

11.07.17

**2017 SWAC
Meeting #4**

Meeting Topics (review)

1. Extent of Service continued – 11/7/17
2. Closed System – 11/7/17
3. Open System – Tentatively 12/5/17
4. Structural BMP's – Tentatively 12/5/2017
5. Stormwater/Watershed Planning
6. Funding Sources and Revenue Options
7. Water Quality Compliance
8. Floodplain Management
9. Regulatory Reforms/Ordinances

Extent of Service

(continued from last meeting)

Extent of Service

- Extent of Service – (Where/What)
 - Geographical Boundaries (City, ETJ and beyond)
 - Public vs Private Property
 - Residential vs Commercial Property
 - Components of System
 - Streams, pipes, lakes, dams, stormwater control measures (SCM's/BMP's)

Extent of Service

- Today, SWAC to consider the current extent of service, the desired extent of service, and then provide a recommendation on what extent is desired
- Funding implications of recommendations will be studied and brought back for further consideration

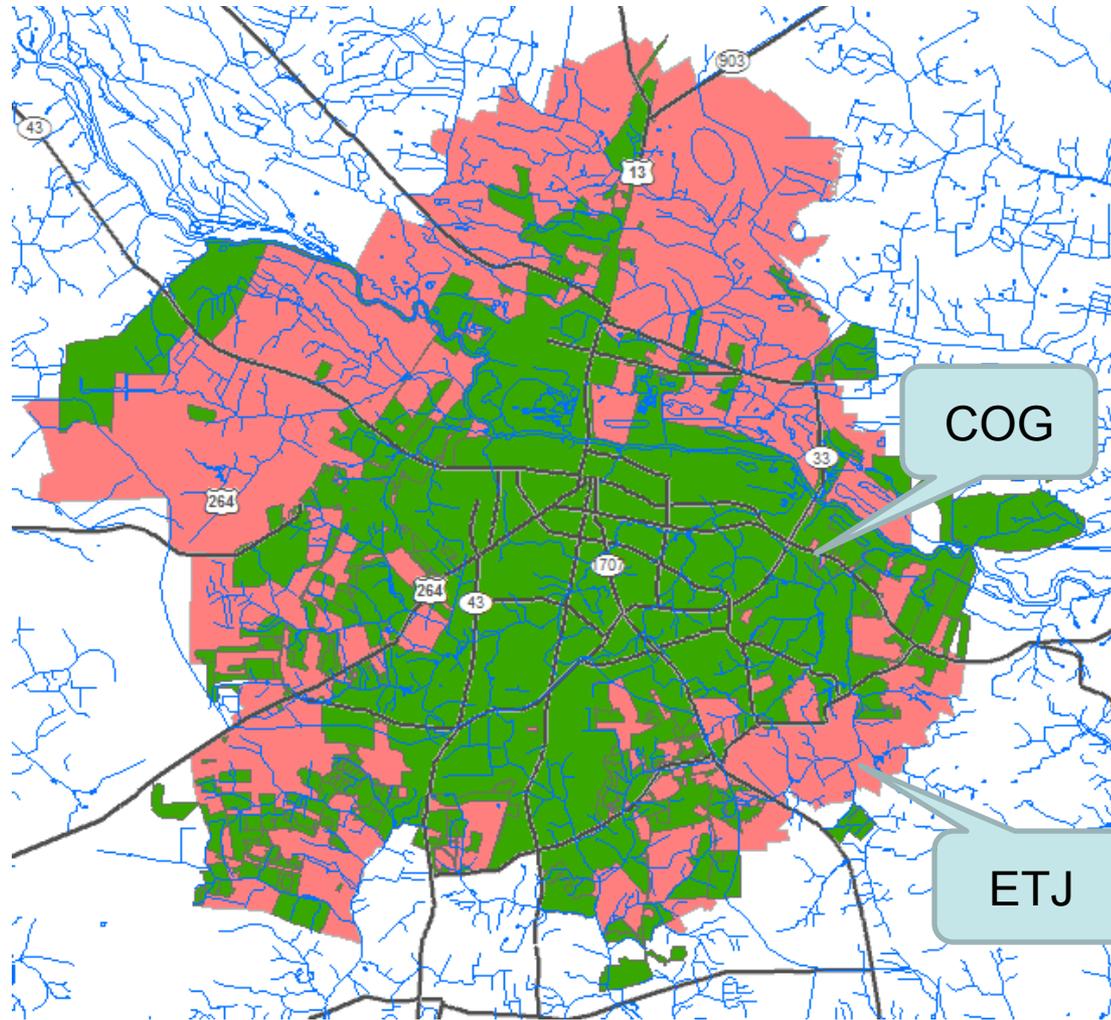
Extent of Service

- Topics to be discussed:
 1. City limits vs ETJ
 2. Drainage on Private Property (major)
 3. Possible expansions to the extent of service:
 1. Leaf collection
 2. Private BMP/SCM maintenance
 3. Assistance with private lakes and dams

Extent of Service

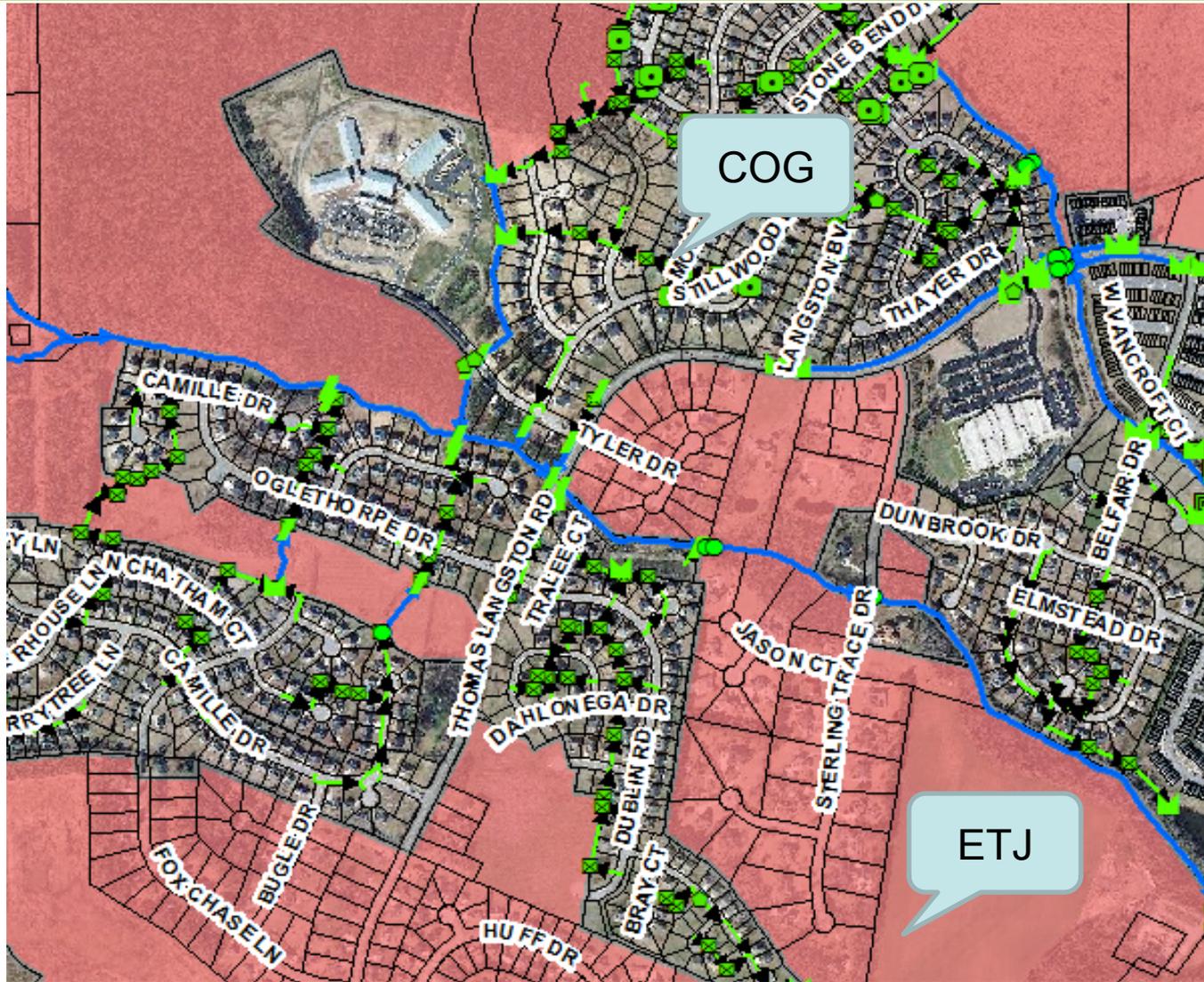
- Format of today's presentation:
 - Categories of extent of service for discussion
 - Considerations / Pros and cons
 - Options for consideration

Jurisdictional Limits



Maintaining Drainage Outside the City (corporate) Limits

- Currently the City does not traditionally maintain the drainage system outside of the City limits.
- Who maintains currently?
 - NCDOT (public roads)
 - Private Property Owners (individual lots and private roads)
- City accepts drainage system when annexed into City
- Where might City maintenance be appropriate?
 - NCDOT roadways where City interests are impacted
 - Where drainage crosses ETJ back into City limits (illustration)



Maintaining Drainage Outside the City (corporate) Limits

- Most cities restrict their maintenance to the City limits
- Extending maintenance to all ETJ would dramatically increase budget needs
- There may be individual cases where work in the ETJ is warranted – blockage that affects public roads or facilities

Maintaining Drainage Outside the City (corporate) Limits

- Options:
 - Maintain only within the City Limits
 - Allow maintenance public outside City limits on a case by case basis
 - Maintain all public drainage within the ETJ
 - Maintain both public and private drainage within the ETJ (with limitations to be discussed in following topics)

Drainage on Private Property

Maintaining Drainage Beyond the Street Right of Way (ROW)

- 20-30 years ago, most NC communities only maintained inside the ROW
- (Cary, Asheville, Wilmington) still only ROW
- Many now provide some service on private property due to:
 - Aging infrastructure and inability to pay for repairs
 - Pressure/expectations due to SW Utility Fees

Maintaining Drainage Beyond the Street Right of Way (ROW)

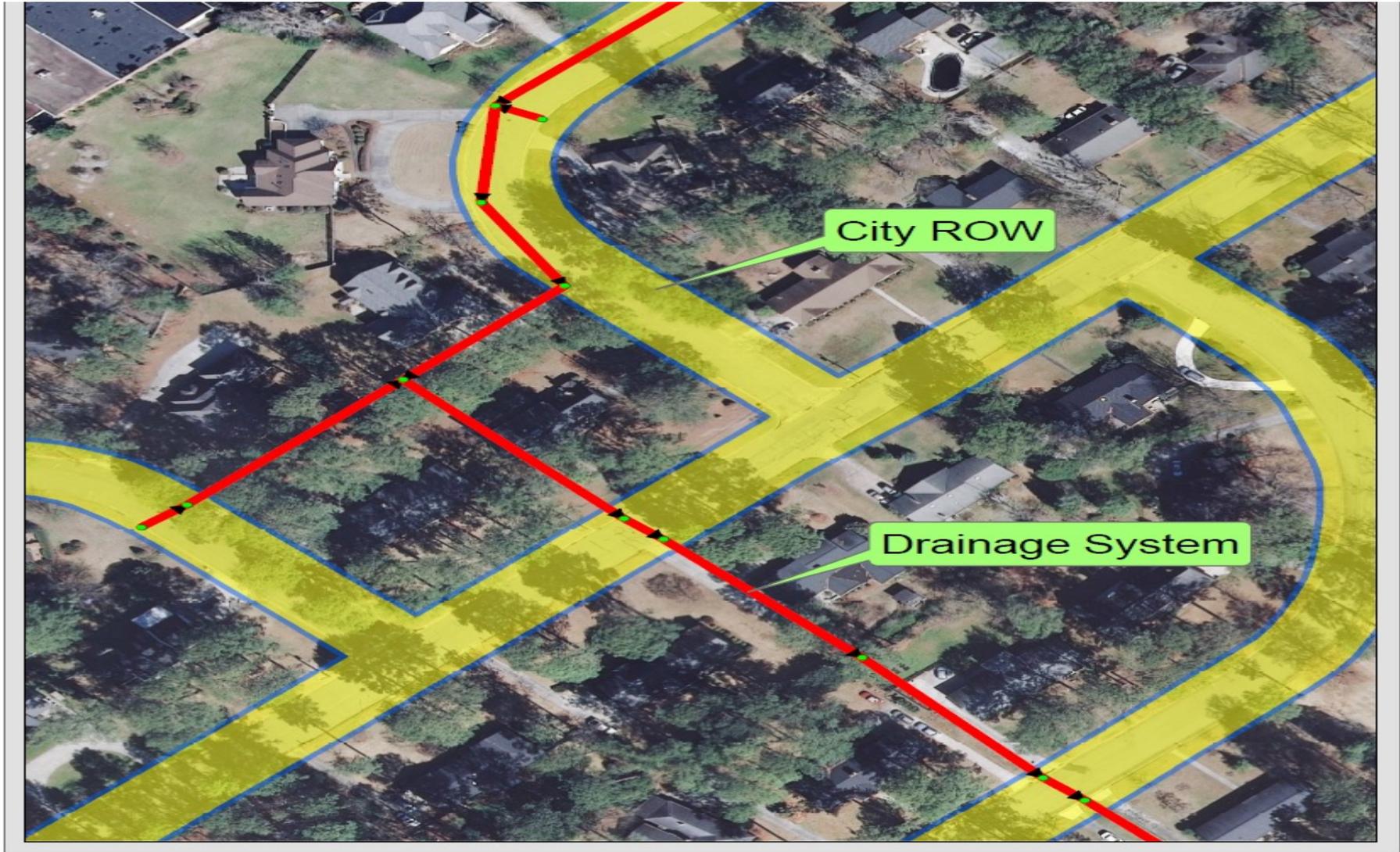
- The Primary Question to be answered – is it appropriate to continue to maintain beyond the right of way?
- If the decision is yes, then we will discuss under what circumstances?

Extent of Service – Private Property Topics

- Should the City maintain beyond the ROW
- Then, the need to convey “Public Water”
- Followed by:
 - Maintaining jurisdictional streams
 - Eroding ditches and streams (non-jurisdictional)
 - Installation of pipes
 - Assistance for failing systems
 - Obtaining easements & accepting maintenance

Extent of Service – Private Property Topics

- Finally, possible expansions to the extent of service:
 - Leaf collection
 - Private BMP/SCM maintenance
 - Assistance with private lakes and dams



Maintaining Drainage on Private Property

- Should the City go beyond the ordinance and maintain all drainage, both public and private?
- Would dramatically increase budget needs
- Only a few communities have adopted the entire system
- Many communities participate at some level on private property

Maintaining Drainage on Private Property

- Options:
 - Continue with the current policy with clarifications
 - Consider modifications to the current limitations/extent
 - Take over maintenance of entire system

Must Convey “public water”?

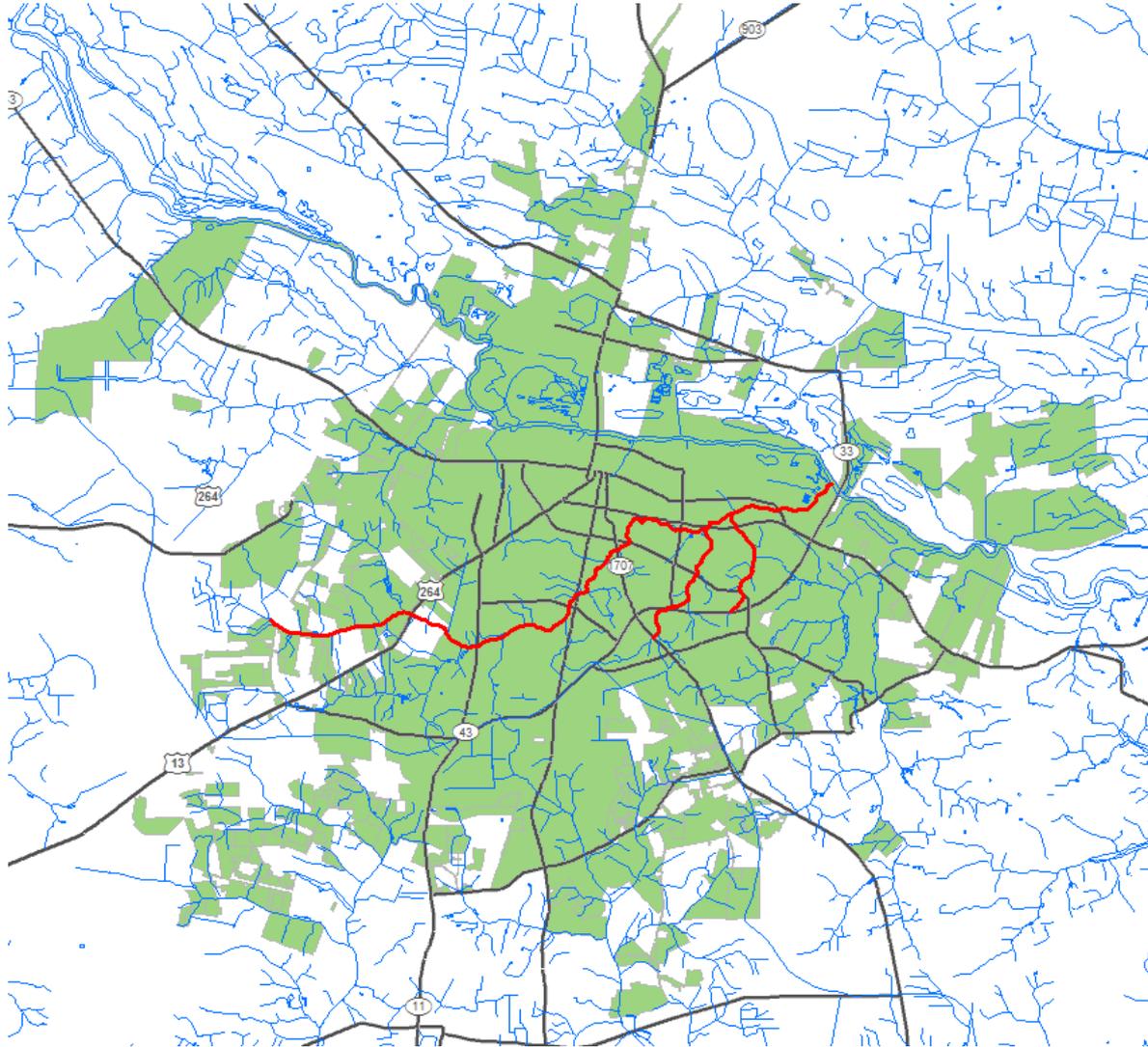
- If decide to provide assistance on private property should it be limited to the portions of the system that convey runoff from public property?
- Assistance currently limited to portions of the system that convey “public water” (from state or city streets)
- Otherwise the responsibility of property owner
- This is a limitation followed by most communities

Must Convey “public water”?

- Options:
 - Continue with the current policy
 - Provide assistance regardless of public water conveyance
 - Allow assistance where public water is not present on a case by case basis

Maintenance of Private Streams

- The City historically maintains a limited number of Jurisdictional streams
 - Greens Mill Run,
 - Fornes Branch, from Greens Mill Run to NC 43
 - Reedy Branch, from Greens Mill Run to Greenville Boulevard; and
 - Other portions of Jurisdictional Streams in which the City has participated in a drainage project.



Maintenance of Private Streams

- Should the City maintain, drop, or expand this program?
- Maintenance only to ensure conveyance of flow (removal of blockages)
- City currently bears all costs
- Has established level of expectation for adjacent owners
- Dropping the program might impact future ability to maintain (impacts to jurisdictional stream buffers)

Maintenance of Private Streams

- Options:
 - Maintain the current policy
 - Cease maintenance of all streams on private property
 - Expand maintenance to all jurisdictional streams

Stabilize Eroding Ditches and Streams

- City ordinance provides for stabilizing both jurisdictional and non jurisdictional ditches & streams on private property
- City covers 100% of cost
- Only as funding allows
- Charlotte has informally “dropped” stabilization due to extensive higher priorities (will never get to)

Stabilize Eroding Ditches and Streams

- Options:
 - Continue current policy
 - Drop policy
 - Modify Policy

Installation of Pipes on Private Property

- City currently participates in installation of pipes for existing ditches (non jurisdictional) under certain conditions
 - <48” pipes / 300’ minimum length
 - Not a jurisdictional stream / in City Limits
 - All owners participate / donated easements – and indemnify city
 - Owners pay materials
 - Low Priority

Installation of Pipes on Private Property

- Options:
 - Maintain current policy
 - Drop policy
 - Expand or modify the policy – owner participation / funding options

Informal Assistance for Failing Systems on Private Property

- City intervenes in correcting problems under certain conditions
 - Problem not caused by owner / owner cannot afford to correct
- Examples
 - Sink holes, clogged pipes, failing headwalls, flooding
- Level of City funding varies from project to project
- Formalizing would likely expand budget needs

Informal Assistance for Failing Systems

- Other Community's programs
 - “Fix” private erosion and flooding problems
 - Many years backlog of projects – may never get to some
 - Limited by annual funding allocation (level of service)

Informal Assistance for Failing Systems

- Options:
 - Discontinue informal policy
 - Maintain current policy
 - Formalize the policy

Obtaining Public Easements & Accepting Maintenance

- Should the City require Public Drainage Easements and then accept maintenance for all private drainage?
- Only a few cities doing this (some take over after projects)
- Would expand budget needs
- Greenville currently requires easements for new development but they are not “public” and City does not maintain them or govern their use or protect them
- Staff prefers drainage system placed in ROW when feasible

Obtaining Public Easements & Accepting Maintenance

- Options:
 - Maintain current policy
 - Drop policy
 - Expand or modify the policy – owner participation / funding options

Private Property

Residential vs Commercial

Residential vs Commercial Property

- Should assistance be applied uniformly to both residential and commercial property?
- Residential normally limited to single family and duplex
- Multifamily is considered commercial
- Varies among other cities
- Raleigh previously only assisted residential but now provides the same assistance to commercial

Residential vs Commercial Property

- Options:
 - Continue current policy
 - Drop policy
 - Modify Policy

Possible Expansions to Extent

Possible expansions to Extent

- Leaf collection
- Private BMP/SCM maintenance
- Assistance with private lakes and dams

	<u>Community</u>						
	<u>Greenville</u>	<u>Raleigh</u>	<u>Cary</u>	<u>Asheville</u>	<u>Wilmington</u>	<u>Greensboro</u>	<u>Charlotte</u>
<u>Service provided</u>							
public SCM maintenance (Utility maintains for other dept)	x	x		soon	x	x	x
maintain private SCM's							x
Assist with private lakes/dams		x					x
leaf collection		x	x			x	x
maintain only in ROW and public easements	by ordinance		x	x	x		
Maintain outside ROW (receives runoff from public)	by practice	x				x	x
obtain public drainage easements	x	x		some	x	some	x
cost share for private drainage improvements	(100)*	(100) least cost	(50/50)				100
cost share for water quality improvements		(75-90)		limited			x
inspect private SCM's annually	x	audit				x	x
Construct SCM retrofits for WQ	pending funds	x			x	x	x

Fund Leaf Collection through Stormwater Utility

- Based on assumption that leaf litter can clog drains and contribute to nutrient loading
- Primarily a budget balancing tool
- Only a few communities fund through stormwater utility

Fund Leaf Collection

- Options:
 - Fund leaf collection through Stormwater Utility
 - Keep leaf collection under Sanitation Division

Private BMP/SCM maintenance

- A few communities have accepted maintenance due to:
 - Frustration in getting owners to maintain (mostly HOA's)
 - Felt obligated/pressured due to collection of utility fee
- Some cities only assist in repair in event of failure
- Most do not perform regular maintenance (mowing)
- Some only maintain for residential and above ground BMP's
- Conditions; have access; won't interrupt business; only serve more than one lot....

Private BMP/SCM maintenance

- Options:
 - Do not maintain private BMP's
 - Maintain only above ground residential BMP's (with conditions)
 - Maintain all above ground BMP's

Private Lake / Dam Maintenance

- Most communities shy away from Lakes/Dams due to liability concerns
- A few have established policies to assist dam owners on a case by case basis under the following conditions:
 - The lake provides a public benefit (flood control / water quality)
 - The City will fund repairs/improvements if the owners agree to maintain the lake in perpetuity
- Cities pressured where road over dam or owners cannot afford to repair after storms (Fayetteville experience)

Private Lake / Dam Maintenance

- Options:
 - Do not maintain private lakes / dams
 - Maintain on case by case basis where appropriate
 - Maintain all lakes / dams

Questions and/or Comments

Level of Service

Level of Service

- Type and magnitude of benefits derived from the City's Stormwater Program
- Can be used to evaluate the performance of stormwater programs
 - Is the program adequate or should the level of service be increased?
- For discussion, stormwater programs can be generalized or broken down into individual components

General Categories

- Operation and Maintenance - Day to day maintenance of the drainage system
- Capital Improvement - Large investments in drainage improvements
- Program Management- Regulatory responsibilities and Administration
- May be discussed in general or broken down into individual components

Individual Components

- Closed System
- Open System
- Capital Improvements (CIP)
- Structural Controls (BMP / SCM)
- Watershed Planning
- Water Quality
- Floodplain Management
- Regulatory / Compliance
- Administration

Evaluating Level of Service

- To facilitate evaluation and consideration of alternative levels of service, a letter grading system is suggested
 - “A” thru “D” (may consider including “F” if desired)
 - For each program component, the stakeholder group may determine the current grade & consider if a higher or lower grade is desired

Closed vs Open System

1. Closed System – man made
 - Inlets, manholes, junction boxes
 - Pipes – concrete, metal, plastic
 - Culverts – under roadways – open ends
 - Outlets – Headwalls, Flared End Sections
2. Open System – natural & man-made
 - Drainage ditch – road ditch & conveyances
 - Stream – jurisdictional and non
 - River system

Closed System Activities

- Design for adequate capacity
- Operation & Maintenance (O&M)
- Inventory and Location
- Condition Assessment & Asset Management

Level of Service

- How to approach level of service
 - Capacity (10yr, 25yr, 100yr storm)
 - Frequency (daily, weekly, monthly, annually)
 - Control level (peak runoff rate, runoff volume)
 - Funding level (% of budget or fixed dollar amount)
 - Level of impact
 - Quantity - (severe, major, minor, nuisance, aesthetic)
 - Quality (eroded, stable, impaired, fair, good)

Design for adequate capacity

- Design storms
 - What is a design storm?
 - 1-year, 2-year, 10-year, 25-year, 100-year

Design for adequate capacity

- Inlet design
- Allowable spread
- Pipe design
- Impacts from new and redevelopment
- Manual of Standard Design and Details updated in 2011

Design for adequate capacity

- Inlet and pipe system design standards:
 - Affect drivability and roadway safety
 - Determine when overland flow and flooding may occur
 - Current City standard is 2-year storm for inlets and 10-year storm for pipe systems
 - Similar to other Cities (see table)

Design Comparison

TABLE 4 – CLOSED SYSTEM LEVEL OF SERVICE			
Town or City	Conveyance System	Required Design Storm	Allowable Spread
Greenville	Inlets	2-year	NA
	Storm Drainage	10-year	NA
Cary	Inlet (on grade)	4 inches/hour	8 feet
	Inlet (sag)	10-year	
	Storm Drainage	10-year	NA
Charlotte	Inlet (on grade)	4 inches/hour	6 feet from edge of curb or edge of pavement if no curb is present
	¹ Inlet (sag)	10-year	
	Storm Drainage	10-year	NA
Fayetteville	Inlets (sag and on grade)	5-year	8 feet
	Storm Drainage	10-year	NA
Kernersville	Inlets	10-year	1/3 travel lane
	Storm Drainage	10-year	NA
Raleigh	Inlet (on grade)	2-year	½ travel lane on 2-3 lane roads and 1 lane on wider roads
	Inlet (sag)	² 2-year	
	Storm Drainage	10-year	NA
Rocky Mount	Inlet (on grade)	2-year & ³ 10-year	6 feet from edge of curb or edge of pavement if no curb is present
	Inlet (sag)	⁴ 2-year & 10-year	
	Storm Drainage	10-year	NA
Wilmington	Inlet (on grade)	10-year	Lesser of 1/3 travel lane or 8 feet
	Inlet (sag)	50-year	
	Storm Drainage	10-year	NA
NCDOT	Inlet (on grade)	⁵ 4 inches/hour	½ travel lane
	¹ Inlet (sag)	10-year	
	Storm Drainage	10-year	NA

Design for adequate capacity

- Options
 - Maintain current design standards
 - Add recommendations from master plan for higher level of service for larger roads and culverts
 - Increase design standards for inlets and pipes

Operation and Maintenance

- Typical activities can include
 - Remove nuisance vegetation that can impede flow
 - Remove debris that can impede flow
 - Remove accumulated sediment
 - Flush pipes
 - Minor repairs to catch basins and pipes

Operation & Maintenance

- Proactive vs. reactive maintenance
- Up front cost for proactive maintenance for staff and equipment
- Proactive maintenance provides long term cost savings
 - Reduction in damages during storm events
 - Rehabilitation and maintenance costs less than replacement

Questions and/or Comments