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- Greenville MS4 Background
- IDDE Program
- Strategies for Detection & Elimination
- Stream Asset Inventory and Dry Weather Flow Inspections



Greenville, South Carolina
 Population: 70,000+
 City Limits: 29 square miles
 Watershed: Richland Creek --> Reedy River --> Saluda River
 Concerns: Bacteria, sediment, nutrients, biological, urban pollutants

MS4 Background

Clean Water Act
NPDES Discharges

- Wastewater Treatment
- Cooling Water, Boiler Blow Down
- MS4 Stormwater
- Industrial Activity
- Construction Sites



What Do You Need Before the Event?

- System Inventory**
 - Pipes & Outfalls
- Ordinance**
- IDDE Plan**
- "All Hands" – "Eyes and Ears"**
 - Public
 - City Staff
- Public Education**
- Illicit Discharge Hotline**
 - 864-467-4554
 - Greenville Cares
 - 864-232-CARE

What can you do to prevent stormwater pollution?

- Prevent oil and grease from entering your storm drains.
- Properly dispose of household hazardous waste.
- Use eco-friendly cleaning products.
- Don't dump paint, automotive fluids, or chemicals down the drain.
- Use lawn care products sparingly.

Reporting Tips:

- Call 864-467-4554 for more information.
- Provide photos if available.
- Include location, date, time, and weather conditions.
- Describe the problem and any potential hazards.
- Call 864-467-4554

For More Information:

Illicit Discharge Hotline Phone Number: 864-467-4554

City of Greenville
Public Safety Department
Programs Division
2801 South Stone Street
Greenville, SC 29605

ILLICIT DISCHARGE OUTREACH

Examples of Illicit Discharges:

- Storm Line Flushing at storm Drains & Basins
- Landfills Leaking Oil from Spillage
- Household or Yard Runoff
- Direct Storm Runoff
- An Overflowing Toilet
- Automotive Spillage
- Non-Compliant emptying of motor oil, antifreeze, or coolant
- Construction Stormwater runoff from sites over 1,000 sq ft
- RV Washing
- Animal Waste
- Commercial Car Washes (including Self-Service Petrol for Vehicle Washes)

Examples of Storm Discharges:

- Oil
- Grass
- Garbage
- Household Appliances
- Paints
- Household Chemicals
- Automotive Fluids
- Gas

Remember: Storm drain systems are designed to handle stormwater only. They are not designed to handle household or commercial pollutants. If you have any questions, call us at 864-467-4554 for more information.

What Do We See?

Paint

- Sediment
- Grease
- Chlorinated Water
- Poor Housekeeping
- Cleaning Discharges
- SSO
- Illegal Dumping
- Floor Drains



Chlorinated Water

- **Water line flushing:**
 - Landscape irrigation.
 - Diverted stream flows.
 - Rising ground waters.
 - Uncontaminated ground water infiltration.
 - Uncontaminated pumped ground water.
- **Discharges from potable water sources:**
 - Foundation drains.
 - Air conditioning condensation.
- Irrigation water.
- Springs.
- Water from crawl space pumps.
- Footing drains.
- Lawn watering.
- Individual residential car washing.
- Flows from riparian habitats and wetlands.
- Dechlorinated swimming pool discharges.
- Street wash water.



Illicit Discharge Response

- **Quick Response**
 - Do not delay
 - Notify State Agencies (i.e., DHEC, DNR)
- **Field Investigation**
 - Emergency Actions Needed?
 - Document (Photos, Database)
- **Follow-up**
 - NOV
 - Enforcement
 - Document (Database)



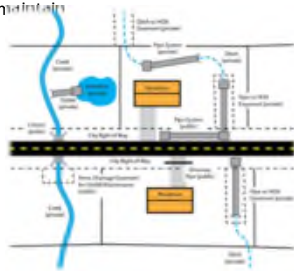
Additional Tools

- Asset Management Program
- Monitoring Network
- Stream Inspections



Stormwater Asset Management Framework

- **Extent of Service Policy**
 - Defines what we own, operate, and maintain
- **Level of Service Policy**
 - Pipe sizing
 - Flood Damage Reduction
- **Asset Management Policy**
 - Proactive Approach
 - Asset Inventory
 - Condition Assessment
 - CIP Strategy



Monitoring Network

- Stream Gauges:**
- Turbidity Sensors
 - Pressure Transducers
 - Wet Chemistry Analyzers (Nitrate/Phosphate)
- Rain Gauges:**
- Median Rainfall = 52 inches per year
- ~35,000 data points per year

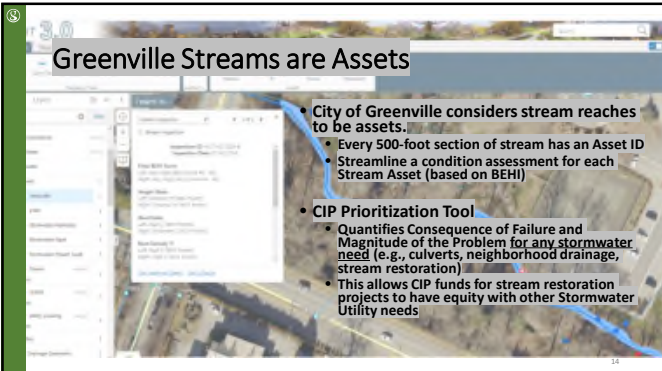


Water Quality Data Usage

- Reedy River Water Quality Group
- Development Requirements
 - LID & GI
 - Construction Inspection
 - Stormwater Treatment
- Floodplain Management
- Illicit Discharge
- Sanitary Sewer Rehab
- Stream Asset Management



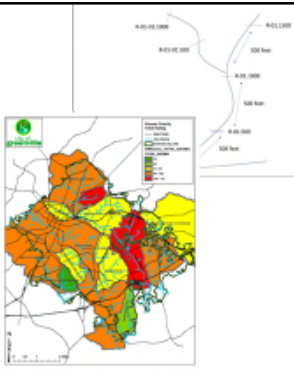
Greenville Streams are Assets




- City of Greenville considers stream reaches to be assets.
 - Every 500-foot section of stream has an Asset ID
 - Streamline a condition assessment for each Stream Asset (based on BEHI)
- CIP Prioritization Tool
 - Quantifies Consequence of Failure and Magnitude of the Problem for any stormwater need (e.g., culverts, neighborhood drainage, stream restoration)
 - This allows CIP funds for stream restoration projects to have equity with other Stormwater Utility needs

Stream Asset Management

- Prioritize Criticality of Basins**
 - LOF: Impervious %, # of Outfalls
 - COF: Parks, Streets, Utilities
- Field Surveys**
 - Survey123
 - BEHI
 - MS4
 - Dry Weather Screenings
 - Outfall Inspections
 - Utility Crossing Condition
- Scoring and CIP Planning**



Field Data Collection



- Data collection consists of stream walks utilizing an Ipad with Survey123 and GIScollector apps.
- Data is inputted at the worst observed area located within a 500 foot reach of stream
- Modified BEHI analyzes Bank Height Ratio, root ratio, root density, bank angle, surface protection, stratifications, and bank material to generate a score.
- Additionally while conducting field work, we collect data on the condition of outfalls and utility crossings as well as screen for dry weather flows as part of our MS4 program.

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Stream Asset Management Plan

Consequence of Failure (COF)

COF Rating Parameters	Subbasin Rating System	
	Yes	No
Border City Parks	5	4
City Street Crossings	5	Five or more crossings
	4	Four crossings
	3	Three crossings
	2	Two crossings
Utility Crossings	2	One crossing
	5	> 30 crossings
	4	16 - 30 crossings
	3	8 - 15 crossings
	2	3 - 7 crossings
City Sewer Crossings	1	1 - 2 crossings
	2	> 30 crossings
	4	16 - 30 crossings
	3	8 - 15 crossings
	2	3 - 7 crossings

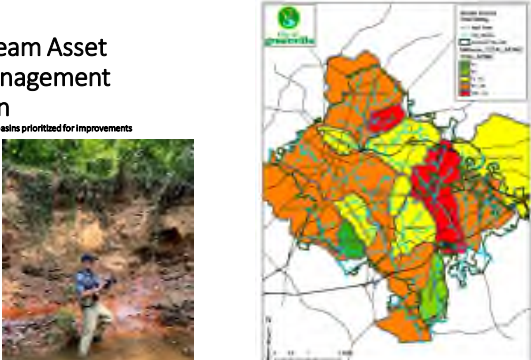
Likelihood of Failure (LOF)

LOF Rating Parameters	Subbasin Rating System	
	5	0 - 500 LF between outfalls
Linear Feet between Outfalls (average)	4	501 - 1,000 LF between outfalls
	3	1,001 - 1,500 LF between outfalls
	2	1,501 - 1,999 LF between outfalls
	1	> 2,000 LF between outfalls
Percent Impervious (Watershed Area Weighted; incl. Streets/Roads/Highways)	5	> 50% of Watershed is Impervious (incl. Buildings, Parking, Athletic Courts, and Sidewalks)
	3	25 - 49% of Watershed is Impervious (incl. Buildings, Parking, Athletic Courts, and Sidewalks)
Yes	1	0 - 24% of Watershed is Impervious (incl. Buildings, Parking, Athletic Courts, and Sidewalks)

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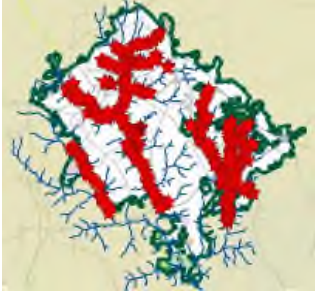
Stream Asset Management Plan

***14 sub basins prioritized for improvements**



Stream Inspections To Date

- Red stars represent an inspection point on a given reach
- Most inspections have taken place in the highest priority areas
- Goal is to cover significant reaches in a 5-6 year cycle
- Last summer over 7 miles of streams were inspected



Natural Resource Protection – Stream Bank Restoration

- Healthy Waterways Enhance:
 - Parks, Trails and Streetscapes
 - Water Quality
 - Flood Control
 - Urban Ecosystems
 - Infrastructure Protection (e.g., roads, bridges, sewer, etc.)

Avoid This! 

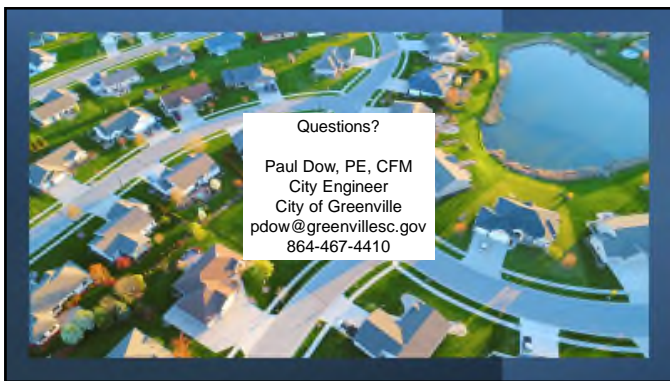
Richland Creek at Zoo



Cleveland Park Near Cancer Survivors



Richland Creek Upstream of Zoo



Questions?
Paul Dow, PE, CFM
City Engineer
City of Greenville
pdow@greenvillesc.gov
864-467-4410
