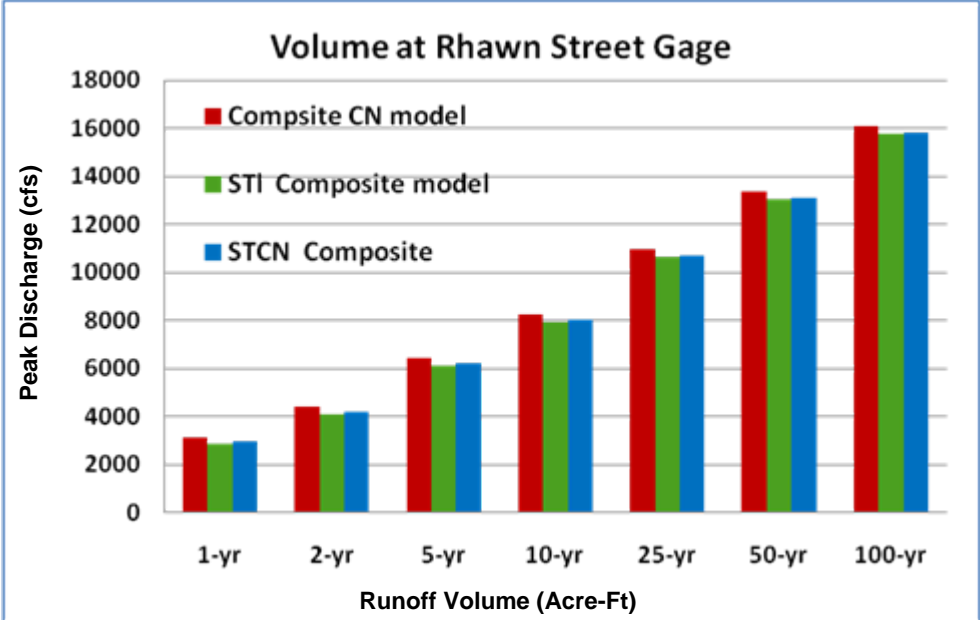
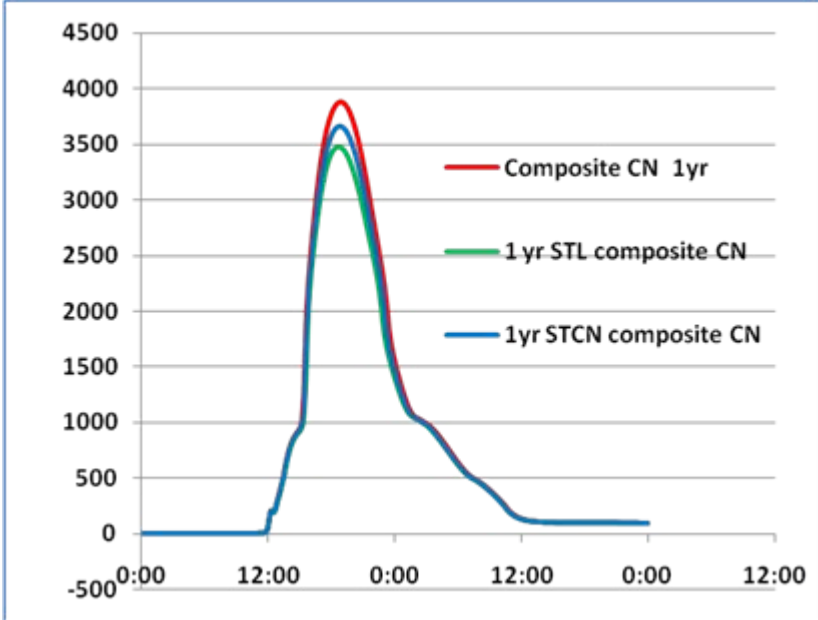
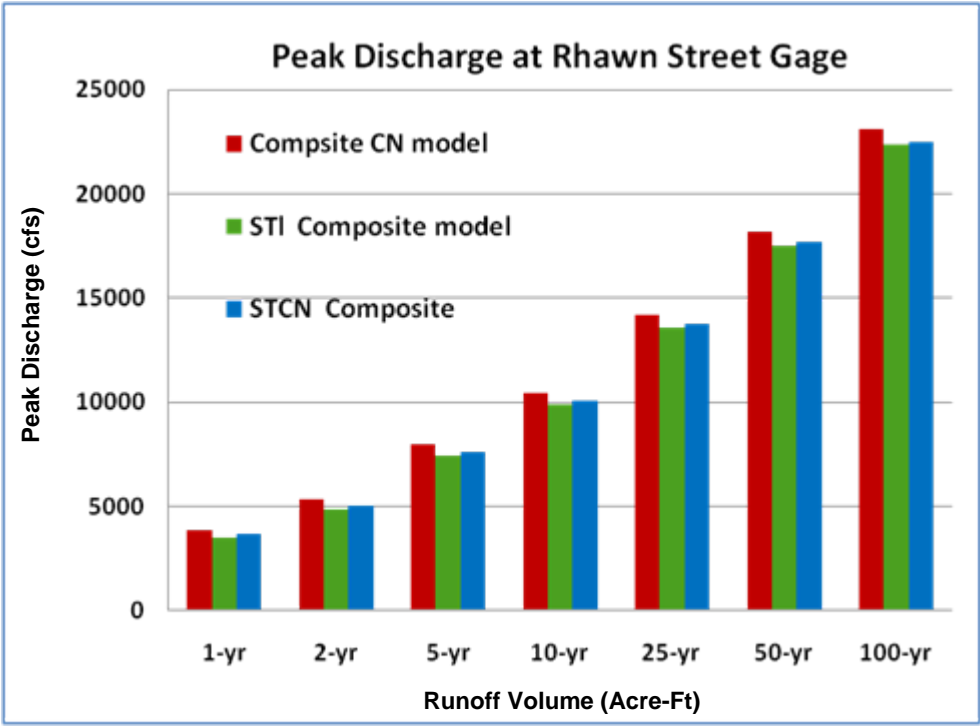
Location: Meadow Brook in Abington Township

Restoration for one side of stream. Width = 75 ft.



Impact of Potential Improvements

- Location: Pennypack Creek at Rhawn Street
- Total Precipitation for 1-Yr Storm = 2.98 inches
- To determine impact, two different methods were used to model potential storage:
 - 1) Initial Abstraction
 - 2) Potential Storage (Modified CN)



Effects of Improvements in Lower Watershed (Rhawn Street)

Junction 9.7/6C	% Difference Peak discharge	
Storm	Initial Abstraction Method	Additional Potential Storage Method
1-yr	-10.22	-5.44
2-yr	-9.29	-5.23
5-yr	-7.32	-4.43
10-yr	-5.59	-3.62
25-yr	-4.20	-3.05
50-yr	-3.78	-2.95
100-yr	-3.32	-2.79

Junction 9.7/6C	% Difference in Runoff Volume	
Storm	Initial Abstraction Method	Additional Potential Storage Method
1-yr	-8.86	-4.84
2-yr	-6.83	-4.06
5-yr	-4.98	-3.26
10-yr	-4.03	-2.82
25-yr	-3.14	-2.36
50-yr	-2.62	-2.07
100-yr	-2.21	-1.82

Effects of Improvements in Upper Watershed (Upper Moreland/Bryn Athyn)

Junction 3.2/2c	% Difference Peak discharge	
Storm	Initial Abstraction Method	Additional Potential Storage Method
1-yr	-16.58	-7.87
2-yr	-12.22	-6.72
5-yr	-9.42	-5.74
10-yr	-7.23	-4.88
25-yr	-4.89	-3.82
50-yr	-3.86	-3.32
100-yr	-3.55	-3.42

Junction 3.2/2c	% Difference in Runoff Volume	
Storm	Initial Abstraction Method	Additional Potential Storage Method
1-yr	-13.58	-6.93
2-yr	-10.60	-5.90
5-yr	-7.85	-4.84
10-yr	-6.39	-4.22
25-yr	-5.02	-3.57
50-yr	-4.21	-3.15
100-yr	-3.58	-2.80

Release Rates for Peak Rate Control

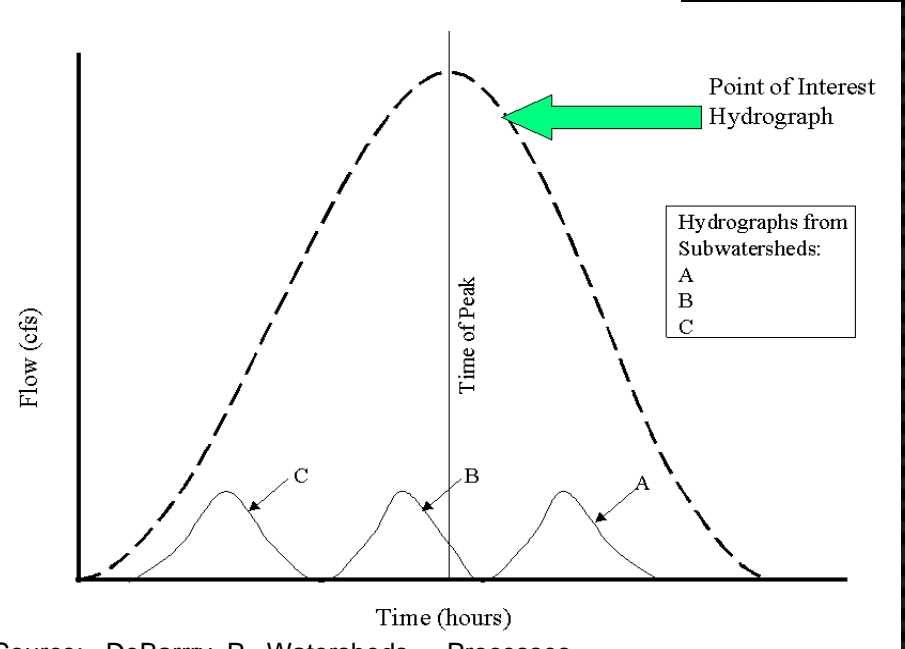
The release rate for a given subarea and a particular point of interest in the watershed is the ratio of the flow that contributes to the peak flow at the point of interest, divided by the peak flow for the subarea.

It is used for managing peak flows from new detention facilities to prevent delayed flows from increasing downstream peak flows.

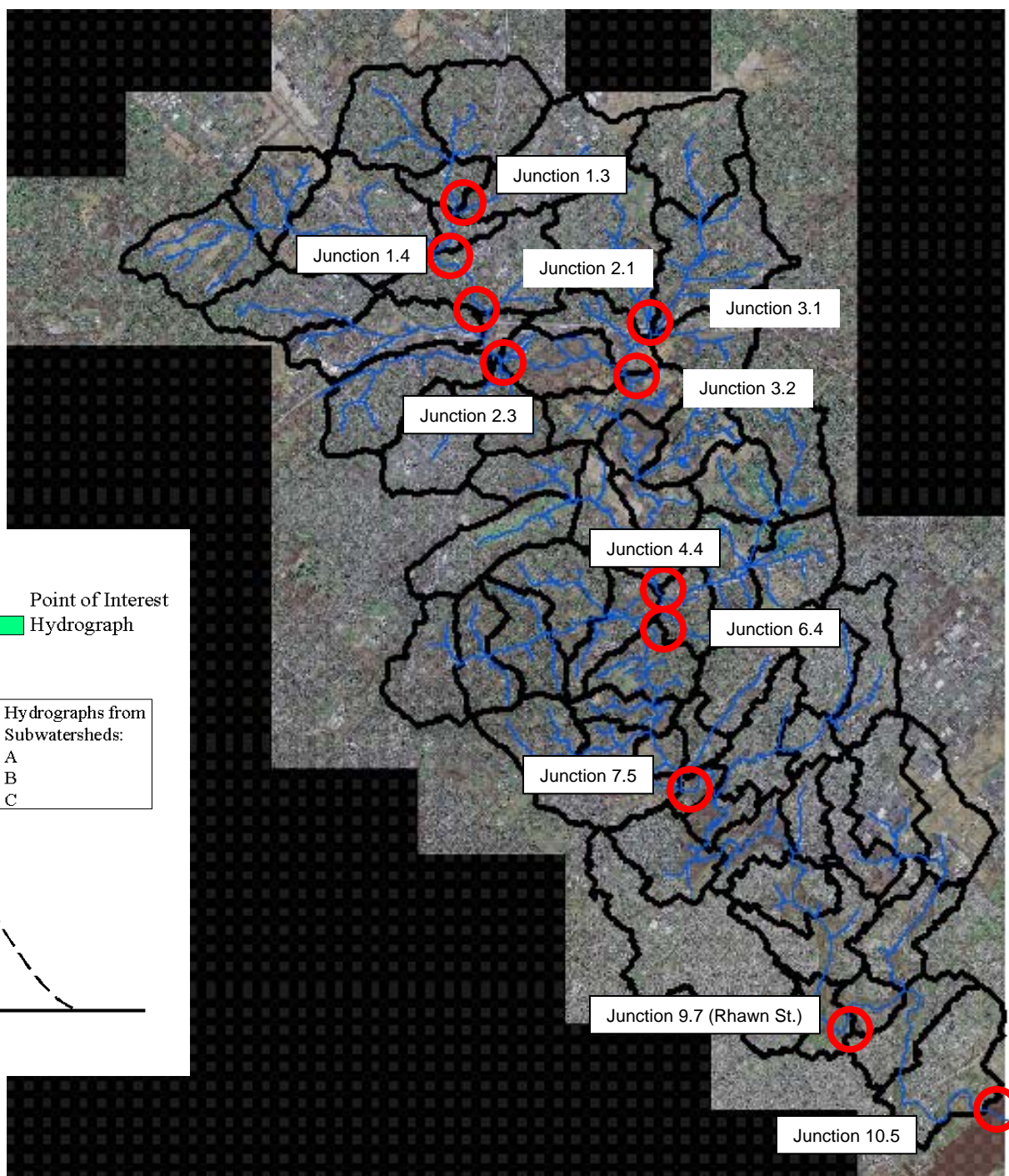
Determination of Release Rates for New and Expanded Development

The model was used to determine the contributions to flood flows from different portions of the watershed.

This shows where rate controls should be applied to prevent detention at new development sites from increasing flood flows



Source: DeBarry, P., Watersheds - Processes, Assessment, and Management, Wiley, 2004, Figure 18.4



Pennypack Watershed

Proposed Stormwater Management Districts

District A

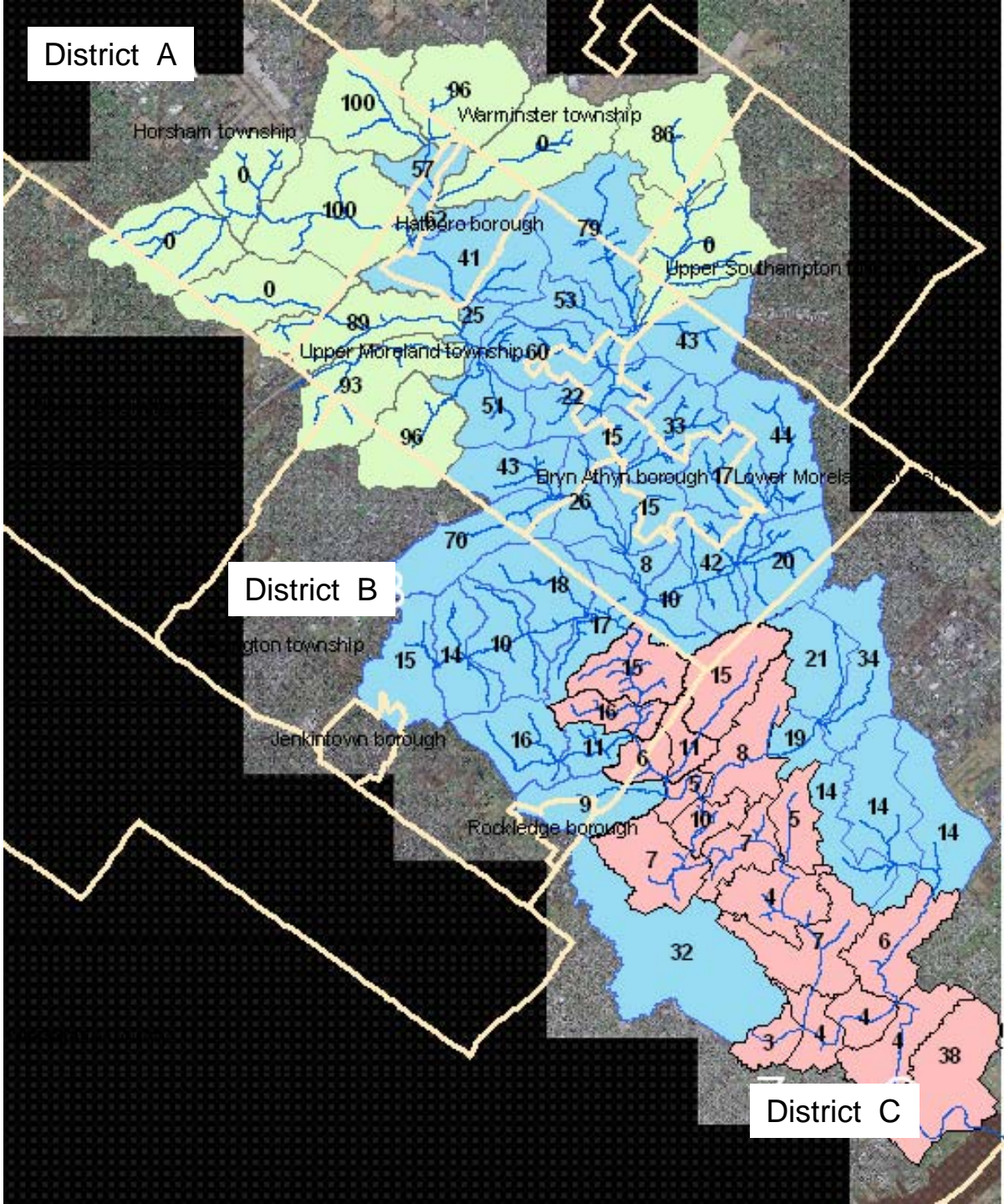
Design Storm Proposed Conditions Conditions		Design Storm Existing
100-Yr	Reduce to	100-Yr
50-Yr		50-Yr
25-Yr		25-Yr
10-Yr		10-Yr
5-Yr		5-Yr
2-Yr		1-Yr

District B

Design Storm Proposed Conditions Conditions		Design Storm Existing
100-Yr	Reduce to	100-Yr
50-Yr		25-Yr
25-Yr		10-Yr
10-Yr		5-Yr
5-Yr		2-Yr
2-Yr		1-Yr

District C*

Conditional Direct Discharge District



CONDITIONAL DIRECT DISCHARGE DISTRICT

* **In District C, development sites that can** discharge directly to the Pennypack Creek main channel, major tributaries, or indirectly to the main channel through an existing storm-water drainage system (i.e., storm sewer or tributary) may do so without control of proposed conditions peak rate of runoff greater than the 5-year storm. Sites in District C will still have to comply with the groundwater recharge criteria, water quality criteria, and streambank erosion criteria. If the proposed conditions runoff is intended to be conveyed by an existing stormwater drainage system to the main channel, proof must be provided that such a system has adequate capacity to convey the flows greater than the 2-year existing condition's peak flow, or that it will be provided with improvements to furnish the required capacity. When adequate capacity in the downstream system does not exist and will not be provided through improvements, the proposed condition's peak rate of runoff must be controlled to the existing condition's peak rate as required in District **B** provisions (i.e., 10-year proposed conditions flows to the 10-year existing conditions flows) for the specified design storms.

Sample Model Act 167
Stormwater
Management
Ordinance
(Pennypack Creek)

Standards and Criteria

Ordinance Provisions:

<u>Article:</u>	<u>Description:</u>
I.	General Provisions
II.	Definitions
III.	SW Mgmt Site Plan Reqs.
IV.	Stormwater Management
V.	Inspections
VI.	Fees And Expenses
VII.	Maintenance Responsibilities
VIII.	Prohibitions
IX.	Enforcement & Penalties

ARTICLE II - Definitions:

Existing Conditions - The dominant land cover during the 5-year period immediately preceding a proposed Regulated Activity. If the initial condition of the site is undeveloped land, the land use shall be considered as "meadow" unless the natural land cover is proven to generate a lower curve number or Rational "c" value, such as forested lands.

Predevelopment - Undeveloped/Natural Condition.

ARTICLE II - Definitions:

Directly Connected Impervious Area (DCIA) - An impervious or impermeable surface which is directly connected to a stormwater drainage or conveyance system, leading to direct runoff, decreased infiltration, decreased filtration, and decreased time of concentration.

Disconnected Impervious Area (DIA) - An impervious or impermeable surface which is disconnected from any stormwater drainage or conveyance system and is redirected or directed to a pervious area which allows for infiltration, filtration, and increased time of concentration.

ARTICLE II - Definitions:

Reconstruction - Demolition of, and subsequent rebuilding of impervious surface.

Redevelopment - Any development that requires demolition or removal of existing structures or impervious surfaces at a site and replacement with new impervious surfaces. Maintenance activities such as top-layer grinding and re-paving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment.

Repaving - Replacement of the impervious surface which does not involve reconstruction of an existing paved (impervious) surface.

Replacement Paving - Reconstruction of and full replacement of an existing paved (impervious) surface

ARTICLE I Section 105 - Applicability:

All Regulated Activities and all activities that may affect stormwater runoff, including Land Development and Earth Disturbance Activity, are subject to regulation by this Ordinance.

Regulated Activities - Any Earth Disturbances Activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff.

Regulated Earth Disturbance Activity - Defined under NPDES Phase II regulations as earth disturbance activity of one (1) acre or more with a point source discharge to surface waters or the Municipality's storm sewer system or five (5) acres or more regardless with or without a point source discharge. This includes earth disturbance on any portion of, part, or during any stage of a larger common plan of development. Activity involving earth disturbance subject to regulation under 25 PA Code 92, 25 PA Code 102, or the Clean Streams Law.

ARTICLE I Section 105 - Applicability:

In addition, all applicable development in Philadelphia County must comply with:

The latest version of "Stormwater Management Guidance Manual" (currently Version 2.0), prepared by the Philadelphia Water Department Office of Watersheds. This manual is available online at:

<http://www.phillyriverinfo.org/PWDDDevelopmentReview/RequirementsLibrary.aspx?>

TABLE 105.1 - ORDINANCE APPLICABILITY FOR THE PHILADELPHIA COUNTY PORTION OF THE WATERSHED

Ordinance Article or Section	Type of Project	Earth Disturbance Associated with Development		
		0-15,000 sq. ft.	15,000 sq. ft.-1 acre	> 1 acre
<u>Article III</u> Drainage Plan Requirements	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Yes	Yes
<u>Section 403</u> Groundwater Recharge Requirements	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Yes	Yes
<u>Section 404</u> Water Quality Requirements	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Yes	Yes
<u>Section 405</u> Channel Protection / Streambank Erosion Requirements	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Exempt	Yes (Alternate Criteria)
<u>Section 406</u> Flood Control / Rate Control and Management Districts Requirements	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Yes (Alternate Criteria)	Yes (Alternate Criteria)

Yes (Alternate Criteria) – Redevelopment disturbing more than one acre which reduces the DCIA from predevelopment conditions by at least 20% is exempt from the Channel Protection Requirements of this Ordinance, and redevelopment greater than or equal to 15,000 square feet which reduces the DCIA from predevelopment conditions by at least 20% are exempt from the Flood Control Requirements of this Ordinance (See Section 106, Philadelphia County Portion of the Watershed, for further details).

N/A – Not Applicable, development project is not subject to requirements of indicated Regulations section. Voluntary controls are encouraged.

Exempt – Development project is not subject to requirements of indicated Regulations section.

** – If the proposed development results in stormwater discharge that exceeds stormwater system capacity, increases the FEMA regulated water surface elevation, causes a combined sewer overflow, or degrades receiving waters, the design specifications presented in these Regulations may be applied to proposed development activities as warranted to protect public health, safety, or property.

Section 106. Exemptions

Note: Philadelphia County and Bucks and Montgomery Counties may follow different Exemption Criteria.

Montgomery County Portions of the Watershed:

- Disconnected Regulated Activities <250 sq. ft. exempt from peak rate control and drainage plan preparation
- Disconnected Regulated Activities => 250 sq. ft. and < 1,000 sq. ft. exempt from the peak rate control
- Agricultural plowing and tilling exempt from rate control and drainage plan preparation.
- Forest management and timber operations exempt from rate control and Drainage plan preparation

Section 106. Exemptions

Note: Philadelphia County and Montgomery County will follow different Exemption Criteria.

Philadelphia County Portion of the Watershed:

- Development, including new development and redevelopment, with Earth Disturbance < fifteen thousand (15,000) square feet is exempt from certain requirements as outlined in Table 105.1. However, applicants must still meet Erosion and Sediment (E&S) Control requirements and coastal water quality requirements from other programs if applicable as described in Table 105.1.
- Redevelopment that results in an area of Earth Disturbance greater than or equal to fifteen thousand (15,000) sq. ft., but less than one (1) acre, is exempt from the Channel Protection/Streambank Erosion (Section 405) Requirements of this Ordinance.

Section 106. Exemptions

Note: Philadelphia County and Bucks and Montgomery County will follow different Exemption Criteria.

- Redevelopment that results in an area of Earth Disturbance greater than or equal to one (1) acre and reduces the predevelopment DCIA (Directly Connected Impervious Areas) on the site by at least 20% is exempt from the Channel Protection/Streambank Erosion and Flood Control/Peak Rate Control Requirements of this Ordinance.
- New BMP's and retrofits that do not increase runoff volume or peak rates are exempt from the Peak Rate Control requirements of this ordinance.

Article: III. Stormwater Management Site Plan Requirements

- Typical plan requirements

- **Statement** - "I, (Design Engineer), on this date (date of signature), hereby certify that the drainage (stormwater management site) plan meets all requirements of the Department of Environmental Protection's (DEP's) regulations and this Ordinance."

Article IV.

Stormwater Management

- Section 401 - General Requirements
- Section 402 - Permit Requirements for Other Government Entities
- Section 403 - Ground Water Recharge
- Section 404 - Water Quality Requirements
- Section 405. Stream Bank Erosion Requirements (Channel Protection)
- Section 406 - Stormwater Peak Rate Control and Management Districts
- Section 407 - Calculation Methodologies
- Section 408 - Other

Article V. Inspections

Section 501. Inspections

A. The Municipality or his Municipal designee shall inspect all phases of the installation of the Best Management Practices (BMPs) and/or stormwater management facilities as deemed appropriate by the Municipality.

ARTICLE VI-FEES AND EXPENSES

Section 601. Municipality Stormwater Management (SWM) Site Plan Review and Inspection Fee

Section 602. Expenses Covered by Fees

- Administrative costs.
- The review of the drainage plan (stormwater management site plan) by the Municipality.
- The site inspections.
- The inspection of SWM facilities and drainage improvements during construction.
- The final inspection
- Any additional work required to enforce any permit provisions

ARTICLE VII-MAINTENANCE RESPONSIBILITIES

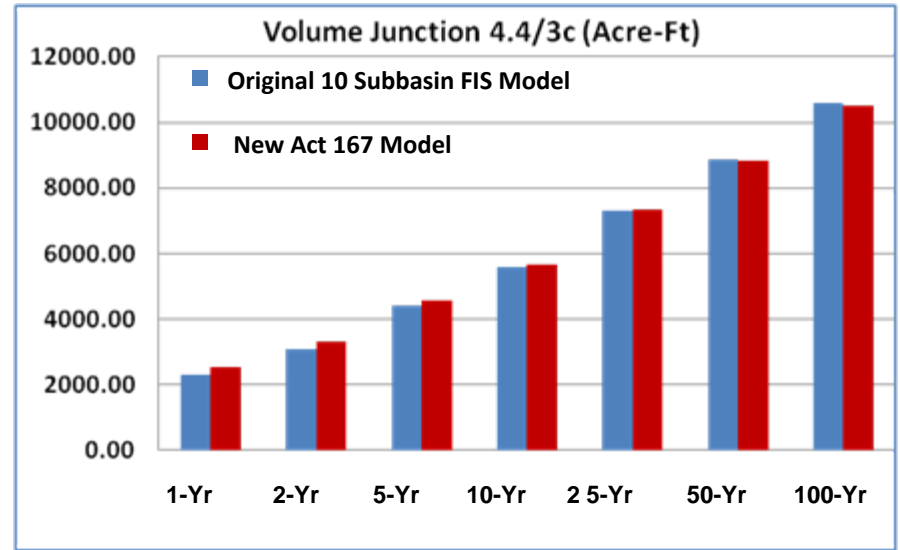
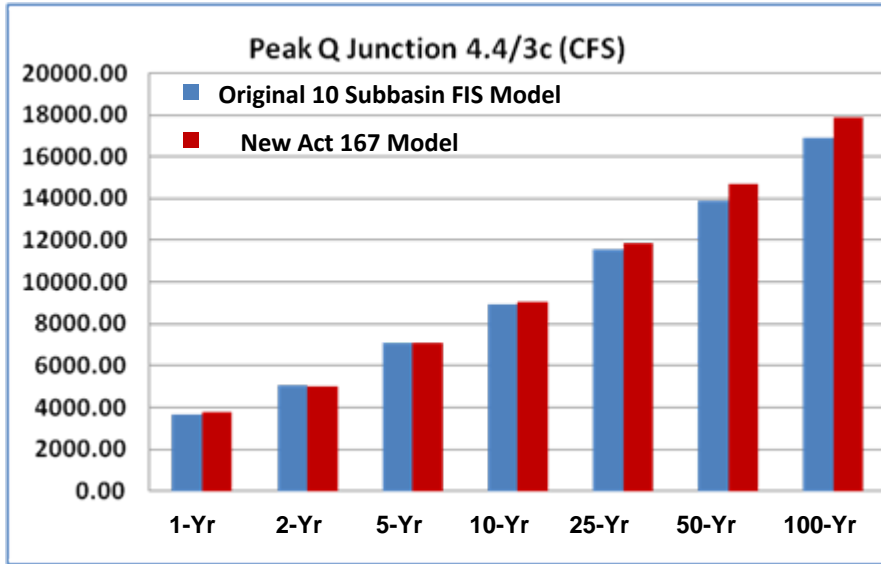
ARTICLE VIII- PROHIBITIONS

Section 801. Prohibited Discharges

- Discharges from fire fighting activities	- Flows from riparian habitats and wetlands
- Potable water sources including water line flushing	- Uncontaminated water from foundations or from footing drains
- Irrigation drainage	- Lawn watering
- Air conditioning condensate	- Dechlorinated swimming pool discharges
- Springs	- Uncontaminated groundwater
- Water from crawl space pumps	- Water from individual residential car washing
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used	- Routine external building wash down (which does not use detergents or other compounds)

ARTICLE IX - ENFORCEMENT AND PENALTIES

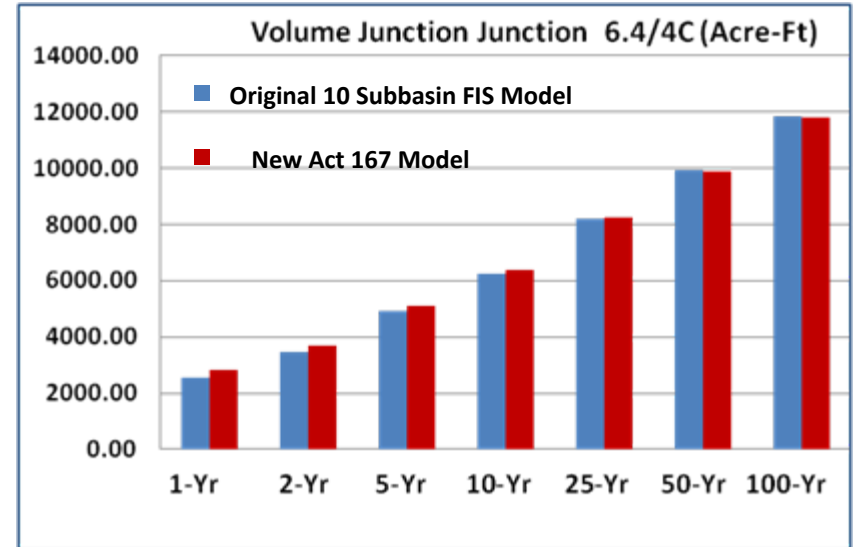
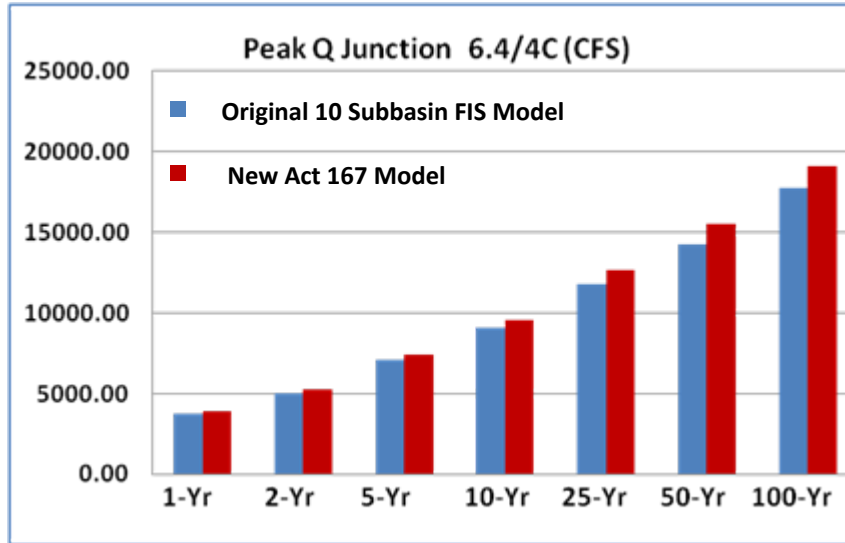
Comparison at Junction 4.4



Storm	Junction 3C/4.4 Peak Discharge (CFS)		
	Original Model	New Model	% Difference
1-YR	3680.60	3797.40	3.17
2-Yr	5044.00	5024.90	-0.38
5-Yr	7095.10	7113.50	0.26
10-Yr	8941.40	9045.00	1.16
25-Yr	11558.30	11876.80	2.76
50-Yr	13918.50	14678.50	5.46
100-Yr	16883.70	17909.00	6.07

Storm	Junction 3C/4.4 Volume (Acre-Ft)		
	Original Model	New Model	% Difference
1-yr	2295.30	2535.00	10.44
2-Yr	3103.20	3306.30	6.54
5-Yr	4422.60	4564.10	3.20
10-Yr	5586.30	5677.60	1.63
25-Yr	7314.90	7340.20	0.35
50-Yr	8856.20	8828.20	-0.32
100-Yr	10579.60	10500.80	-0.74

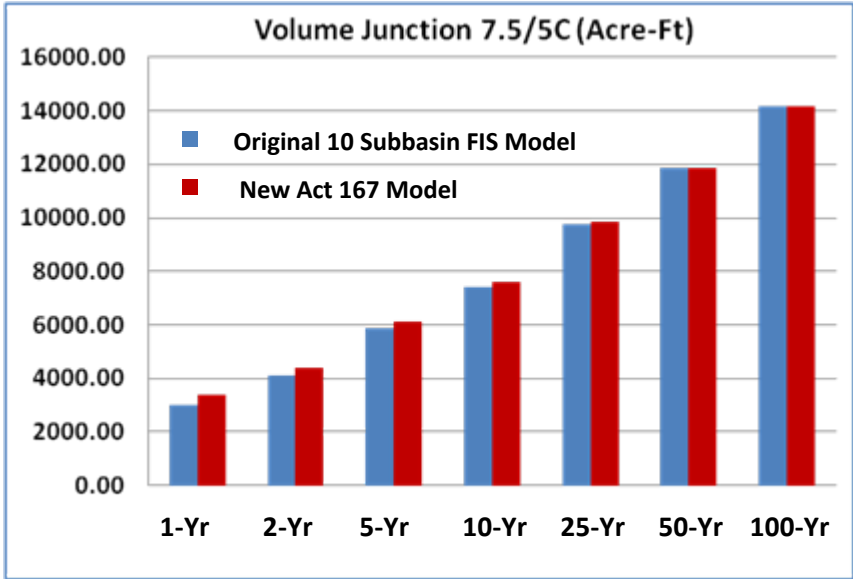
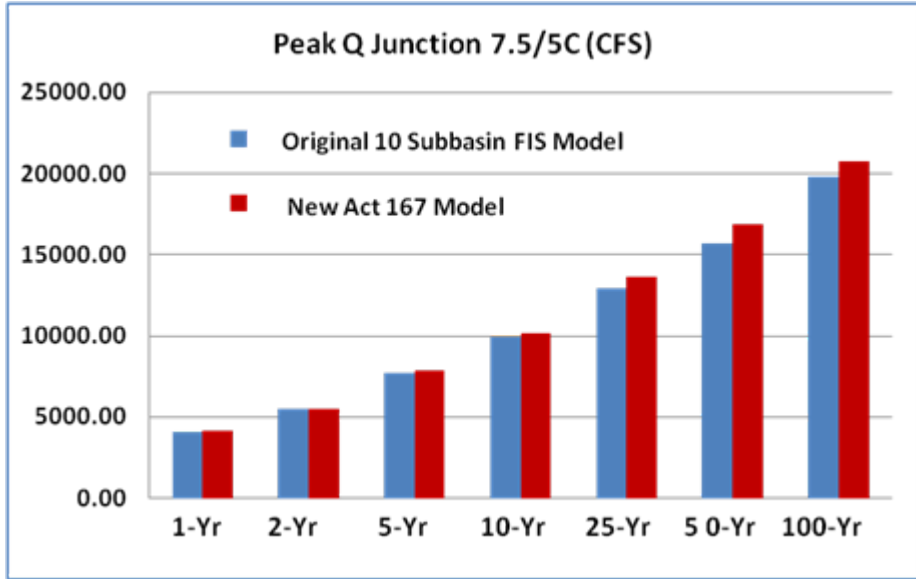
Comparison at Junction 6.4



Storm	Junction 4C/6.4		% Difference
	Original Model	Peak Discharge (CFS) New Model	
1-Yr	3746.50	3930.70	4.92
2-Yr	5026.60	5244.00	4.32
5-Yr	7075.70	7439.60	5.14
10-Yr	9057.30	9536.40	5.29
25-Yr	11798.20	12634.30	7.09
50-Yr	14284.60	15562.10	8.94
100-Yr	17730.20	19137.80	7.94

Storm	Junction 4C/6.4		% Difference
	Original Model	Volume (Acre-Ft) New Model	
1-Yr	2552.80	2830.00	10.86
2-Yr	3458.90	3696.60	6.87
5-Yr	4939.90	5110.10	3.45
10-Yr	6247.00	6365.20	1.89
25-Yr	8189.80	8233.50	0.53
50-Yr	9922.40	9911.20	-0.11
100-Yr	11860.30	11794.70	-0.55

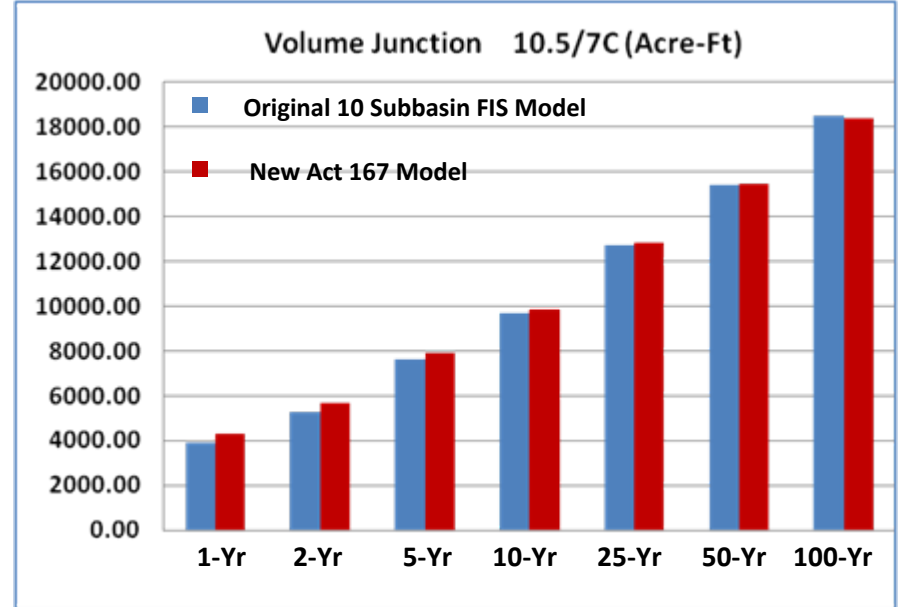
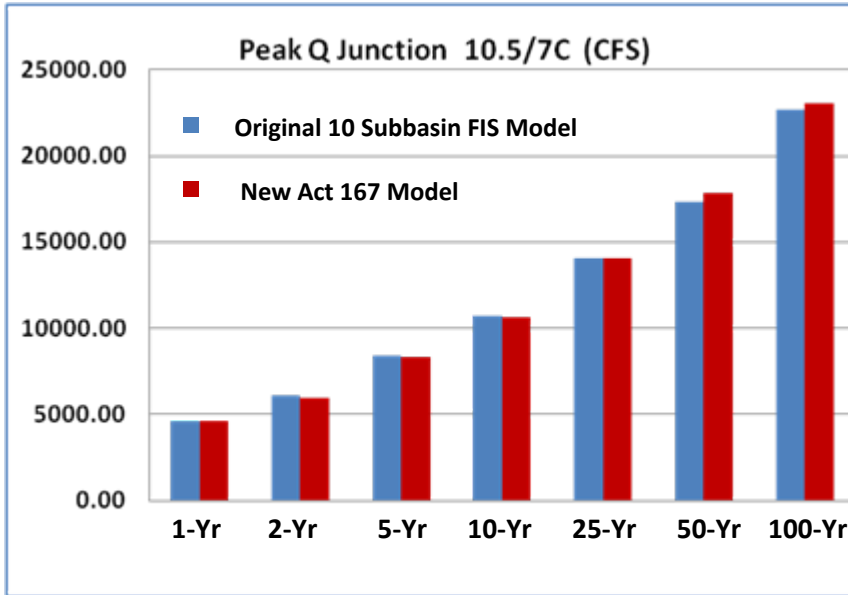
Comparison at Junction 7.5



Storm	Junction 7.5/5C		% Difference
	Original Model	Peak Discharge (CFS) New Model	
1-Yr	4082.40	4170.90	2.17
2-Yr	5468.30	5539.10	1.29
5-Yr	7694.00	7907.80	2.78
10-Yr	9900.60	10155.90	2.58
25-Yr	12951.40	13643.90	5.35
50-Yr	15693.80	16861.80	7.44
100-Yr	19807.00	20714.80	4.58

Storm	Junction 7.5/5C		% Difference
	Original Model	Volume (Acre-Ft) New Model	
1-Yr	3013.70	3367.30	10.50
2-Yr	4095.40	4404.80	7.02
5-Yr	5868.30	6101.40	3.82
10-Yr	7434.60	7610.60	2.31
25-Yr	9770.50	9861.70	0.92
50-Yr	11852.10	11884.70	0.27
100-Yr	14184.80	14159.80	-0.18

Comparison at Junction 10.5



Storm	Junction 10.5/7C		% Difference
	Original Model	New Model	
1-Yr	4630.90	4585.50	-0.98
2-Yr	6089.80	5952.70	-2.25
5-Yr	8429.80	8333.00	-1.15
10-Yr	10736.10	10619.90	-1.08
25-Yr	14032.70	14073.20	0.29
50-Yr	17350.60	17859.90	2.94
100-Yr	22672.70	23066.70	1.74

Storm	Junction 10.5/7C		% Difference
	Original Model	New Model	
1-Yr	3883.20	4324.40	11.36
2-Yr	5299.20	5684.40	7.27
5-Yr	7617.90	7904.00	3.76
10-Yr	9664.60	9874.20	2.17
25-Yr	12718.20	12811.60	0.73
50-Yr	15437.50	15447.70	0.07
100-Yr	18485.90	18411.00	-0.41