

Middlesex Township Public Meeting 1 Introduction to MS4

Middlesex Township
Cumberland County PA
October 11, 2017



Presented by:
Carrol Ehrhart, RLA
Skelly and Loy, Inc.
Harrisburg PA

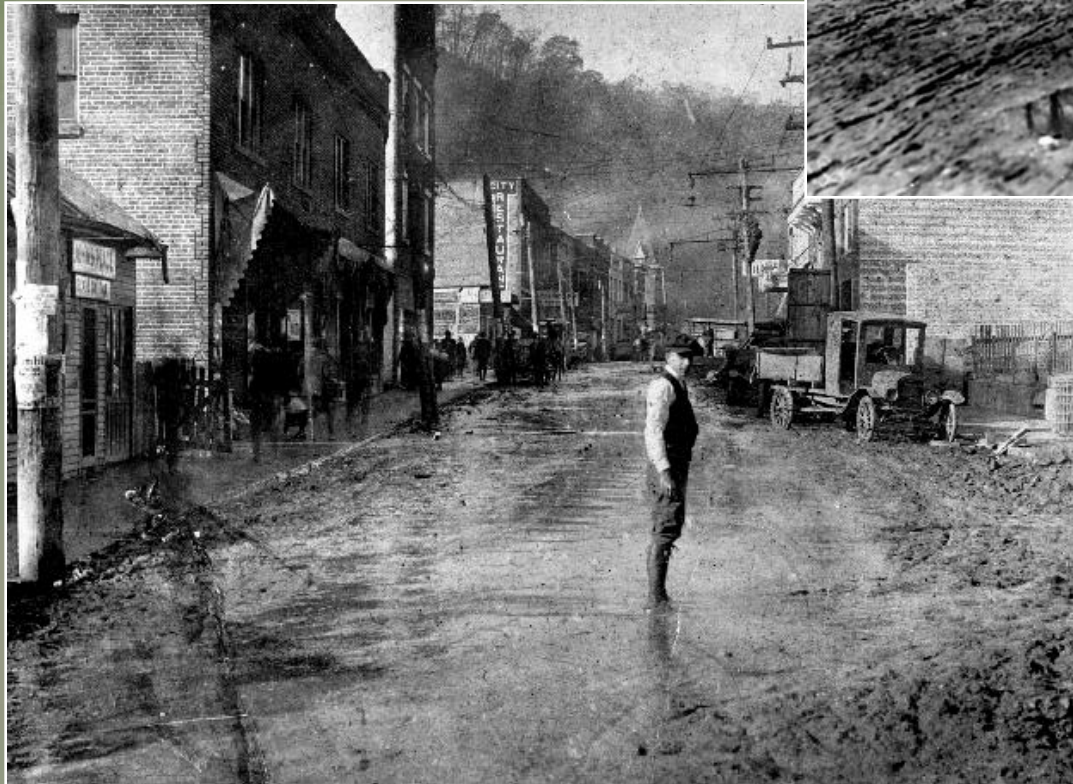


Today's Topics

- Basis for Regulated Stormwater Management
- MS4 Made Easy
- MS4 Permit Requirements
- Stormwater Management Program

Basis for Regulated Stormwater Management

**Streets were quagmires
before stormwater
management (SWM)**



Market Street, Harrisburg, Pa.



<http://www.cattransit.com/wp-content/gallery/cat-history/history2.jpg>

**Market Street
Circa 1865**

**Street paving
improves access to
business
centers...but
generates increased
runoff**



**Market Street
Circa 1910**

<https://s-media-cache-ak0.pinimg.com/736x/b7/65/9f/b7659f5d9773dbb6becf0598949f4ed5.jpg>

Ascent of Regulation

- Federal incentives following WWI for private housing construction



<https://s-media-cache-ak0.pinimg.com/736x/4d/0e/c9/4d0ec9afe937f8bd648d29596048abf2.jpg>

Ascent of Regulation



<https://s-media-cache-ak0.pinimg.com/736x/4d/0e/c9/4d0ec9afe937f8bd648d29596048abf2.jpg>

- Federal incentives following WWI for private housing construction
- New Deal – 1934 –FHA created by the National Housing Act- regulate interest rates and mortgage terms

Ascent of Regulation



- Federal incentives following WWI for private housing construction
- New Deal – 1934 – FHA created by the National Housing Act- regulate interest rates and mortgage terms
- Large scale residential development initiated 1941-1944 – developers adopted standardization acceptable to qualify for FHA mortgages

Financial incentive influences design

Ascent of Regulation

- 1947- Levittown-standardized rental housing for returning veterans



Times
 Vol. 1—No. 44 LEVITTOWN, PENNSYLVANIA, THURSDAY, APRIL 16, 1953 Price 5c

Levitt Plans Low-priced Homes 'Suitable for Any Wage Earner'

A notice priced lower than the Levittowner will be built here in the near future, William Levitt, president of Levitt and Sons, Inc., personally announced Tuesday.

He would not reveal the selling price of planned low-cost dwelling, but said it would be "suitable for any wage-earner in the area."

The head of the building firm stated that the plans were prompted by a "market for low priced housing in this area."

Sets Safety Qualification
 "I've got a hunch that people will go wild about it as soon as the price is announced," he said. "Anyone making \$12 a week will be qualified to buy it."

The new type house, which will come in four different models, is now being constructed for exhibition at the Levittown Exhibit Center, and is expected to be opened to the public the week-end of April 23.

The builder would not discuss any of the specifications of the houses.

Local Churchmen Disclose Future Construction Plans

A number of Levittown's churchmen met the past Tuesday to tell of their church building plans for the community.

Represented at the meeting were the Lutheran, Reformed, Presbyterian and Episcopal denominations, all of which have already selected sites for their churches in Levittown and expect to begin construction in the near future.

A spokesman for Levitt and Sons, Inc., disclosed plans being made by the Catholic parish for the Rev. Joseph M. Collins, pastor of St. Michael, the Archangel's Church.

Lutherans, Missouri Synod
 First to state their plans were the Rev. William A. Drew, executive secretary of the eastern district of the Lutheran Church, Missouri Synod, and the Rev. Louis Kaufmann, pastor of Levittown's Hope Lutheran Church.

Their intentions are to erect first an "all purpose" unit on the square tract purchased by the church at the corner of Mill Creek rd. and Holmes rd.

This initial structure will house an auditorium able to seat 250 persons, a full basement and of-

'I Know Nothing' Says Wm. Levitt About Authority

The Middlestown-Bucks County Authority, which last week received the green light from Middlestown township to operate and maintain the municipality's sewer, was referred to by William J. Levitt, president of Levitt and Sons, Inc., as a "paper organization" about which he knows

STOOD-UP, BUT HAPPY!

Ascent of Regulation

- 1947- Levittown-standardized rental housing for returning veterans

Financial incentive influences intensity and scale

- 1948 amendments to National Housing Act incentivized large-scale corporate builders



<http://ushistoryscene.com/wp-content/uploads/2015/03/LevittownPA.jpg>

Vol. 1—No. 44 LEVITTOWN, PENNSYLVANIA, THURSDAY, APRIL 16, 1953 Price 5c

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Ascent of Regulation

- 1947- Levittown-standardized rental housing for returning veterans
- 1948 amendments to National Housing Act incentivized large-scale corporate builders

Regulatory reaction to accelerated growth

1968 – PA Municipalities Planning Code (MPC “Act 247”) - Enabling legislation for land use authorizes (not mandates) Comprehensive Plans, Zoning, Subdivision and Land Development (major amendments 1988 and 2000)

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Shopping Malls Serve Suburbia



Park City Shopping Mall Concept Rendering
Constructed 1971

<https://s-media-cache-ak0.pinimg.com/600x315/36/cb/13/36cb130e2db88e8068c71a2cd3a3b6cf.jpg>

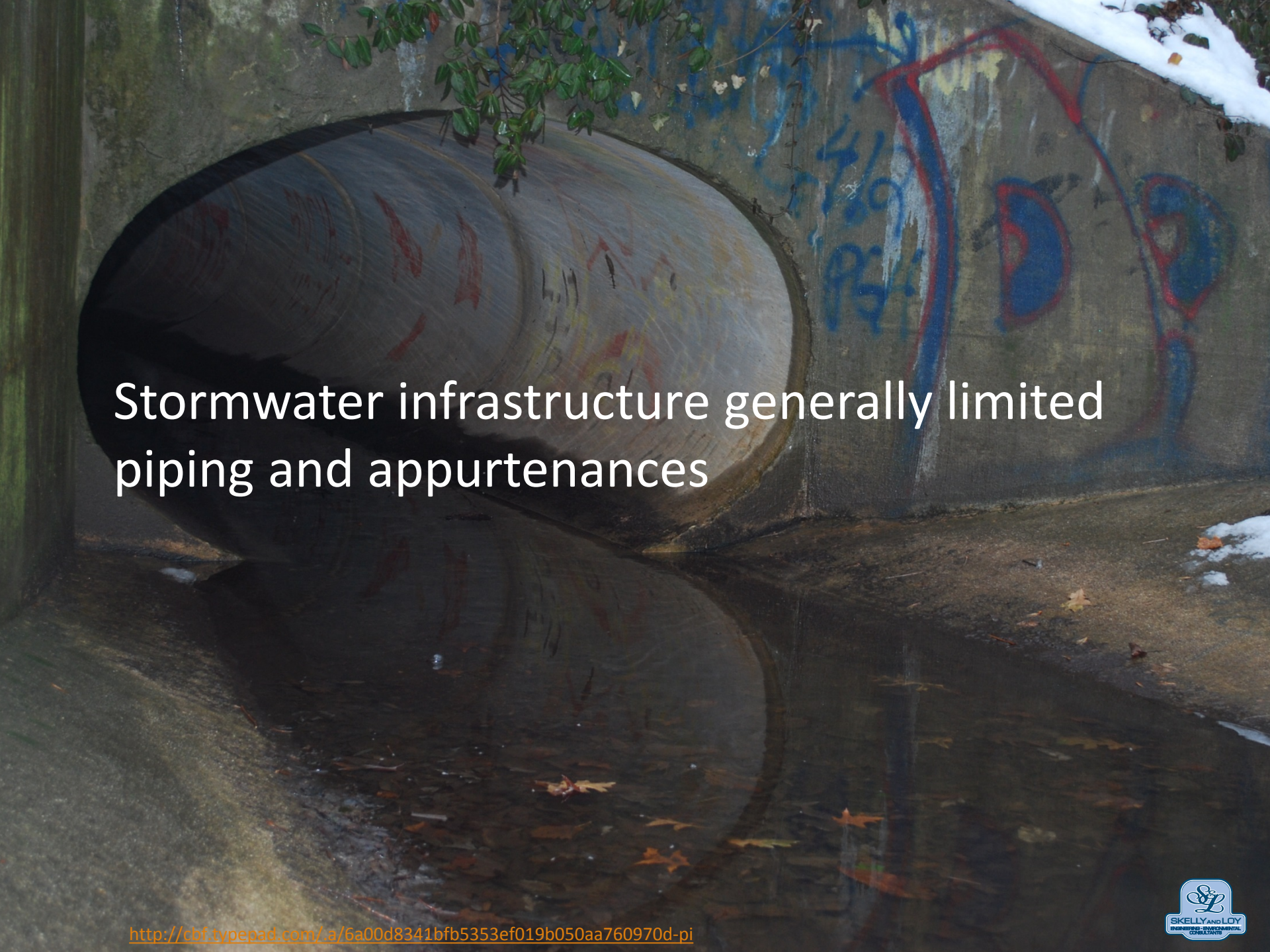
Shopping Malls Serve Suburbia

Where is the stormwater management?



Park City Shopping Mall Concept Rendering
Constructed 1971

<https://s-media-cache-ak0.pinimg.com/600x315/36/cb/13/36cb130e2db88e8068c71a2cd3a3b6cf.jpg>



Stormwater infrastructure generally limited
piping and appurtenances

Late 1960's and early 1970's -
Momentum for controlling pollution
swells nationally

Cuyahoga River 1969



Cuyahoga River 1969



1972

- PA requirements for erosion control for construction sites and agriculture (25 PA Code Chapter 102)
- Federal Clean Water Act (40 CFR 122)
 - National Pollutant Discharge Elimination System (NPDES)
 - Primary focus on industrial and public wastewater treatment plant discharges to “waters of the US”

Floods!

10 inches in 12 hours!
6 dam failures
84 deaths



1972 Harrisburg
Hurricane Agnes

1977 Johnstown

<http://www.weather.gov/images/bgm/flood/june1972/wilkesbarre001.jpg>

<http://www.weather.gov/images/bgm/flood/june1972/wilkesbarre001.jpg>



Regulatory Reaction

1978

- PA Storm Water Management Act (Act 167)
 - Mandates management of stormwater runoff rates from new and redevelopment on county-wide or watershed basis to prevent additional rise in the flood elevation



Increased Regulation = Increased Cost of Stormwater Management

- Cost of design
- Cost of permitting
- Cost of piping and appurtenances
- Cost of excavation
- Cost of maintenance
- Loss of revenue producing property

...to manage flooding

Stormwater/Pollutant Transmission Link


1987

- Amendments to the Clean Water Act (federal)
- Phased implementation
 - NPDES required for earth disturbance
 - Phase 1 > 5 acres
 - Phase 2 > 1 acre
 - Beginning of MS4 (the municipal version)
 - Phase 1 >100,000
 - Phase 2 <100,000



<http://www.pacificwater.org/userfiles/image/Water%20Demand%20Management/waterflow.jpg>

MS4 Made Easy

A photograph showing a concrete stormwater pipe discharging a thick, brown, turbid liquid into a stream. The water in the stream is also brown and murky. The background is dark and out of focus, suggesting a natural setting.

MS4 Focus is
Water QUALITY
NOT
Flooding

(Although Flooding Might be reduced as a result of Water Quality Enhancement)

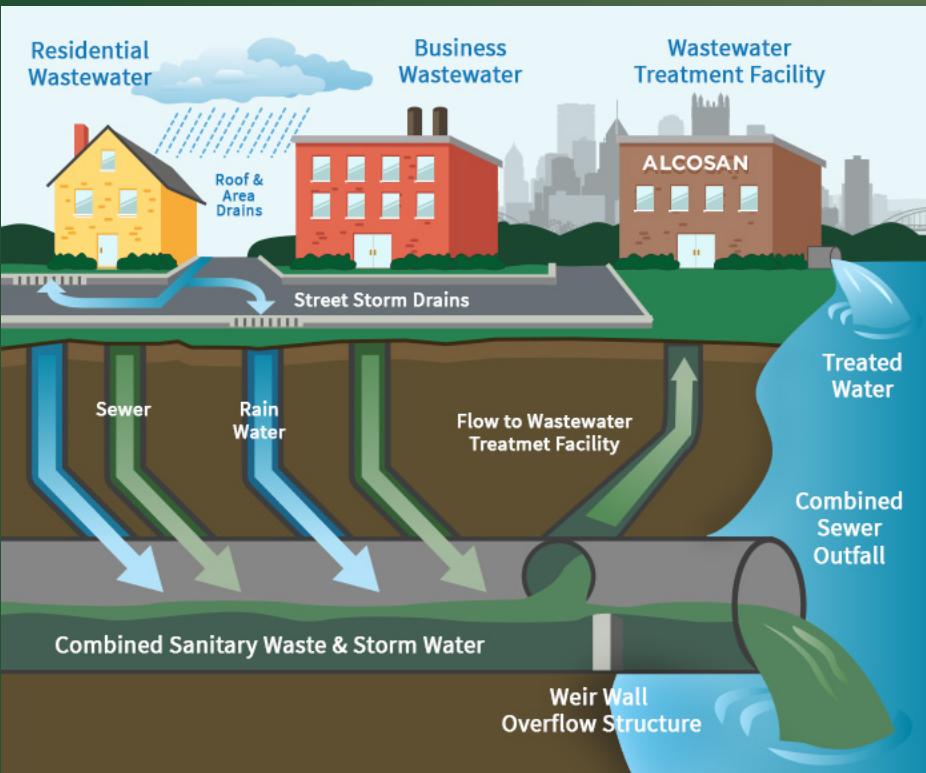
MS4 =

Municipal Separate Storm Sewer System

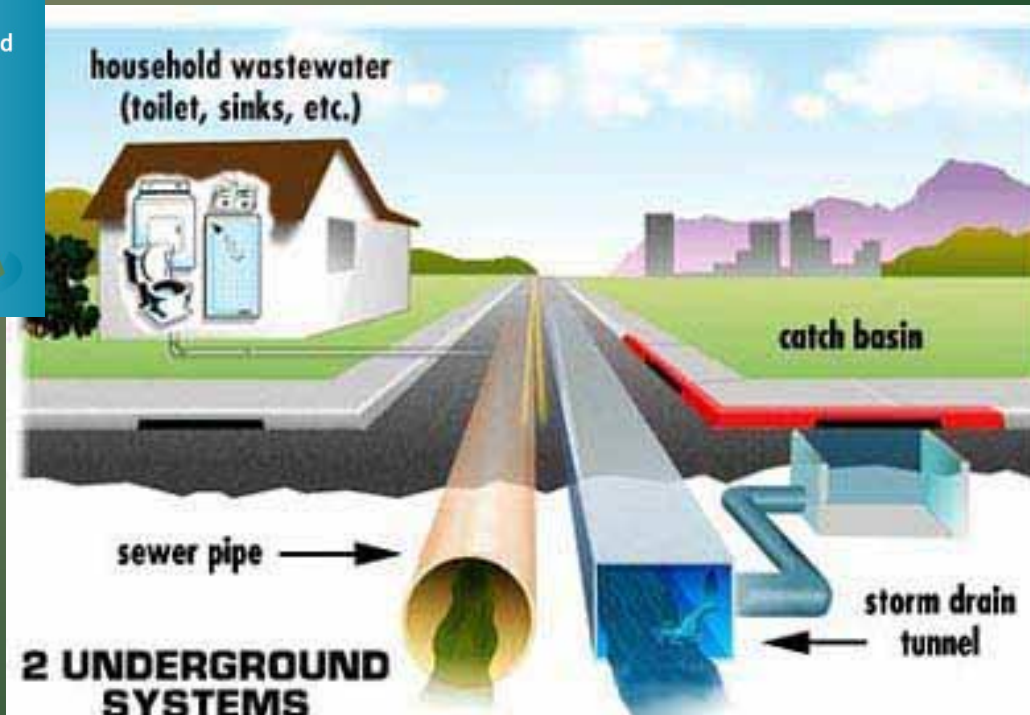
MS4 Short Definition

- Network that conveys exclusively stormwater and is owned or operated by a municipality or similar regulated entity that discharges to a “waters of the United States”

Combined vs. Separate



...a Combined Sewer Overflow (CSO) is not possible from a Separate Storm Sewer System



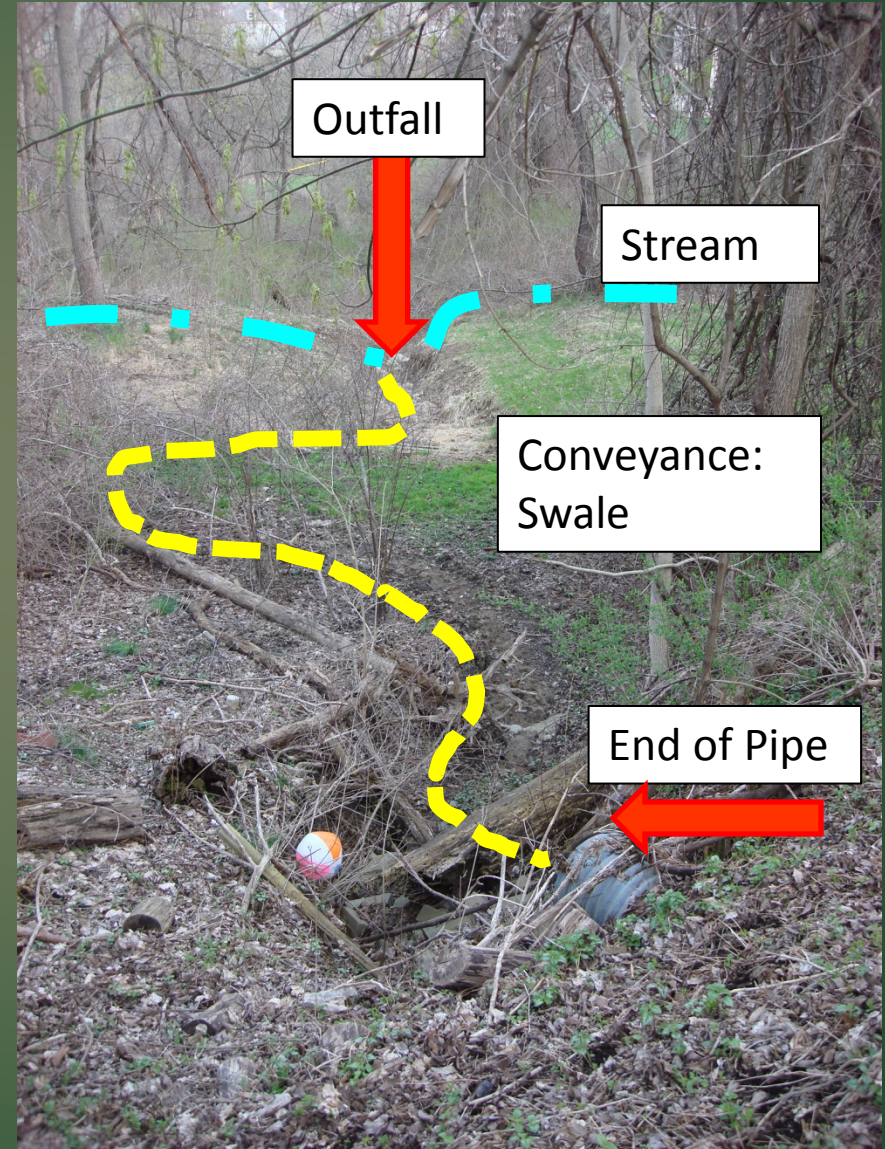
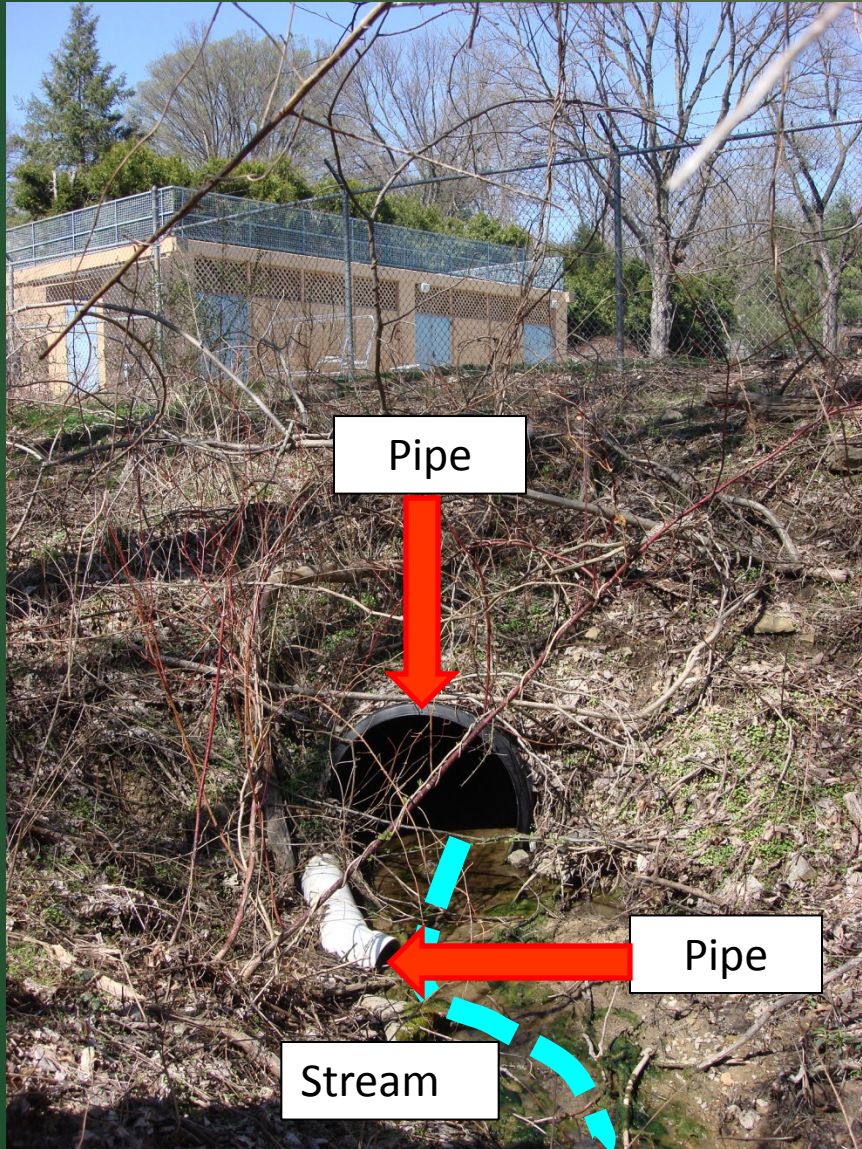
<http://www.project15206.org/challenge/>

<http://www.boondockequipmentwest.ca/tag/drainage-systems/>

Separate Storm Sewer System Components

- Roads with drainage
- Municipal Streets
- Catch basins (inlets)
- Curbs and Gutters
- Ditches, Manmade Channels
- Storm Drains (pipes & culverts)

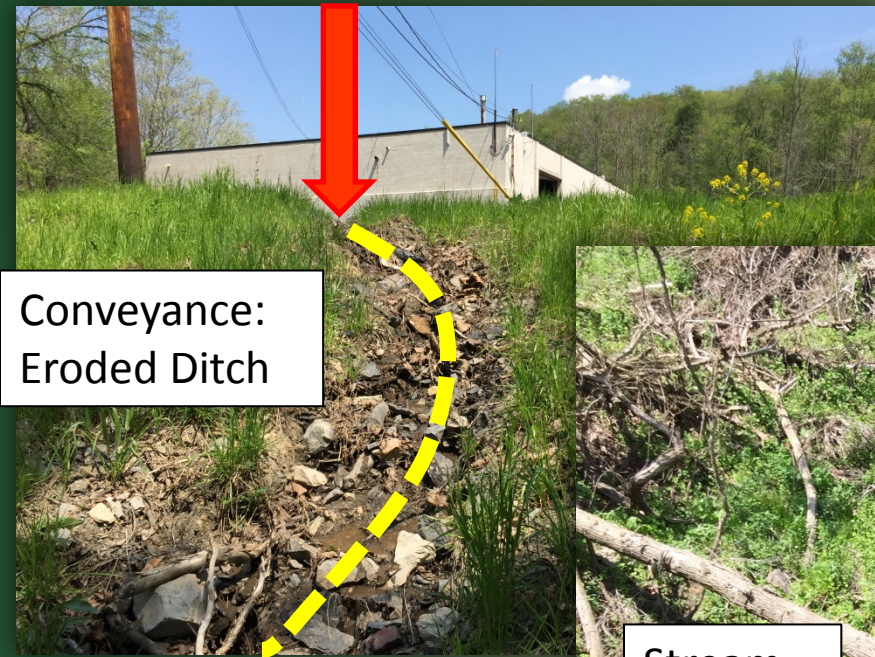
Conveyances



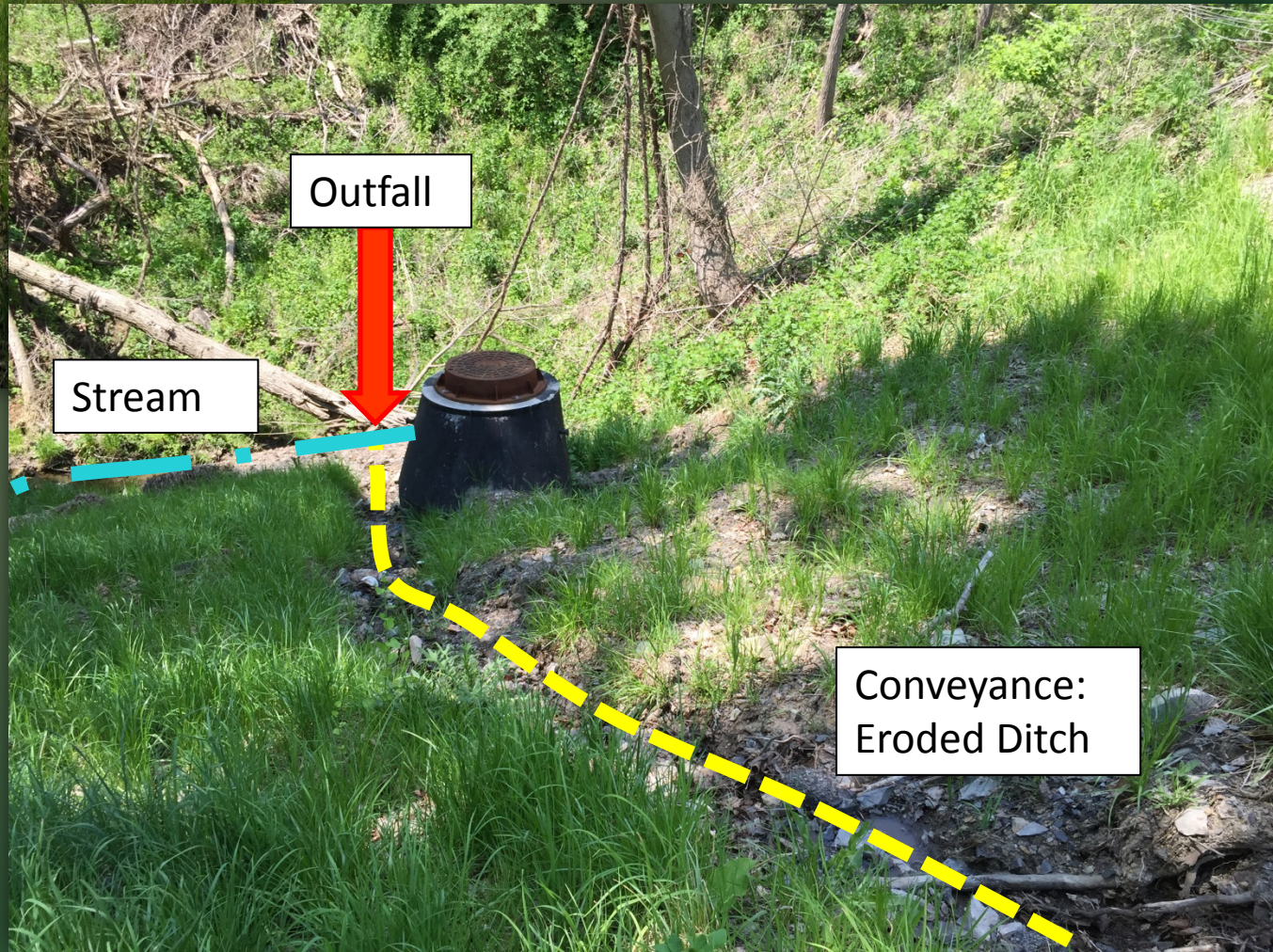
Conveyances



Conveyances



Conveyance:
Eroded Ditch

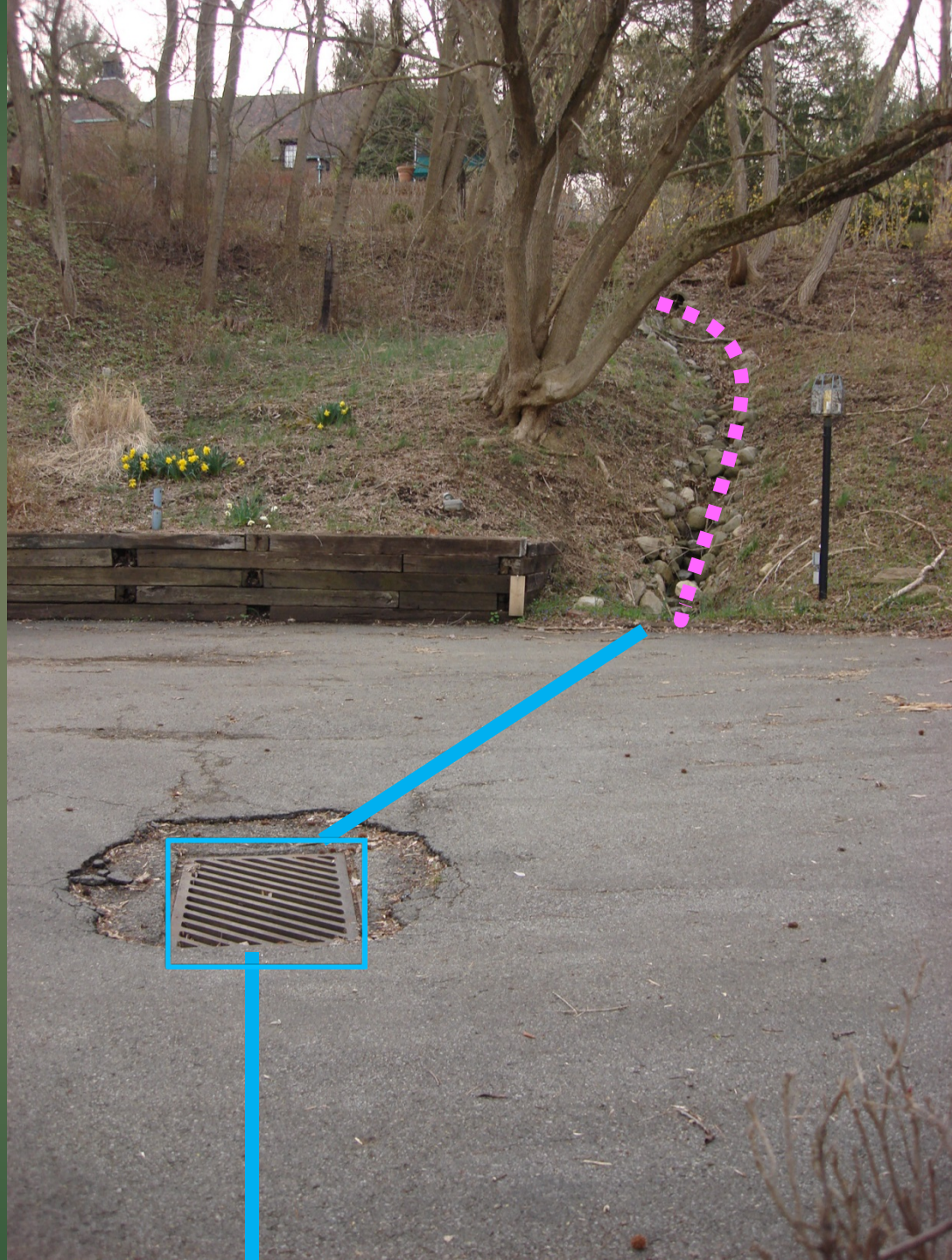


Stream

Outfall

Conveyance:
Eroded Ditch

- MS4-Conveyance includes: Inlets, pipes, gutters, ditches, eroded gullies



220 Wolfs Bridge Rd



Exit Street View

N



© 2017 Google

© 2017 Google

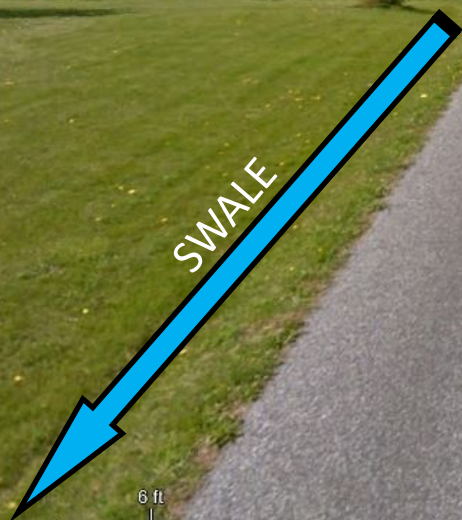
Google Earth

SKELLY AND LOY
ENGINEERS - ENVIRONMENTAL
CONSULTANTS

6 ft

Report a problem

• ... swales



6 ft

Report a problem

© 2017 Google

© 2017 Google

Google Earth

- ... swales, and roads themselves that deliver runoff to an outfall

SWALE

ROAD

6 ft

© 2017 Google

© 2017 Google

Google Earth

MS4 Regulated Area

The municipal Urbanized Area (UA) defined by most recent 10- year US Census including the area contributing to the operator's stormwater network (Stormsewershed)

UA + contributory drainage = Regulated MS4

Middlesex Township



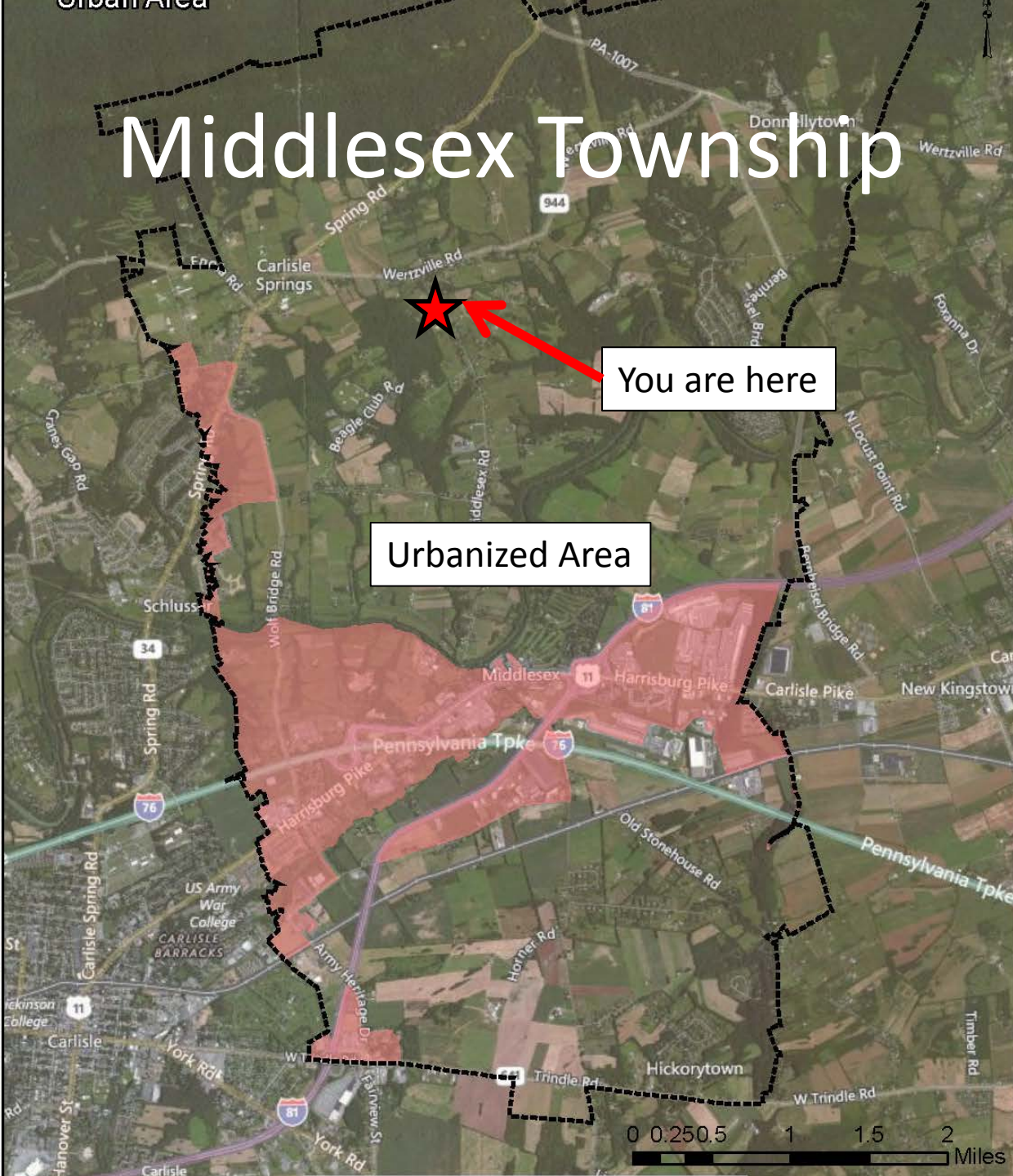
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Middlesex Township

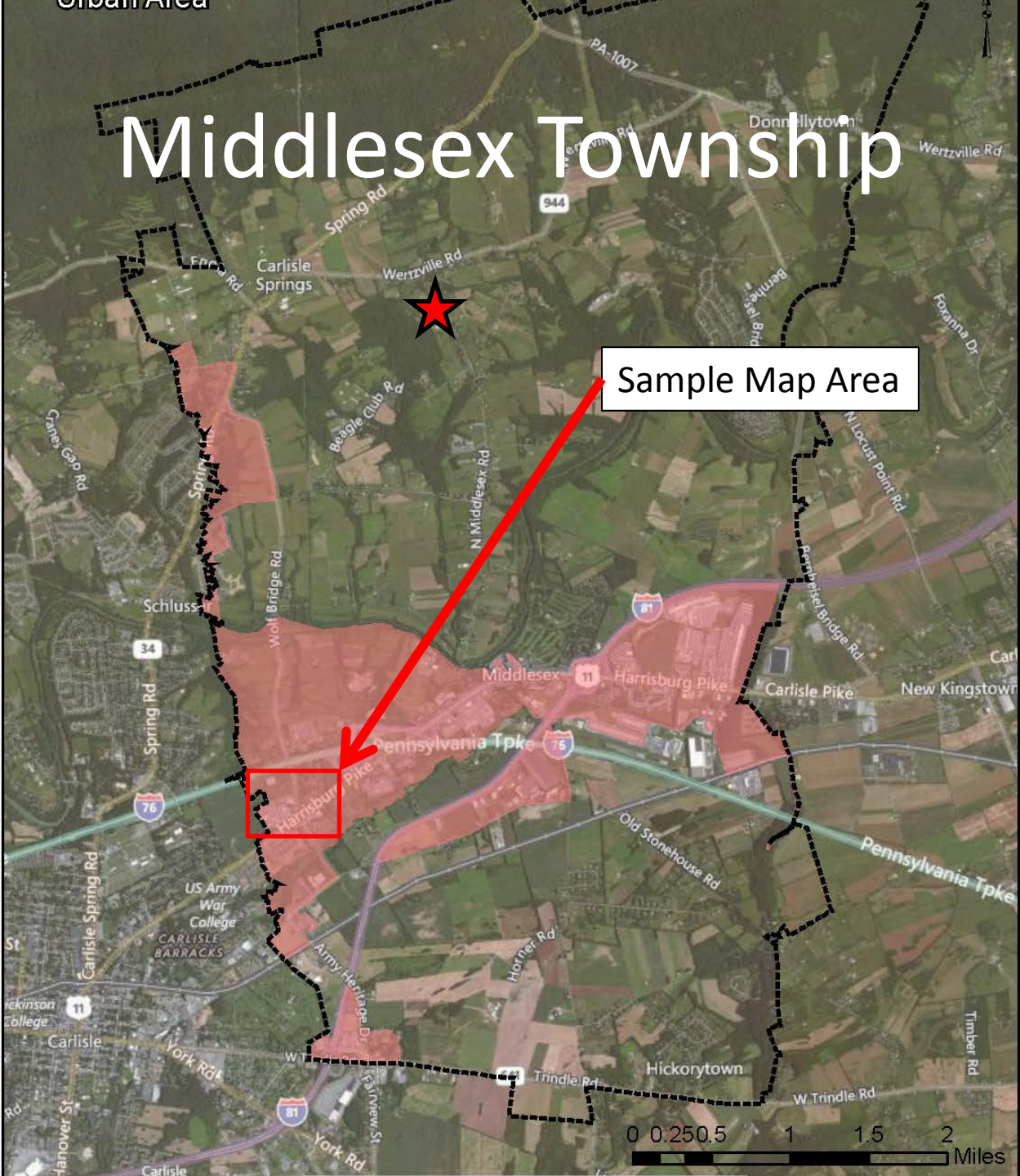
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Urbanized Area

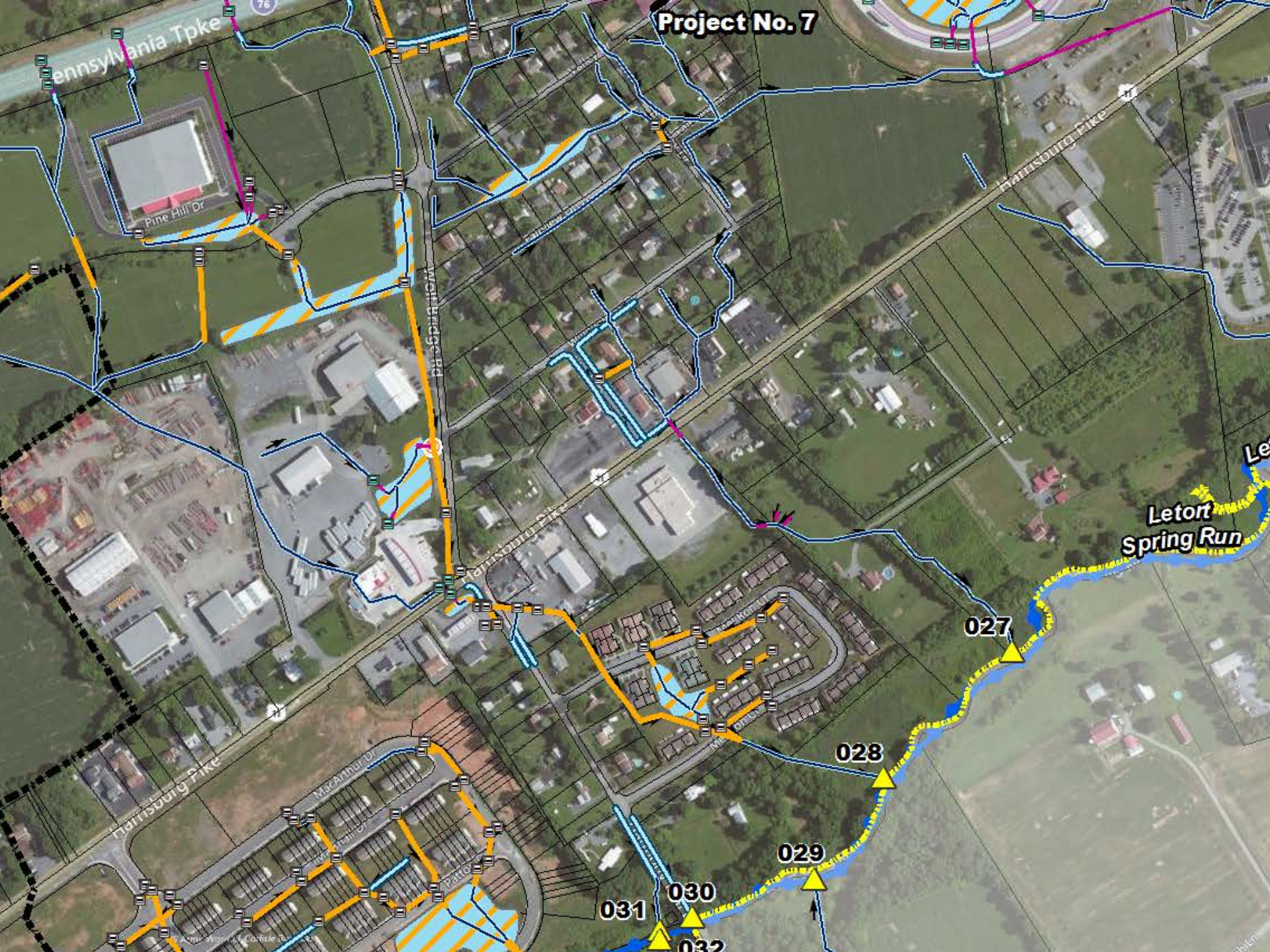


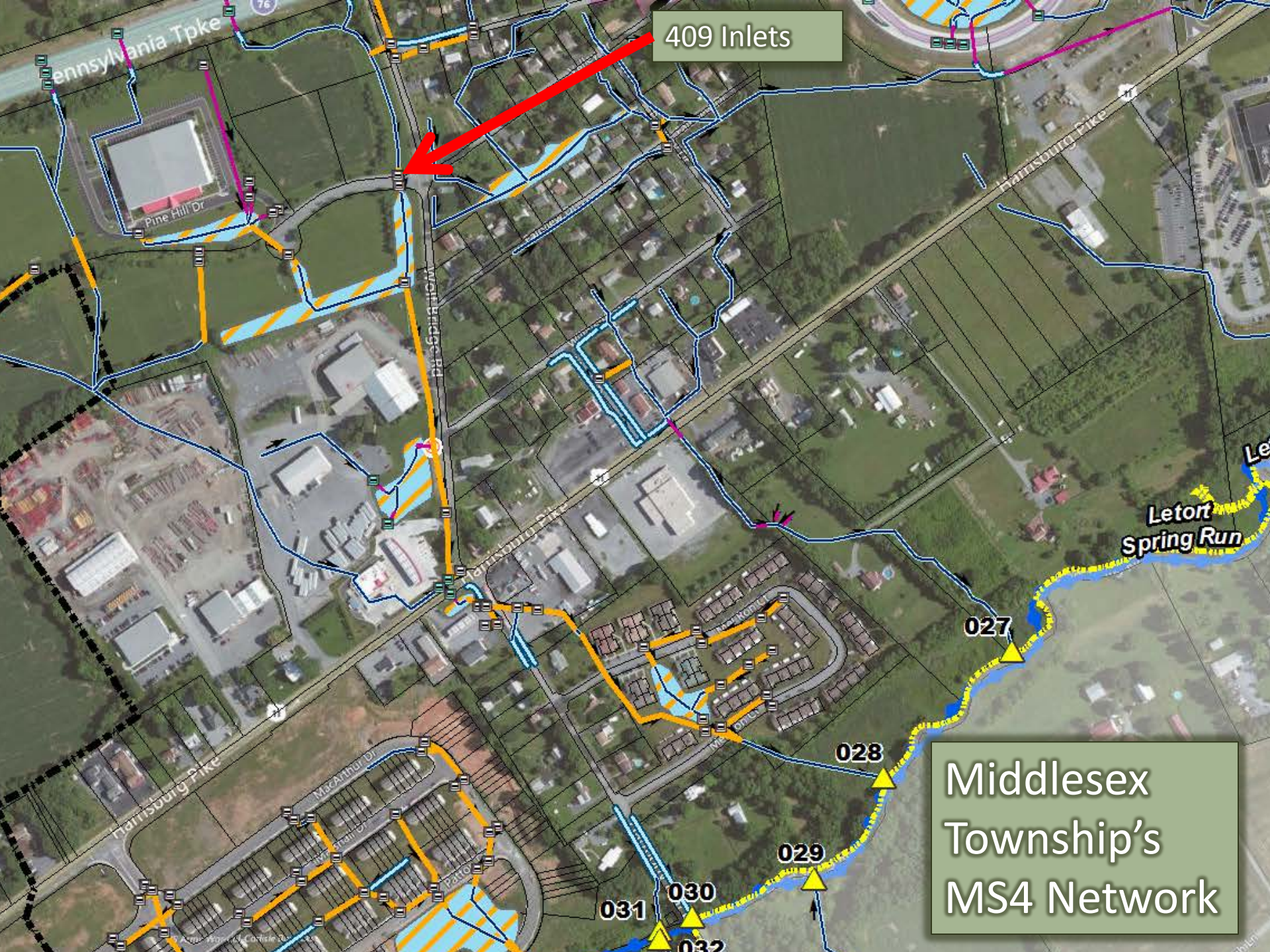
Middlesex Township

Sample Map Area



Project No. 7





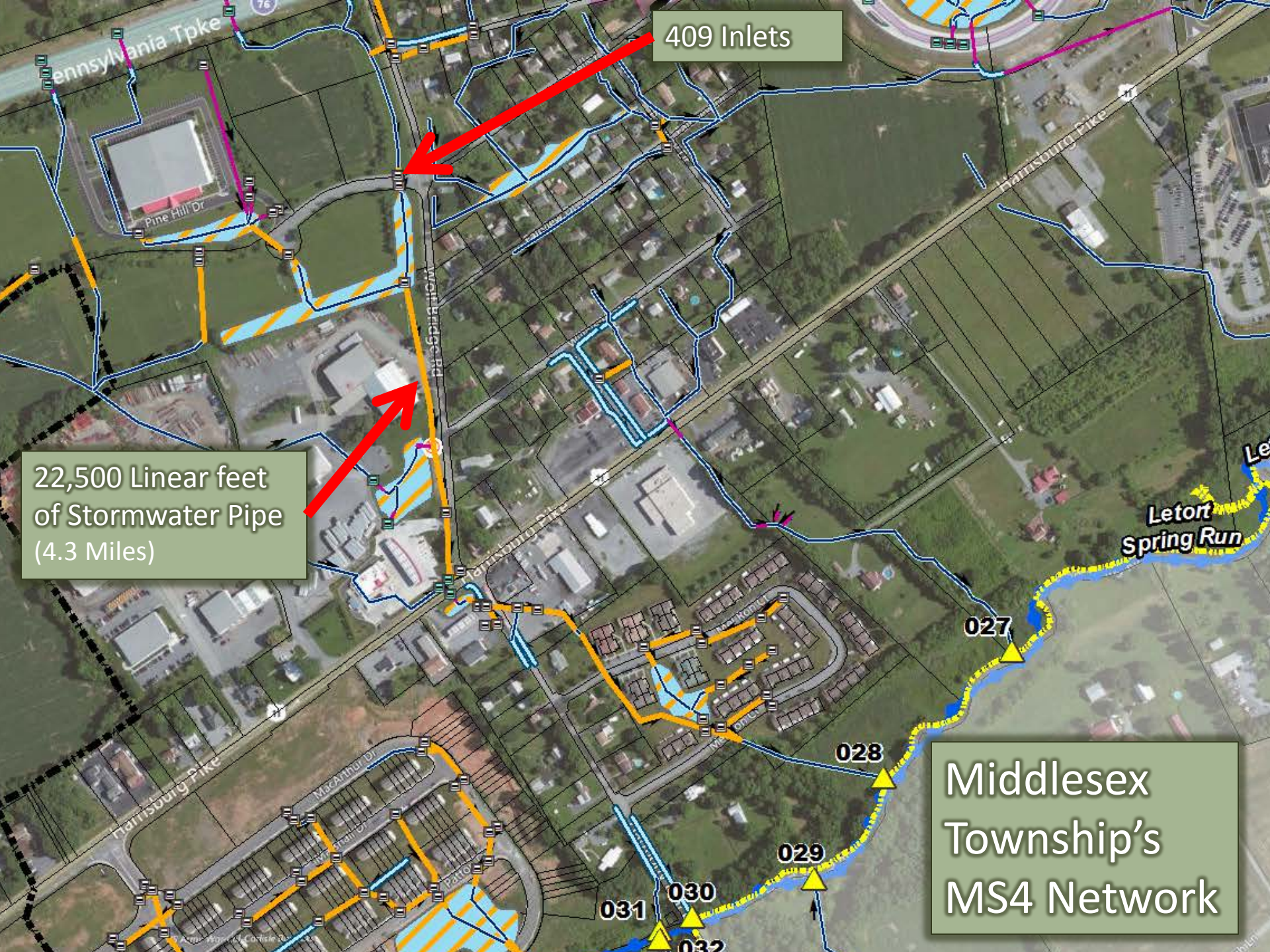
409 Inlets

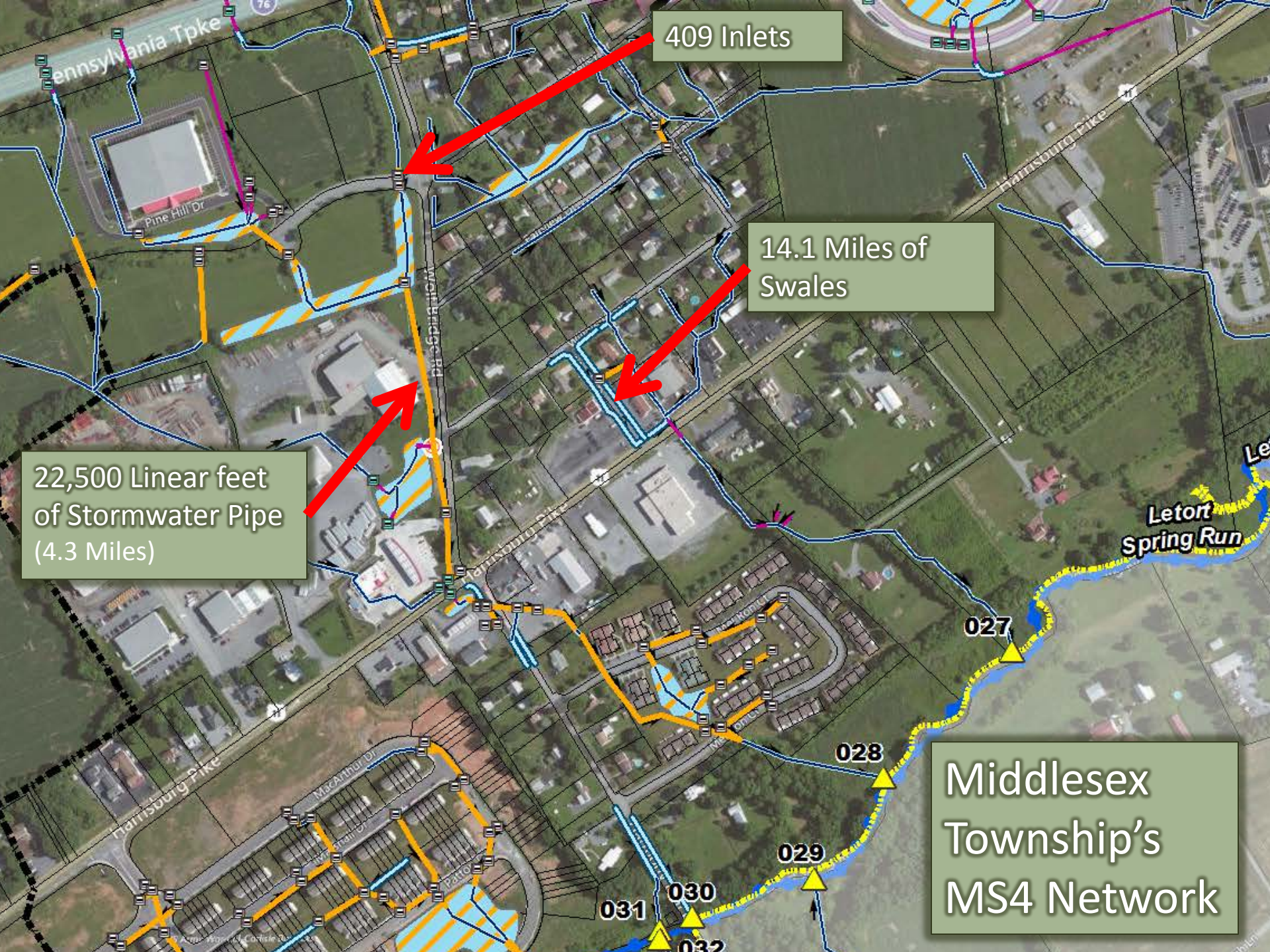
Middlesex
Township's
MS4 Network

409 Inlets

22,500 Linear feet
of Stormwater Pipe
(4.3 Miles)

Middlesex
Township's
MS4 Network



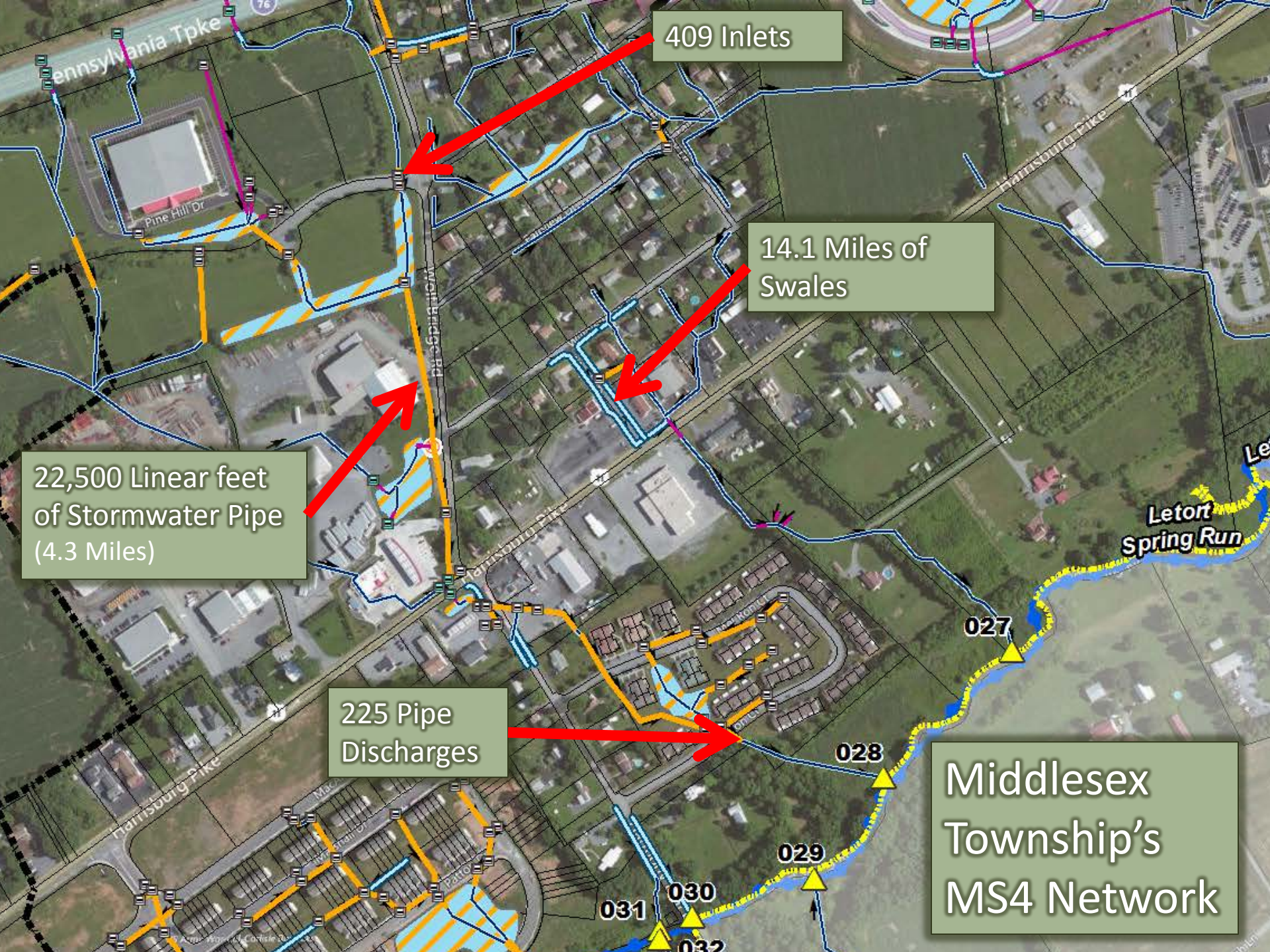


409 Inlets

14.1 Miles of Swales

22,500 Linear feet of Stormwater Pipe (4.3 Miles)

Middlesex Township's MS4 Network



409 Inlets

14.1 Miles of Swales

22,500 Linear feet of Stormwater Pipe (4.3 Miles)

225 Pipe Discharges

Middlesex Township's MS4 Network

Letort Spring Run

027

028

029

031

030

032

Pennsylvania Tpke

Pine Hill Dr

Westbridge Rd

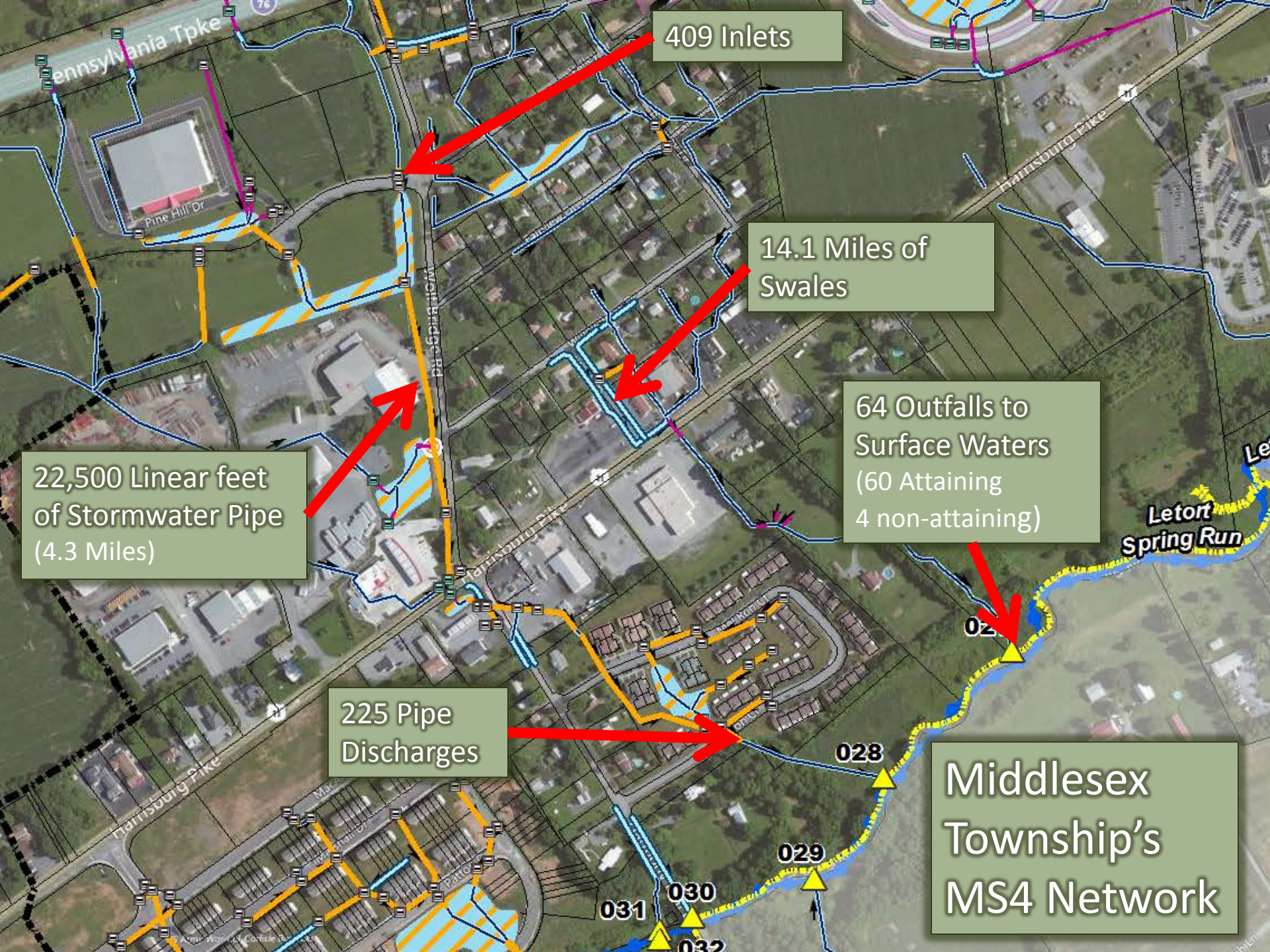
Harrisburg Pike

Harrisburg Pike

Mac

Patto

MAJOR ROAD



409 Inlets

14.1 Miles of Swales

64 Outfalls to Surface Waters
(60 Attaining
4 non-attaining)

22,500 Linear feet of Stormwater Pipe
(4.3 Miles)

225 Pipe Discharges

Middlesex Township's MS4 Network

Letort Spring Run

027

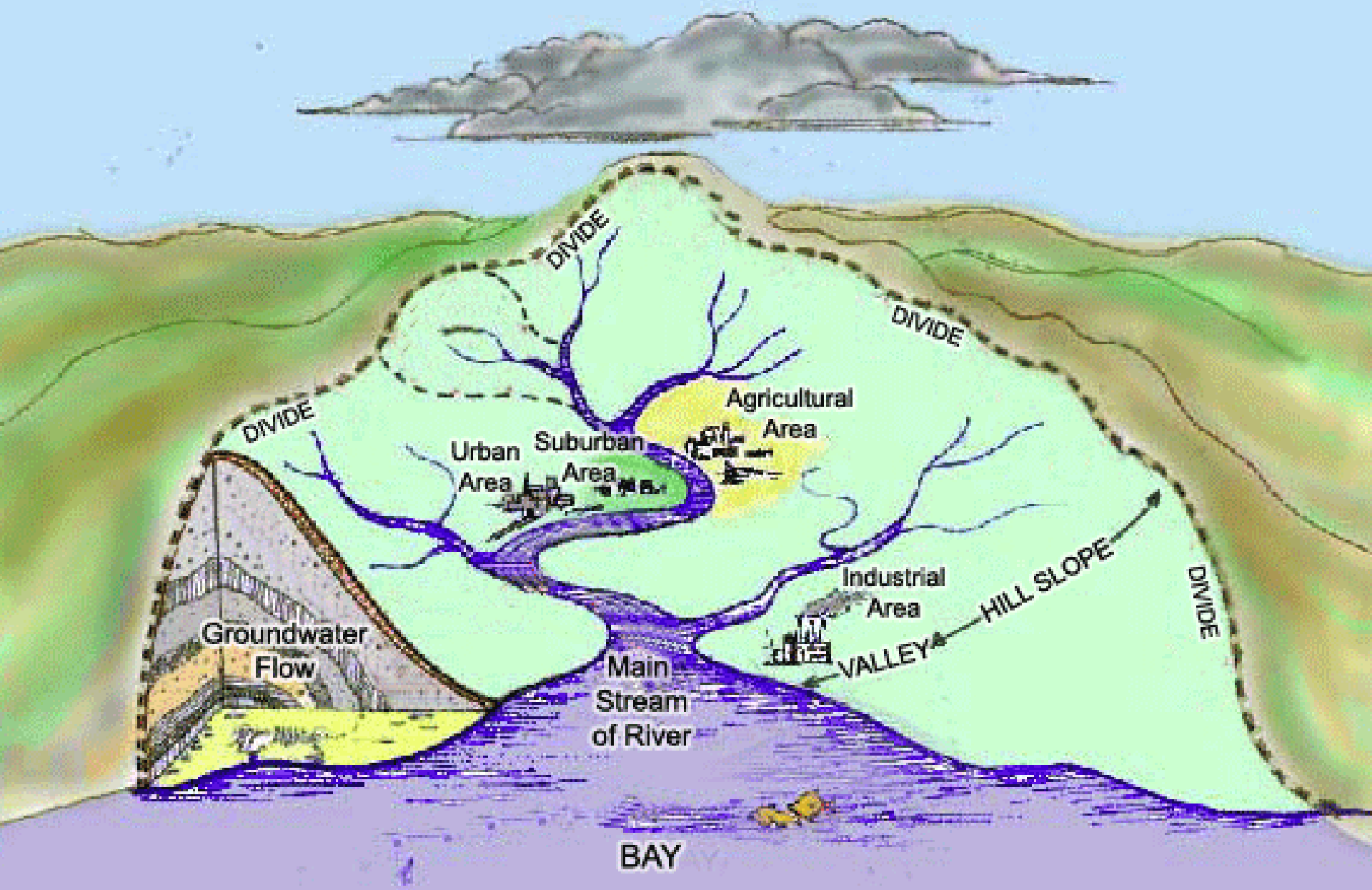
028

029

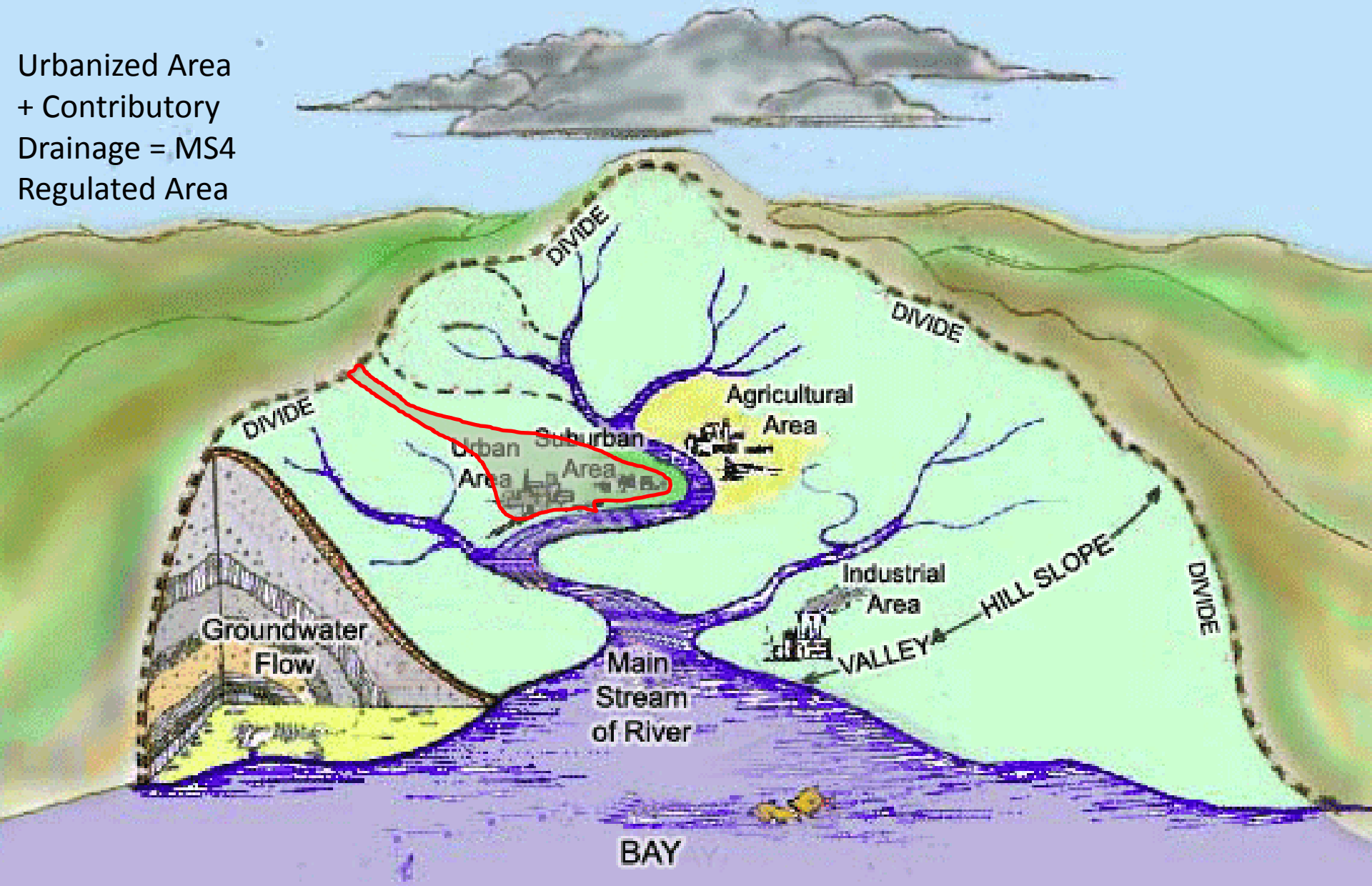
031

030

032



Urbanized Area
+ Contributory
Drainage = MS4
Regulated Area



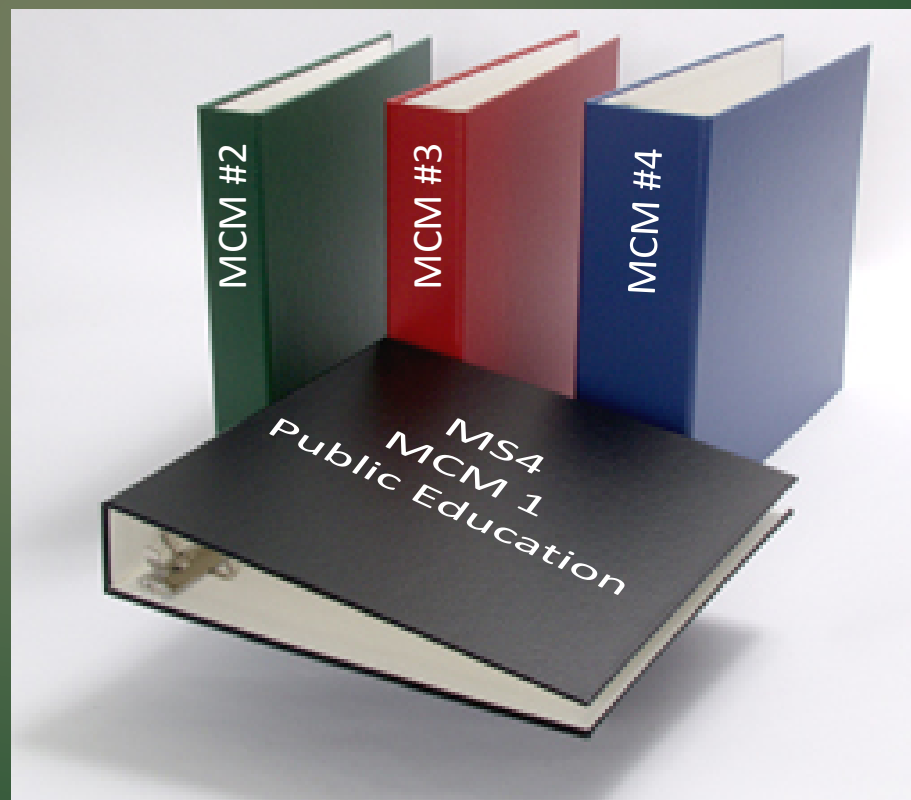
MS4 Permit Requirements

Middlesex Township National Pollutant Discharge Elimination System (NPDES) MS4 Permit

- New Permit
- Effective Date: March 2018 to March 2023

Components

- Minimum Control Measures (MCMs)
- + Pollutant Reduction Plan (PRPs)
- Stormwater Management Program



Minimum Control Measures

1. Public Education and Outreach

2. Public Involvement and Participation

3. Illicit Discharge Detection and Elimination

4. Construction Site Runoff Control

5. Post-construction Stormwater Management
in New Development

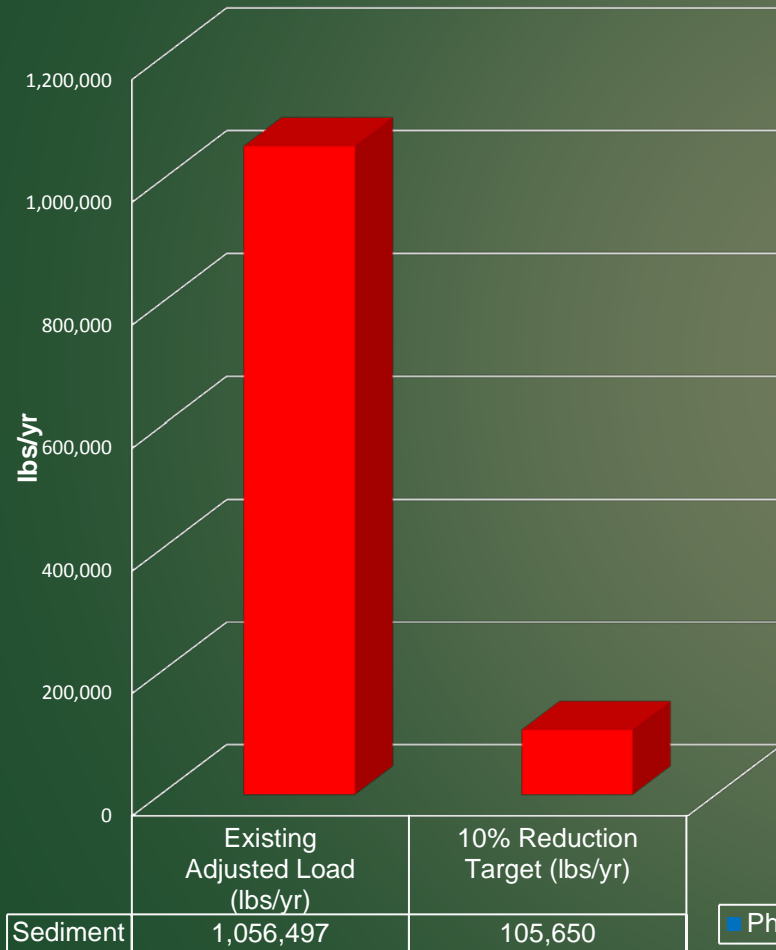
6. Pollution Prevention and Good Housekeeping
for Municipal Operations and Maintenance

Pollutant Reduction Plan

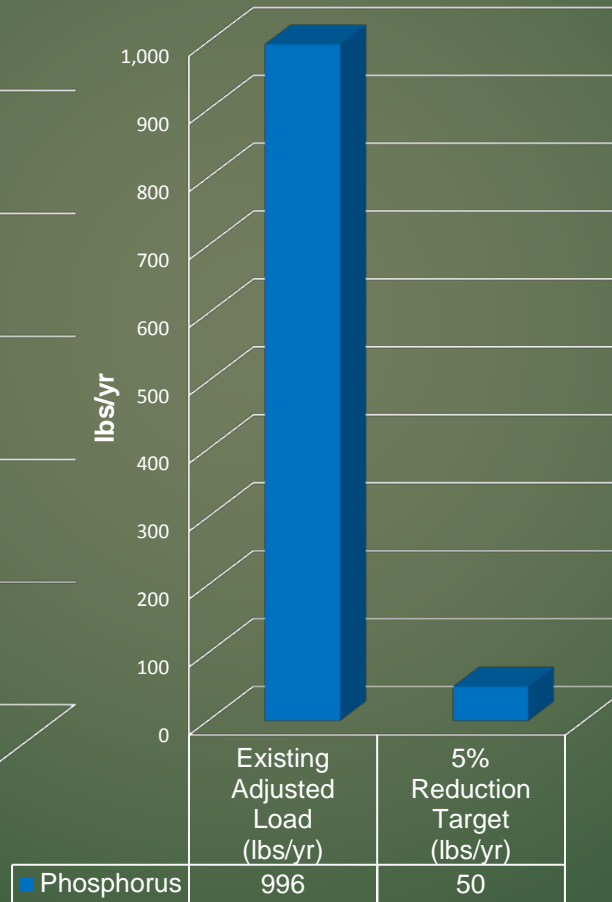
- Identify projects and practices to reduce sediment and nutrients in stormwater runoff
 - Actual locations
 - Real budgets
 - Implement
 - Within 5-year permit cycle

Pollutants of Concern

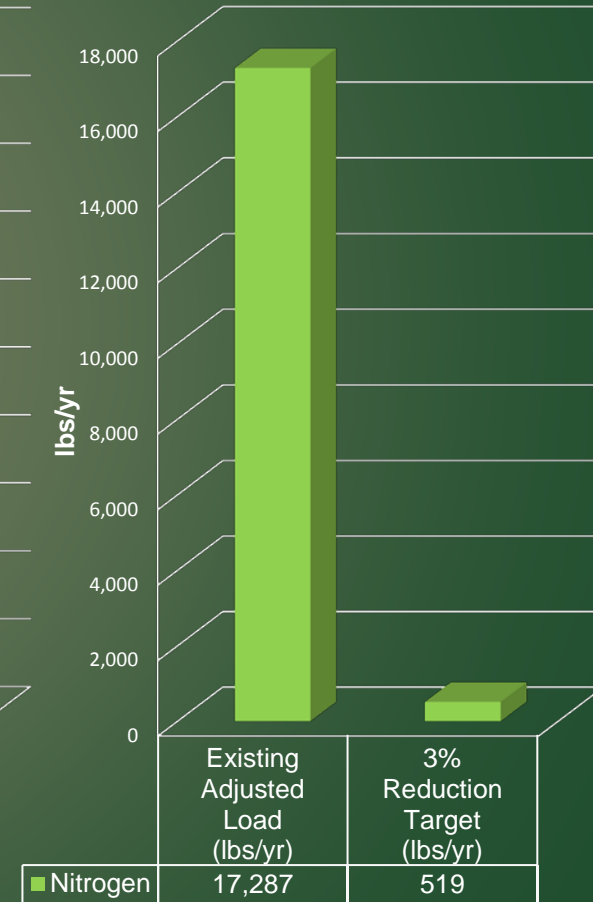
Sediment



Phosphorus



Nitrogen



Middlesex Township

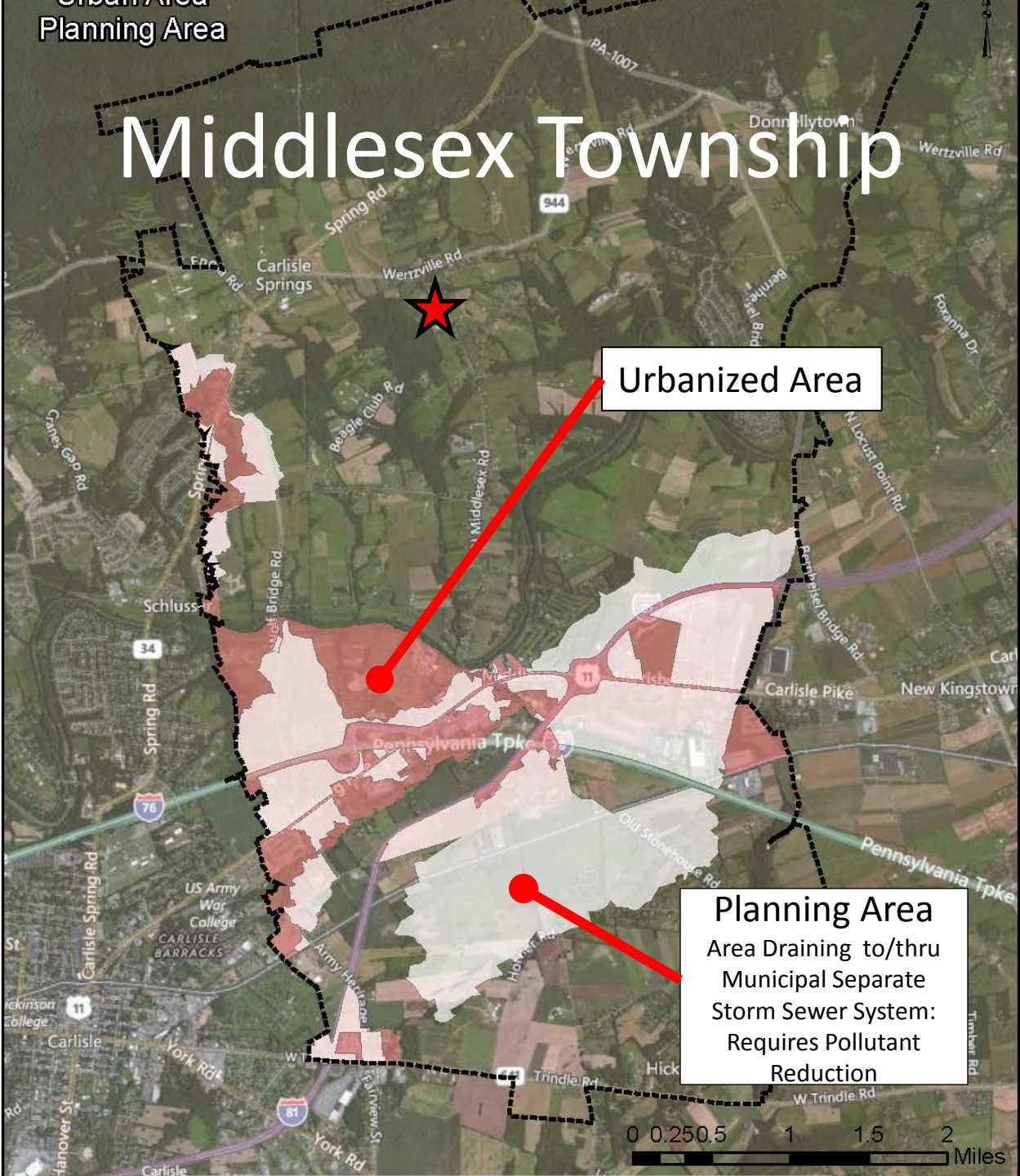


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Urban Area
Planning Area

Middlesex Township



Urbanized Area

Planning Area

Area Draining to/thru
Municipal Separate
Storm Sewer System:
Requires Pollutant
Reduction

0 0.250.5 1 1.5 2 Miles

Proposed Projects

- 9 Projects Planned

- Wertz Run – Conodoguinet Creek

- 6 projects

- Letort Spring Run

- 2 Projects

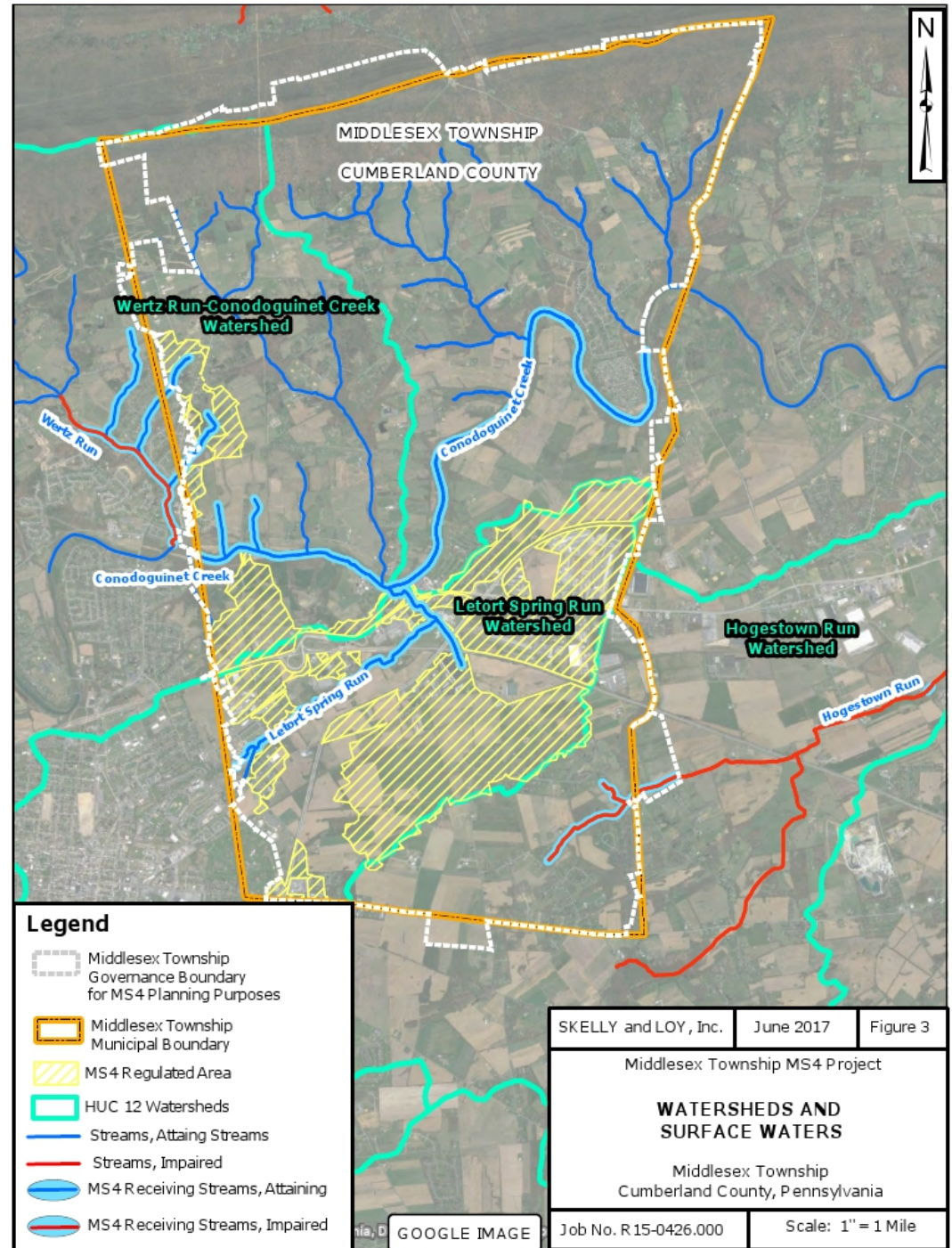
- Hogestown Run

- 1 project

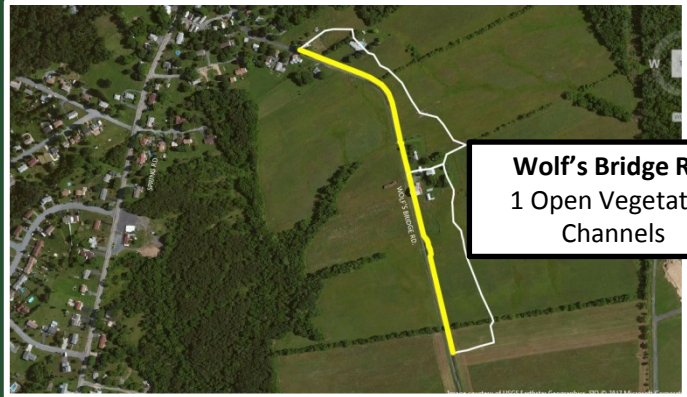
\$ 815,600

to

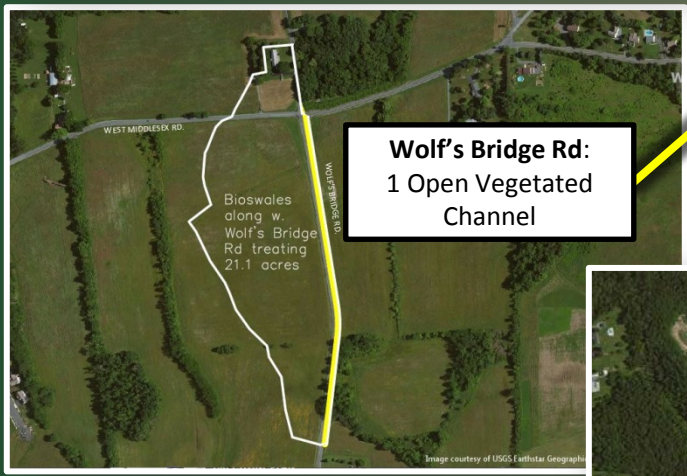
\$ 1,165,125



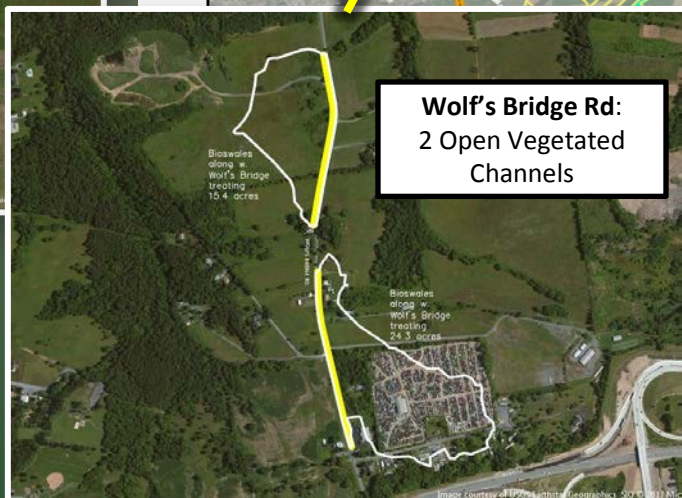
Wertz Run



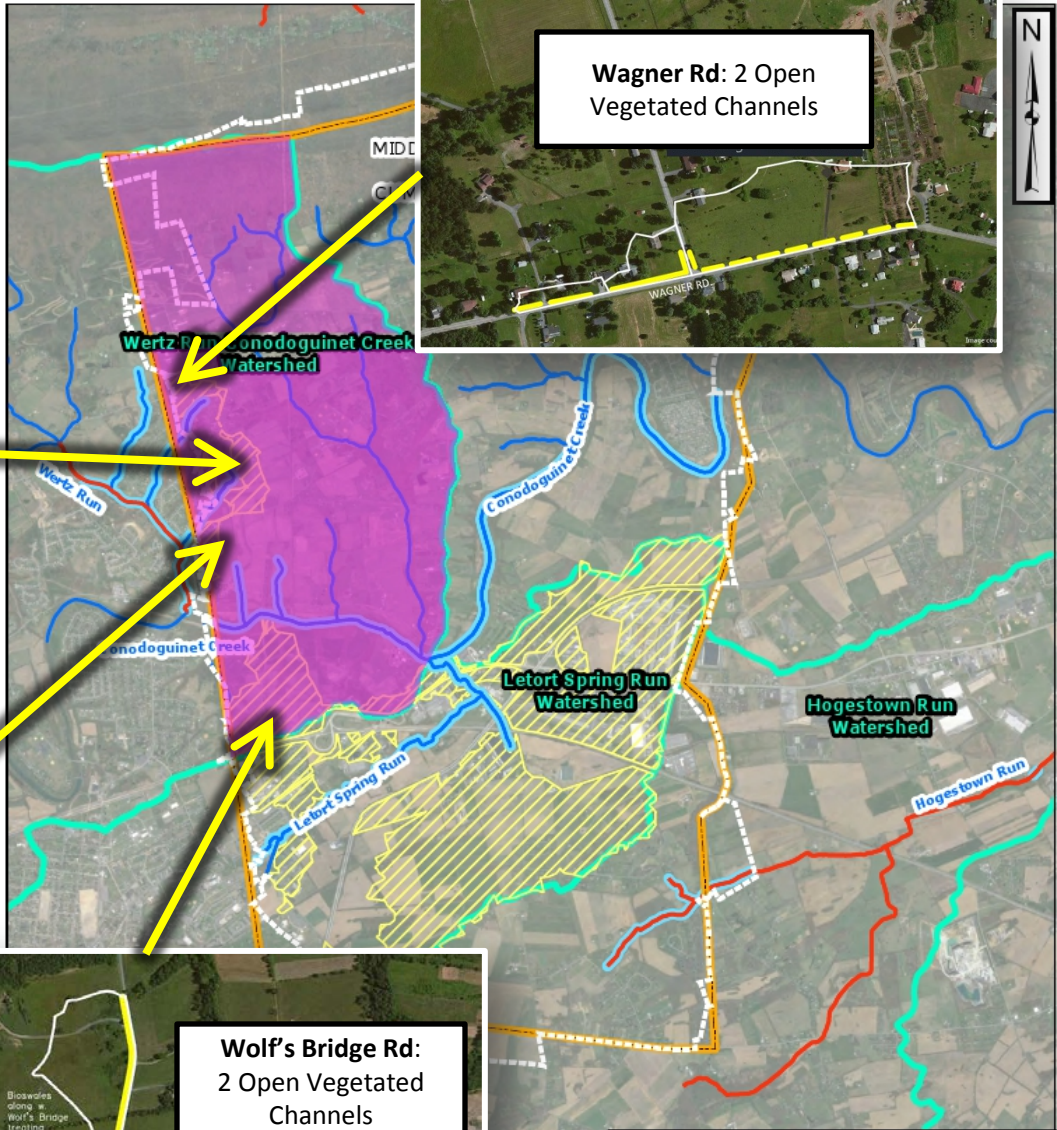
Wolf's Bridge Rd:
1 Open Vegetated Channels



Wolf's Bridge Rd:
1 Open Vegetated Channel



Wolf's Bridge Rd:
2 Open Vegetated Channels



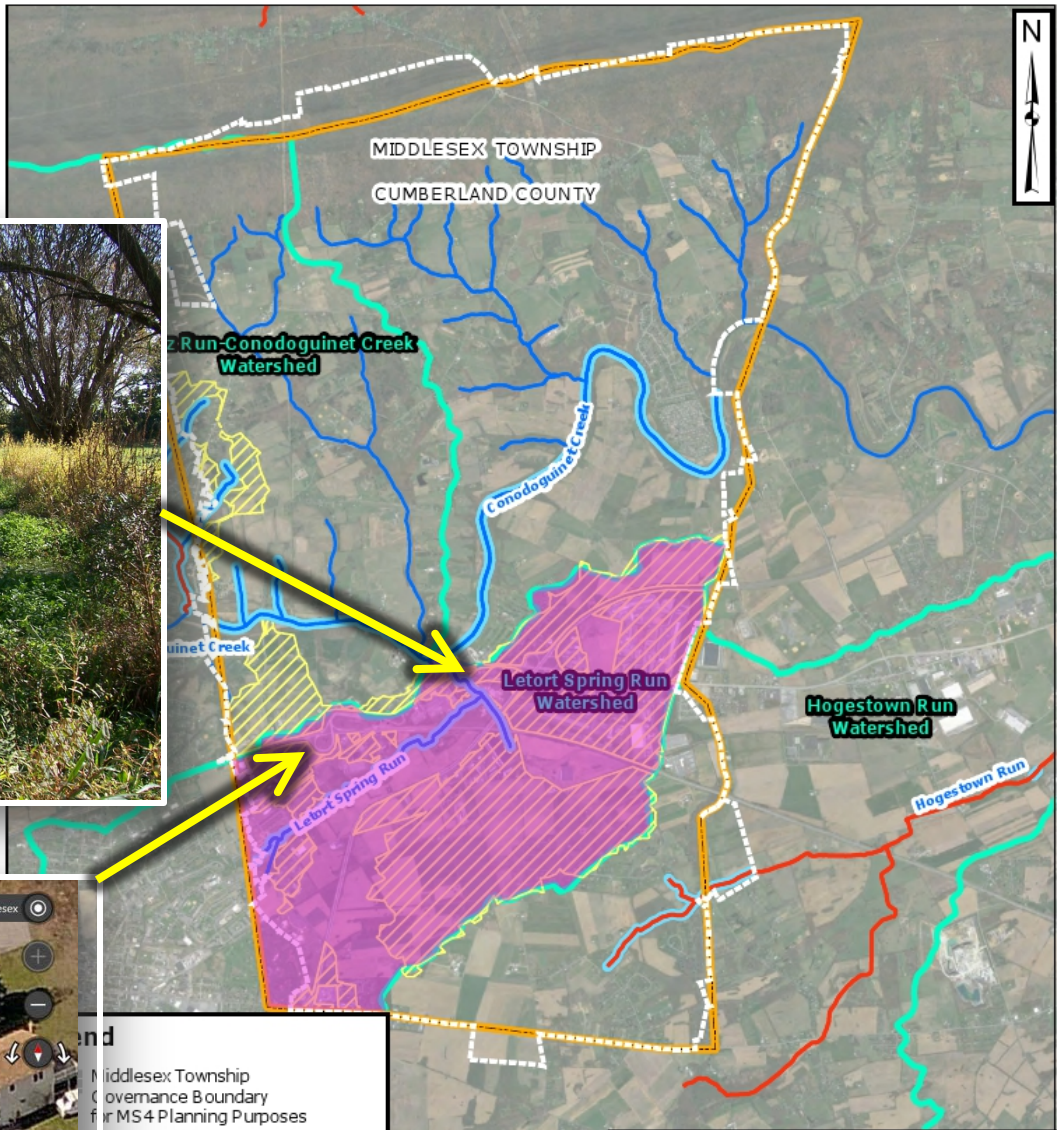
Wagner Rd: 2 Open Vegetated Channels

SKELLY and LOY, Inc.	June 2017	Figure 3
Middlesex Township MS4 Project		
WATERSHEDS AND SURFACE WATERS		
Middlesex Township Cumberland County, Pennsylvania		
Job No. R.15-0426.000	Scale: 1" = 1 Mile	

Letort Spring Run



**Letort Spring Run:
Stream Restoration**



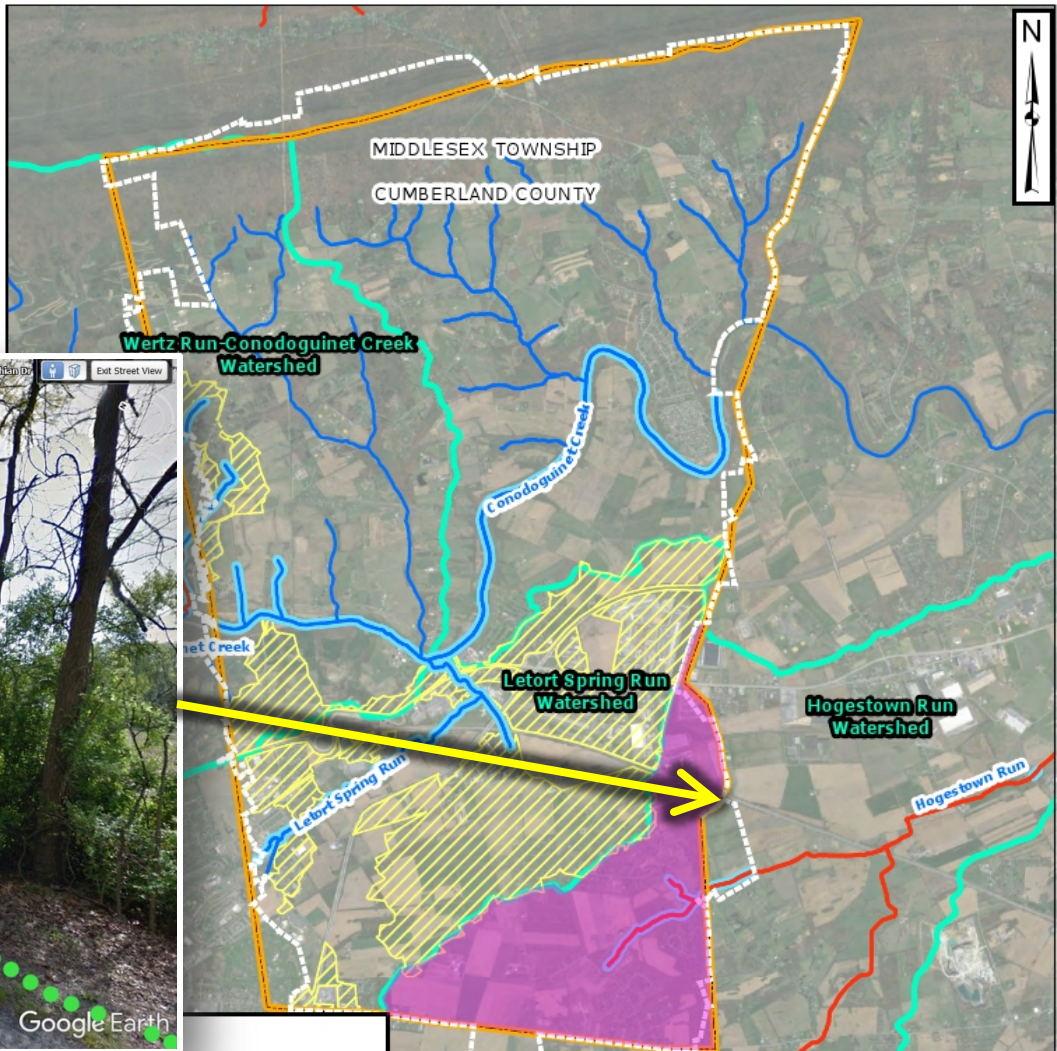
**Anderson Park:
1 Open Vegetated
Channel to Rain
Garden**

- nd
- Middlesex Township
- Coverance Boundary
- for MS4 Planning Purposes
- Middlesex Township
- Municipal Boundary
- MS4 Regulated Area
- HJC 12 Watersheds
- Streams, Attaining Streams
- Streams, Impaired
- MS4 Receiving Streams, Attaining
- MS4 Receiving Streams, Impaired

SKELLY and LOY, Inc.	June 2017	Figure 3
Middlesex Township MS4 Project		
WATERSHEDS AND SURFACE WATERS		
Middlesex Township Cumberland County, Pennsylvania		
Job No. R.15-0426.000	Scale: 1" = 1 Mile	

GOOGLE IMAGE

Hogestown Run



- Middlesex Township Governance Boundary for MS4 Planning Purposes
- Middlesex Township Municipal Boundary
- MS4 Regulated Area
- HUC 12 Watersheds
- Streams, Attaining Streams
- Streams, Impaired
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- MS4 Receiving Streams, Impaired

SKELLY and LOY, Inc.	June 2017	Figure 3
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Middlesex Township Cumberland County, Pennsylvania		
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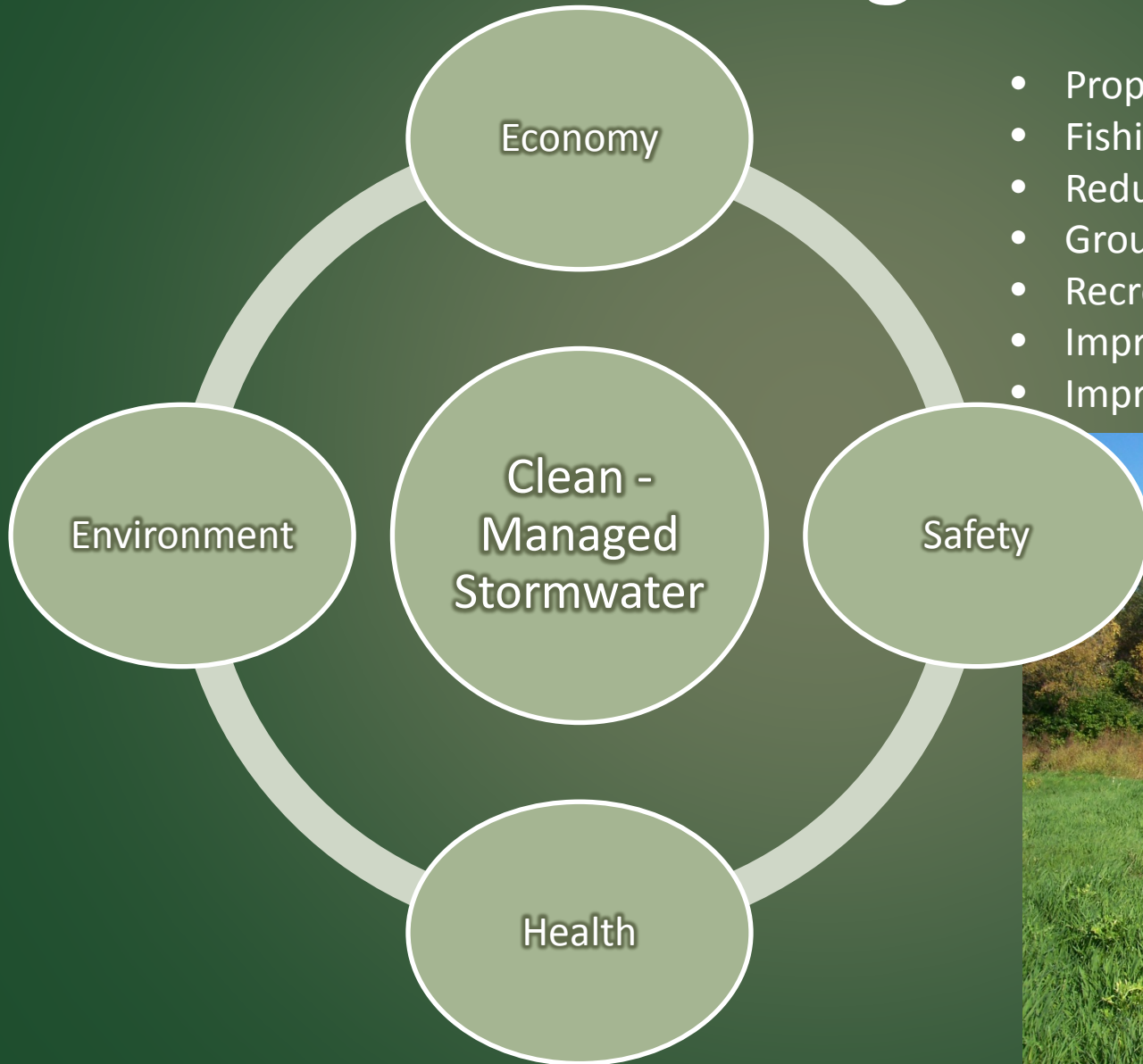
GOOGLE IMAGE

Middlesex BMP Funding and Maintenance

- Proposed Method of Funding
 - Grants
 - General Fund
- Maintenance
 - Parties Responsible for Maintenance: Road Crew
 - Maintenance Activities: Cleaning, Mowing, Repair and Replacement
 - Frequency of Maintenance: Varies

Stormwater Management Program

Stormwater Program Benefits



- Property Value Protection
- Fishing-based Tourism Support
- Reduced Flooding and Damage
- Groundwater Recharge (supply)
- Recreational Opportunity
- Improved Stream Health
- Improved Wildlife Habitat



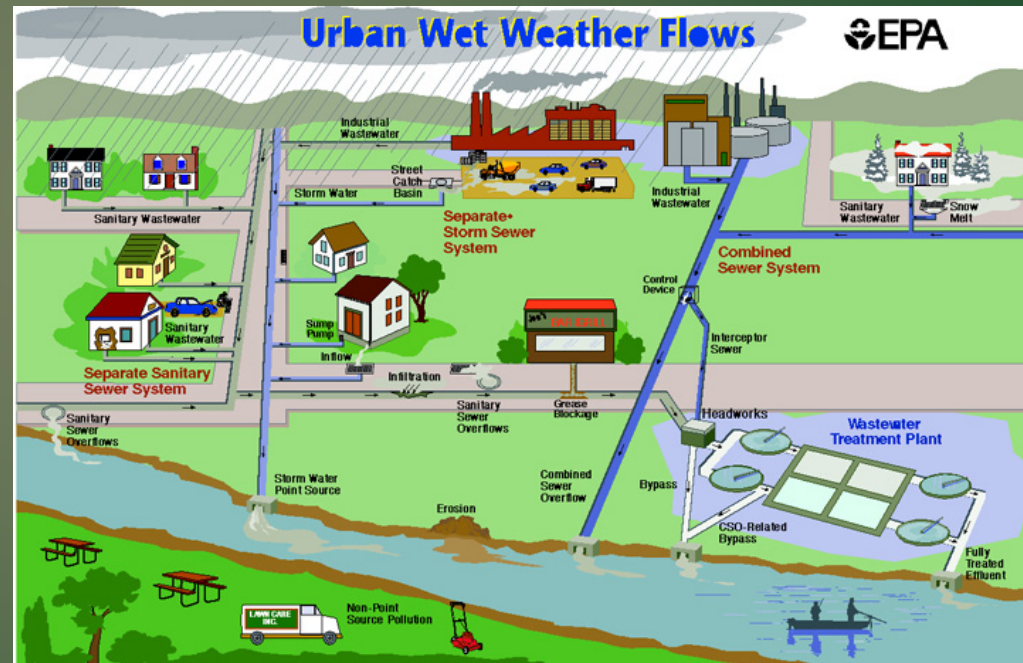
Stormwater Program Goals

- Assess drainage, flooding and stormwater problems
- Maintain aging Infrastructure
- Implement System Improvements
- Comply with state and federal regulations, particularly NPDES MS4 permit

Stormwater Program Services

Stormwater infrastructure = Utility

- Maintenance (repair and replacement)
 - Storm conveyance (pipes, channels and swales)
 - Catch basins
 - Detention/retention ponds
 - Raingardens and bioswales
 - Preventative practices (sweeping)
 - Ongoing monitoring & inspections
- Capital Improvements and Expansion
- Personnel Management
- Administrative Duties
 - Record keeping
 - Payroll and contracts
 - Complaint resolution
 - Funding procurement and management (grants and loans)



http://whenitrains.commons.gc.cuny.edu/files/2013/06/wet_weather_flow_graphic.jpg

Current Maintenance Activities

- 110 Miles of Paved Roadway
- Street Sweeping
- Leaf Removal
- Cleaning and Repair of Inlets
- Storm Sewer Pipe/Culvert Cleaning and Repair
- Review of Privately-owned BMP Agreements and Facilities

Additional Maintenance Activities

- **Increased maintenance** of public stormwater facilities within the MS4 regulated portion of the Township
- **Increased documentation and records management** for maintenance activities
- **New Inspection Responsibilities:** Outfalls at streams and suspicious discharges (Illicit Discharge Detection and Elimination-IDD&E)

Recent Capital Improvements

- Wagner Road Open Channel Improvements initiated
- Limited non-routine maintenance and repairs

Proposed Capital Improvements

- New and retrofit MS4 BMPs to improve/protect local water quality and the Chesapeake Bay (Approximately \$1 million)
- Computer Hardware/Software

Other Expenditures

- Training
- Equipment
- Consultants
- Staffing

MS4 Permit Financial Requirements

- Sample Permit Language:

The permittee shall develop and maintain adequate legal authorities, where applicable, and shall maintain adequate funding and staffing to implement this Permit, including the Stormwater Management Plan....

MS4 Permit Financial Requirements

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Legal Authority

- Pennsylvania Act 68 of 2013 - Authorities may be tasked with addressing stormwater issues
- Pennsylvania Act 62 of July 1, 2016 – Amends Act 69 of May 1, 1933 to permit Second-class Townships to collect fees to implement, construct and maintain stormwater facilities.
- The intent of the Acts is to provide municipalities with options other than taxation for funding stormwater management obligations

MS4 Permit Financial Requirements

- Sample Permit Language:

The permittee shall develop and maintain adequate legal authorities, where applicable, and shall maintain adequate funding and staffing to implement this Permit, including the Stormwater Management Plan....

Bottom Line...

Current Costs

- Routine Road/Stormwater Maintenance
- Emergency Repair Response

NEW COSTS!

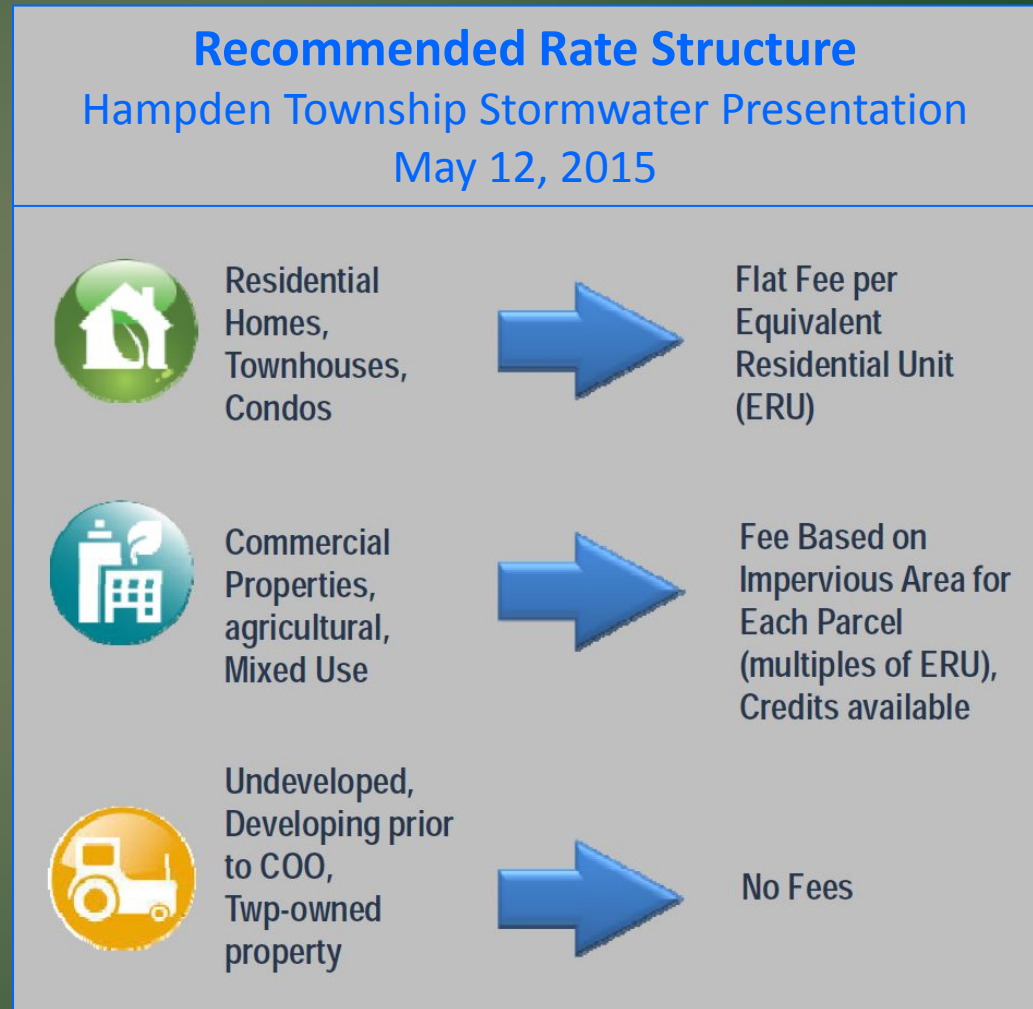
- BMP Construction
 - Additional Personnel
 - Inspections
 - Administration
 - Documentation
- = STORMWATER MANAGEMENT FEES



<http://science-all.com/money.html>

Typical Structure

- No Exemptions - Fee applicable to **ALL** serviced properties
- Rate structure correlates to land use
- Fee directly linked to impervious surface (actual or average)
- Discounts available



<http://www.hampdentownship.us/wp-content/uploads/2015/05/Hampden-Stormwater-Public-Mtg-3.pdf>

Pennsylvania Samples

ID	Hampden Township	Lancaster	Radnor	Meadville	Mount Lebanon
Billing Unit Equivalent Residential (ERU) Base Unit (BU)	3,534 SF Imp (1 ERU)	4 BU Tiers Tiers 1-3: Graduated Flat Rate Tier 4: (> 3,000 SF Imp) SF Imp/1000 SF x \$7.74	4 BU Tiers	2,660 SF Imp (1 ERU)	2,400 SF Imp (1 ERU)
Residential	\$13.25 (Flat)	Tier 1-3: \$3.87 to \$19.35	\$7.25 to \$29 Based on <u>total lot area</u>	\$22.50	\$24.00
Non-Residential	\$13.25/ERU	Tier 4: Calculate	\$7.25 to \$29 Based on <u>impervious area/1500 SF</u>	\$22.50/ERU	\$24.00/ERU
Min. Billing Threshold	>300 SF Imp	>300 SF Imp	N/A	>200 SF Imp	>800 Imp
Credits-Discounts	Yes	Yes	Yes	Yes	Yes

Rates shown are quarterly



Carrol Ehrhart, RLA
cehrhart@skellyloy.com

Skelly and Loy

Engineering and Environmental Consultants

449 Eisenhower Blvd, Suite 300

Harrisburg, PA 17111

Telephone: (717) 232- 0593



Questions / Discussion