Public Utilities City Council Work Session

Thursday, March 20, 2014

1:00 pm – 5:00 pm

Utility Performance Overview

Stakeholder Understanding and Support
Product Quality
Customer Satisfaction
Employee and Leadership Development
Operational Optimization
Financial Viability
Infrastructure Stability
Operational Resiliency
Community Sustainability
Water Resource Adequacy
Effective Utility Management

Strategic Plan Update

Public Utilities Vision

We are a world-class leader in sustainable water and wastewater service delivery.

Public Utilities Mission

To provide safe, sustainable water services for our customers while protecting public health and contributing to the economic, environmental and social vitality of our communities.

Public Utilities Core Values for Development

- Accountability
- Effectiveness
- Empathy
- Equality
- Fairness
- Fiscal Responsibility
- Honesty and Openness
- Knowledge
- Quality

Public Utilities
Areas for Development

- Customer Service
- Employee and Leadership Development
- Environmental Stewardship
- Financial Viability
- Operational Optimization
- Reliability
- Stakeholder Outreach
- Water Resource Management

Customer Service

- **Customer Interactions**
- **Call Center Plans**
  - **Interim**
  - **Long range**

Operational Optimization

- ***Departmental Approach***
- Six Sigma
- LEAN
- Process Mapping and Business Case Analysis

- ***Tools***
- North Carolina State University Extension Office
- Public Utilities Quality Assurance Manager
- Metrics
- Benchmarking
- Key Performance Indicators
- Consultant Reviews

Operational Optimization

- ***2013 Realized Savings***
- **Key Efficiency Gains and Business Case Analysis**
- ***$1.2 Million in total savings***

- ***2014 Update***
- **Key Efficiency Gains and Business Case Analysis**
- ***$150,000 in projected savings thus far***

- ***Inter-Departmental Process Reviews***

PU Fleet Update

- **Fleet Success**
  - **Reduction in vehicle inventory**
  - **Asset Management**
  - **Standardization committee**
  - **Unified Service Delivery Model**
- **Planned Improvements**
  - **Install GPS & AVL Solution**
  - **Comprehensive fuel mileage analysis**
  - **Creating quarterly report**

Water Treatment Division

Consultant Review

- Employee Development
- Staffing
- Procurement and Materials Management
- Maintenance (Treatment and Remote Storage/Pumping)
- Operations (Treatment and Remote Storage/Pumping)
- Water Quality
- Communications
- Technology
- Budget Management
- Risk Management

Key Observations

- Plants are well maintained and operated by qualified staff
- Staff demonstrated support/initiative for efficiency/effectiveness improvements
- Top Importance versus Performance Gaps: Compensation and opportunity for advancement.
- Metric Benchmarking: Higher number of FTE's per MGD produced but at a lower cost than median value.

❖ Opportunities for improvements

A. Work Processes
B. Capital improvements
C. Staffing (increasing staffing flexibility)
D. Advancement and compensation

Resource Recovery Division

Resource Recovery Division Highlights

- Two Divisions Combined (Reuse and WW Treatment)
- ISO 14001 and EPA's National Biosolids Partnership Certification
- Repeat Peak Performance Award Recipient from NACWA
- Groundwater Modeling at NRWWTP, resumed Land Application
- Tertiary Filter & Influent Pump Station Expansion
- Expansion of Primary Clarifiers
- Last Steps to 75 MGD
- Additional Reuse Water Customers

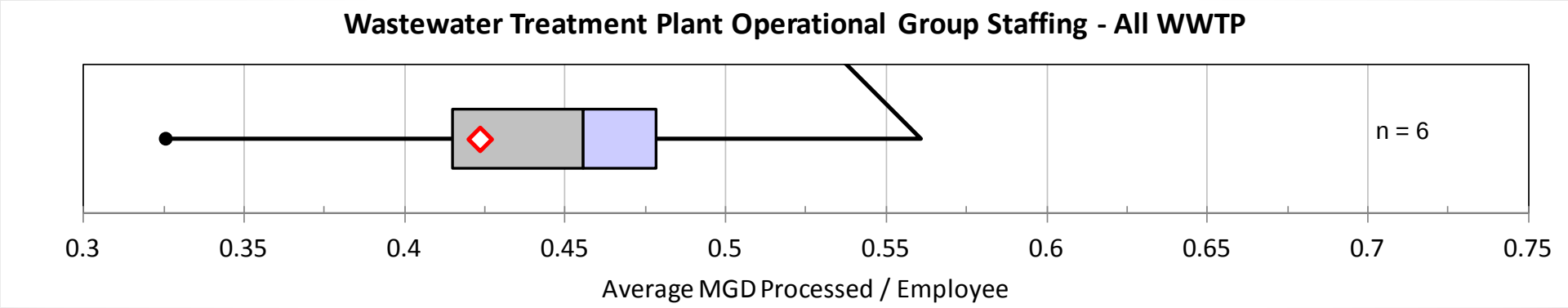
Overview

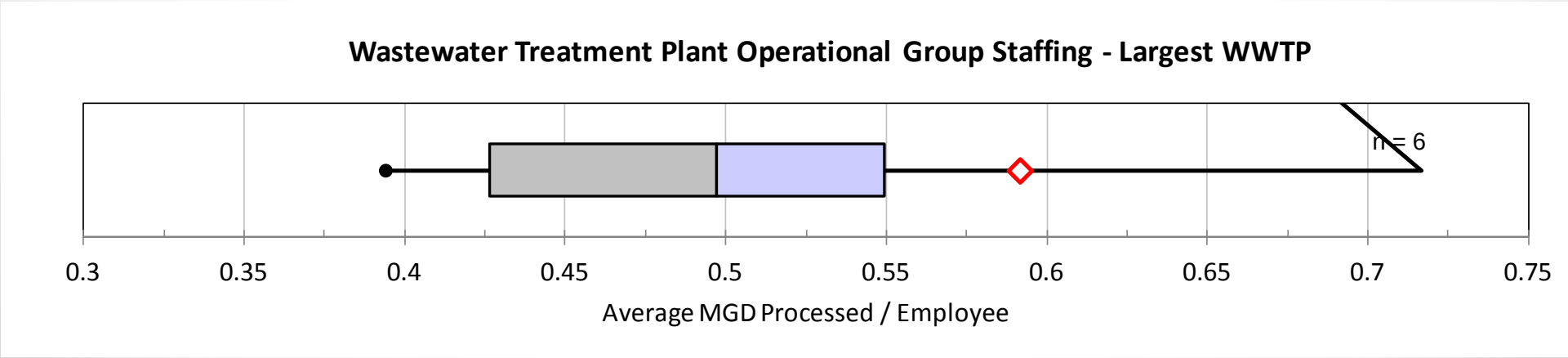
- Employee Development
- Procurement & Materials Management
- Staffing
- Maintenance
- Operations
- Product Quality
- Communications
- Technology
- Budget Management
- Risk Management

Study Participant Breakdown

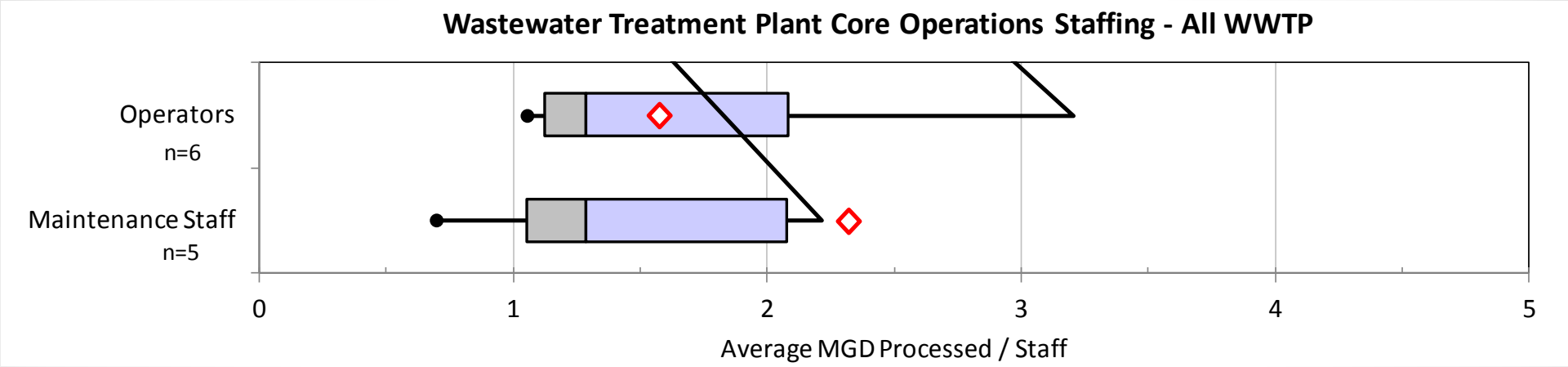
- Focus Group – 15 participants
- Operations – 19 participants (from all three WWTPs)
- Plant & Remote Maintenance – 30 participants
- Land Management – 12 participants

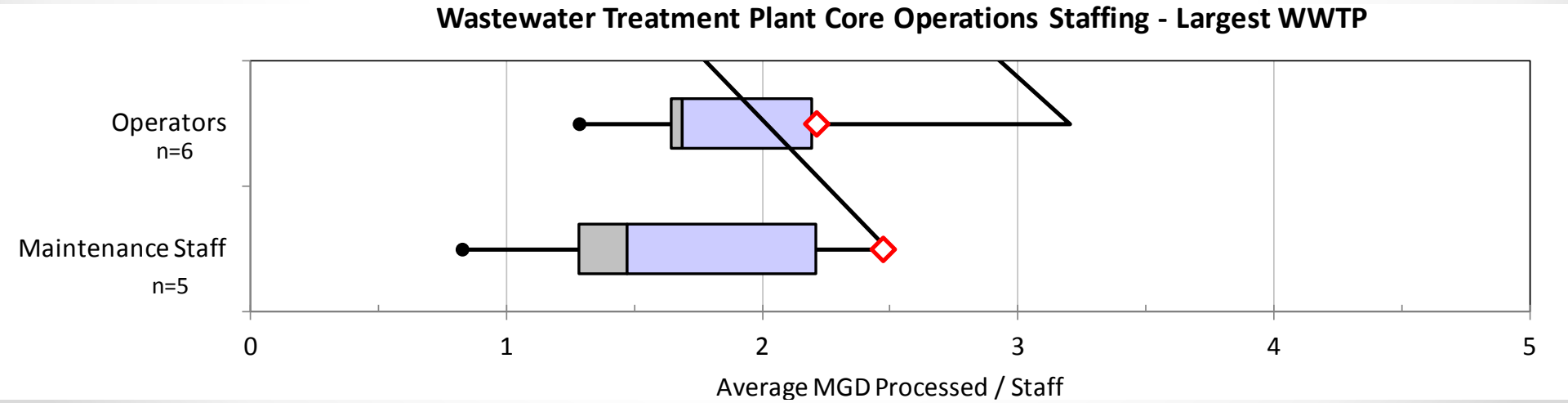
Benchmarking Staffing Efficiency





Benchmarking Core Staffing Efficiency





Key Observations

- Plants are well maintained and operated by qualified staff
- Staff support for efficiency/effectiveness improvements
- Top Gap Identified: Compensation and opportunity for advancement
- Benchmarking: Lower number of FTEs per MGD processed
- Conservative approach to absence coverage
- Lack of staffing flexibility (subject matter experts)
- Opportunity to improve maintenance management

Management

- Supervisor to Non-Supervisor ratio is appropriate.
- Land Management Program – Not typical. Further review
- City Procurement – Frustration reported, but functional and relatively efficient. Some minor improvements are recommended.
- Bulk Chemical Purchasing – Process is well managed and functional, but complex and cumbersome.
- Organizational Structure – Functional, but superintendent's span of control is too large. Consider hybrid.

Management (continued)

- Wrenn Road Spray Irrigation Program– Consider structure.
- Develop Employee Skills Training program.
- Create Division "Communications Team."
- Increase Operator/Staff Involvement in analyzing process data and making process decisions.

Operations - Capital Improvements

- Provide remote monitoring and control Product (biosolids, water reuse) loading (~ 0.3 FTE)
- Upgrade Supervisory control and data acquisition (SCADA) to remotely monitor aerobic digester odor control system.
- Provide online pH monitoring of digester pH via in lieu of field sampling and analysis
- Upgrade SCADA monitoring at LCWWTP
- Upgrade Influent flow diversion reliability at SCWWTP

Operations - Staffing

- **Laboratory practices**
  - **Reduce time spent for laboratories at LCWWTP & SCWWTP**
  - **Consider "floater" lab analyst for small plants, or shifting all laboratory analyses to Neuse River WWTP.**
- **Consider reducing SCWWTP operator staffing from 4 to 3 FTEs (consistent with LCWWTP).**
- **Neuse River operations staffing should remain at current levels especially considering expansion.**

Maintenance - Work Processes

- Computerized Maintenance Management System (CMMS)
  - 10 recommended work flow improvements related to MainStar (work order software).
  - Insufficient training (breadth and depth).
- Formalize preventive and predictive maintenance programs. Consider applying Reliability Centered Maintenance principles for assets with very high consequence of failure.

Maintenance - Capital Improvements

Neuse River WWTP

- Increase number of computer workstations available to maintenance staff. (IMPLEMENTED)
- Upgrades as required to automatically shut down a plugged influent screen.

Smith Creek WWTP

- Evaluate need for grit chamber upstream of Influent Pump Station to reduce high maintenance burden.

Maintenance - Staffing

- **Metric Benchmarking: Plant Maintenance staffing levels/MGD are <u>lower</u> than the median reported.**
- **Consider adding a second Lead Industrial Maintenance Electrician position.**
- **Consider creation of a dedicated CMMS Administrator. Role could be assumed by a Maintenance Planner/Scheduler.**
- **Consider additional training/certification especially for Service Specialist to expand opportunities.**

Remote Facilities Logistical Evaluation

- Currently 177 remote facilities: water booster pumping stations, wastewater pumping stations, elevated water tanks.
- Wastewater facilities currently serviced from the Neuse River WWTP and Water Booster Stations and Elevated Tanks Serviced from EMJ Water Plant.
- CH2M Hill hired to evaluate multiple service options
  - Optimized Routing
  - As is
  - Separate water and wastewater but served from geographic centers
  - Combined Water and Wastewater served from geographic centers
  - Combined Water and Wastewater from Centralized location

Evaluation Findings

- Optimized routing results in increased efficiency over current estimates. (1.3 FTE savings)
- Geographic dispatch locations reduce travel time to first stop, but only provide marginal improvement overall.
- Maintaining the current geographic groupings of stops and current dispatch locations is an optimal solution.
- A centralized dispatch location provides marginal improvement in travel efficiency.

Evaluation Recommendations

- Maintain current geographic areas & dispatch locations.
- Implement optimized stop order and routing on trial basis.
- Consider combining WT & RR remote sites for facility checks only, using 6 total crews or Maintain separate WT and RR crews and reduce to 5 RR crews.
- Given SCADA Improvements reduce wastewater pump station visits from 3 times per week to 2 times per week
- Potential saving of 2.8 FTEs. (could be applied to deferred maintenance)

Water Distribution Division Lean Processes

Lean Processes Reviewed & Findings

- Water Distribution VSM (Valve & Leak Detection)
- Water Distribution VSM (Hydrants PM's)
- Water Distribution VSM (Repairs minor & major)
- Water Distribution VSM (New service install request)
- Creation of new programs & organizational changes of Division (This will be a 3 year process)

Sewer Maintenance Division Lean Processes

Identified Areas

Area	Problem	Proposed Action	Course of Action
Easement Clearing	Lack of public awareness	Educate public of do's and don'ts	Working on Media campaign.
Easement Inspections	Reducing travel time	Assigning inspectors to outlying offices	Utilizing outlying office staff to inspect easements
Sewer Main Flushing	Obstructed access to Easements in neighbor hoods	Provide additional code enforcement.	Developing a business case to open another Code Enforcement Officer Position to address code issues
Backfilling Procedures	Settling trenches and return visits	Use of self-compacting aggregates	See remainder of presentation

Backfilling Procedures

- **Problem:**
  Settled trenches requiring return visits.

- **Resolution:**
  A dry self-compacting aggregate suggested for backfilling.

- **Rewards**
  Using stone aggregate provides:
  - **Reduction in staff time**
  - **Saving of $135,000 each year**
  - **Reduction in complaints**

BREAK

Stakeholder Outreach

- Communications Plan
- Capital Improvement Projects Communication
- Raster Zone 2 Clearing Project Communication
- Merger Towns

Ongoing Stakeholder Outreach

- Web/social media presence
- Increase frequency of news releases and articles
- Neighborhood/community event attendance
- Scheduled and emergency repair communication
- Collaboration with other City departments
- Account representatives for key accounts
- Employee participation in local parades
- Internal communication improvements

Communications Plan

The City of Raleigh
PUBLIC UTILITIES DEPARTMENT

SERVING
Garner | Knightdale | Raleigh | Rolesville
Wake Forest | Wendell | Zebulon

Developed by:

FRENCH I WEST I VAUGHAN
www.fwv-us.com
919-832-6300
112 East Hargett Street
Raleigh, NC 27601

BTB MARKETING COMMUNICATIONS
www.btbmarketing.com
919-872-8172
900 Ridgefield Drive, Suite 270
Raleigh, NC 27609

Upcoming Communication Efforts

Our current mascots you may be familiar with…

Neusie & Mr. Flushy our 15 foot inflatable toilet!

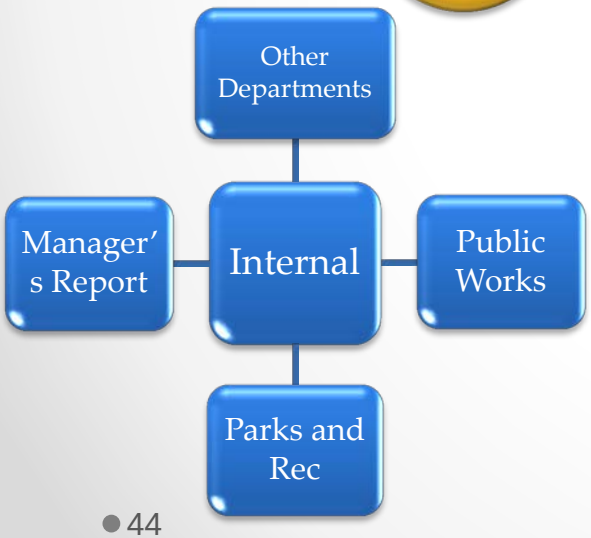
- **New and Innovative Marketing Tactics**
- **Media Training for staff**
- **Rebrand/Rename CORPUD *(with consideration of our entire service area)***
- **Crisis Communication Plan Development**
- **Communication campaign concerning annual rate recommendation**
- **Capital Improvements Customer Communication Plan**

Capital Communication Plan

- **Timing**
  - **What information should be communicated at what time?**
- **Personal**
  - **Putting a face to a project**
- **Efficient**
  - **Reaching the largest target audience possible**

Construction
CACs
Website Updates
E-mail Updates
Social Media
Other Media
Greenway Signs
Digital Message Boards
Door Hangers

Pre-Construction
Easement Acquisition
CACs
Public Meeting
1,500 Ft Letters
E-mail List Serve
Project Website
Social Media


Internal
Other Departments
Manager's Report
Public Works
Parks and Rec

Blasting
500 Ft Letters
Pre Blast Surveys
Q&A with Experts
YouTube Videos
Digital Message Boards
Greenway Signs
Door Hangers

Contractor
City Project Manager
Resident Field Representative
Citizens

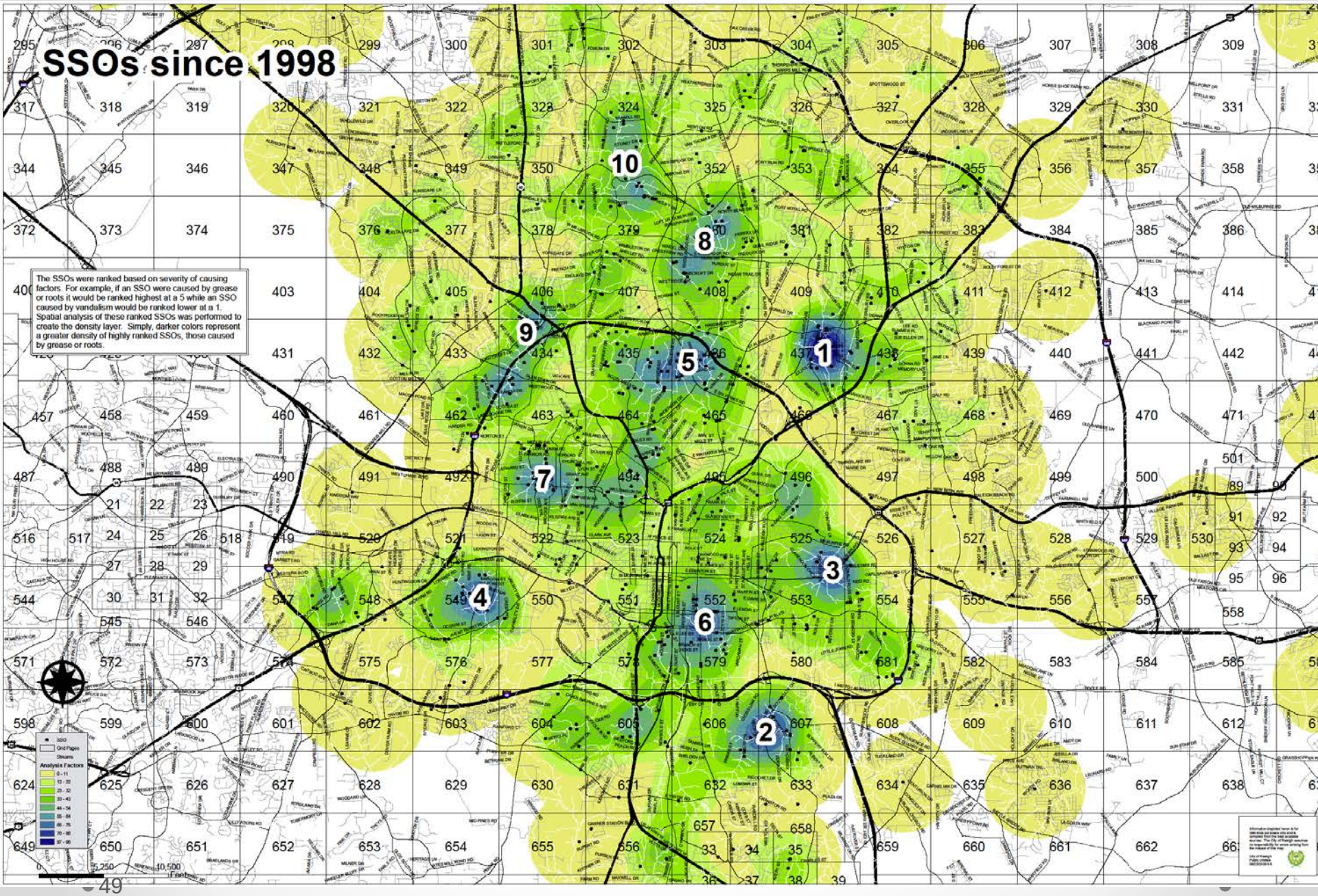
Tree Clearing Project Sewer Easements

Project Background

- Tree clearing efforts are based on NCDENR-DWR issued Collections System Permit requirements
  - "Rights of way and/or easements ***shall*** be properly maintained to allow accessibility to the wastewater collection system…"
- PUD process built around CoR Public Works Committee recommendations
- Raster Zones developed based on PUD-SSO event history since permit inception ("root" cause=root intrusion)

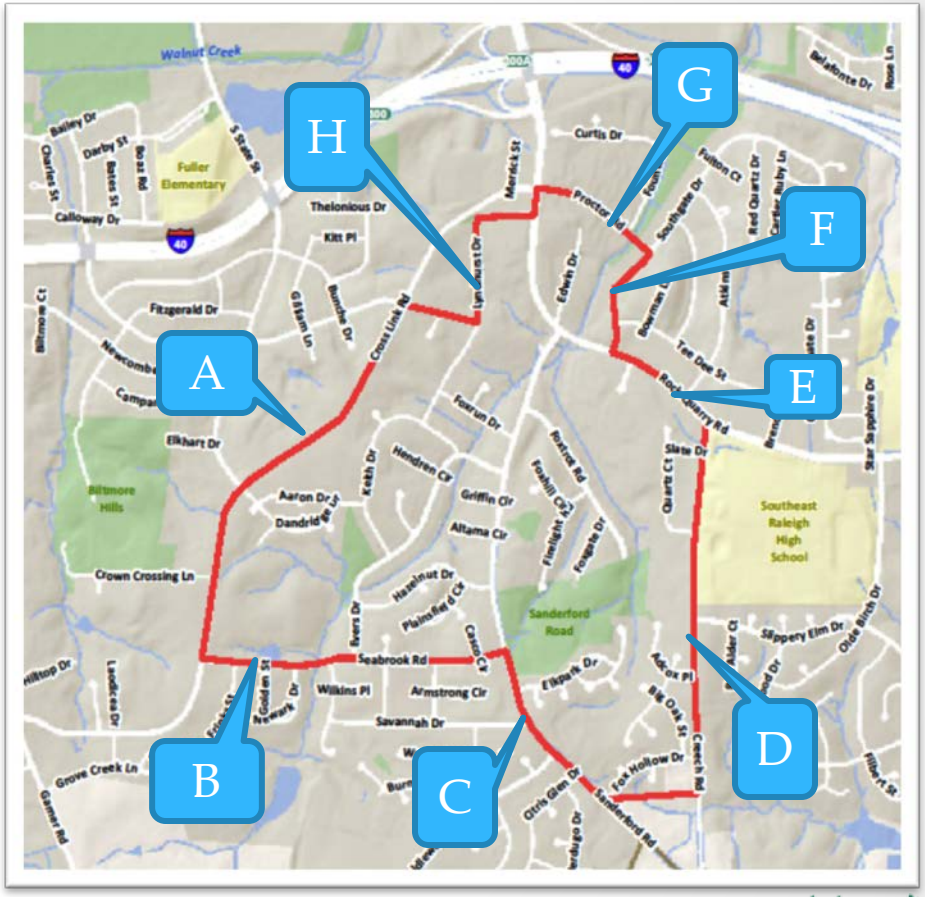
Typical Issues with Easements: Roots

Typical Issues with Easements: Overflows


SSOs since 1998
The SSOs were ranked based on severity of causing factors. For example, if an SSO were caused by grease or roots it would be ranked highest at a 5 while an SSO caused by vandalism would be ranked lower at a 1. Spatial analysis of these ranked SSOs was performed to create the density layer. Simply, darker colors represent a greater density of highly ranked SSOs, those caused by grease or roots.
1
2
3
4
5
6
7
8
9
10

The Raster Zone 2 Project Area is defined by the following street boundaries:

A. Cross Link Road
B. Seabrook Road
C. Sanderford Road
D. Creech Road
E. Rock Quarry Road
F. Southgate Drive
G. Proctor Street
H. Lyndhurst Drive



Clearing Process

1) Staff reviews updated map of historical SSO data
2) Preliminary assessment completed
3) Meet with Council representative (Councilor Weeks)
4) Public meeting is held (SE-CAC on 3/10/14)
5) A site survey is requested
6) PUD notifies customers of survey work (personal letter)
7) Staff visits the project site to review survey
8) Contact customers with obstructions (personal letter)
9) Meet with customers to review concerns (face-to-face meeting)
10) Schedule the project with the Contractor
11) Notify customers of start date (2 weeks ahead by letter)
12) Begin project work
13) Meet with customers on as needed basis during project (face-to-face meeting)

Current Project – Zone 2

- Total footage: 21,550 ft. (approx. 4.08 mi.)
- Preliminary work complete
- Field survey ready to commence
- Cost: $582,000
- Time Frame: 9 months (weather dependent)
- CAC Meeting – March 10, 2014
- Next steps :
  - Notification letters about survey work
  - Survey work initiation
  - Final assessment

Striking the Balance

Customer Service

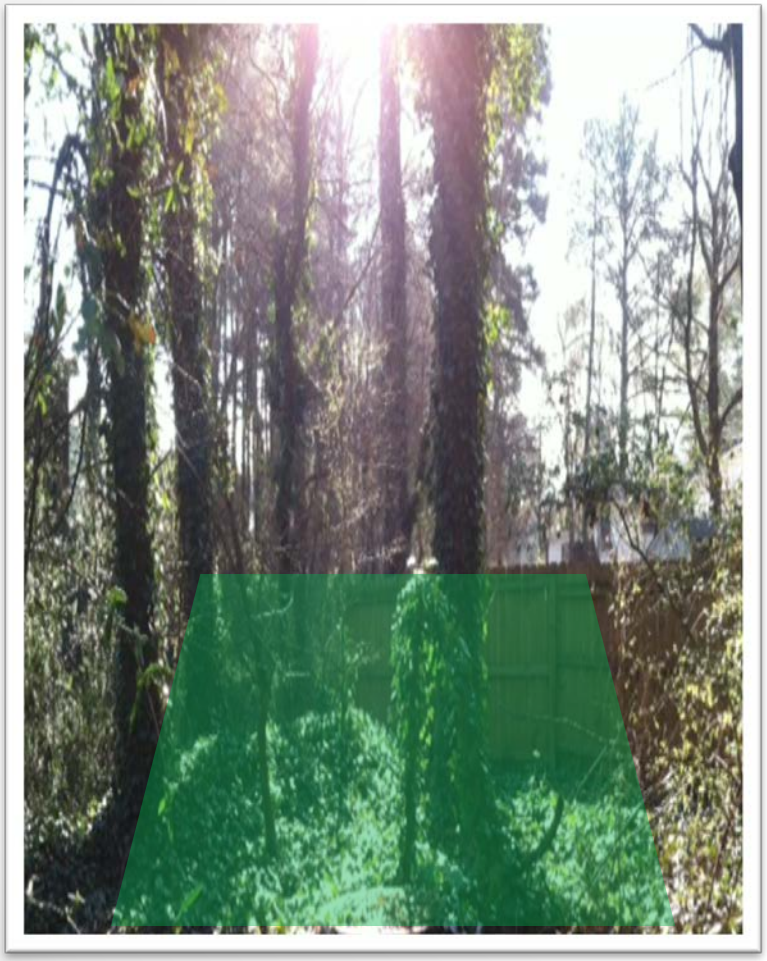
Operational Optimization

Foxtrot Drive

Access Issues

Heavy Vegetation

Foxtrot Drive



Fences

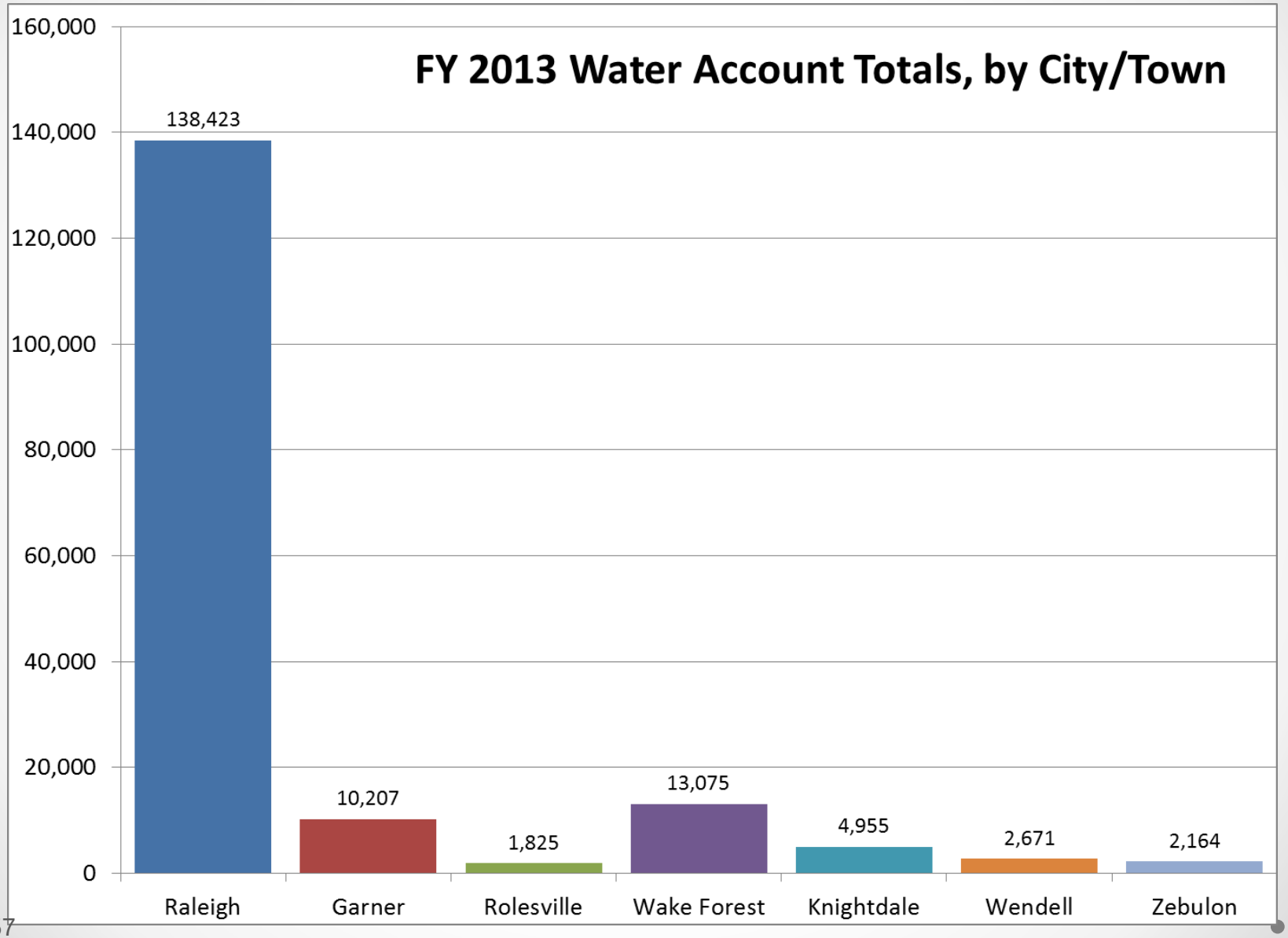
Structures

Brentwood Subdivision: Crofton Lane

Before

After

Account Totals at start of FY2014



Contract vs. Projected Schedule for Merger Cost Recovery

Town	Schedule	Current Projection
Rolesville	December 31, 2016	End FY2014
Wake Forest	July 1, 2015	FY 2015 (mid-year)
Knightdale	July 1, 2018	FY2020 (mid-year)
Wendell	October 1, 2023	Late FY2024
Zebulon	July 1, 2024	Late FY2022 (4-7% growth) Early FY2025 (3% growth)

Example of FY2014 Merged System Water/Wastewater Rates

Raleigh / Garner Rates

(For Residential Customer, 5/8" meter)

- ***Monthly Administrative Water Charge*** **$5.98**
- ***Metered Water Charge (rates per 100 cubic ft)***

0-4 ccf	**$2.28/ccf**
5-10 ccf	**$3.80/ccf**
11 ccf & up	**$5.07/ccf**

- ***Monthly Administrative Sewer Charge*** **$6.56**
- ***Metered Sewer Charge*** **$3.82/ccf**
- **Monthly bill for example residential customer (assume 4500 gallon/month) $52.63**

Merger Towns Example Monthly Residential Bill

(For 5/8" meter, 4,500 gallon/month)

Rolesville: $60

Wake Forest $65

Knightdale $74

Wendell $77

Zebulon $94

Favorites | Suggested Sites | Free Hotmail | Web Slice Gallery | CORECON | more | RALEIGH
EFC Resources: North Carolina Water and Wastewat...
Page | Safety | Tools

Click to exit tool

UNC ENVIRONMENTAL FINANCE CENTER

NC Water and Wastewater Rates Dashboard

Rates as of February 2014

Last updated: March 10, 2014

Smart Management for Small Water Systems

Raleigh - Zebulon

Rates Comparison | Financial Benchmarks | Characteristics | Links

Select residential bill and monthly consumption amount

Water Bill | Sewer Bill | Water + Sewer

0 — 15

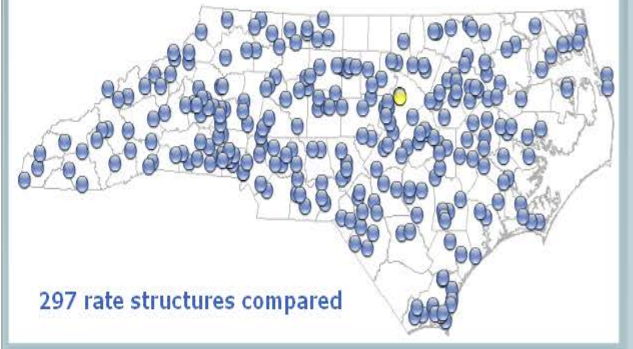
5,000 gallons
668 cubic feet

Monthly Water & Sewer Bill: $101.84

Select comparison group

All Utilities

Comparing to all utilities in the survey



297 rate structures compared

Observe the effects of raising rates by: **0%**

Bill Comparison

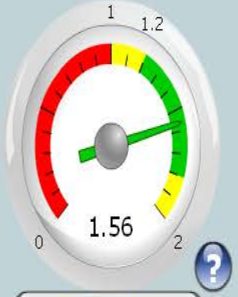
Water & Sewer Bill at 5,000 gallons

Conservation Signal

Water & Sewer Price/1,000 Gallons after 10,000 Gallons

Cost Recovery

Water & Sewer Operating Ratio incl. Deprec. (FY13)



Affordability

Water & Sewer Bills as % MHI in 2012

Edit Data

Done | Internet | 125%

Employee Leadership and Development

Program Recommendation

City of Raleigh Public Utilities Department

Employee and Leadership Development

CITY COUNCIL WORK SESSION

MARCH 20, 2014

Strategic Planning Process

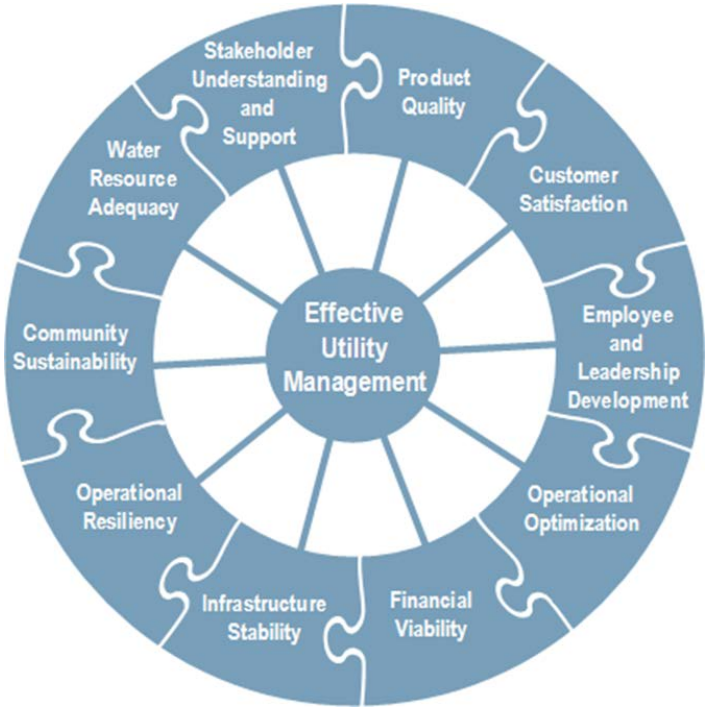
10 Attributes of Effective Utility Management

1. Stakeholder Understanding and Support
2. Product Quality
3. Customer Satisfaction
4. Operational Optimization
5. Financial Viability
6. Infrastructure Stability
7. Operational Resiliency
8. Community Sustainability
9. Water Resource Adequacy

10. Employee & Leadership Development

Sponsoring Agencies

AWWA
WEF
AMSA
NACWA
NAWC
APWA
USEPA



Finding: *Employee and leadership development is the foundation for long-term success of the utility.*

Employee and Leadership Development
As Defined and Shared with Council (2/19/2013)

A. Revised job descriptions and training plans that match new organizational needs as communicated by the Strategic Plan.

B. A unified training program which serve to develop skills specific to divisional requirements.

C. An incentive program that is, in part, monetary; that is associated with prioritization of promotional opportunities, that uses cross functional training.

D. A recruitment plan for a competent, motivated and agile workforce.

E. Defined career ladders encouraging both division-specific expertise development and cross functional training.

F. Divisional organizational charts designed to support the roll-out of the Strategic Plan.

G. An employee evaluation system that develops goals for each employee that ties to the Strategic Plan.

Employee and Leadership Development
CORPUD Objective

- Make strategic investments in employee training and development.
  - Create a more highly skilled, competent, and flexible workforce
  - Achieve greater degree of efficiency and effectiveness improvements
- Apply innovative compensation and performance management strategies that:
  - Foster, encourage, and reward employees who acquire, master, and apply *targeted (i.e. "on strategy")* knowledge, skills, and competencies
  - Enhance job satisfaction, and
  - Promote professional and leadership development
- Conduct salary survey of comparable and competing organizations and comparable job classifications.

Employee and Leadership Development
Consultant Recommendation

- Implement Career Ladder System (skill-based pay system)
  - Employee career advancement and salary increases are directly related to an employee's contribution to the success of the City (*i.e. Strategic Plan*).
  - Career ladders have been developed in Raleigh by Police, Fire, and the Emergency Communications Center.
  - Career ladder systems are well established for water and sewer utilities in the Triangle and across the country (*goal: improve efficiency and effectiveness*).
  - Transition employees from existing compensation structure to new compensation structure over 30-month period.
  - Develop necessary training and skills assessment methods during the 30-month implementation period.
  - Develop a similar program for non-technical positions (*Managers, Supervisors and Program Specialists*).
  - Flatten organization to increase span of control for managers and supervisors.

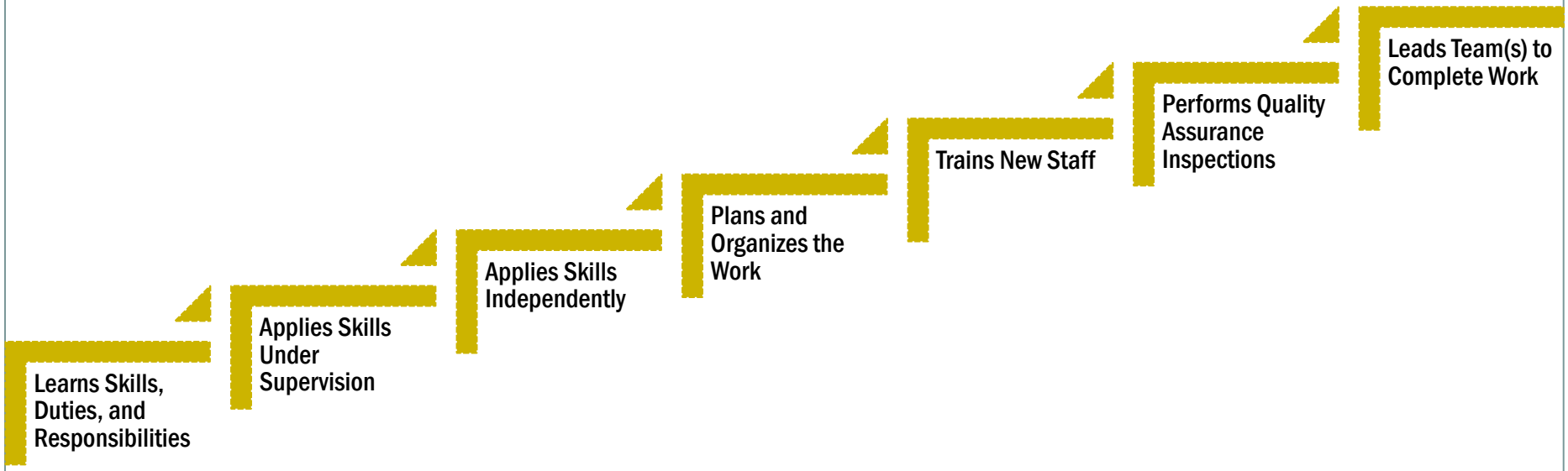
Traditional System

- Departments require numerous job descriptions to complete their missions (*112 job descriptions in CORPUD*).
- Employees do not advance unless there is a vacancy.
- Employees who do advance may not necessarily be prepared for new role.
- System does not foster or require attainment of new skills.
- Career advancement and salary increases may occur without attainment of additional skills.
- Employees may progress to the top of a pay range over time without advancing skills.
- System does not support succession planning.

Career Ladder System

- 22 career ladders replace 75 individual job descriptions.
- Training, skills, and proficiency tests defined for each level of a career ladder.
- Employees advance to next level of a career ladder only after certifying as proficient in the skills required for the next level.
- Employees may advance vertically within ladder or horizontally between ladders (*cross-functional, increased staff flexibility*).
- System fosters and encourages the attainment and utilization of skills important to the organization (*i.e. "on strategy"*).
- System supports succession planning for the organization.

Career Ladder Progression Concept



Employees advance in a career ladder as they increase their knowledge, skills and competencies, and apply them for the benefit of the City. Employees can advance vertically through, and horizontally across, career ladders.

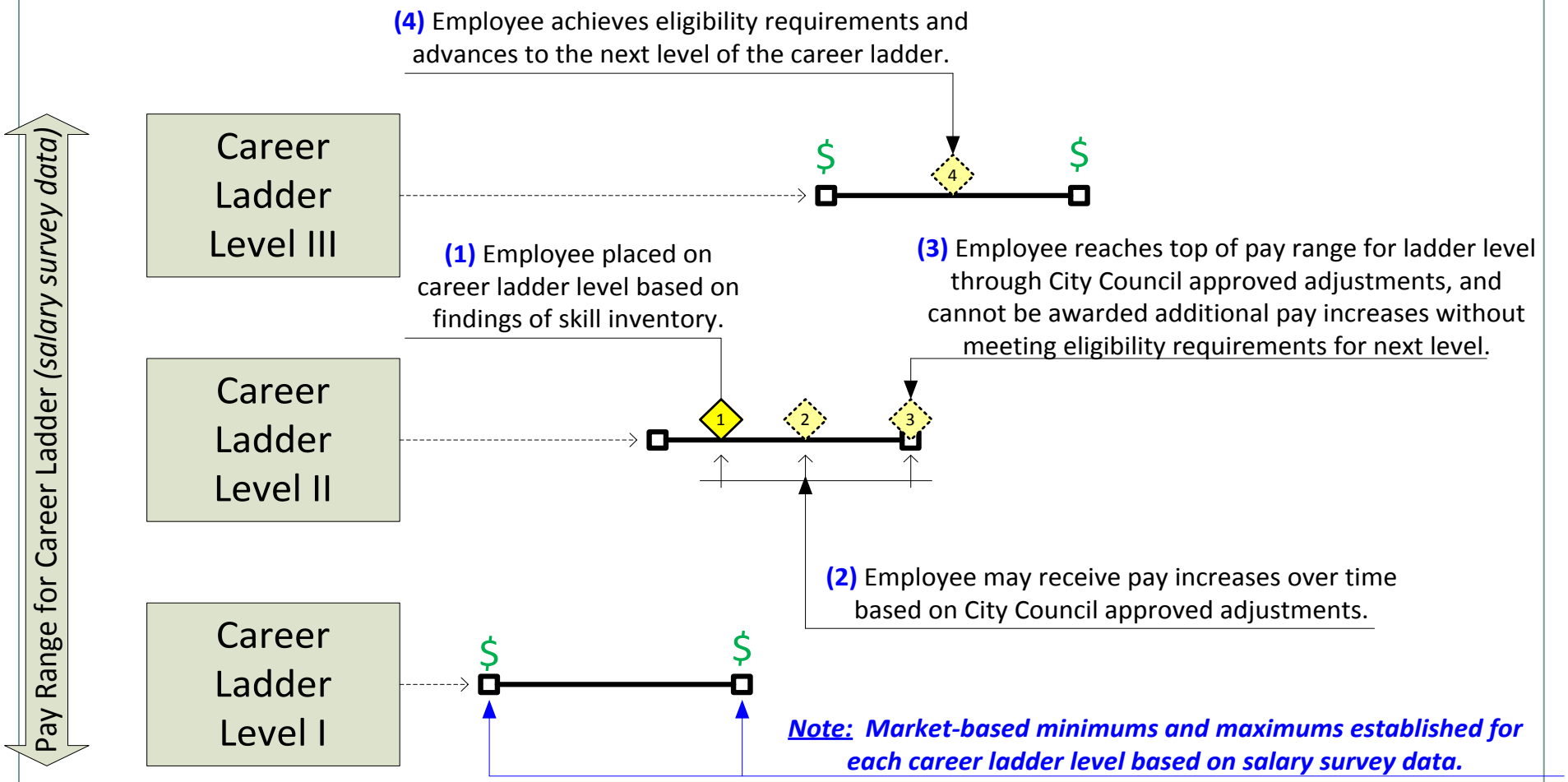
Proposed Technical Career Ladders (22)

CORPUD E&LD Program

Career Ladder	No. of Levels	Employee Counts	Career Ladder	No. of Levels	Employee Counts
Account Manager	4	26	Laboratory Scientist	6	14
Administrative Specialist	4	17	Meter Services Technician	5	58
Billing and Records Analyst	3	4	Public Utilities Maintenance Electrician	5	10
Building Services	4	2	Public Utilities Maintenance Mechanic	6	41
Business Systems Management and Design	4	3	Residuals	5	12
Engineer	5	12	Technical and Safety Training	5	8
Environmental Compliance	5	22	Treatment Plant Operator	6	55
Financial Analyst	3	5	UB Quality Assurance / Training	4	4
GIS Technician	5	5	UB Systems Testing	4	6
Inspector	5	27	Utility Technician	3	14
Inventory Specialist	5	9	Utility Worker	5	113

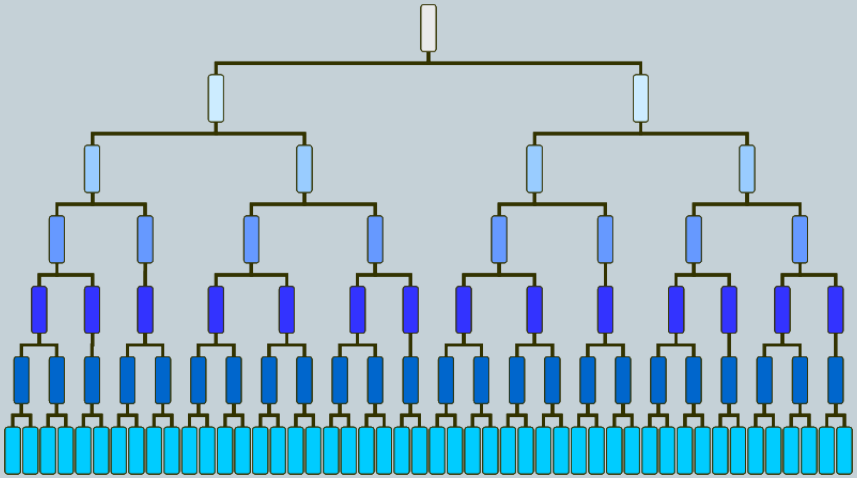
CORPUDs management team has established requirements for training, certifications, skills, duties and responsibilities for each level of the 22 proposed career ladders.

Proposed E&LD Compensation System



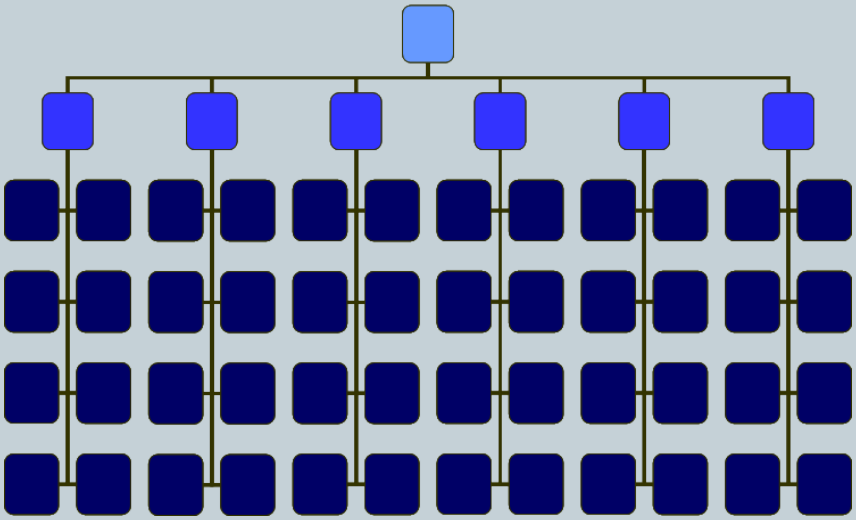
Revised Management Structure

Tall Hierarchy
Low Span of Control



Currently approximately 4 employees per supervisor

Flat Hierarchy
High Span of Control



Transition to ~8 employees per supervisor

More skilled work force requires less direct supervision

Employee Advancement Process

1. Business Need
   - *Some ladder levels may have caps on staff counts based on the business needs for the skills.*
2. Time-in-Position
   - *Performance improves with experience at a career ladder level.*
3. Annual Performance Evaluations
   - *Minimum acceptable rating required (above standard), emphasis on Core Values and incorporates 360-degree reviews.*
4. Skill-Development Training
   - *Classroom, onsite, offsite, on-the-job, etc.*
5. Status of Disciplinary Actions
   - *Review preceding 12-months.*
6. Completion of Proficiency Testing
   - *Minimum acceptable scores required on proficiency tests – 90 percent.*

Directors Salary Management Fund

Affords the Director the ability to address employee salary discrepancies, with the concurrence of the HR Director, including:

- *Retention*
- *Resolving salary disparity between long serving and newly hired employees*
- *Resolving salary disparity caused by changes in promotional policies*
- *Rewarding exceptional employee performance*

Benefits of E&LD for Employees

- Employee pay is commensurate with an employee's contribution to the organization's success.
- Employee advancement is awarded in a transparent, equitable, and consistent manner.
- Employee's are provided with clear direction and guidance for career advancement.
- Employee advancement is self-directed.
- As employee's gain more experience, knowledge, skills, and competencies, employees will:
  - Gain more freedom, independence, and control of their work.
  - Be assigned more challenging and complex work.
  - Be granted opportunities to demonstrate leadership in the execution and completion of work.

Benefits of E&LD for the City

- Employees' pay based on their value to the organization and what they contribute.
- Employee advancement is awarded in a transparent, equitable, and consistent manner.
- A more talented, more productive, more flexible workforce will result in:
  - Improved efficiency, effectiveness, and safety for the Department
  - Increased span of control for supervisors and managers (*more skilled employees require less direct supervision*)
- Pool of available talent within the organization is increased.
- A dedicated and focused attention on training, coaching, mentoring and developing high-performing talent.

Employee and Leadership Development
10 Attributes of Effective Utility Management

An effectively managed water sector utility . . . .

- Recruits and retains a workforce that is competent, motivated, adaptive, and safe-working.
- Establishes a participatory, collaborative organization dedicated to continual learning and improvement.
- Ensures employee institutional knowledge is retained and improved upon over time.
- Provides a focus on, and emphasizes opportunities for, professional and leadership development and strives to create an integrated and well-coordinated senior leadership team.

Ten Attributes of Effectively Managed Water Sector Utilities
May 2007

Proposed Interim Implementation Plan

1. Resize CORPUD management team
2. Stand up a Unified Training Program
3. Change some job titles to better reflect actual duties preformed
4. Modify the existing Incentive for Certification Program
5. Establish E&LD Program Team (internal to CORPUD)

QUESTIONS

Environmental Stewardship

- **Report on Compliance History**
  - **Water Treatment, Distribution and Metering**
  - **Cross Connection**
  - **Sewer Maintenance and Resource Recovery**
- **Legislative Agenda**
  - **Vote**

Process Improvements Supporting Compliance

- Compliance Sampling
- Area Wide Optimization Plan (AWOP)
- Ultraviolet Disinfection Credit (UV)
- Partnership for Safe Water

Cross Connection Program

- What is a cross-connection program and what are our roles?
- What have we done and what are our goals?
  - Past
  - Present
  - Future
- How can these goals be accomplished?

Compliance History

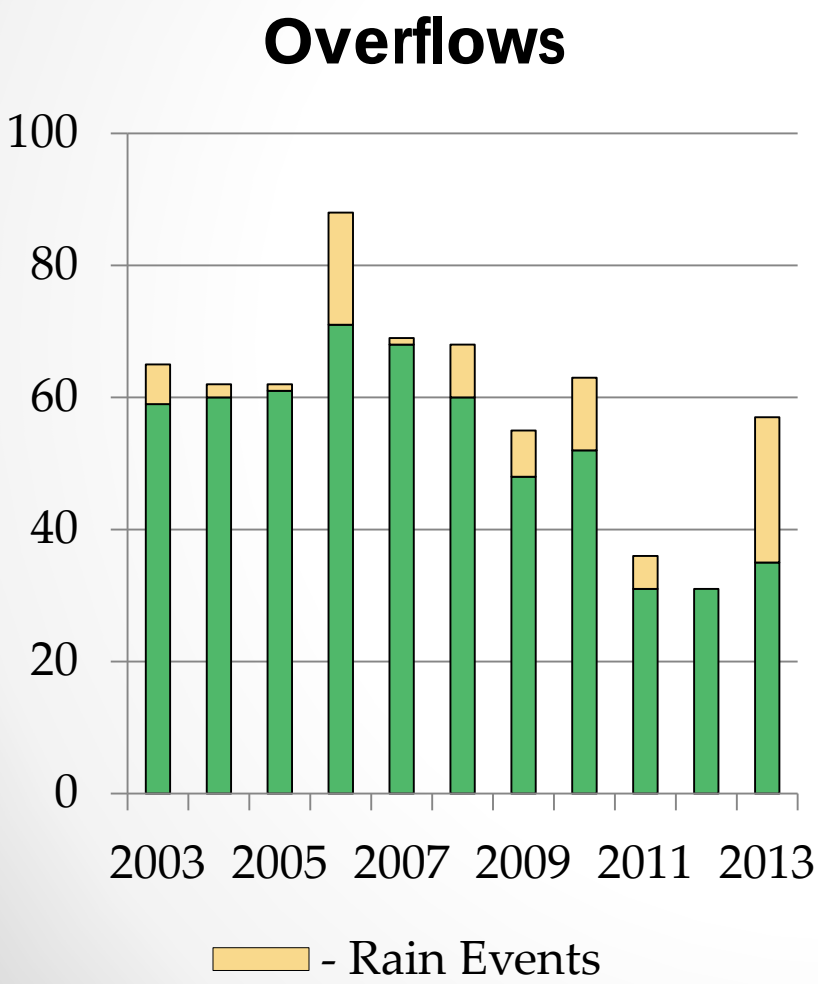
Operation and Maintenance Permit

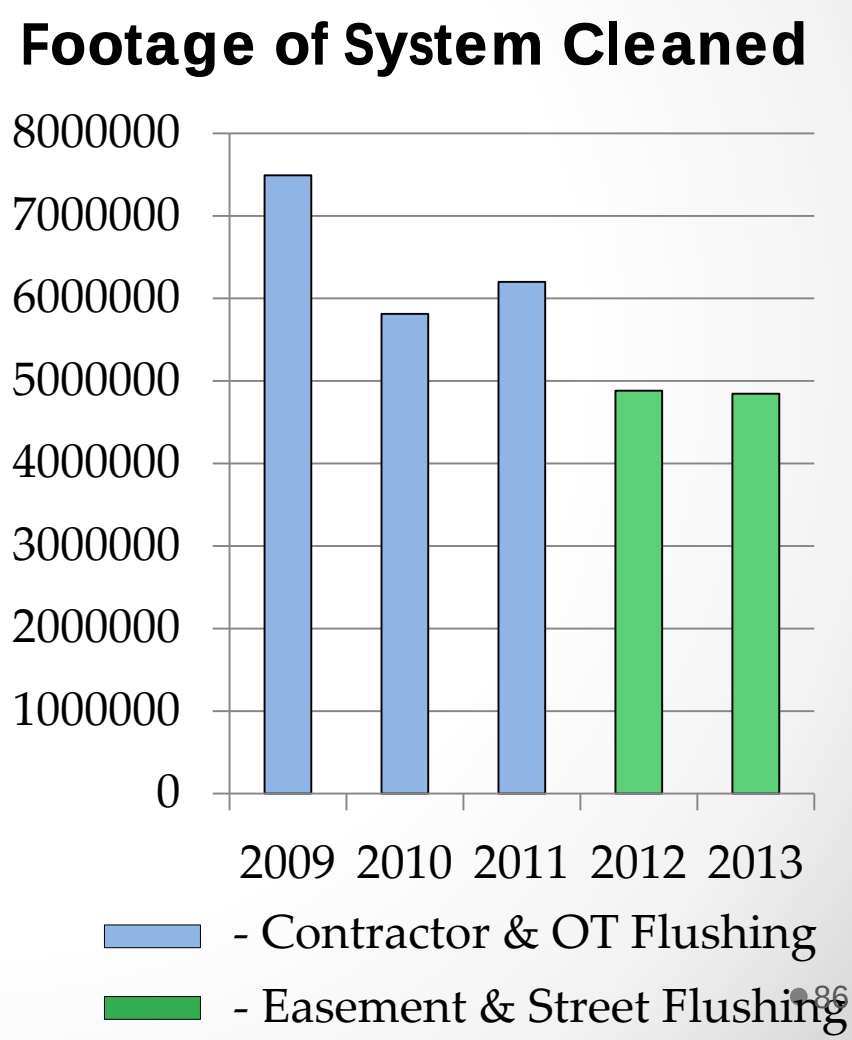
- NCDENR-DWR Permit
- Permit covers existing and newly installed assets leading up to the wastewater treatment facility
- Mandates compliance in a number of measurable areas
- Failure to abide may subject the Permittee to enforcement action

Areas of Concern

- Sanitary Sewer Overflow (SSO) – Prevention and Response
- Collection System Inspections
- Collection System Maintenance and Cleaning
- Easement Maintenance
- FOG program

SSO History


Overflows
100
80
60
40
20
0
2003
2005
2007
2009
2011
2013
- Rain Events


Footage of System Cleaned
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
2009
2010
2011
2012
2013
- Contractor & OT Flushing
- Easement & Street Flushing

Collection System Inspections & Maintenance

- Easement Inspections
- Cleaning
- Identify system problems
- Right-of-way maintenance
- Enforceable FOG program

Environmental Management System

- Developing an EMS System based upon the ISO 14001 Standard
- Development of Environmental Impacts related to air, water, soils, waste, energy, and nuisances
- Establishment of Significant aspects with Critical Control Points and appropriate and realistic DOP's for staff functionality
- Monitoring and measurement of actions

EMS Overview

Resource Recovery Division Compliance Record and Achievements

- 100% compliance at ALL NPDES WWT plants (SC, LC & NR)
- Began Land Application on NRWWTP Land after 10 years of research
- Recipient of 2012 NACWA's Platinum Peak Performance Award (11 years- NRWWTP, 7 years –LCWWTP, 8 years- SCWWTP)
- Recommended for ISO 14001/2004 - *Framework for Environmental Management Systems* (February 2014)
- Recommended for EPA's National Biosolids Partnership EMS (February 2014)
- 100% compliance for all NCDENR permitted WW facility Inspections
- 100 % compliance for Industrial Pretreatment Program
- 100 % compliance for Land application Program (Class A & Class B) Completed all Proficiency Testing for WW laboratory Certification

VOTE

- **Recommendation: Approve Legislative Agenda**

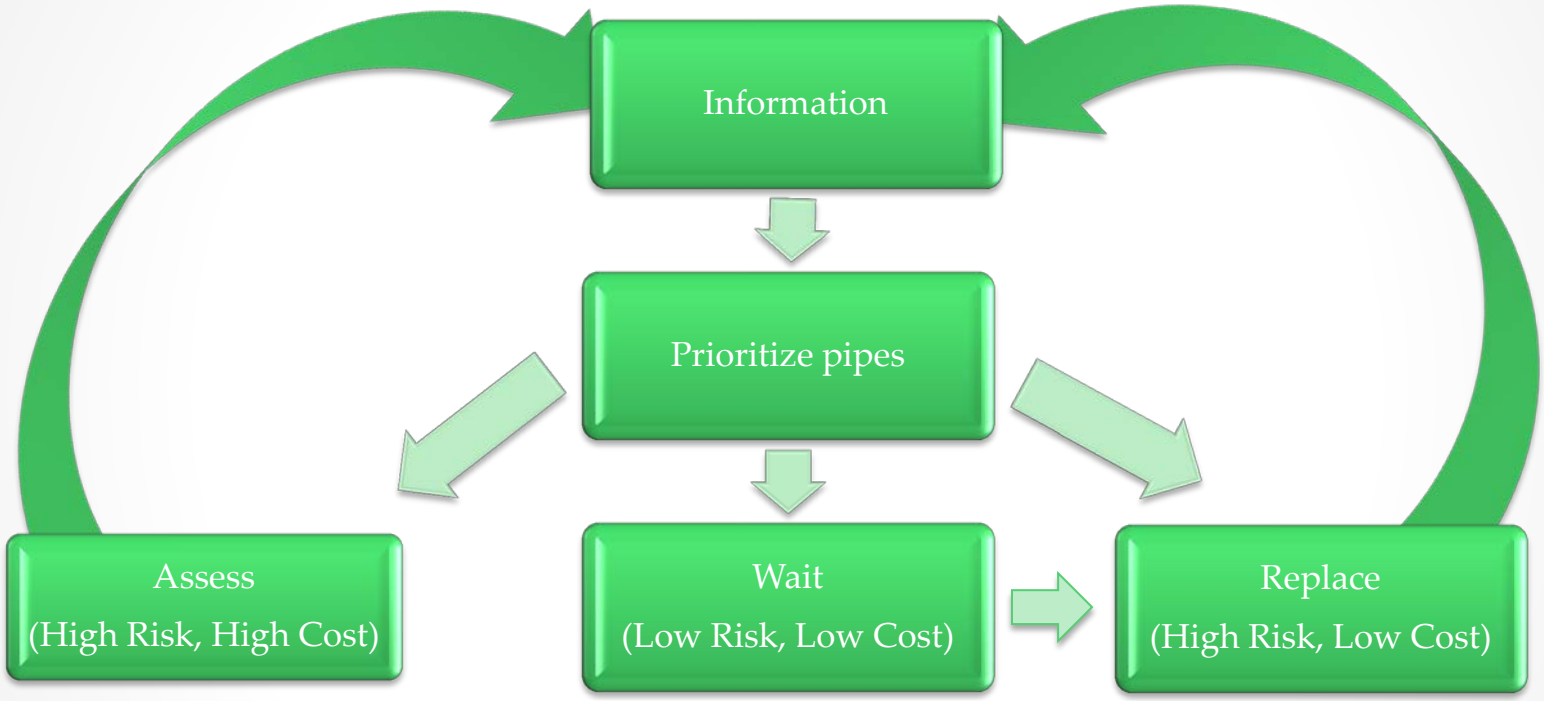
BREAK

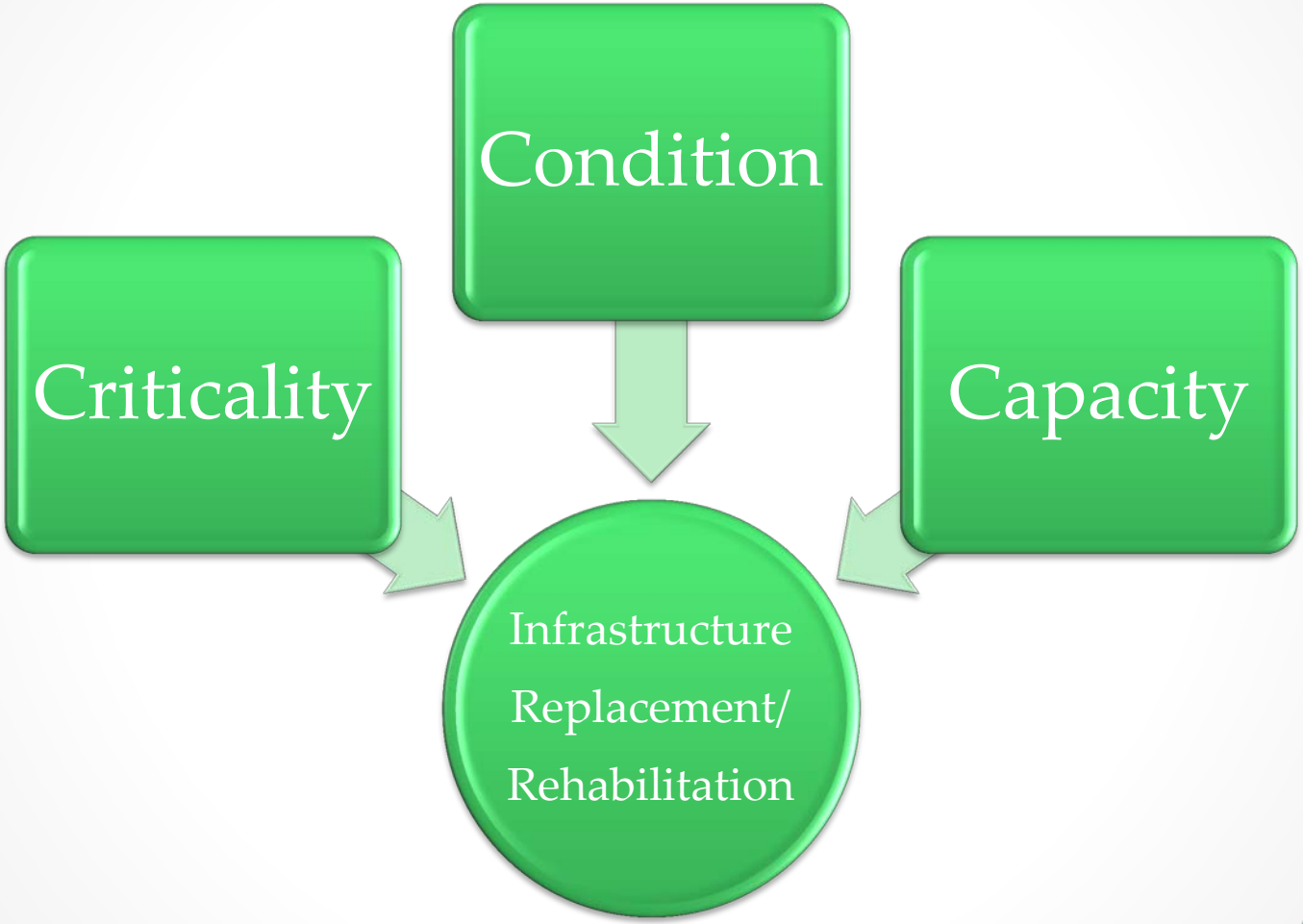
Reliability

- Asset Management Program
- Sewer Capacity Study Update
- Water System Master Plan Update
- Reuse Master Plan Update

Asset Management Program

What is Asset Management?




Condition
Criticality
Capacity
Infrastructure Replacement/ Rehabilitation

Criticality

- Critical Customer Impact
- Difficulty of repair
- Environmental Consequence of Failure

Condition

- Age
- Assessment Data
- Maintenance Issues
- Customer Complaints

Capacity

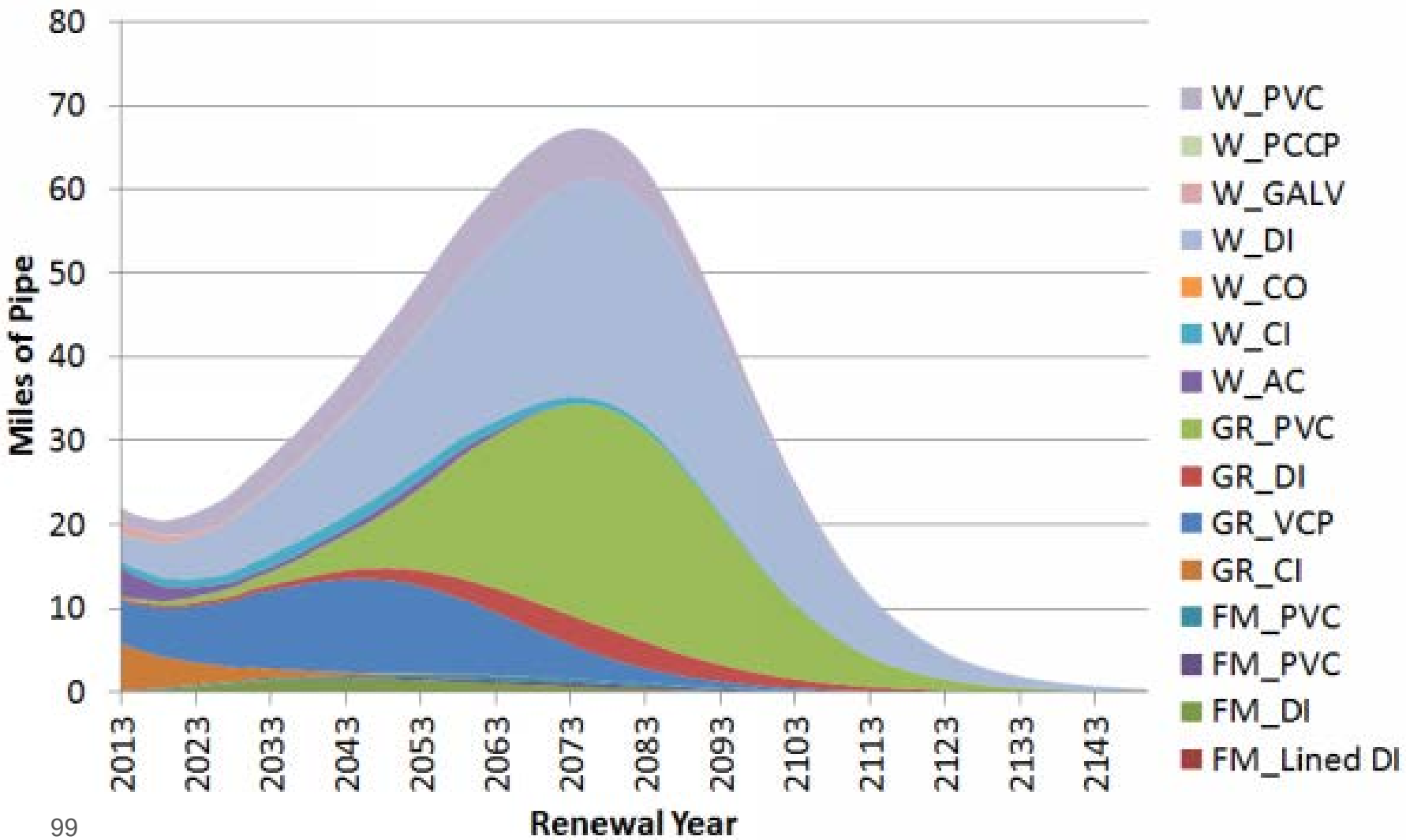
- Current Capacity Limitations
- Projected Future Demands

Why Asset Management?

Maximizes Service Life and Minimizes Customer Impacts through:

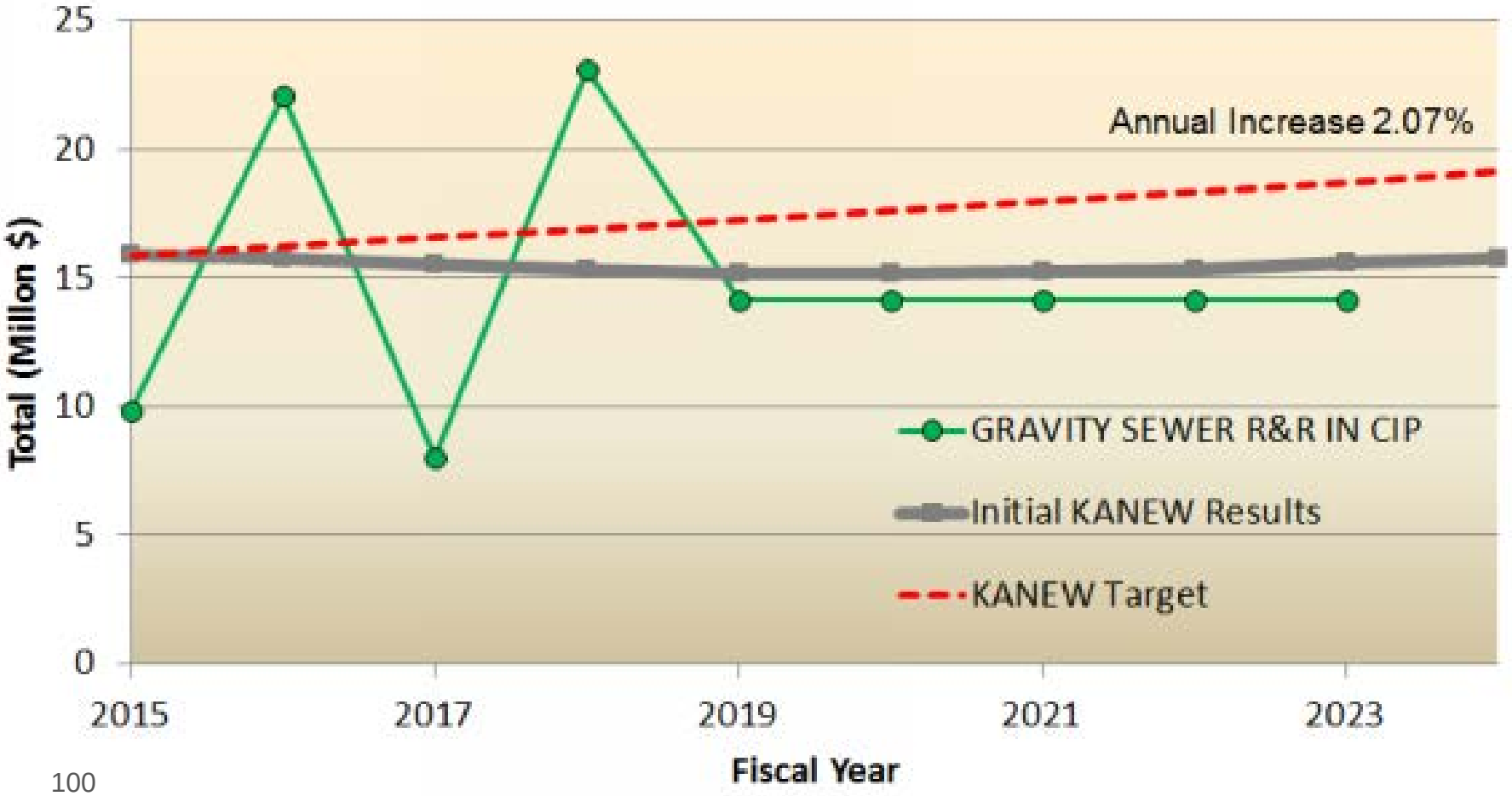
- **Proactive assessment** and replacement of critical infrastructure.
- **Reactive replacement** of non-critical infrastructure.
- **Coordination** with paving and other projects to avoid the need for reactive replacement in new streets.
- **Prediction of Budget impact** of future Replacement Needs

Replacement Date for Existing Pipe



Near Term Budget Needs for Replacement

Figure ES-8. Current Gravity Sewer Pipe R&R CIP Budget and Recommended KANEW Target



That sounds like a good goal…
But how are we going to do it?

Criticality Analysis

- Completed by CDM Smith September 2013

Condition Information

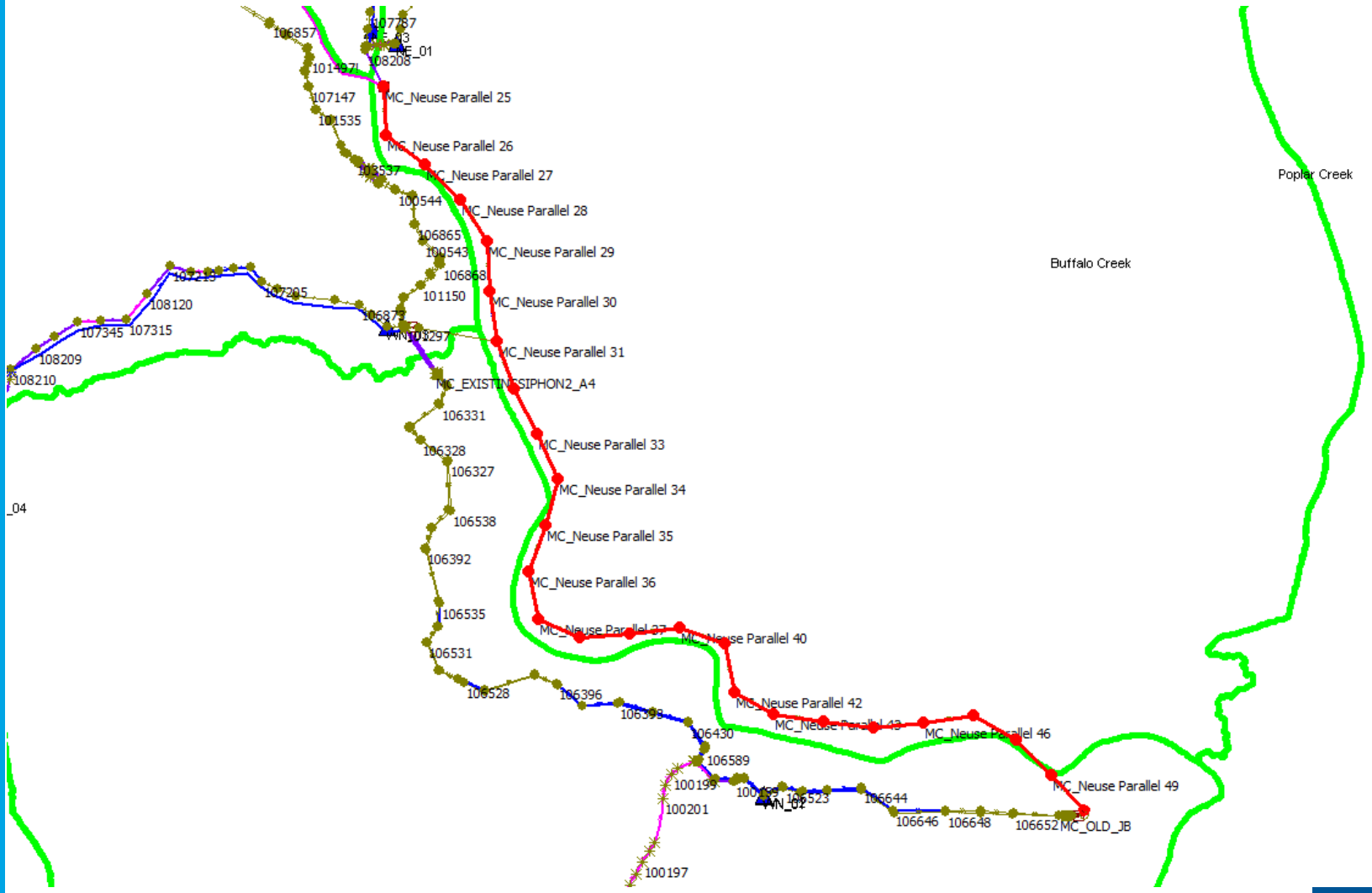
- Watermain Age is being mined from historical records. 34% complete including most of our oldest infrastructure.
- Assessment contracts for Critical Water Transmission mains and 3% of oldest water and sewer are scoping now.

Capacity Information

- Reuse Master Plan (Completion 2014)
- Sewer Capacity Study Update (Completion 2014)
- Water Master Plan Update (Completion 2015)

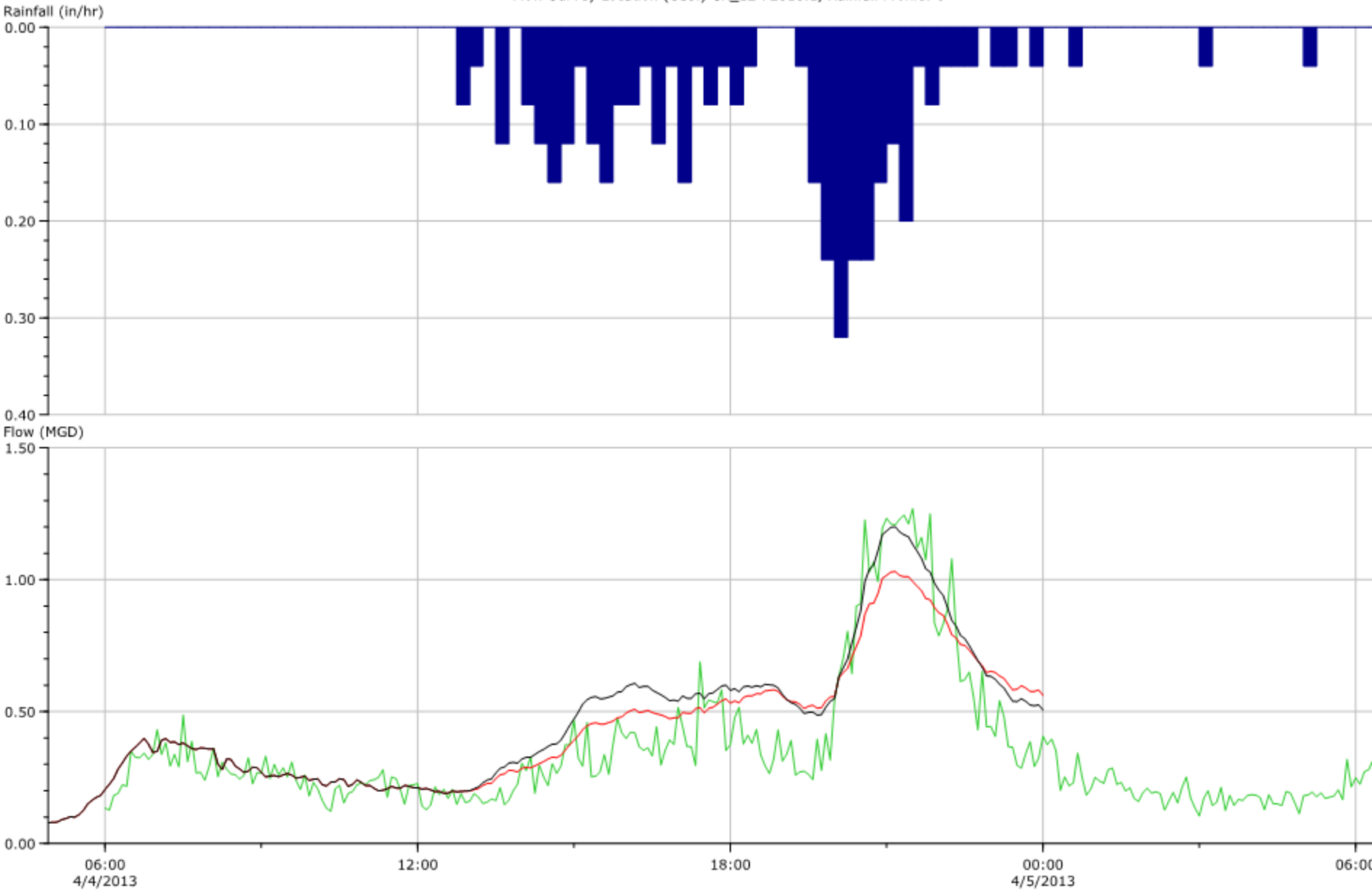
Sewer Capacity Study

EAST NEUSE INTERCEPTOR



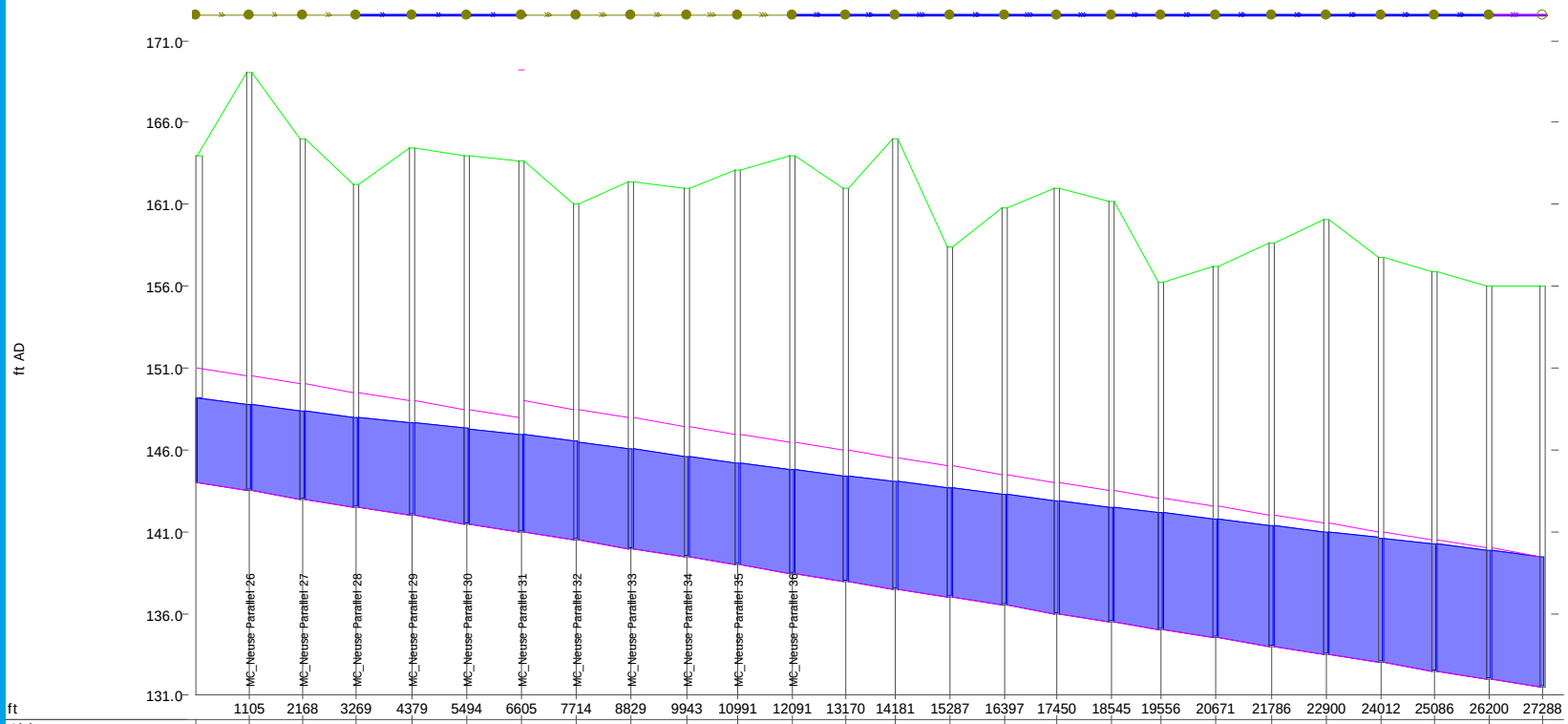
Observed / Predicted Plot Produced by men73570 (12/19/2013 11:16:50 AM) Page 1 of 9
Flow Survey: >WWF-baselinev3>Flow Survey Group>4/4/2013 (9/20/2013 7:32:01 PM)
Sim: >WWF-baselinev3>Run Group-Recalibration-R1->R2 30%>0404!>rain (12/19/2013 10:55:56 AM)
Sim: >WWF-baselinev3>Run Group-Sensitivity Analysis>0404>rain (12/18/2013 1:49:42 PM)
Graph Template: >WWF-baselinev3>Graph Template Group>WWF 3 basins (12/19/2013 11:13:50 AM)

Flow Survey Location (Obs.) CR_12 72010.1, Rainfall Profile: 8



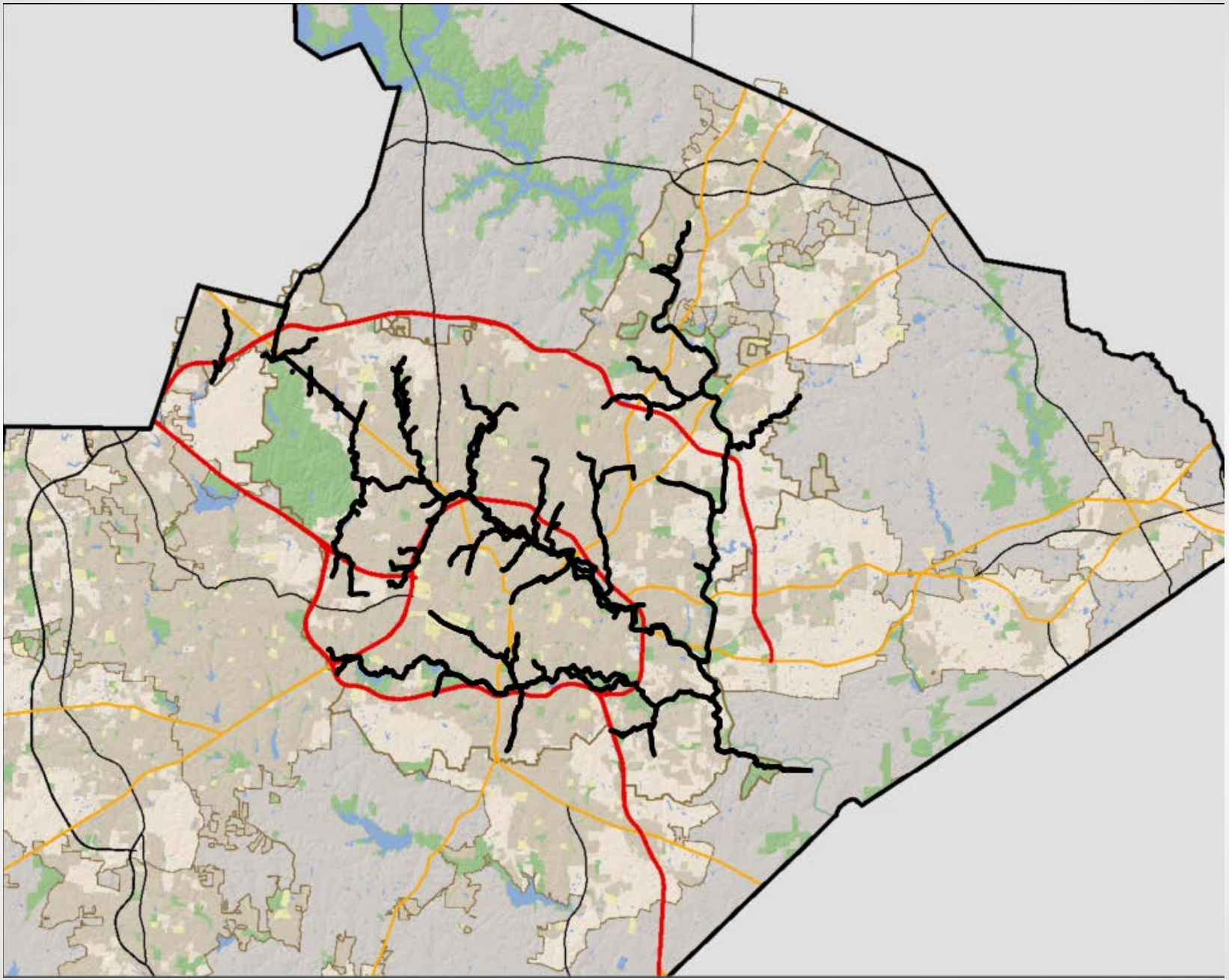
Rainfall	Flow (MGD)

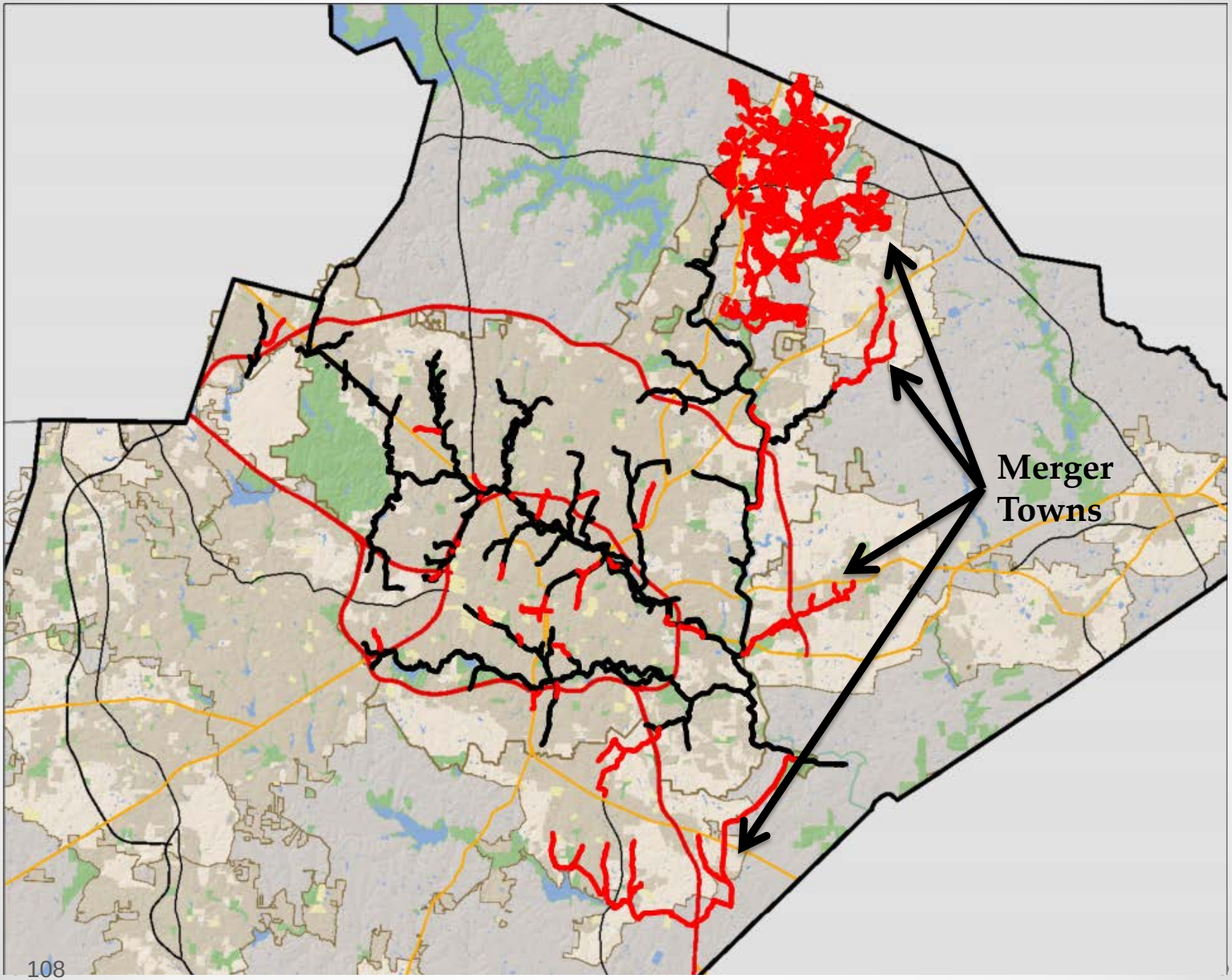
EAST NEUSE INTERCEPTOR PROFILE – PRELIMINARY DESIGN

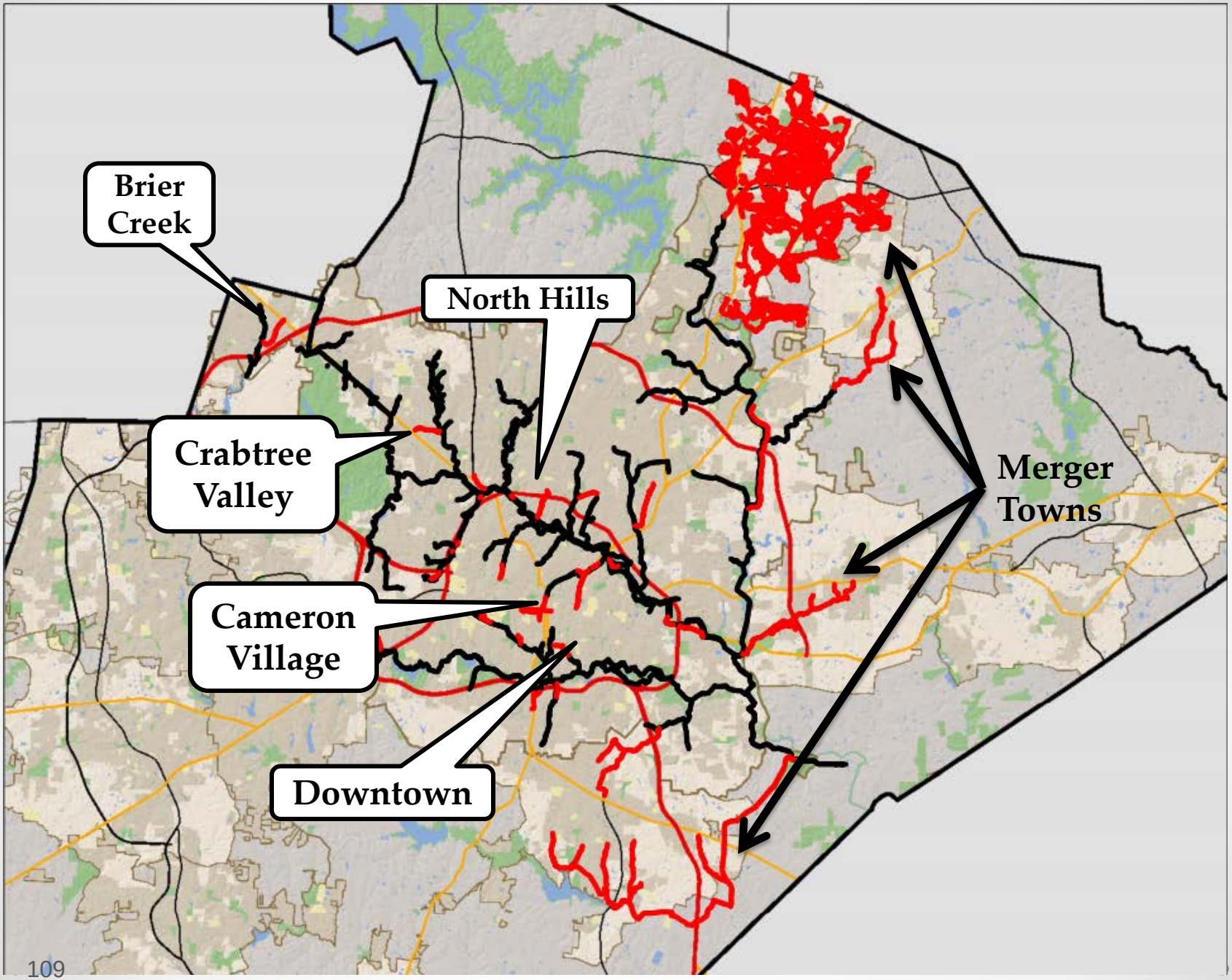


ft	1105	2168	3269	4379	5494	6605	7714	8829	9943	10991	12091	13170	14181	15287	16397	17450	18545	19556	20671	21786	22900	24012	25086	26200	27288
Link	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
length (ft)	1105.2	1062.5	1101.1	1110.2	1115.1	1110.7	1108.7	1115.2	1114.4	1048.0	1100.0	1078.3	1011.1	1106.2	1110.3	1053.1	1095.0	1010.3	1115.2	1115.0	1114.0	1111.9	1074.7	1113.9	1088.1
width (in)	84.0	84.0	84.0	84.0	84.0	84.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
Bottom Roughness Manning	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
User Text 1																									
r.pfc (MGD)	88.377	88.377	88.377	88.377	88.377	88.377	126.178	126.178	126.178	-	126.178	126.178	-	126.178	126.178	126.178	126.178	-	126.178	126.178	126.178	126.178	126.178	126.178	126.178
surc	0.75	0.77	0.79	0.81	0.83	0.86	0.76	0.76	0.77	0.78	0.80	0.81	0.82	0.84	0.85	0.86	0.88	0.89	0.91	0.92	0.94	0.95	0.97	0.98	1.00
US Flow (MGD)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Node	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ground (ft AD)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chamber Floor Level (ft AD)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
level (ft AD)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
flood dep (ft)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-15.414	-	-	-	-	-	-

EAST NEUSE




Merger
Towns


Brier Creek
North Hills
Crabtree Valley
Cameron Village
Downtown
Merger Towns

Model Updates for 2013 Study

- Model expansion to include Garner, Knightdale, and proposed redevelopment areas.
- Updated billing data
- Updated population projects (CAMPO 2040 Data)
- Updated flow monitor data (70 flow monitors)
- Capacity Assurance Tool to help verify adequate facilities for proposed downtown developments.

Results

- Preliminary results have verified that the Crabtree Creek, Smith Creek and Richland Creek improvements are adequately sized.
- Continues to recommend improvements along Walnut Creek to convey peak wet weather flows.
- Proposed sizes for downtown sewers.

Water System Master Plan

- Model Update/Calibration
- Future Capacity Predictions
- Develop CIP
- Update Diurnal Demand Patterns
- Pump/Energy Efficiency
- Tracer Study (Mixing Zone)
- Emergency Response Plans
- System Vulnerability Assessment

Public Utilities Summary Program Requests

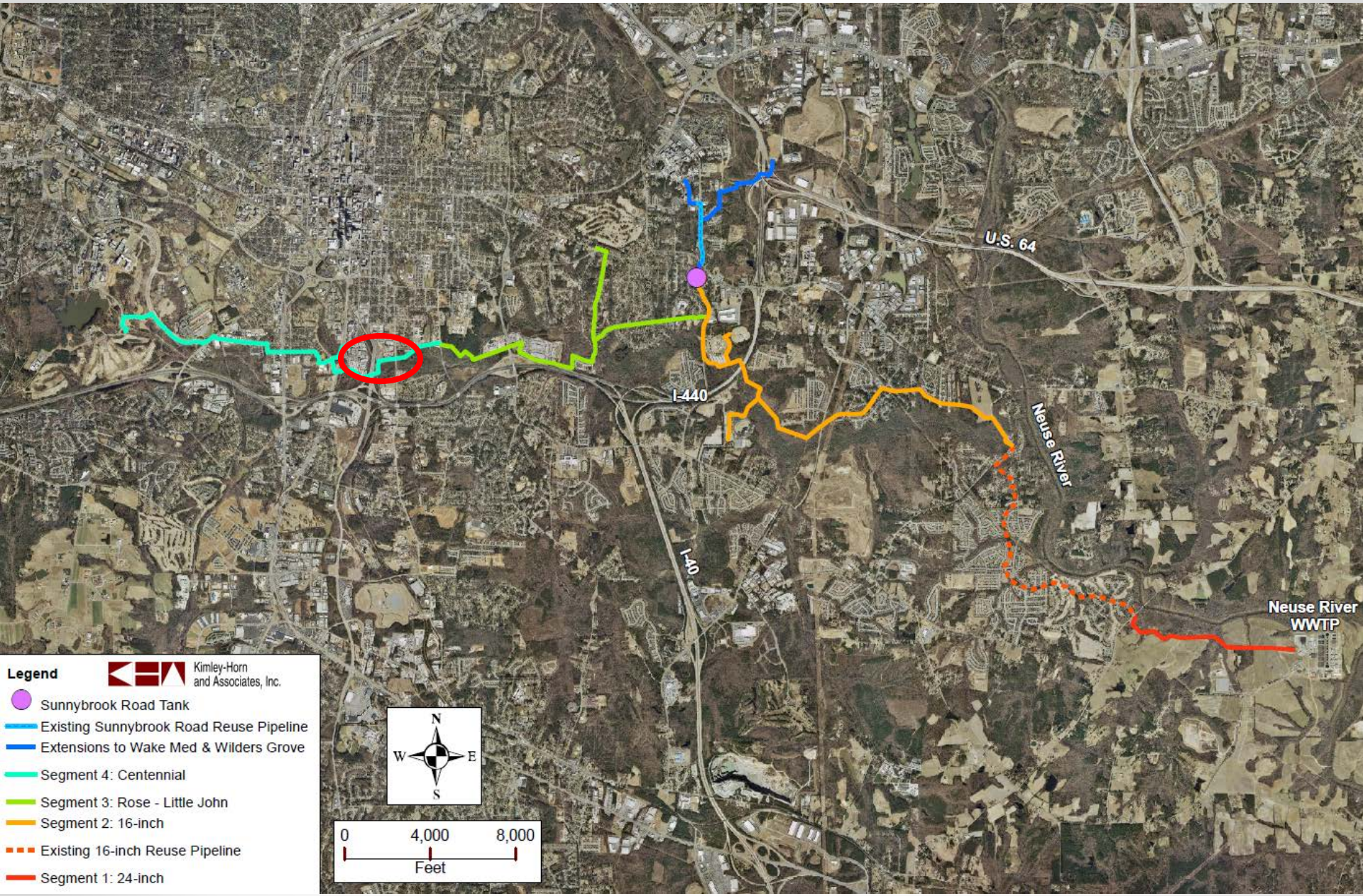
FY2015

FY15 Budget Process

CIP

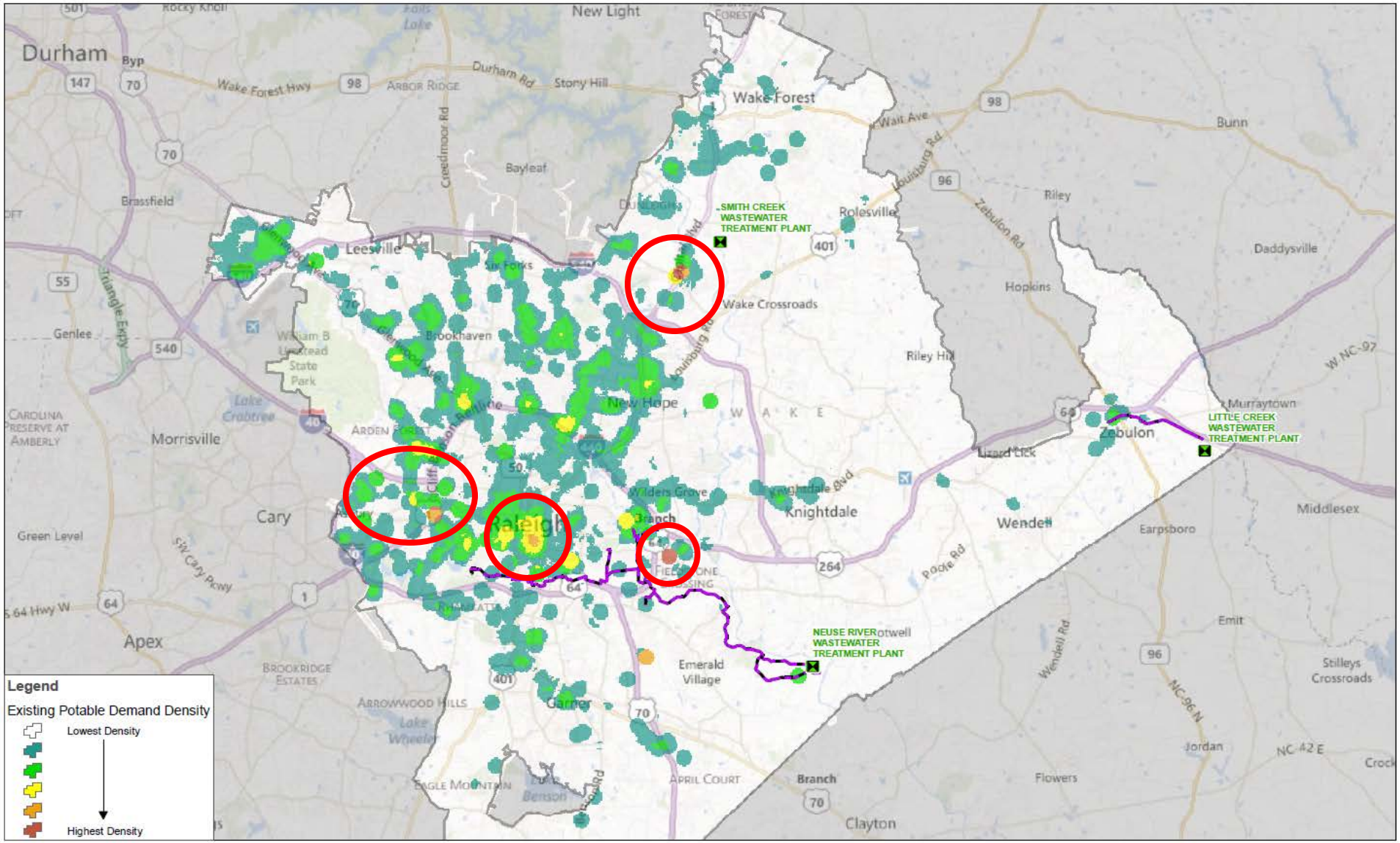
Fnd	Project	Prog	Account	Project Name	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	5Y Rq	Ph II	Total CIP	ID	Rank
320	80100000	975	792020	Service Area Growth	-	100,000	100,000	100,000	100,000	400,000	500,000	900,000	W39	33
320	90190000	975	793080	Water Booster Station Rehab	50,000	50,000	50,000	50,000	50,000	250,000	250,000	500,000	W44	38
320	90190000	975	792020	Water Booster Station Rehab	450,000	350,000	350,000	350,000	350,000	1,850,000	1,750,000	3,600,000	W44	38
320	New PUDC	975	790010	EMJWTP Solids Handling Improvements	-	-	-	-	-	-	10,000,000	10,000,000	W55	46
320	92070000	975	793080	EMJWTP Facility/Equipment Rehabilitation	50,000	75,000	75,000	75,000	75,000	350,000	300,000	650,000	W17	13
320	92070000	975	792020	EMJWTP Facility/Equipment Rehabilitation	450,000	675,000	675,000	675,000	675,000	3,150,000	3,450,000	6,600,000	W17	13
320	90250000	975	792020	EMJWTP Chemical Storage Tank Replacement	-	-	-	-	250,000	250,000	-	250,000	W16	12
320	90260000	975	792020	Elevated Water Tank Rehabilitation and Maintenance	1,300,000	1,000,000	1,000,000	1,000,000	1,000,000	5,300,000	5,000,000	10,300,000	W10	7
320	97820000	975	791010	Little River Reservoir Wake City Acquisition Reimbursement	500,000	500,000	500,000	500,000	500,000	2,500,000	2,500,000	5,000,000	W28	23
320	81010170	975	752900	Capital Equipment Rehbailitation/Replacement	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	15,000,000	15,000,000	30,000,000	W53	44
320	New PUDC	975	792900	Fire Hydrant Replacement	-	1,000,000	1,000,000	1,000,000	1,000,000	4,000,000	5,000,000	9,000,000	W57	48
320	New PUDC	975	792900	Fire Hydrant Nozzle Replacement	-	700,000	700,000	700,000	700,000	2,800,000	-	2,800,000	W56	47
320	ZZAssetM	975	793080	Highest Priority Action Projects	920,000	920,000	920,000	920,000	920,000	4,600,000	-	4,600,000	W58	49
320	ZZAssetM	975	790010	FCA and HPPR Assessment (50%)	-	-	-	-	-	-	9,000,000	9,000,000	W59	50
320	ZZAssetM	975	792020	Replacement of Galvanized Pipe in Streets Soon to be Paved	530,000	-	-	-	-	530,000	-	530,000	W60	51
320	ZZAssetM	975	792020	Replacement of Remaining Galvanized Pipe	1,120,000	-	-	-	-	1,120,000	-	1,120,000	W61	52
320	ZZAssetM	975	792020	Asset Management Water Main R&R	-	1,800,000	3,100,000	3,700,000	4,000,000	12,600,000	30,500,000	43,100,000	W62	53
320	84680000	975	793080	Watermain Rehab/Replace	400,000	500,000	500,000	500,000	500,000	2,400,000	2,500,000	4,900,000	W46	40
320	84680000	975	793080	Watermain Rehab/Replace	3,600,000	4,500,000	4,500,000	4,500,000	4,500,000	21,600,000	27,500,000	49,100,000	W46	40
320	83370000	975	792020	Thoroughfare Mains	400,000	400,000	400,000	400,000	400,000	2,000,000	2,000,000	4,000,000	W42	36
320	94870000	975	793080	Water Distribution WQ Program, Study, Eval, & Design	150,000	100,000	100,000	500,000	100,000	950,000	500,000	1,450,000	W45	39
320	91590000	975	792020	VA Security Improvements	-	-	-	4,650,000	-	4,650,000	-	4,650,000	W43	37
348	81010210	975	792020	Replace the Springdale Tank (B402)	1,450,000	-	-	-	-	1,450,000	-	1,450,000	W38	32
348	CIP01_NP	975	790010	EMJWTP Discharge Pipe (B302)	-	-	-	-	-	-	359,000	359,000	W12	9
348	CIP01_NP	975	793080	Franklin Street TM 12" (B602)	-	13,000	-	-	-	13,000	-	13,000	W23	18
348	CIP01_NP	975	792020	Franklin Street TM 12" (B602)	-	120,000	-	-	-	120,000	-	120,000	W23	18
348	CIP01_NP	975	790010	Hebron Church Road 24" (B511)	-	-	-	-	-	-	970,000	970,000	W24	19
348	CIP01_NP	975	790010	Jones Sausage Rd I-40 (B512)	-	-	-	-	-	-	850,000	850,000	W25	20
348	89980010	975	793080	Lingon Mill Rd TM 12" (B604)	-	43,000	-	-	-	43,000	-	43,000	W26	21
348	89980010	975	792020	Lingon Mill Rd TM 12" (B604)	-	387,000	-	-	-	387,000	-	387,000	W26	21
348	CIP01_NP	975	793080	NC98 Bypass TM 12" (B603)	-	49,000	-	-	-	49,000	-	49,000	W32	26
348	CIP01_NP	975	792020	NC98 Bypass TM 12" (B603)	-	444,000	-	-	-	444,000	-	444,000	W32	26
348	CIP01_NP	946	793080	Wendell Blvd TM (B902)	-	150,000	-	-	-	150,000	-	150,000	W47	41
348	CIP01_NP	946	792020	Wendell Blvd TM (B902)	-	1,299,000	-	-	-	1,299,000	-	1,299,000	W47	41
348	99380000	975	792020	Oak Forest 30" Water Main	-	2,900,000				2,900,000	-	2,900,000	W33	27
348	CIP01_NP	975	790010	Oregon Trail Rd Line 24" (B509)	-	-	-	-	-	-	1,219,000	1,219,000	W34	28
348	CIP01_NP	975	790010	Rand Road Line 12" (B513)	-	-	-	-	-	-	1,029,000	1,029,000	W36	30
348	CIP01_NP	975	790010	Bethlehem Rd TM 16" (B802)	-	-	-	-	-	-	839,000	839,000	W4	3
348	CIP01_NP	975	790010	Ten Ten road Line 12" (B514)	-	-	-	-	-	-	432,000	432,000	W37	31
348	CIP01_NP	975	790010	Clifford Rd TM 24" (B510)	-	-	-	-	-	-	1,189,000	1,189,000	W5	4
348	CIP01_NP	945	793080	Zebulon TM on NC97 (B903)	-	-	220,000	-	-	220,000	-	220,000	W51	42
348	CIP01_NP	945	792020	Zebulon TM on NC97 (B903)	-	-	1,956,000	-	-	1,956,000	-	1,956,000	W51	42
348	93670000	975	793080	DEBWTP T Mn (B101)	-	1,200,000	-	-	-	1,200,000	-	1,200,000	W9	6
348	93670000	975	791010	DEBWTP T Mn (B101)	-	200,000	-	-	-	200,000	-	200,000	W9	6
348	93670000	975	792020	DEBWTP T Mn (B101)	-	-	10,600,000	-	-	10,600,000	-	10,600,000	W9	6
348	CIP01_NP	975	793080	Pullen Park Booster Pump -disch	-	-	-	222,300	-	222,300	-	222,300	W36	30
348	CIP01_NP	975	791010	Pullen Park Booster Pump -disch	-	-	-	20,000	-	20,000	-	20,000	W36	30
348	CIP01_NP	975	792020	Pullen Park Booster Pump -disch	-	-	-	1,835,700	-	1,835,700	-	1,835,700	W36	30
348	97940000	975	793080	Poole road booster PS (B102)	-	280,000	-	-	-	280,000	-	280,000	W35	29
348	97940000	975	791010	Poole road booster PS (B102)	-	150,000	-	-	-	150,000	-	150,000	W35	29
348	97940000	975	792020	Poole road booster PS (B102)	-	2,370,000	-	-	-	2,370,000	-	2,370,000	W35	29
348	CIP01_NP	975	793080	Mt. Herman PS 1MG Upgrade	-	30,000	-	-	-	30,000	-	30,000	W1	1
348	CIP01_NP	975	792020	Mt. Herman PS 1MG Upgrade	-	250,000	-	-	-	250,000	-	250,000	W1	1
348	CIP01_NP	975	793080	Bain PS Upgrage (B103)	-	10,000	-	-	-	10,000	-	10,000	W3	2
348	CIP01_NP	975	792020	Bain PS Upgrage (B103)	-	60,000	-	-	-	60,000	-	60,000	W3	2
348	CIP01_NP	975	790010	EMJWTP PS1 Upgrade (B301)	-	-	-	-	-	-	690,000	690,000	W19	15
348	New PUDC	975	790010	EMJWTP Clearwell Expansion	-	-	-	-	-	-	21,000,000	21,000,000	W54	45
348	CIP01_NP	975	790010	EMJWTP Ozone Expasion	-	-	-	-	-	-	24,500,000	24,500,000	W20	16
348	CIP01_NP	975	790010	EMJWTP Flocculation Sedimentation Basin Improvements	-	-	-	-	-	-	36,400,000	36,400,000	W18	14
348	CIP01_NP	975	790010	EMJWTP Filter/Sed/Floc Basin Additions	-	-	-	-	-	-	38,500,000	38,500,000	W11	8
348	81000010	975	793080	EMJWTP UV/Solids Handling	-	-	2,100,000	-	-	2,100,000		2,100,000	W15	11
348	81000010	975	790010	EMJWTP UV/Solids Handling	-	-	-	-	-	-	36,000,000	36,000,000	W15	11
348	92910000	975	793080	EMJWTP New Laboratory Facility	400,000	-	-	-	-	400,000	-	400,000	W14	10
348	92910000	975	792020	EMJWTP New Laboratory Facility	-	4,100,000	-	-	-	4,100,000	-	4,100,000	W14	10
348	86300000	975	793080	EMJWTP Settling Basin Rehabilitation	-	200,000	-	-	-	200,000	-	200,000	W22	17
348	86300000	975	792020	EMJWTP Settling Basin Rehabilitation	-	1,000,000	-	-	-	1,000,000	-	1,000,000	W22	17
348	zz New	975	790010	DEBWTP Raw Water Reservoir	-	-	-	-	-	-	5,000,000	5,000,000		New
348	CIP01_NP	975	790010	Ten Ten Road Water Tank (B503)	-	-	-	-	-	-	3,000,000	3,000,000	W41	35
348	CIP01_NP	975	790010	Little River Reservoir Wetland Mitigation Construction	-	-	-	-	-	-	15,600,000	15,600,000	W31	25
348	99400000	975	793080	Little River Reservoir Wetland Mitigation Property Acquisition	-	300,000	300,000	300,000	300,000	1,200,000	-	1,200,000	W27	22
348	99400000	975	791010	Little River Reservoir Wetland Mitigation Property Acquisition	-	2,200,000	2,200,000	2,200,000	2,200,000	8,800,000	12,500,000	21,300,000	W27	22
348	CIP01_NP	975	790010	Little River Reservoir Mitigation Monitoring	-	-	-	-	-	-	300,000	300,000	W30	24
348	91590000	975	792020	VA Security Improvements	-	-	-	350,000	-	350,000	-	350,000	W43	37

Reuse Master Plan Update


U.S. 64
I-440
I-40
Neuse River
Neuse River WWTP
Legend
Kimley-Horn and Associates, Inc.
Sunnybrook Road Tank
Existing Sunnybrook Road Reuse Pipeline
Extensions to Wake Med & Wilders Grove
Segment 4: Centennial
Segment 3: Rose - Little John
Segment 2: 16-inch
Existing 16-inch Reuse Pipeline
Segment 1: 24-inch
N
W
E
S
0
4,000
8,000
Feet

Reuse Master Plan Update

- CIP for traditional “third utility”
- Review of IPR and DPR
- Water Quality Improvements
- Model Updates
- Financial Model



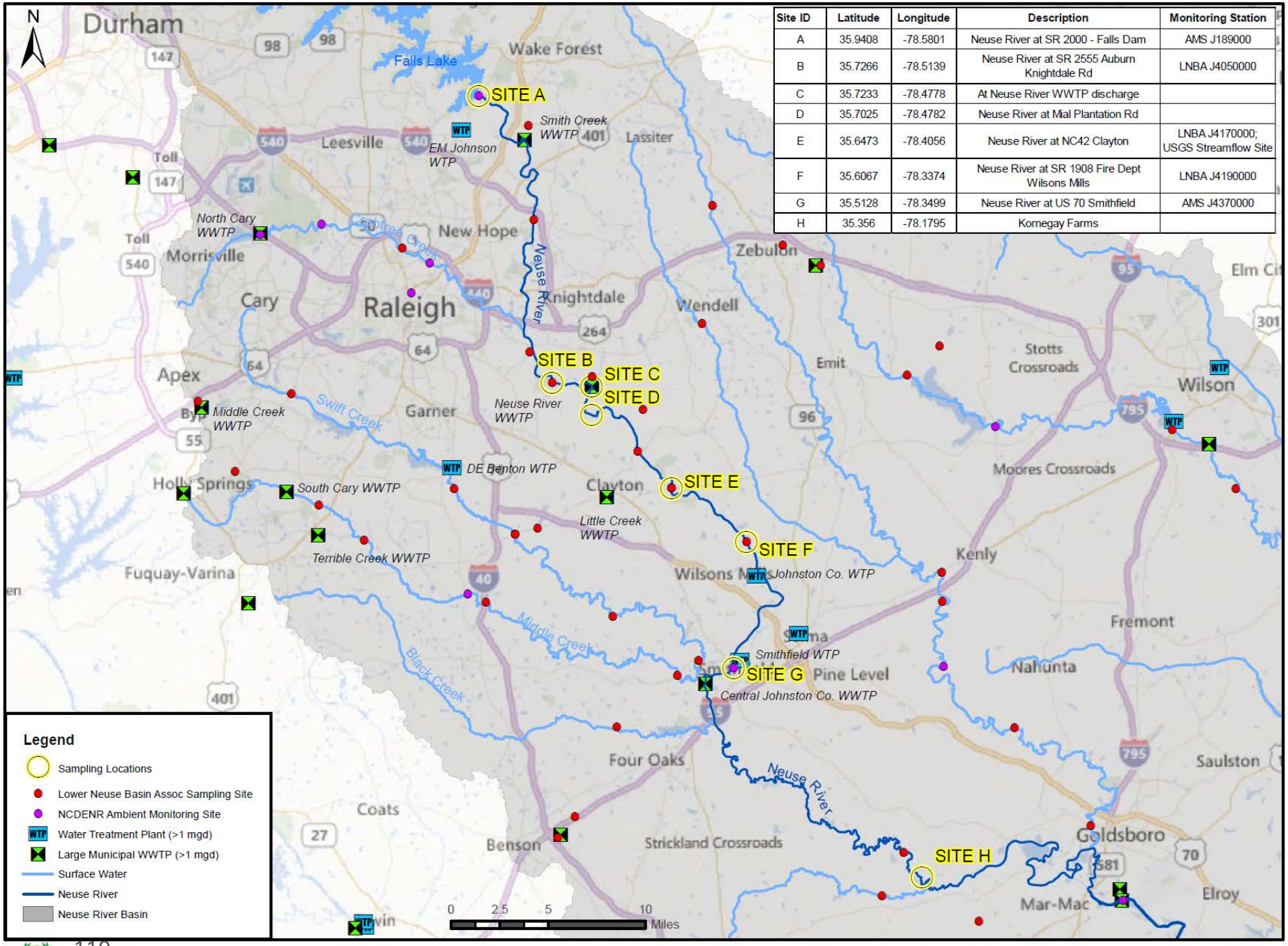
Demand Density Includes the following water uses:
Residential - Irrigation meters only
Institutional/Commercial/Industrial - Irrigation Meters and Potable Meters

0 1 2 4 6 Miles

Existing Potable Demand Density

Neuse River Study

- **Collaborative approach with NCDENR for innovative water resource options**
- **Reclaimed Water as a Source Water**
  - **Unplanned IPR occurs throughout the State and the U.S.**
  - **Several states have allowed planned IPR and DPR**
- **Draft Legislation – Written early 2013 with NCDENR**
  - **Neuse River Study to inform the underlying conditions and assumptions of the Bill.**



Site ID	Latitude	Longitude	Description	Monitoring Station
A	35.9408	-78.5801	Neuse River at SR 2000 - Falls Dam	AMS J189000
B	35.7266	-78.5139	Neuse River at SR 2555 Auburn Knightdale Rd	LNBA J4050000
C	35.7233	-78.4778	At Neuse River WWTP discharge	
D	35.7025	-78.4782	Neuse River at Mial Plantation Rd	
E	35.6473	-78.4056	Neuse River at NC42 Clayton	LNBA J4170000; USGS Streamflow Site
F	35.6067	-78.3374	Neuse River at SR 1908 Fire Dept Wilsons Mills	LNBA J4190000
G	35.5128	-78.3499	Neuse River at US 70 Smithfield	AMS J4370000
H	35.356	-78.1795	Kornegay Farms	

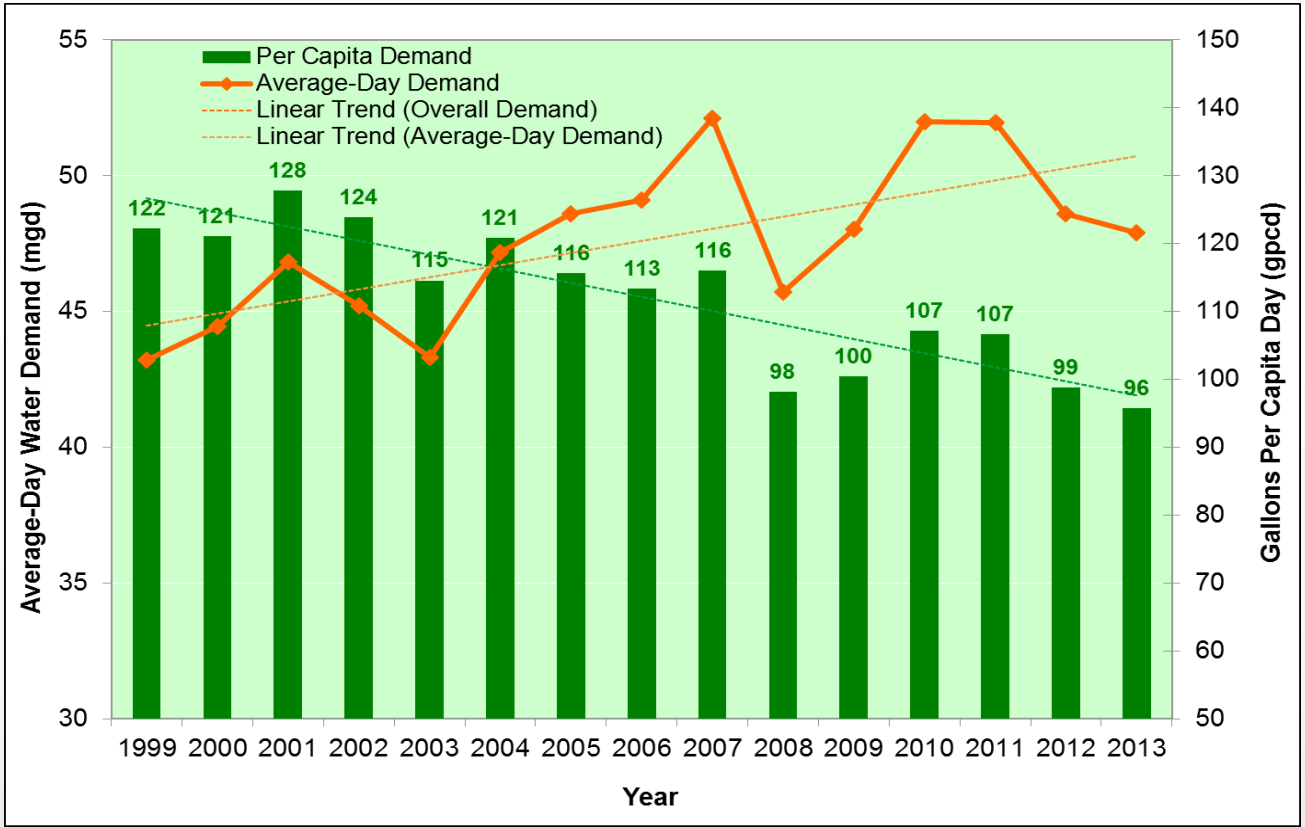
Figure 4-1. Sampling Locations on the Neuse River

Resource Management

Water Resource Assessment and Plan

Current Trends and Resources

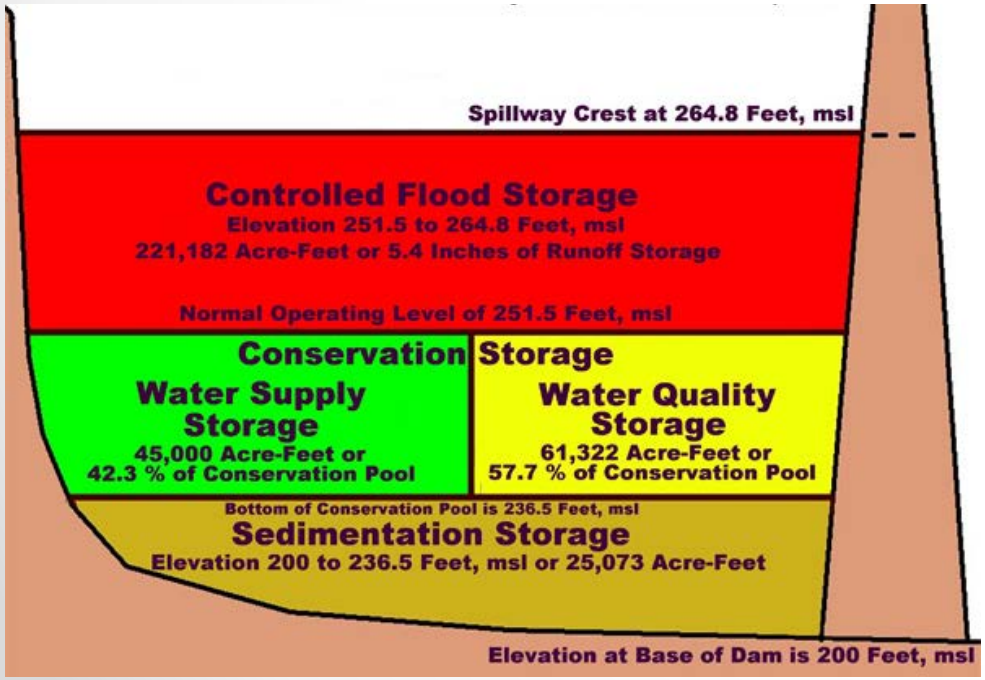
Source	50 Yr Safe Yield
Falls Lake	66.1 MGD
Lake Benson & Lake Wheeler	11.2 MGD
Total	77.3 MGD

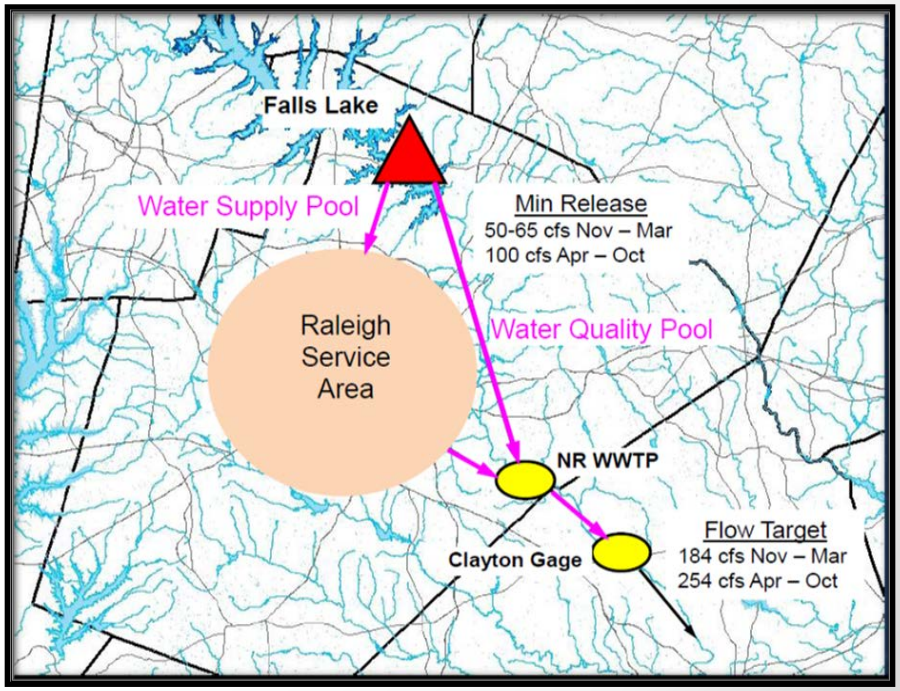


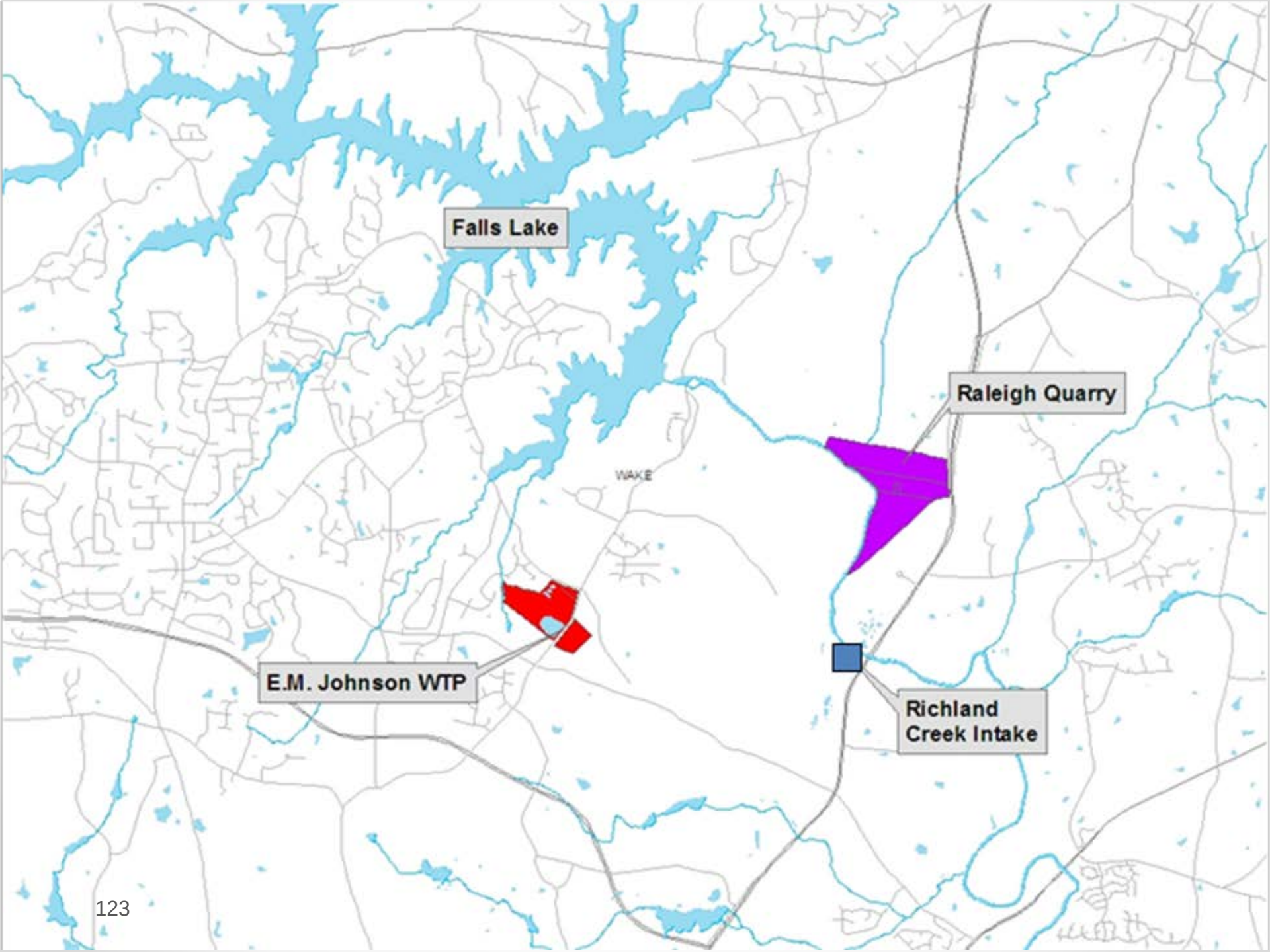
Future Needs and Resources

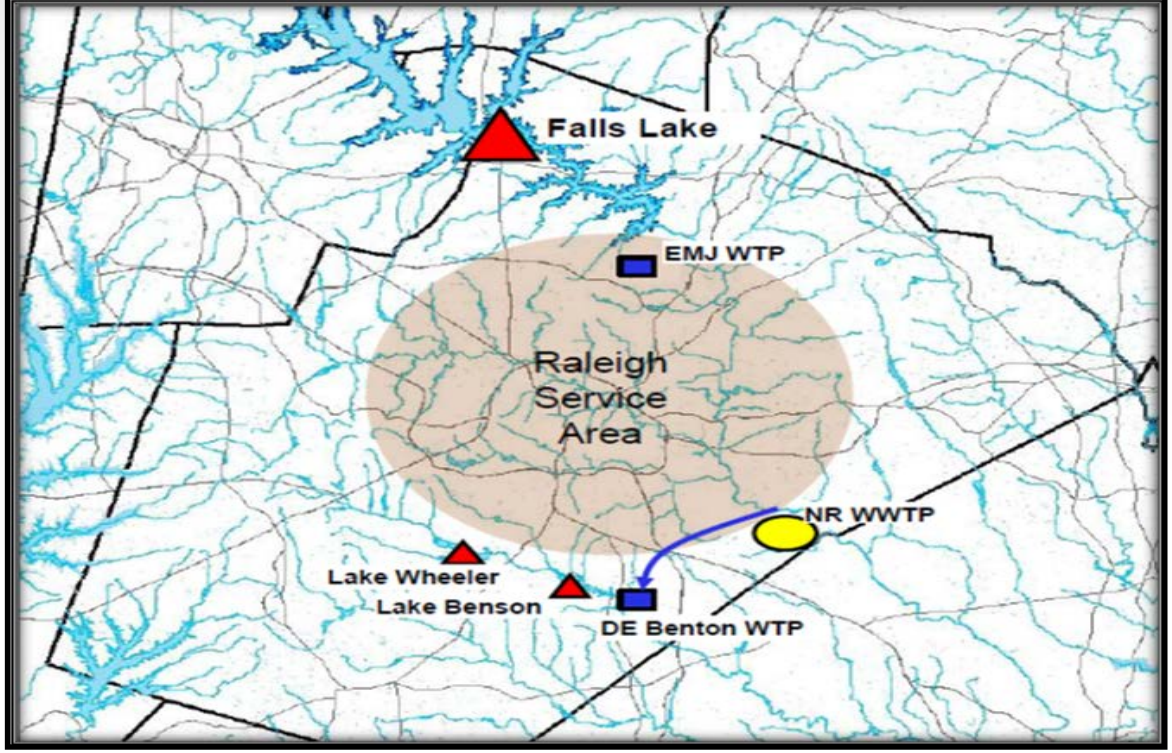
	2011	2020	2030	2040	2050	2060
Surface Water Supply, mgd	77.3	77.3	77.3	77.3	77.3	77.3
Reduced Demand, mgd	--	1.9	4.5	8.7	14.4	15.2
Service Area Demand, mgd	51.9	64.4	78.2	91.3	102.7	115
Future Water Supply Need, mgd	--	0.0	13.8	14	25.41	37.7

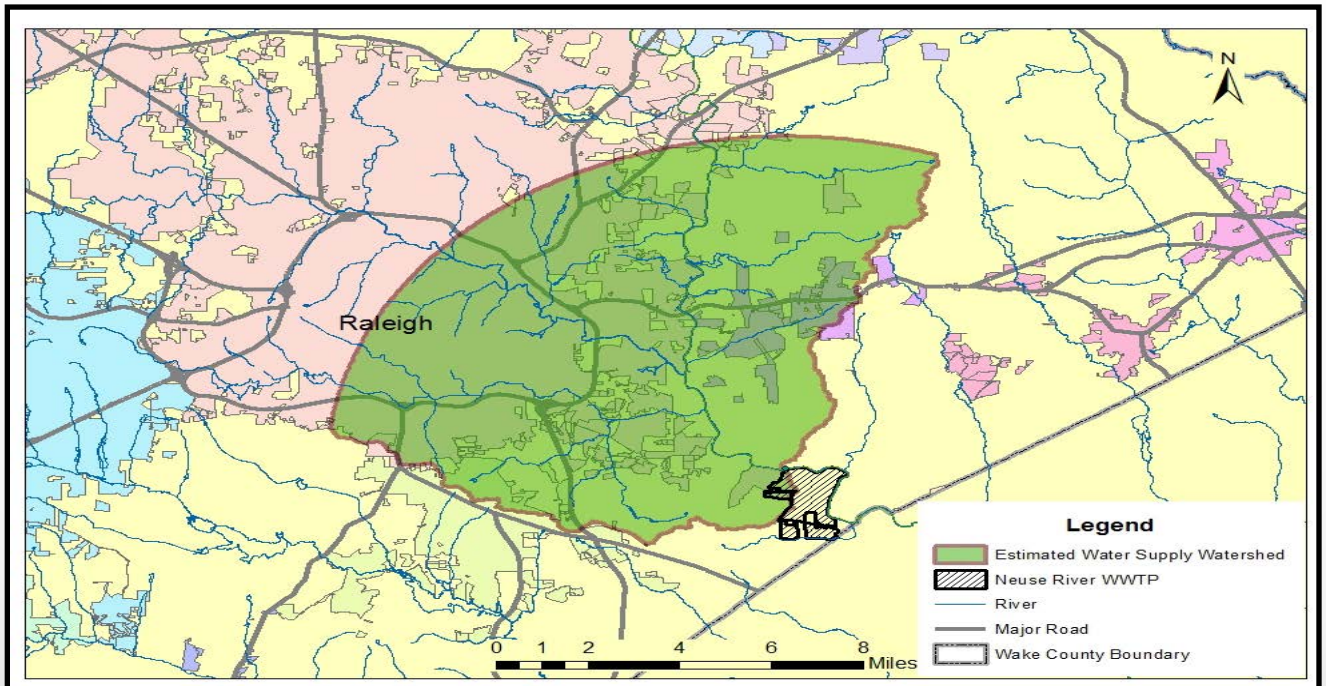
Reallocate Storage in Conservation Pool to Water Supply Pool

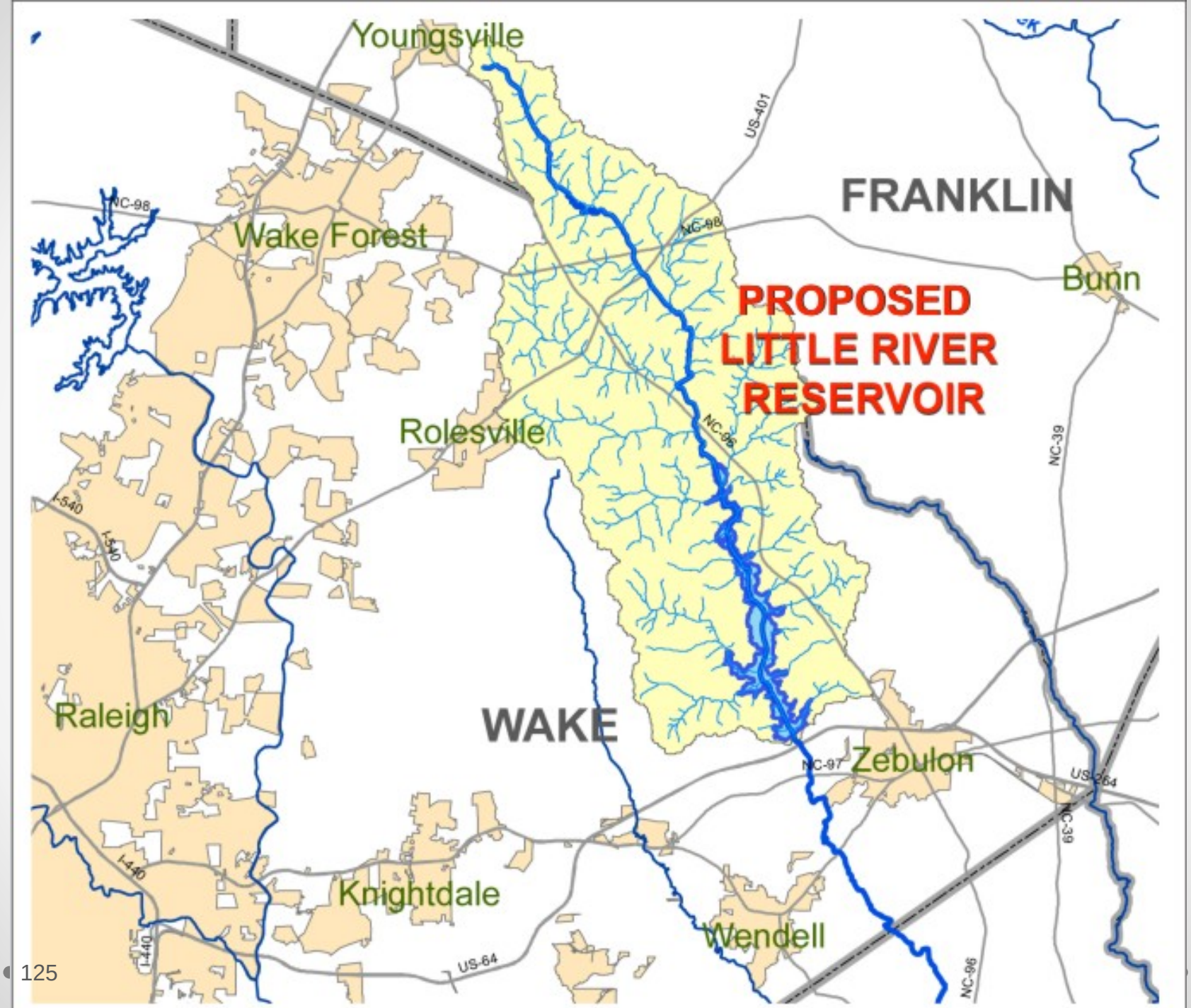





Falls Lake
Raleigh Quarry
WAKE
E.M. Johnson WTP
Richland
Creek Intake


Falls Lake
EMJ WTP
Raleigh
Service
Area
NR WWTP
Lake Wheeler
Lake Benson
DE Benton WTP


N
Raleigh
Legend
Estimated Water Supply Watershed
Neuse River WWTP
River
Major Road
Wake County Boundary
0 1 2 4 6 8
Miles


Youngsville
US-401
FRANKLIN
NC-98
Wake Forest
NC-98
Bunn
PROPOSED
LITTLE RIVER
RESERVOIR
Rolesville
NC-96
NC-39
I-540
I-540
Raleigh
WAKE
NC-97
Zebulon
US-264
NC-39
I-440
Knightdale
Wendell
US-64
NC-96

Financial Viability

- **Financial Area Review**
- **Cost of Service Study**
- **Proposed Rate Recommendations**
  - **Vote**

Financial & Administrative Services Functional Review

- **Areas of Focus**
  - **Organizational Approach**
  - **Business Process Optimization**
  - **Staffing Requirements**
  - **Internal Financial Controls**

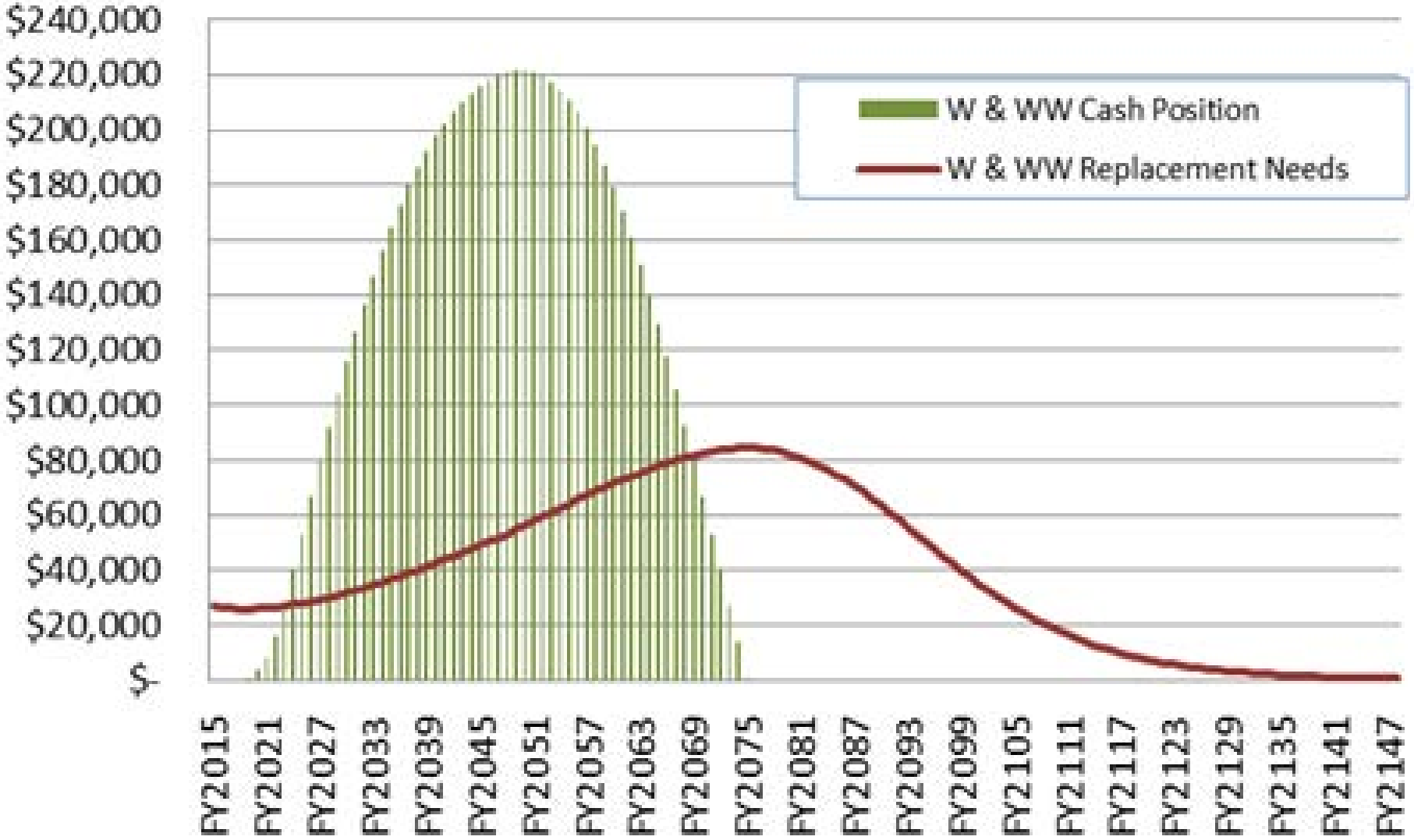
Cost of Service Study

- Review Rate Design for Residential and Non-Residential Customers
- Fire Protection Charges
- Rainy Day and/or Drought Charges
- Surcharges for BOD, SS, TN
- Infrastructure Replacement Charges

Rate Recommendations

Targeted Revenue	**$ 10,740,304**
Approx. across-the-board rate increase	**7.0%**
Infrastructure Replacement Charge	
Water Charge 5/8" meter monthly	**$ 1.00**
Sewer Charge 5/8" meter monthly	**$ 2.25**
Est. Water Revenue all meter sizes	**$ 2,561,166**
Est. Sewer Revenue all meter sizes	**$ 5,410,544**
Infrastructure Replacement Revenue	**$ 7,971,710**
Sewer Volumetric Rate Increase	**4.4% ($3.82 to $3.99/ccf)**
Sewer Volumetric Rate Increase Revenue	**$ 2,768,595**

System Wide Replacement Needs



Impact to 6 ccf Customer

- **Under current rate structure**
  - **6 ccf customer monthly bill $52.63**
- **Under proposed rate structure**
  - **6 ccf customer monthly bill $56.90**

VOTE

- **Recommendation: Provide preliminary approval of the sewer rate increase and infrastructure replacement fee implementation recommendations to allow Utility Billing staff time to program the changes into Customer Care and Billing software, and notification to customers for planning and budgeting purposes.**

Council Questions and Closing Remarks