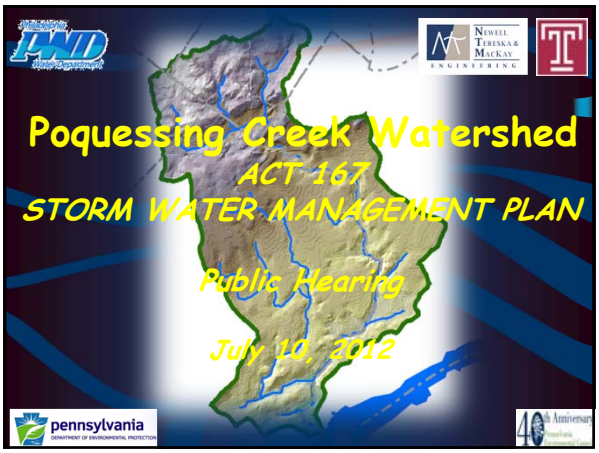


AGENDA – Public Hearing for:

Poquessing Creek Watershed Act 167

Stormwater Management Plan

July 10, 2012

Holy Family University Campus Center Building Room 115

9801 Frankford Avenue

Phila, PA 19114

I. Introductions
II. Background for the Poquessing Creek Watershed
III. Act 167 Overview
IV. Poquessing Creek Plan Scope of Work
V. Obstructions
VI. Problem Areas
VII. Detention Basins
VIII. Model Stormwater Ordinance
IX. Access to the Report and Ordinance
X. Q&A

I. Welcome & Introductions

WPAC History

(Paul Racette, PEC)

Primary WPAC Members:

Bucks County:
- Bensalem Township
- Lower Southampton Township
- Upper Southampton Township

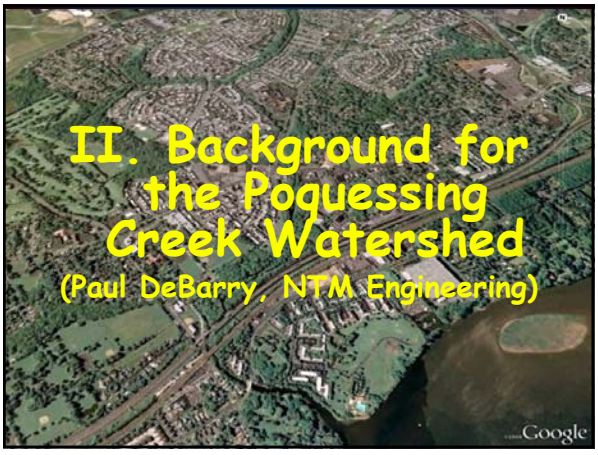
Montgomery County:
- Lower Moreland Township

Philadelphia County:
- City of Philadelphia

Friends of the Poquessing
Conservation Districts
Benjamin Rush State Park
Northeast Trail
Others

WPAC Meetings:

Meeting	Date	Purpose
1	2/5/2010	Introduction to Stormwater Management; Reviewed Act 167; Distributed data collection forms; NPDES coordination, coordination with other study initiatives; Watershed characteristics.
2	9/28/2010	Watershed characteristics, reviewed coordination with other study initiatives; discussed data collection forms - progress report; reviewed GIS mapping efforts; reviewed infill / redevelopment issues and BMPs; reviewed Fluvial Geomorphology study; sample Act 167 Plan.
3	3/3/2011	Reviewed Goals and Act 167 NPDES Ordinance; discussed status of project and mapping; reviewed municipal data collection efforts and status; discussed modeling variables; discussed timeline and milestones.
4	12/8/2011	Update on status of problem area analysis; discussed current modeling efforts; reviewed SW ordinance; reviewed other related efforts within the watershed; reviewed timeline for work completion.
5	5/21/2012	Present FINAL DRAFT Plan to municipalities, discuss exemption criteria, establish timeline for review and adoption



Related Documents/ Studies:

- Poquessing Creek
- Watershed Rivers Conservation Plan (RCP)

Poquessing Watershed River Conservation Plan Goals:

1.) Establish Comprehensive Watershed-Based Planning & Protective Regulations
2.) Improve Stream Habitat, Protect Aquatic Resources and Restore Aquatic Communities
3.) Improve In-Stream Flow Conditions
4.) Improve and Protect Water Quality of Ground and Surface Waters and Reduce Pollutant Loads
5.) Improve and Protect Stream Corridors
6.) Address Flooding

Poquessing Watershed River Conservation Plan Goals:

7.) Enhance and Improve Recreational Opportunities
8.) Improve Stewardship, Communication and Coordination Among WS Stakeholders
9.) Protect Significant Natural Features
10.) Protect Significant Historic & Cultural Features
11.) Initiate Sustainable Development on a Watershed Level
12.) Initiate Capital Improvements for Watershed Protection

Southeast Regional Wetland Inventory and Water Quality Improvement Initiative - Poquessing Creek Watershed Bucks, Philadelphia, and Montgomery Counties, Pennsylvania - PWD & EPA

RECOMMENDATIONS FOR POTENTIAL WETLAND ENHANCEMENT AND CREATION AREAS
A. Potential Creation Areas: In-City Locations
B. Potential Creation Areas: Out-Of-City Locations

WETLAND RESOURCES
A. In-City Existing Wetlands
B. Out-Of-City Existing Wetlands

STORMWATER OUTFALL ASSESSMENT

III. ACT 167 Overview

ACT 167 Overview

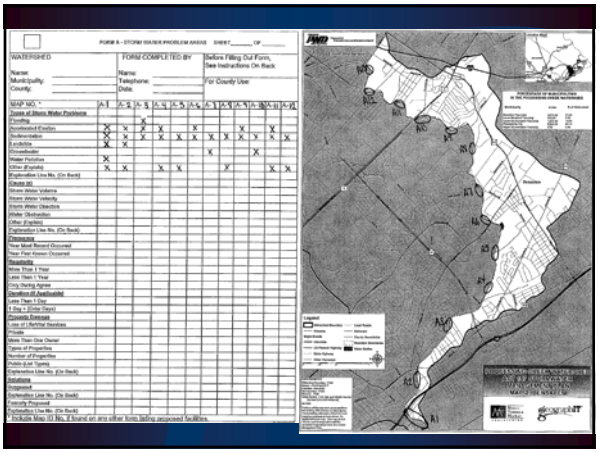
- Also known as the Pennsylvania Stormwater Management Act, was passed in 1978.
- Under Act 167, counties in the Commonwealth are to develop comprehensive stormwater management plans for each watershed within the County.
- The planning process is done with input from a Watershed Plan Advisory Committee (WPAC)
- Once approved by the Department of Environmental Protection (DEP), municipalities are required to implement the plan through local ordinances.

IV. Poquessing Creek Act 167 Scope of Work

Task 1 – Data collection and analysis

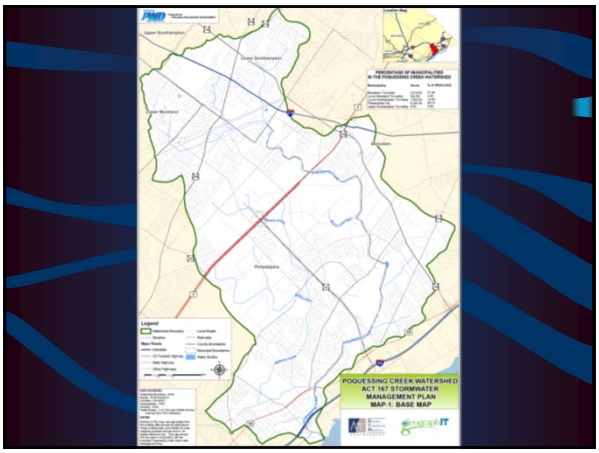
- Past reports / studies,
- Detention basins,
- Municipal data collection,
- Obstructions,
- GIS

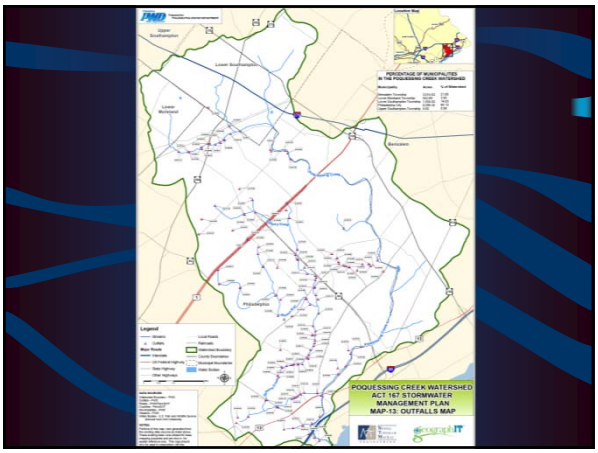
Form	Symbol	Description	Types of Examples	Sources of Information
A		Stormwater Problem Areas	Flooding, Drainage, Erosion/Sedimentation	Existing studies or reports, Township Documentation, Personal memory, Township engineer
B		Obstructions	Bridges. Culverts, Fill, Structures	Owner or structure, township files, subdivision applications, roadmaster, township engineer
C		Existing Flood Control Projects	Channel excavation, rip-rap, floodwalls, etc.	Township records, township engineer, owner of facilitiy
D		Proposed Flood Control Projects	Channel excavation, rip-rap, floodwalls, etc.	Township records, township engineer, owner of facilitiy
E		Existing Stormwater Control Facilities	Detention basins, recharge basins, roof-top stroage	Subdivision files, township engineer, owner of facility
F		Proposed Stormwater Control Facilities	Detention basins, recharge basins, roof-top stroage	Subdivision files, township engineer, owner of facility
G		Existing Stormwater Collection Systems	Storm sewers, man-made channels, diversions	Existing plans, township engineer, owner of system
H		Proposed Stormwater Collection System	Storm sewers, man-made channels,	Existing plans, township engineer, owner of

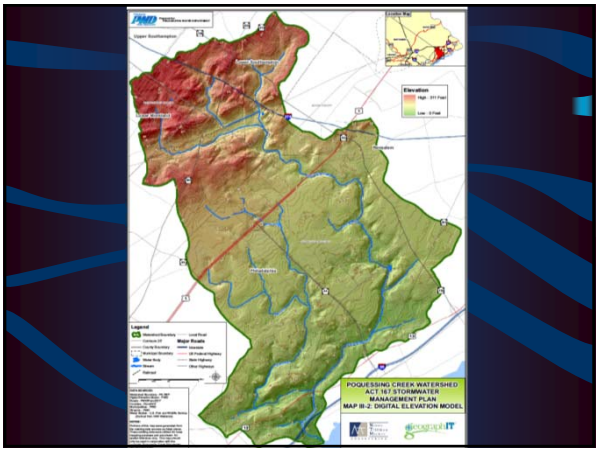


Task 2 – GIS Mapping

GIS Data	Likely Source
County and municipal boundaries	PennDOT or Counties
Road centerlines	PennDOT or Counties
Streams	PennDOT or Counties
Water bodies	PennDOT or Counties
Watershed boundary	PWD will delineate the watershed from (DEM) and provide it to NTM.
Wetlands	U.S. Fish and Wildlife Service National Wetlands Inventory (NWI)
High Resolution Digital Ortho Photographs	Philadelphia Water Dept. or DVPRC
Digital Elevation Model (DEM)	Philadelphia Water Dept.
Existing Land Use	Philadelphia Water Dept.
Future Land Use	DVPRC
Impervious Surface Areas	Philadelphia Water Dept.
Hydrologic Soil Groups	Philadelphia Water Dept.
Geology	Philadelphia Water Dept.
Obstructions	Philadelphia Water Dept.
Floodplains (FEMA Q3)	PASDA







Task 3 – Technical Analysis, Standards and Criteria

- Develop Watershed Computer Model to Analyze Watershed Runoff and Timing
- From the Model, Devise a Plan to Manage Stormwater
- Incorporate this Plan into Model Municipal Ordinance language.

Task 4 – Report

- Draft report including model SW ordinance
- Municipal review of draft report and ordinance
- Final report including model SW ordinance

Task 5 – WPAC Meetings

Summary of Phase II Tasks

- Determining specific areas/problems/obstructions to evaluate
- Develop Plan of action, prioritization and costs for implementation
- Develop standards and criteria for new development
- Develop Model Stormwater Management Ordinance

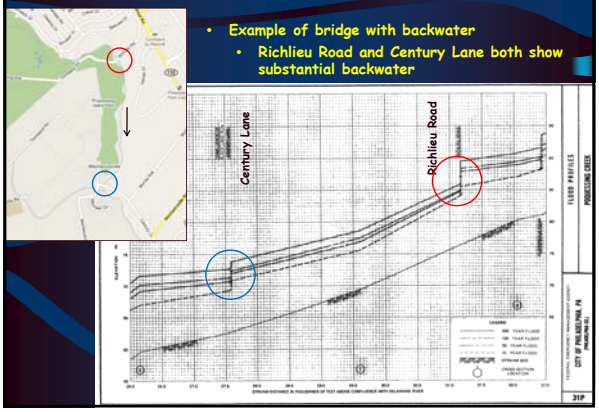
V. Obstructions

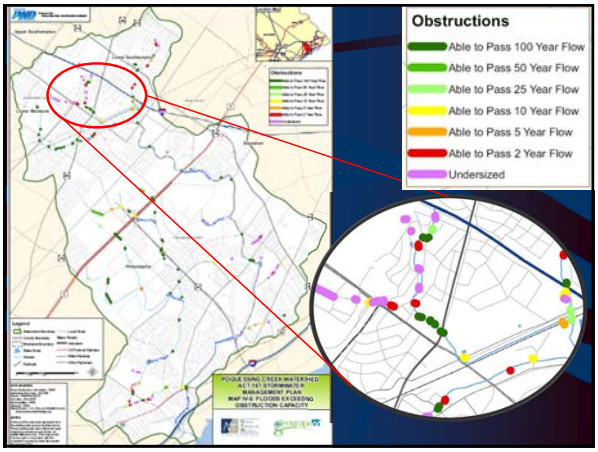
Obstructions

- PWD modeled individual bridge capacities and determined what storm event each bridge was capable of passing before overtopping.
- NTM analyzed FEMA FIS Profiles and determined which bridges had backwater and determined properties that would be inundated during the 100-year FEMA flood event.

FIS Profile

- Example of bridge with backwater
  - Richlieu Road and Century Lane both show substantial backwater





VI. Problem Areas

Problems in the Watershed

- Stream Impairment
- Erosion
- Sedimentation
- Flooding
- Obstructions
- Existing Management
- General vs. Detailed

Problems in the Watershed

- Increased emphasis on stormwater problems within the watershed
- Majority of the watershed is already developed and minimal potential exists for new development
- The best approach for appropriately managing stormwater within the watershed will be to apply corrective measures to existing problem areas and implement regulations geared towards redevelopment

Problem Areas: Sources:

- Municipal Data Collection Forms A & J
- Flood Insurance Study Profiles
- FEMA Flood Plain Mapping Transposed to Aerial Photography
- FEMA FIS Repetitive Loss Structures
- 303d Streams, DEP
- Other Reports (BEHI)

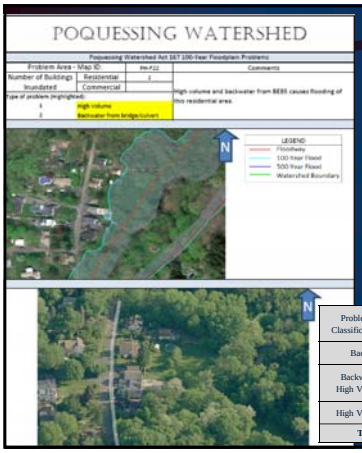
Classified by:

- Water Quality Related
- Flooding Related

- General Problem Area Category
- Detailed Study Area

Problem Area Summary

Types of Problems	Source	# of Problems
BEHI Data	URS	18
Sedimentation Sites	PWD	8
	Bensalem	12
Erosion Sites	PWD	50
	Bensalem	6
Flooding	Bing, PASDA (floodplain/floodway boundaries)	243 Buildings
	Bensalem	1
FIS Bridge Backwater Data	FEMA FIS Profiles	42
Stream Impairment (303d)	PASDA	Entire Watershed Impaired



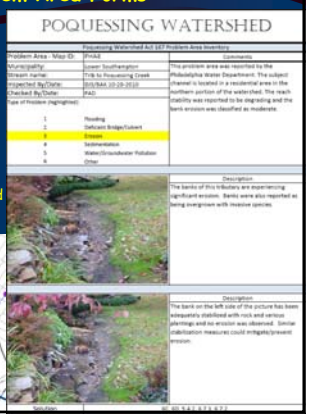
Floodplain Problem Areas

- Example of problem areas showing locations of inundated buildings
  - Problem PH-F22 is just upstream of Century Lane as shown in the previous slide
  - Backwater from the bridge and high volume cause flooding of these 2 structures
- Used Bing and Google to capture aerials

Problem Classification	Problem Areas	Residential Buildings	Commercial Buildings
Backwater	7	63	5
Backwater & High Volumes	25	160	27
High Volumes	24	105	5
TOTAL	56	328	37

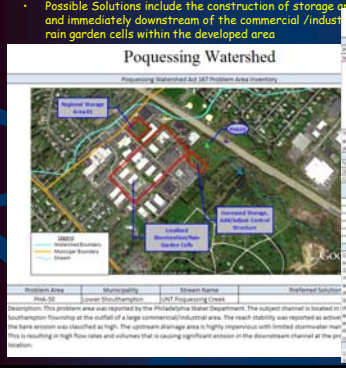
General Problem Area Forms

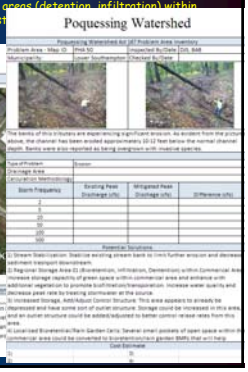
- Used during field views to classify problems and determine potential solutions
- This shows a general problem area.
  - Left side has native vegetation to prevent bank erosion.
  - The right bank has only grass and has been eroded.



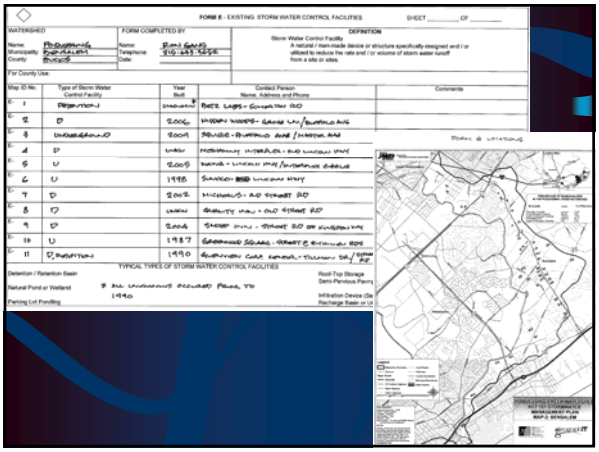
Detailed Problem Area Forms

- This shows a detailed problem area.
  - Significant erosion along an UNT to Poquessing Creek in Lower Southampton Township
  - Possible Solutions include the construction of storage areas (detention, infiltration) within and immediately downstream of the commercial /industr
    rain garden cells within the developed area





VII. Detention Basins



Basin Data Collection

- Basin data collected
  - Length, Width and Depth
  - Inflow pipe sizes and quantity
  - Outfall structure type & size
- Basin data used to determine amount of runoff volume that can be detained
  - Determine potential retrofit ideas

Basin Photos

- Basin off McNulty Rd
  - Runoff from building is eroding basin
  - Plants should be planted on basin floor
  - Add meandering natural low flow channel
  - Dimensional data collected by PWD

Basin Photos

- Basin off Townsend Rd
  - Two inlets flow directly to outfall
  - One inlet has oily fluid draining to basin
    - Further investigation needed to determine source and cause
  - Divert/Treat flow to eliminate water quality impacts
  - Plant native vegetation in basin

VIII. Model Stormwater Ordinance

Ordinance Provisions:

Article:	Description:
I.	General Provisions
II.	Definitions
III. (303)	SWM Site Plan Requirements
IV. (403-411)	Stormwater Management
V.	Inspections
VI.	Fees And Expenses
VII.	Maintenance Responsibilities
VIII.	Prohibitions
IX.	Enforcement and Penalties

Definitions:

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

Regulated Earth Disturbance Activity – Activity involving Earth Disturbance subject to regulation under 25 Pa. Code 92, 25 PA Code 102, or the Clean Streams Law.

In other words, all earth disturbance or alteration of land has to comply with the stormwater ordinance unless it is exempt (Table 106).

Section 106 – Eligibility for Exemption

Bucks and Montgomery Cos.
- Based on proposed New Impervious Cover (NIC) and Earth Disturbance (ED).
  - < 1,000 sq. ft. of NIC & <5,000 sq. ft. of ED

Exempt from ordinance – Don't have to apply to Municipality

Philadelphia
- Based on proposed Earth Disturbance (ED).
  - <5,000 sq. ft. of ED

Exempt from ordinance – Don't have to apply to City

Voluntary controls are encouraged

Section 106. Exemptions

A. Table 106.1a – Eligibility for Exemptions for the Bucks and Montgomery Portions of the Watershed

Ordinance Article or Section	Type of Project	Proposed New Impervious Cover: < 1000 sq. ft. — Earth Disturbance <5,000 sq. ft.	< 1000 sq. ft. — Earth Disturbance ≥5,000 sq. ft. - 1 acre	< 1000 sq. ft. — Earth Disturbance > 1 acre	≥ 1000 to <5,000 sq. ft. — Earth Disturbance <5,000 sq. ft.	≥ 1000 to <5,000 sq. ft. — Earth Disturbance ≥5,000 sq. ft. - 1 acre	≥ 1000 to <5,000 sq. ft. — Earth Disturbance > 1 acre	≥ 5,000 sq. ft. — All Earth Disturbance Categories
Article III SWM Site Plan Requirements	Development and Redevelopment	Yes	No*	No	No*	No*	No	No
Section 404 Nonstructural Project Design	Development and Redevelopment	Yes	No*	No	No*	No*	No	No
Section 405 Groundwater Recharge	Development and Redevelopment	Yes	No*	No	No*	No*	No	No
Section 406 Water Volume Control Requirements	Development and Redevelopment	Yes	No*	No	No*	No*	No	No
Section 407 Stream Bank Erosion Requirements	Development	Yes	No*	No	No*	No*	No	No
	Redevelopment		Yes		Yes	Yes		
Section 408 Stormwater Peak Rate Control and Management Districts	Development and Redevelopment	Yes	No*	No	Yes	No*	No	No
Erosion and Sediment Pollution Control Plan	Earth Disturbance	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements
		(Refer to municipal earth disturbance requirements, as applicable)						

Section 106. Exemptions (cont.)

A. Table 106.1b – Eligibility for Exemptions for the Philadelphia Portion of the Watershed

Ordinance Article or Section	Type of Project	Earth Disturbance Associated with Development: < 5,000 sq. ft.	≥ 5,000 sq. ft. but < 1 acre	≥ 1 acre
Article III. SWM Site Plan Requirements	New Development	N/A**	No	No
	Redevelopment	N/A**	No	No
Section 405 Groundwater Recharge Requirements	New Development	N/A**	No	No
	Redevelopment	N/A**	No	No
Section 406 Water Volume Control Requirements	New Development	N/A**	No	No
	Redevelopment	N/A**	No	No
Section 407 Streambank Erosion (Channel Protection) Requirements	New Development	N/A**	No	No
	Redevelopment	N/A**	Yes	Yes (Alternate Criteria)
Section 408 Flood Control / Stormwater Peak Rate Control and Management Districts Requirements	New Development	N/A**	No	No
	Redevelopment	N/A**	No	Yes (Alternate Criteria)

Yes (Alternate Criteria) – Redevelopment disturbing one acre or more that reduces the DCIA from predevelopment conditions by at least 20% is exempt from the Channel Protection/Streambank Erosion (Section 407) and Flood Control/Peak Rate Control (Section 408) Requirements of this Ordinance; and redevelopment that results in an area of earth disturbance equal to or greater than 5,000 square feet, but less than one (1) acre, is exempt from the Channel Protection/Streambank Erosion Requirements of this Ordinance (See Section 106, Exemptions, Philadelphia County Portion of the Watershed).

N/A – Not Applicable, development project is not subject to requirements of the indicated sections of this Ordinance. Voluntary controls are encouraged.

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

** – 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 this Ordinance may be applied to proposed development activities as warranted to protect public health, safety, or property.

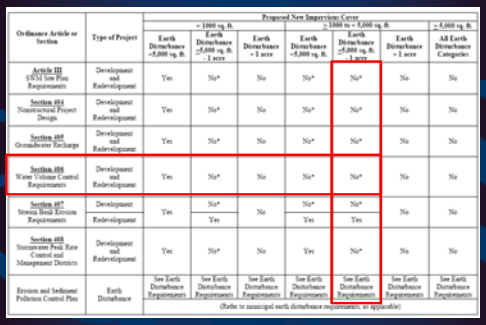
Section 106. Exemptions (cont.)

Small Project Stormwater Management Site Plan

This Small Project SWM Site Plan is included as an option for municipalities to adopt to give small regulated activities the opportunity to submit a non-engineered stormwater management plan.

Sites with less than one thousand (1,000) square feet of new impervious surface, but between five thousand (5,000) square feet and one (1) acre of earth disturbance must submit a SWM Site Plan to the Municipality and can use the protocols in the Small Project SWM Site Plan if Municipality has adopted Ordinance Appendix B.

Small Project Stormwater Management Site Plan

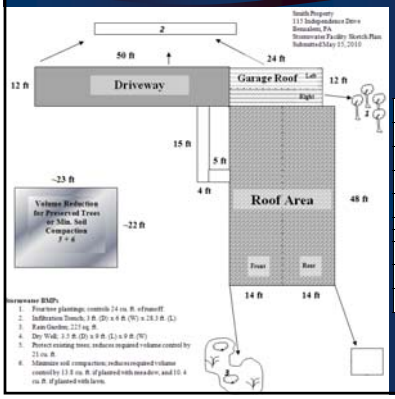


Ordinance Article or Section	Type of Project	Proposed New Impervious Cover: < 1000 sq. ft. — Earth Disturbance <5,000 sq. ft.	< 1000 sq. ft. — Earth Disturbance <5,000 sq. ft. - 1 acre	< 1000 sq. ft. — Earth Disturbance > 1 acre	≥ 1000 sq. ft. - 5,000 sq. ft. — Earth Disturbance <5,000 sq. ft.	≥ 1000 sq. ft. - 5,000 sq. ft. — Earth Disturbance <5,000 sq. ft. - 1 acre	≥ 1000 sq. ft. - 5,000 sq. ft. — Earth Disturbance > 1 acre	≥ 5,000 sq. ft. — All Earth Disturbance Categories
Article III SWM Site Plan Requirements	Development and Redevelopment	Yes	No*	No	No*	No*	No	No
Section 404 Nonstructural Project Design	Development and Redevelopment	Yes	No*	No	No*	No*	No	No
Section 405 Groundwater Recharge	Development and Redevelopment	Yes	No*	No	No*	No*	No	No
Section 406 Water Volume Control Requirements	Development and Redevelopment	Yes	No*	No	No*	No*	No	No
Section 407 Stream Bank Erosion Requirements	Development	Yes	No*	No	No*	No*	No	No
	Redevelopment		Yes		Yes	Yes		
Section 408 Stormwater Peak Rate Control and Management Districts	Development and Redevelopment	Yes	No*	No	Yes	No*	No	No
Erosion and Sediment Pollution Control Plan	Earth Disturbance	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements	See Earth Disturbance Requirements

(Refer to municipal earth disturbance requirements, as applicable)

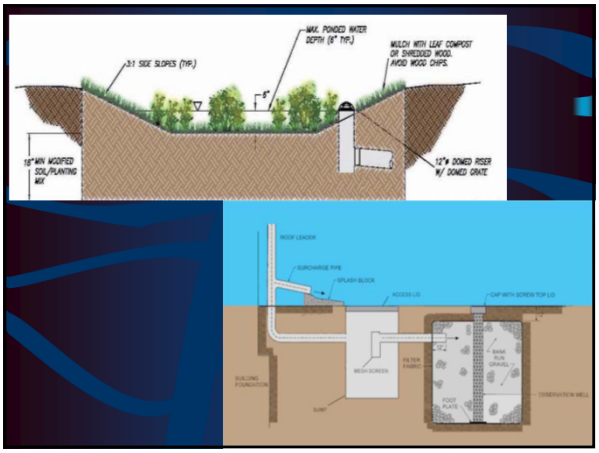
No* – Modified SWM Site Plan required, Small Project Site Plan possible.

Small Project Stormwater Management Site Plan



Impervious Surface			Area (sq. ft.)
House Roof (Front)	14 ft. x 48 ft.	=	672 sq. ft.
House Roof (Rear)	14 ft. x 48 ft.	=	672 sq. ft.
Garage Roof (Left)	6ft. x 24 ft.	=	144 sq. ft.
Garage Roof (Right)	6 ft. x 24 ft.	=	144 sq. ft.
Driveway	12 ft. x 50 ft.	=	1,000 sq. ft.
Walkway	4 ft. x 20 ft.	=	80 sq. ft.

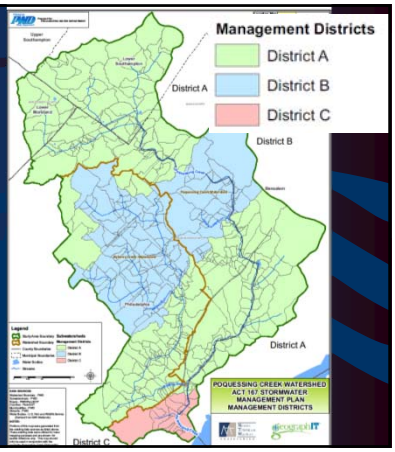
	Total Impervious		3,000 sq ft
	Total Earth Disturbance		6,000 sq ft



Stormwater Management Requirements

- Section 401 - General Requirements
- Section 402 - Permit Requirements for Other Government Entities
- Section 403 - Erosion and Sediment Control During Regulated Earth Disturbance
- Section 404 - Nonstructural Project Design
- Section 405 - Ground Water Criteria
- Section 406 - Water Quality Criteria
- Section 407 - Stream Bank Erosion Criteria
- Section 408 - Stormwater Peak Rate Control and Management Districts
- Section 409 - Calculation Methodologies
- Section 410 - Other Requirements

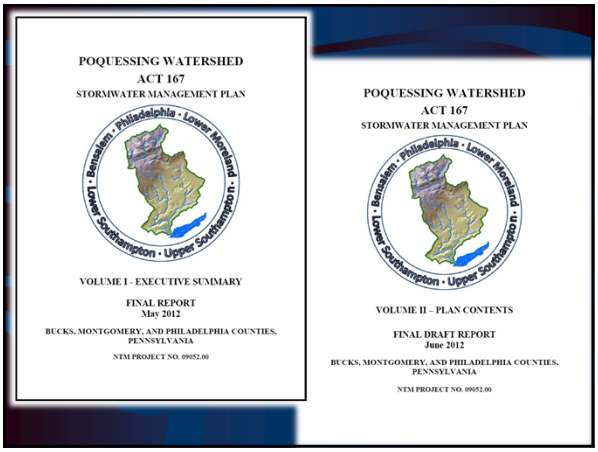
Section 408 Peak rate Control - Management Districts



Peak Rate Control by Stormwater Management District - TABLE V-3

District	Proposed Condition Design Storm		Existing Condition Design Storm
A	2-year	reduce to	1-year
	5-year		5-year
	10-year		10-year
	25-year		25-year
	50-year		50-year
	100-year		100-year
B	2-year	reduce to	1-year
	5-year		2-year
	10-year		5-year
	25-year		10-year
	50-year		25-year
	100-year		50-year

IV. Access to the Report and Ordinance


POQUESSING WATERSHED
ACT 167
STORMWATER MANAGEMENT PLAN

VOLUME I - EXECUTIVE SUMMARY

FINAL REPORT
May 2012

BUCKS, MONTGOMERY, AND PHILADELPHIA COUNTIES, PENNSYLVANIA

NTM PROJECT NO. 09052.00

POQUESSING WATERSHED
ACT 167
STORMWATER MANAGEMENT PLAN

VOLUME II – PLAN CONTENTS

FINAL DRAFT REPORT
June 2012

BUCKS, MONTGOMERY, AND PHILADELPHIA COUNTIES, PENNSYLVANIA

NTM PROJECT NO. 09052.00

Copies of the Plan (PDFs) and ordinance (Word) can be obtained from either of the 3 Co's or the PWD and NTM web sites.

http://ntmeng.com/poquessing/
http://www.phillywatersheds.org/doc/PoquessingAct167.pdf

Questions ? ? ? ?