



Charlotte's Experience in Developing a Stormwater System Operation, Inspection, and Maintenance Manual



17th Annual Regional Stormwater Seminar
Operations and Maintenance Best practices for Your MS4 Permit
Atlanta, GA
April 22, 2022

Presentation Outline

- ◁ Overview of Charlotte's program
- ◁ Overview of MS4 documentation requirements
- ◁ Activities covered in the manual
- ◁ Documentation for each activity
- ◁ Information gathering
- ◁ Lessons learned
- ◁ Benefits

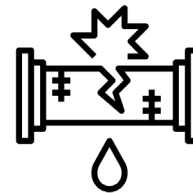
Program Overview

City of Charlotte Storm Water Services

◁ Established in 1993 as a municipal stormwater utility (joined by Mecklenburg County in 1994; separate agencies but work together)

◁ Four primary functions:

- Repair/replace aging infrastructure
- Manage runoff from rainfall
- Reduce flood risks
- Protect and improve surface waters



◁ Driven by a Sustainable Stormwater Management Strategy: a five-year plan and vision

Program Overview



208 positions



FY21: 314 projects completed; 700+ actively managed



FY22 operating fund budget = \$85M; \$74M in stormwater fees in FY21



5,800 miles of municipal system (open & closed)

Program Overview

◀ Service policy

- Qualifying system for repair receives runoff from public ROW
- May include systems in public ROW and on private property
- Priority given to properties with existing easements

◀ Focus on public safety (street flooding, sinkholes) and structural flooding

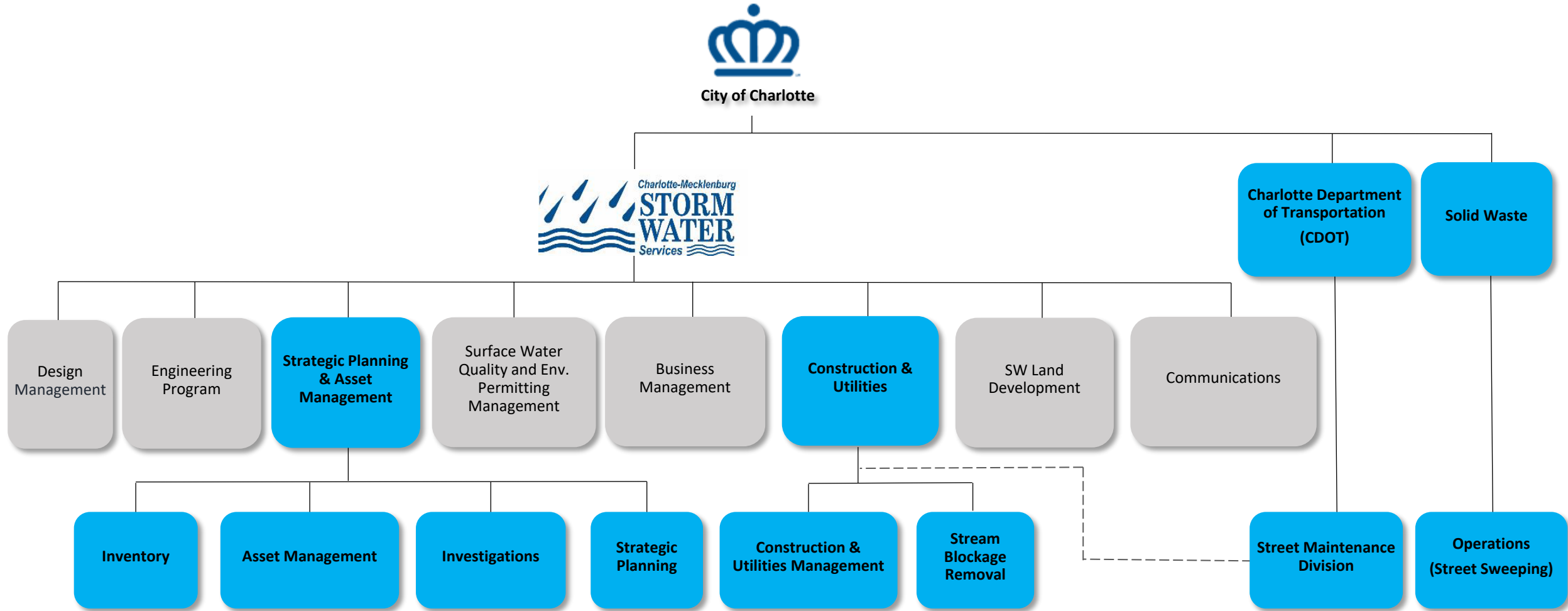
◀ Risk of failure and consequence of failure are key factors

Program Overview

◀ Evolving Level of Service

Service	Early Program	Current Program
Streets	10-yr	2-yr
Culverts	25-yr (local) 50-yr (thoroughfare)	10-yr (local) 25-yr (thoroughfare)
Structures	100-yr	25-yr

Program Overview



Overview of MS4 Documentation Requirements



Why the MS4 O&M manual was developed:

- ◁ Charlotte's NPDES Municipal Stormwater Permit
- ◁ Required by Clean Water Act; issued and regulated by NC Dept of Environmental Quality
- ◁ Requirements designed to reduce polluted stormwater discharges into waterways
- ◁ Requirement under Municipal Good Housekeeping section to *inspect and maintain stormwater system*
- ◁ Written procedures required for all programs



Activities Covered in the Manual



Activities Covered in the Manual



Documentation For Each Activity

What did we cover:



Program-Driver Policies



Documentation Methods



Methods and Practices



Data Metrics



Inspection and
Maintenance Schedules/Frequency

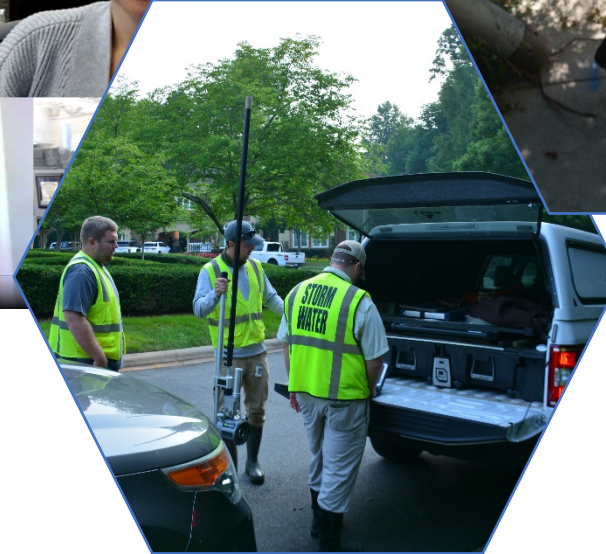


Staff Responsibilities

Information Gathering & Reporting

Methods to collect info:

Name	Phone Number (local)	Email	Division / Position	Work Responsibilities	Subject Matter Categories
Craig Miller	704-351-9472	cmiller@charlotte.gov	Storm Water	Supervisor NPDES MS4 Permit project Permit Manager	Overall
Kevin Herring	900-253-3751	kevin.herring@charlotte.gov	Storm Water	Supervisor team of Drainage Specialists that investigate drainage-related issues	
Scott Hudson	704-634-7623	scott.hudson@charlotte.gov	Storm Water	Drainage Specialist supervisor; broad knowledge of investigation process and its work, blockage removal, etc.	
Bob Jarzemsky	704-972-2869	bjarzemsky@charlotte.gov	Storm Water	Senior Project Manager/Engineer on Stormwater's Strategic Planning team, work on updating strategy for quality and monitoring problems for service	
Colby Botin	900-248-8861	colby.botin@charlotte.gov	Storm Water	Senior Project Manager/Engineer on Strategic Planning team, asset management, inspections, outreach, etc.	
Kara Labadie	704-980-3039	k.labadie@charlotte.gov	Storm Water	Strategic Planning Program Manager; Stormwater asset management & investment, drainage problem/issue complaint investigations, long-term planning	
Sanjago Rodriguez	704-694-0463	sanjabo@charlotte.gov	Storm Water	Commission Supervisor; help to oversee street-related curb-painted and/or contract by CDDT Street Maintenance	
Levi "Counny" Horton	704-507-3530	levi.horton@charlotte.gov	Storm Water	CCTV Supervisor (closed-circuit TV inspections of storm sewer assets)	
Curtis Hehn	603 704-136-6700	curtis.hehn@charlotte.gov	Charlotte DOT - Street Maintenance Division	Coordinate activities to maintain storm drain system like catch basin cleaning, ditch clearing/maintenance, etc.	



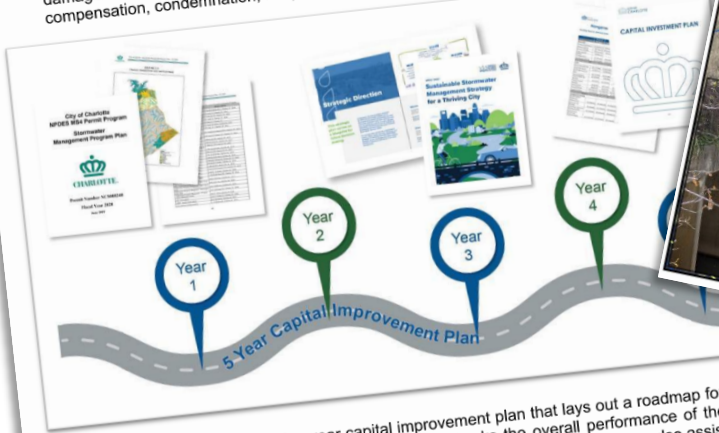
City of Charlotte - Maintenance & Operation (I, M, & O) Manual
Interview A
Date: 6.16.2021

Attendees	Topics to Cover	Please describe the methods and practices used to conduct work	What are the inspection and maintenance schedules and how frequently do they occur?	What methods do you use to document the inspections and maintenance?	What is the program-driver policies?	What data metrics are used?	Describe the responsibilities
Kevin Herring, Scott Hudson, Bob Jarzemsky	Drainage service request investigations and policy						
Scott Hudson, Bob Jarzemsky, Susan Totin	Structural assets maintenance and repair (pipes, headwalls, drop inlets, outlets, etc.)						
Scott Hudson	Stream blockage removal						

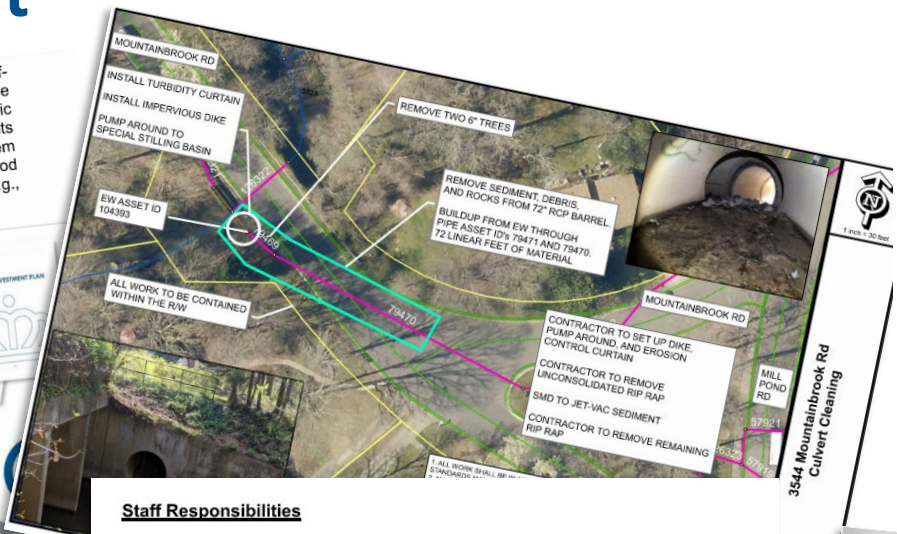
Information Gathering & Reporting

Manual development

The program endeavors to give the highest priority to systems within the public right-of-way and where existing permanent storm drainage easements exist. Where suitable easements do not exist to allow for maintenance of systems receiving runoff from a public street right-of-way, the program requests that private property owners donate easements to enable maintenance in a danger to the public, publicly owned infrastructure, or potential flood damages to a habitable structure, the program may pursue other means (e.g., compensation, condemnation, etc.) to secure a suitable easement.



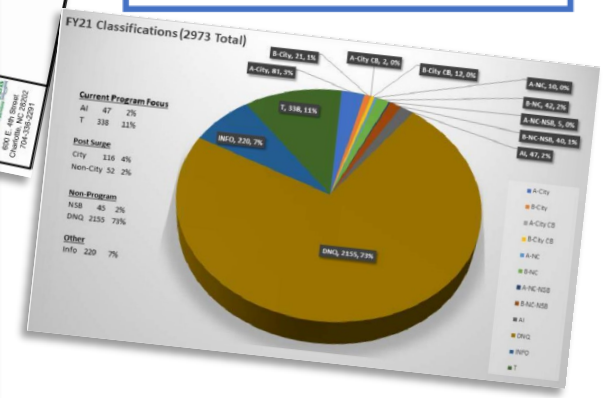
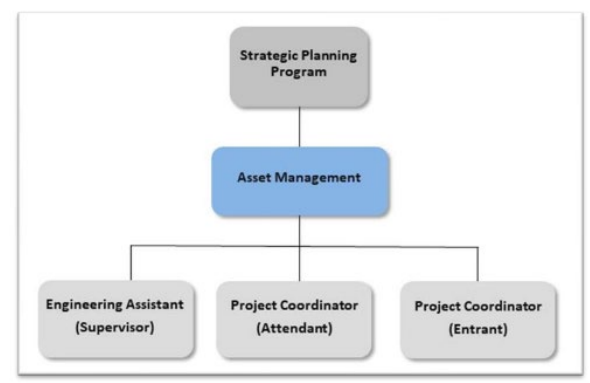
The program maintains a five-year capital improvement plan that lays out a roadmap for projects. A beta program is in development that tracks the overall performance of the program based on quantitative measures. This system, once completed, may also assist in assessing staffing needs and maintaining records that facilitate the mapping of problem areas or areas of interest for future study or ongoing maintenance activities.



At a Glance

- Mecklenburg County addresses blockages at FEMA-regulated streams while the City of Charlotte addresses smaller streams outside the FEMA boundary.
- Blockages are typically cleared with handwork although larger equipment may at times be necessary.
- Staff inspect 20% of the streams in the city over a five-year timeframe and identify blockages. Other requests may come from the Charneck 311 call service.

Staff Responsibilities



Lessons Learned

What did we learn through the process?



You learn more from observing field ops



Policy vs real world application



Some activities of program are documented in other places (e.g. large capital projects, O&M for SCMs)



Lots of elements and moving parts to program – start with basics and you can always add & edit later as you grow



Some observations may reveal safety or other concerns

Benefits

What did the City gain:



Meeting the NPDES permit requirements



Identifying program gaps and needs (e.g., improve maintenance of hotspots)



Bringing together existing policies and data into one source



Identifying things that are being done well



Getting to know program better

Questions?

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