

Isolating and Fixing Illicit Discharges

Wissahickon IDDE Workshop
Fort Washington, PA
May 31, 2011

Overview

- ▶ Using outfall and field data to prioritize watersheds
- ▶ Finding Illicit Discharges
- ▶ Making sure they get fixed.

Subwatershed and Survey Reach Screening: Metrics to Consider

- ▶ Fraction flowing (from ORI)
- ▶ Number with physical indicators, and severity
- ▶ Indicators at dry outfalls
- ▶ Other existing monitoring data
- ▶ In-stream goals
- ▶ History of complaints

Characterizing the IDDE Problem at the Community Level:

Using Stream and ORI Data to Categorize IDDE Problems	
Extent	ORI Support Data
Minimal	<ul style="list-style-type: none">• Less than 10% of total outfalls are flowing• Less than 20% of total outfalls with obvious, suspect or potential designation
Clustered	<ul style="list-style-type: none">• Two thirds of the flowing outfalls are located within one third of the subwatersheds• More than 20% of the communities subwatersheds have greater than 20% of outfalls with obvious, suspect or potential designation
Severe	<ul style="list-style-type: none">• More than 10% of total outfalls are flowing• More than 50% of total outfalls with obvious, suspect or potential designation• More than 20% of total outfalls with obvious or suspect designation

Tracking Discharges to the Source

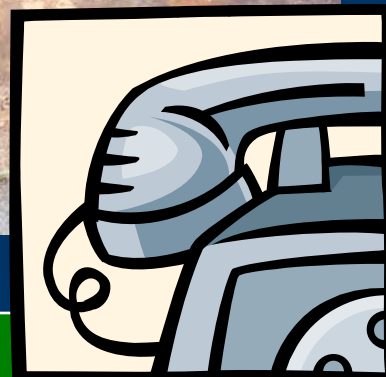
- ▶ Hotlines
- ▶ Isolating within the pipe
- ▶ Drainage area investigations
- ▶ Site investigations

Finding:

Pollution Complaint Hotline

Phone number or website where citizens can easily report illicit discharges and pollution concerns.

- ▶ Useful for intermittent or transitory discharges
- ▶ Follow-up within 24 hours



Hotline Establishment and Maintenance

Six Steps:

1. Define the scope
2. Create a tracking and reporting system
3. Train personnel
4. Advertise
5. Respond to complaints
6. Track Incidents



Source: Ft. Worth DEM

Finding: Illicit Discharge Investigations



- ▶ Storm Drain Network Investigations
- ▶ Drainage Area Investigations
- ▶ On-Site Investigations
- ▶ Septic System Investigations

Finding: Storm Drain Network Investigations



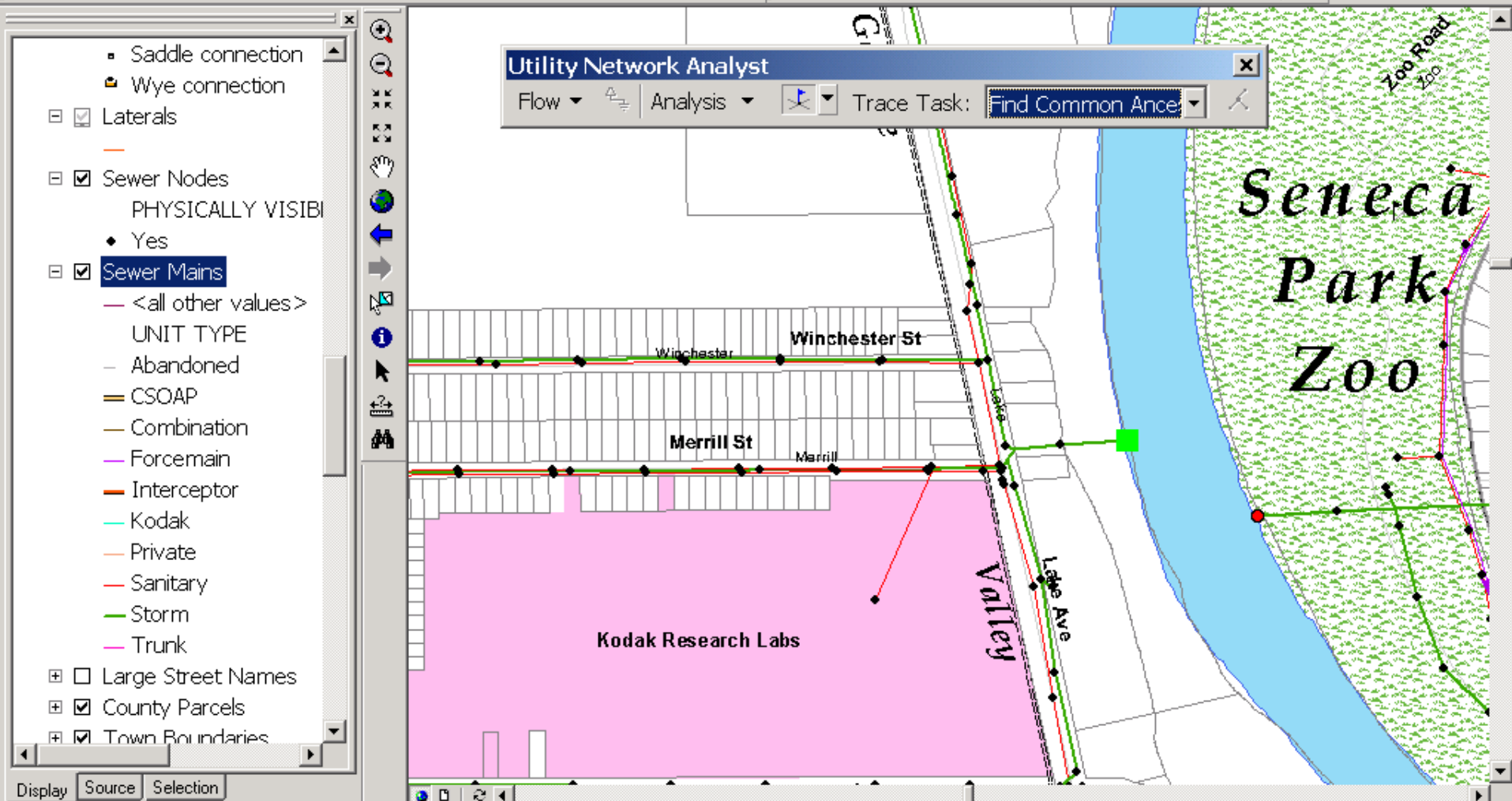
Trunk Investigations –
narrows source to a single
segment of a storm sewer

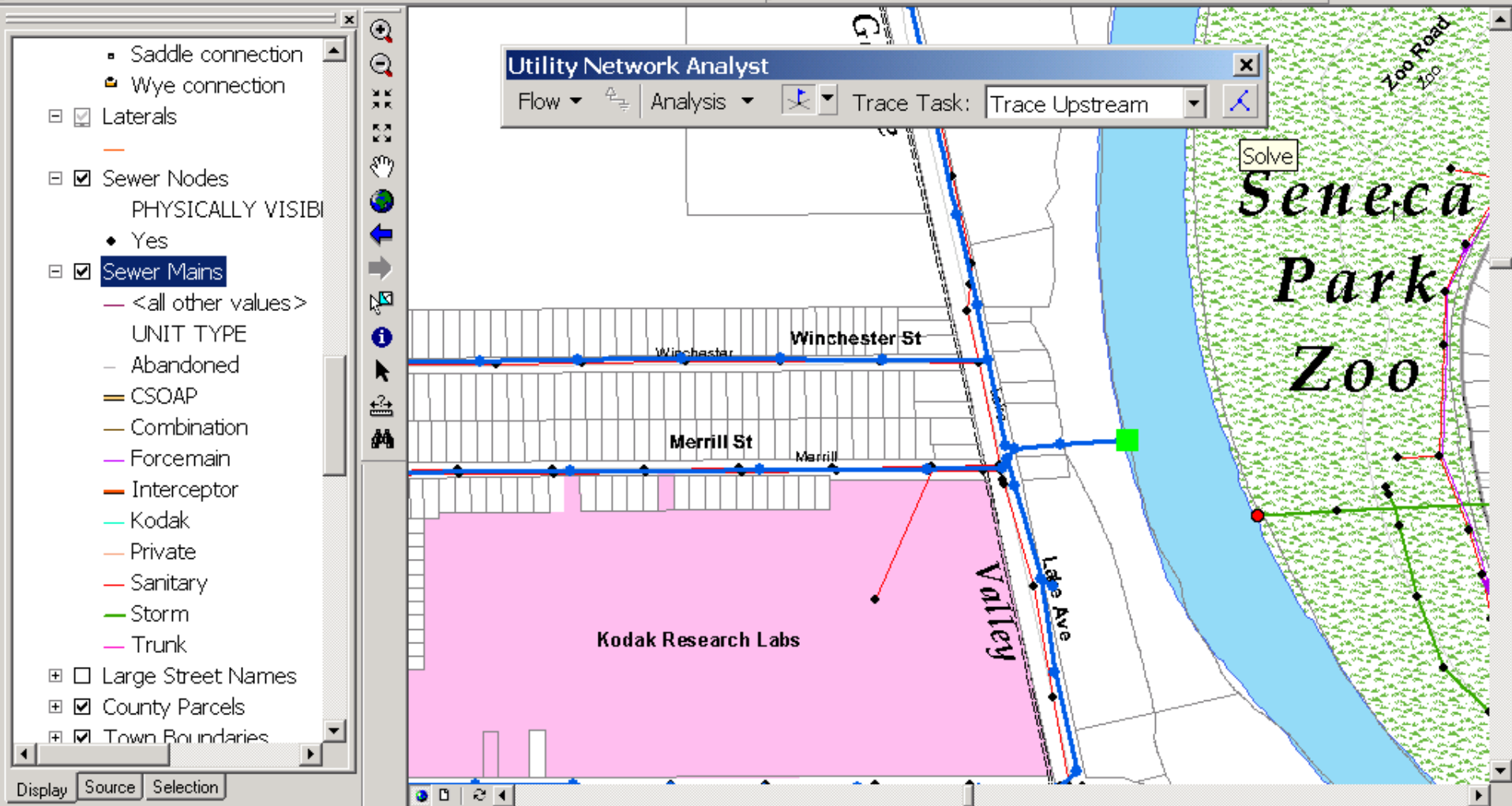
3 Methods for how to Explore
Network:

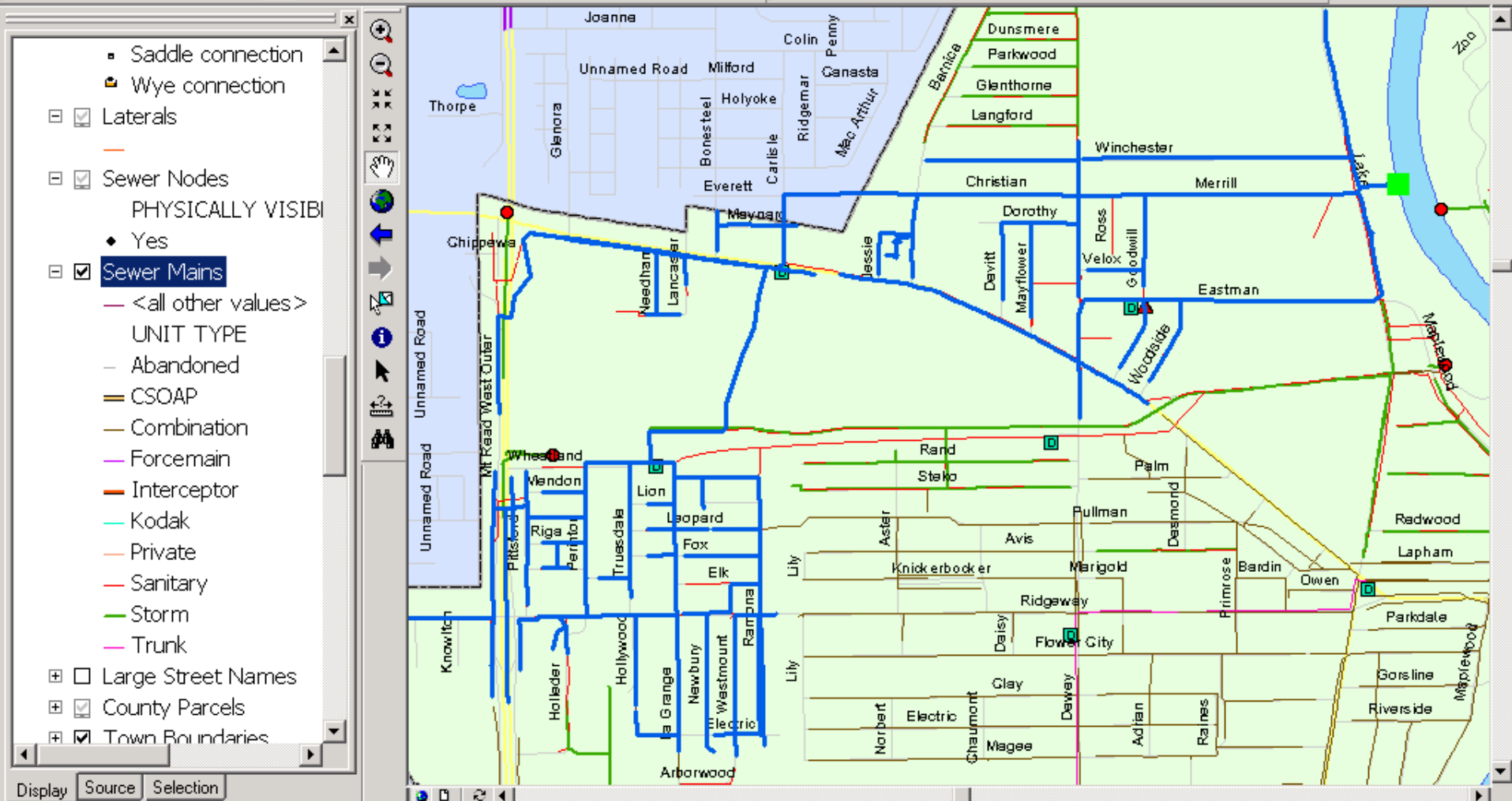
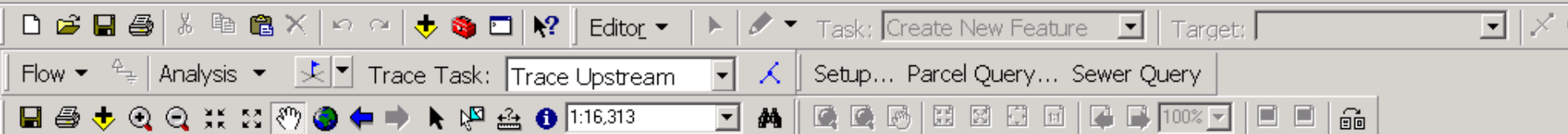
- Move up the trunk
- Split the Storm Drain Network
- Move down the Storm Drain
Network

Example: Use Mapping to Isolate Andy Sansone, Rochester, NY

- ▶ Very large drainage network.
- ▶ Use GIS to isolate discharges to a segment of the storm drain network.
- ▶ Later, follow up with detailed investigations.







Tracking Approach: Manhole Inspections



Source: Ft. Worth DEM

Methods:

- ▶ Visual Observations
- ▶ Indicator Sampling

Considerations:

- ▶ Need crew of 2
- ▶ Dry weather conditions
- ▶ Traffic diversion
- ▶ Proper lifting

Lucky IDDE (Tom Lawrence, City of Memphis, TN)



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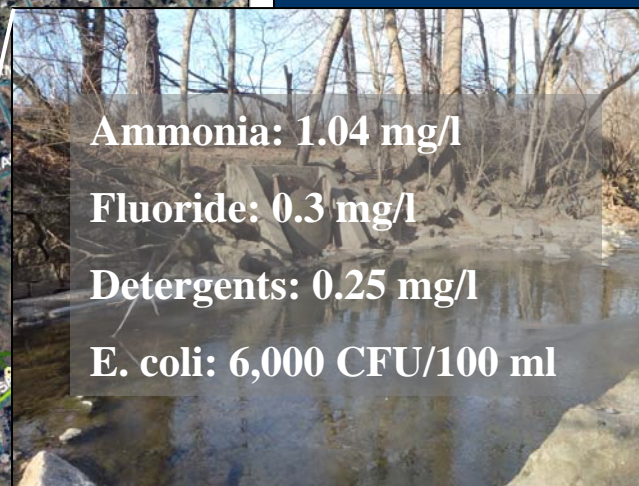


“Lucky IDDE” (Tom Lawrence, City of Memphis, TN)



Some Examples from Maryland

- ▶ Field work by CWP
- ▶ Examples tracking down a couple of discharges
- ▶ Often, initial investigation requires follow-up



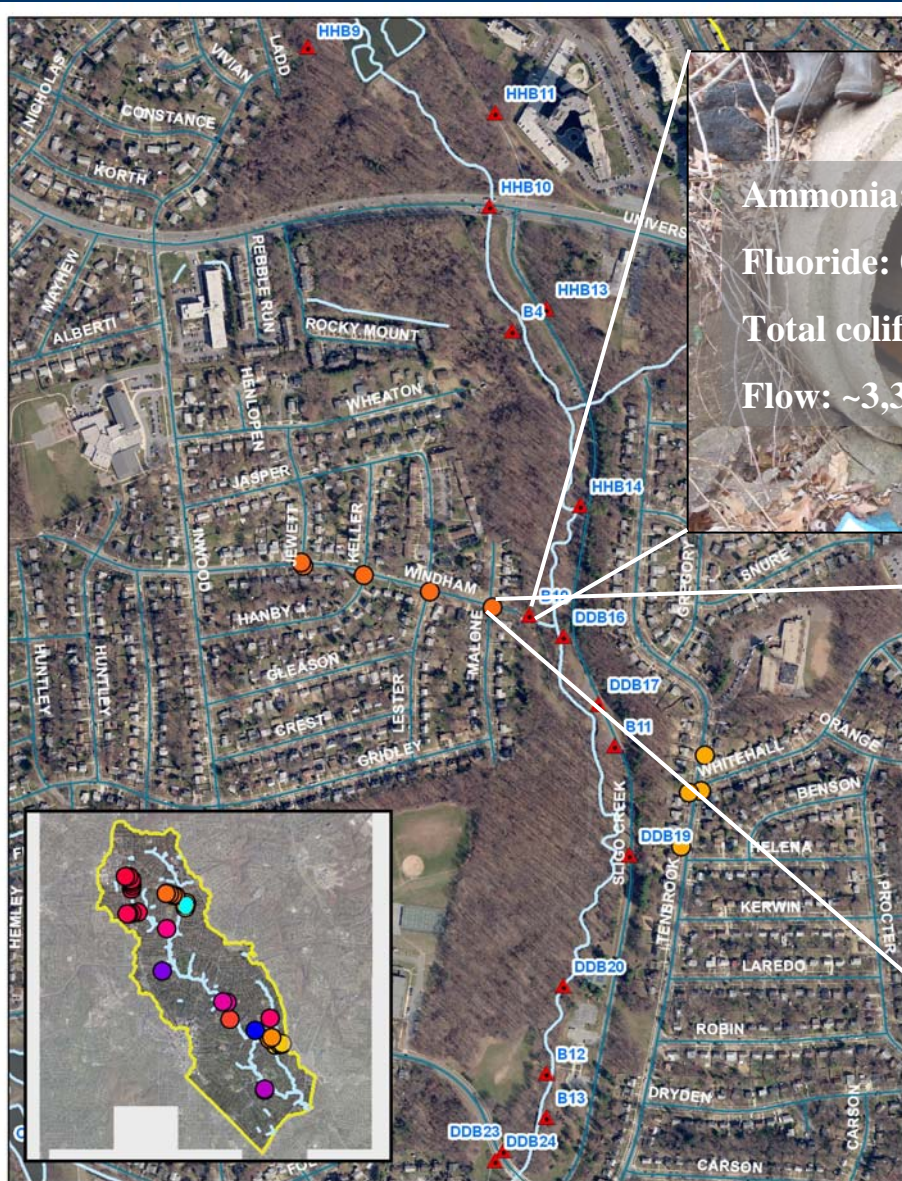
Ammonia: 1.04 mg/l

Fluoride: 0.3 mg/l

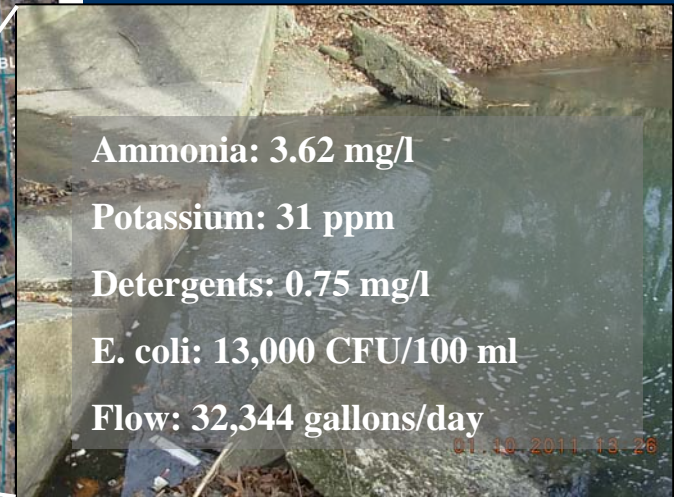
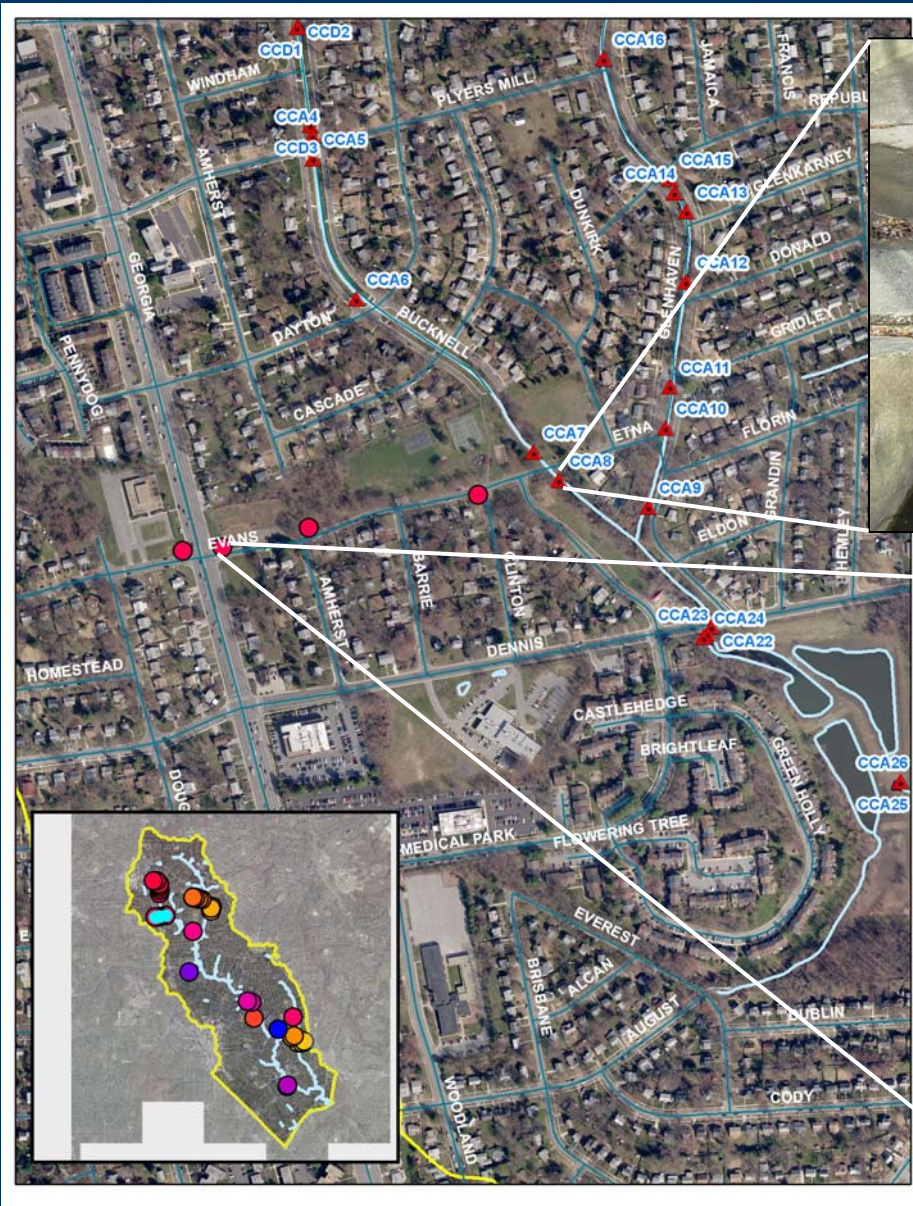
Detergents: 0.25 mg/l

E. coli: 6,000 CFU/100 ml

- Team walked grounds of International school looking for flow
- No indicators of flow were found in any manholes on school grounds or along Wayne Ave
- Flow likely a cross connection within school
- County will need to access pipe schematics for school and perform dye testing



- Team walked Windham St. and found flow in all manholes
- A fire hydrant up pipe from last flowing outfall may have a leak
- Neighbors report of seeing sump discharges from houses, sometimes with suds
- Discharges from sumps also a potential

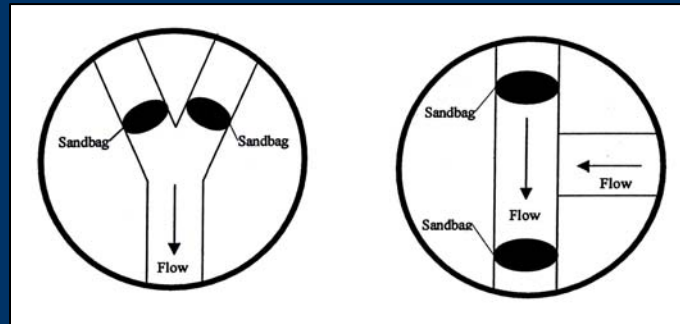


- Team walked Evans Ave, surveying manholes
- Manholes off Evans were dry
- Mapping problematic up-pipe of problem area
- East of Georgia: Ammonia-0.7 mg/l and detergents-0.75 mg/l
- West of Georgia: Ammonia-0.1 mg/l and detergents-0.25 mg/l
- Source likely between the two (still a problem up-pipe?)

Tracking Approach: Isolating Intermittent Discharges



- ▶ Sandbags
- ▶ Optical Brightener Monitoring (OBM) Traps
- ▶ Automatic Samplers
- ▶ Observation of Deposits/Stains



Finding:

Drainage Area Investigations

Survey of drainage area with problem outfall:

- Rapid Windshield Survey
- Detailed Investigation
- Effective if illicit discharge has unique characteristics allowing crews to quickly ascertain probable cause.

Finding: Drainage Area Investigations



Source: R. Frymire

Finding: Drainage Area Investigations

MATCH



Source: R. Frymire

Finding: On-Site Investigations

Used to pinpoint the exact source or connection producing a discharge within a storm drain network.

3 Basic Approaches:

- ▶ Dye
- ▶ Video
- ▶ Smoke

Dye Testing

Introduce non-toxic dye into plumbing fixtures – if it appears in storm drain then an illicit connection exists.

Useful when:

- Very small drainage area (<10 properties)
- Source from an individual property
- Commercial or industrial land use



Source: NIWPC, 2003

Dye Testing



Source: A. Sansone

Video Testing

Guide a mobile video camera to locate connections producing illicit discharge.



Useful when:

- Continuous discharge
- Discharge limited to single pipe segment
- Communities own equipment for other investigations

Smoke Testing

Introduce smoke into storm drain system and observe where smoke surfaces.

Useful when:

- Cross-connection with sanitary sewer exists
- Identifying other underground sources caused by storm drain damage
- Discharge confined to upper reaches of storm drain network

Finding:

Septic System Investigations

Used to identify indirect illicit discharges in rural or low-density residential neighborhoods.

2 Basic Approaches:

- ▶ On-Site Septic Investigations
- ▶ Infrared Imagery

On-Site Septic Investigations

3 Investigations:

- ▶ Homeowner Survey
- ▶ Surface Conditions Analysis
- ▶ Detailed System Inspection



Infrared Imagery

Photography with gray or color scales representing differences in temperature and emissivity of objects used to locate sewage discharge.

Two methods:

- ▶ Infrared Thermography
- ▶ Color Infrared Aerial Photography



Fixing

Key Elements of Success:

- ▶ Well defined legal authority
- ▶ Strong Enforcement
- ▶ Follow-up measures

Four Questions:

- ▶ Who is responsible?
- ▶ Methods to fix?
- ▶ How long should it take?
- ▶ How is removal or correction confirmed?

Who is responsible?

The property owner or municipality/utility? ...

Generally, if illicit discharge from -

- Internal plumbing connection ⇒ property owner
- Service lateral cross-connection ⇒ property owner
- Infrastructure failure w/in sanitary sewer or MS4 ⇒ municipality/utility
- Transitory discharge ⇒ property owner

Methods to Fix?

- ▶ Varies depending on type and location.
 - ▶ Develop a pre-approved list of certified/licensed contractors.
 - ▶ Use in-house contractors/staff to repair as part of routine maintenance activities.



How long should it take?

Varies depending on type and location – though local ordinance should provide time frame for removing discharge and repairing.

Generally –

- If illicit discharge is significant health or environmental threat ⇒ fix immediately
- After notification by municipality
 - ⇒ Stop discharge w/in 7 days
 - ⇒ Repair w/in 30 days

How is removal or correction confirmed?

- ▶ At source
- ▶ Downstream (sampling or sand bagging to ensure only local discharge present)
- ▶ Dye testing if internal plumbing or lateral connection

Questions?

