

# Stormwater Infrastructure

Maintenance, Repair and Replacement

# Stormwater Infrastructure - Maintenance, Repair and Replacement

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## Direction Needed:

- What is the appropriate “Level of Service” or scope of responsibility for Fayetteville stormwater maintenance?

## Key questions:

- Cost
- Sustainability
- Peer Communities

# Stormwater Infrastructure - Maintenance, Repair and Replacement

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**Goal** Provide background on the extent of City responsibility to maintain, repair, remove and replace stormwater infrastructure within City Limits.

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What is  
Stormwater  
Infrastructure

Easements &  
Legal  
Responsibility

Peer City/CoF  
Comparison

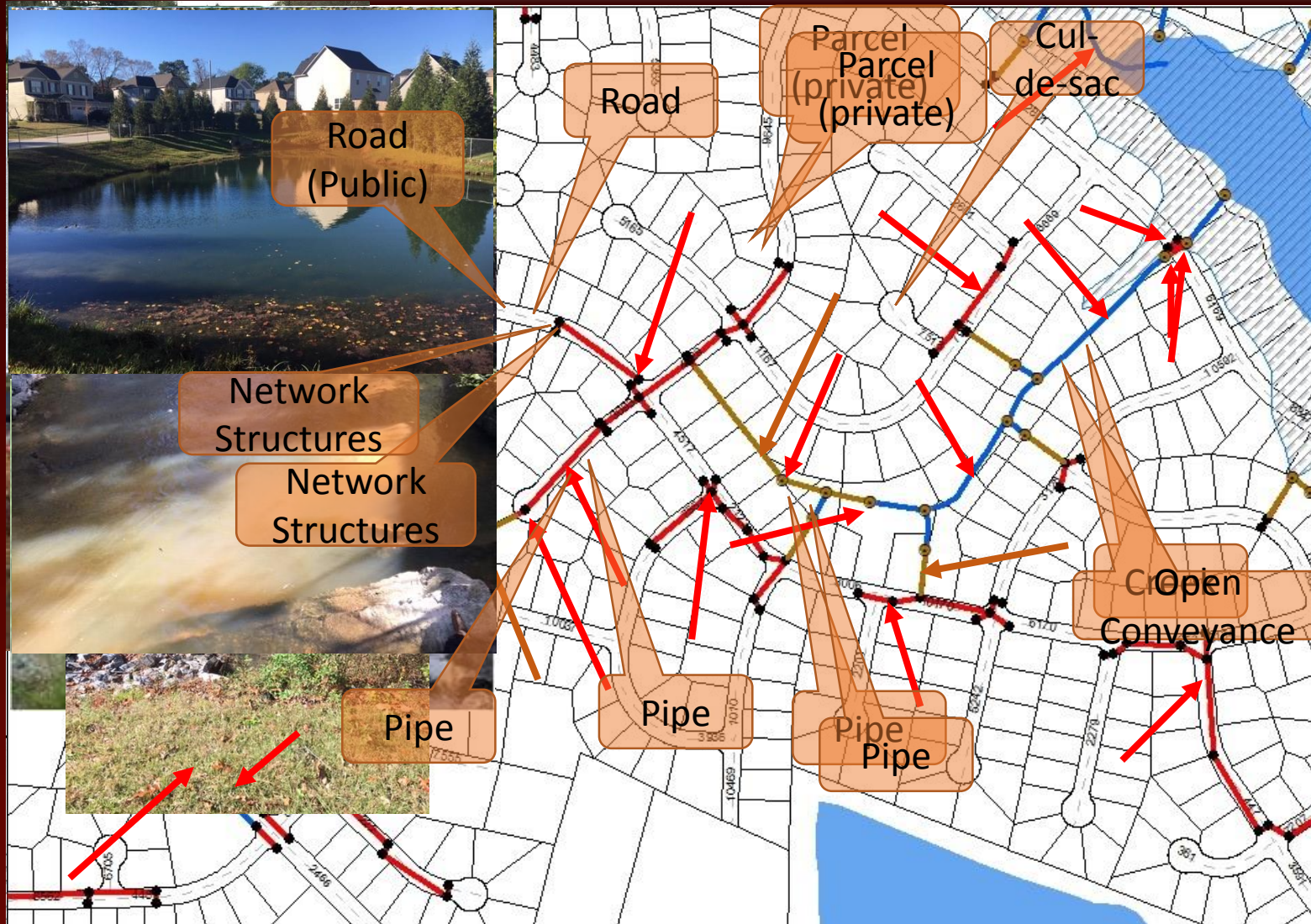
Potential  
Liability

Options for  
Private  
Properties

Council  
Direction

# What is Stormwater Infrastructure

# What is Stormwater Infrastructure



## Assets

- Stormwater Pipe network
  - In the road (Public RoW)- Red
  - Off RoW - Brown
- Stormwater Network Structures
  - Catchbasins
  - Inlets
  - Headwalls
- Open Conveyance
  - Roadside Swale
  - Backyard creek or ditch
  - Stream
  - Retention Basin (SCM)

What stormwater or  
drainage infrastructure  
does the City have legal  
responsibility to  
maintain and/or repair?

# *Helpful Distinction:*

**PUBLIC  
RIGHT-OF-  
WAY**

Commonly  
referred to as  
a “city street”

Triggers a  
**DUTY** under  
STATE LAW

**EASEMENT**  
(on private  
property)

No duty  
triggered

Grants  
**PERMISSION**  
for a purpose

# CITY'S MAINTENANCE DUTY UNDER STATE LAW FOR **PUBLIC RIGHTS-OF-WAY or STREETS**

**NCGS 160A -  
296(a)(1)**

“A city shall have general authority and control over **all public streets**, sidewalks, alleys, bridges, and **other ways of public passage** within its corporate limits ... [and has] [t]he **duty** to keep the public streets, sidewalks, alleys, and bridges in proper repair.”

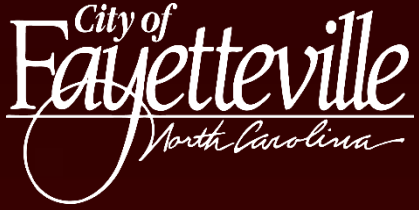


# CITY'S MAINTENANCE DUTY UNDER STATE LAW FOR **PUBLIC RIGHTS-OF-WAY or STREETS**

When does a City assume the duty or OBLIGATION to maintain streets (which includes drainage)?

When streets are dedicated for public use, and

The City accepts the streets for maintenance either **EXPLICITLY OR IMPLICITLY**



## CITY'S MAINTENANCE DUTY UNDER STATE LAW FOR **PUBLIC RIGHTS-OF-WAY or STREETS**

*More on the City's IMPLICIT acceptance of rights-of-way for maintenance (including drainage). Cases have found municipal control when a city has:*

**Maintained or repaired drainage, sewer lines and other utilities in a private right-of-way or easement;**

**PUBLIC  
RIGHT-  
OF-WAY**

Commonly  
referred to as  
a “city street”

Triggers a  
**DUTY** under  
STATE LAW

**EASEMENT  
(on private  
property)**

Grants PERMISSION for a  
purpose

No duty triggered

**BUT a legal obligation to  
maintain could be legally  
triggered by the city's implicit  
acceptance for maintenance.**

# Peer City/CoF Comparison

# What do other Municipalities in NC do

Durham (267,743,  
108 mi<sup>2</sup>)

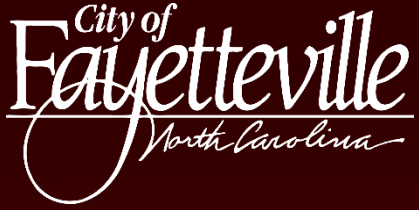
- Drainage System Ownership and Maintenance Responsibility: The owner of the property where a drainage system is located is legally responsible for its maintenance. This includes all features of the drainage system such as ditches, stream banks, and even buried pipes. **The city only owns and maintains the stormwater drainage system within the public right-of-way and other property owned by the city.**

Winston-Salem (244,605,  
133 mi<sup>2</sup>)

- The mission of the Stormwater Management Program is to restore, protect, and preserve the surface waters within the City of Winston-Salem and to **maintain, repair, map, and evaluate drainage systems within the street right-of-ways.**

Cary (165,904,  
59 mi<sup>2</sup>)

- Storm drainage features such as streams, swales, pipes and culverts on a homeowner's property are the responsibility of the home owner as stated in the Certificate of Ownership and Dedication, required on all subdivision plats recorded in the Town of Cary. **The Town only maintains drainage in the right-of-way.**



## What do other Municipalities in NC do

| City          | Population | Area (Sq. Mile) | Public RoW | off RoW |
|---------------|------------|-----------------|------------|---------|
| Raleigh       | 464,758    | 145             | ✓          | x       |
| Durham        | 267,743    | 108             | ✓          | x       |
| Winston-Salem | 244,605    | 133             | ✓          | x       |
| Cary          | 165,904    | 59              | ✓          | x       |
| Wilmington    | 119,045    | 41              | ✓          | x       |
| Highpoint     | 111,513    | 55              | ✓          | x       |
| Asheville     | 91,902     | 45              | ✓          | x       |
| Chapel Hill   | 59,862     | 19              | ✓          | x       |

## Others vs City of Fayetteville

# CoF Article 3, Section 23

Prior to 10-27-2008

There was no ordinance for stormwater systems in the city communicated via easement.

Stormwater management facilities shall mean those structures and facilities that are designed for the collection, conveyance, storage, treatment and disposal of stormwater runoff into and through the drainage system. This includes all stormwater quantity and quality facilities.

for

Post 10-27-2008

All stormwater management facilities shall be privately owned and maintained unless the city accepts the facility for city ownership and maintenance.


The City shall accept functional maintenance responsibility of structural stormwater management facilities that are installed pursuant to this article following a warranty period provided the stormwater management facility only serves a single-family detached residential development or townhomes all of which have public street frontage.

# Summary - What does the City have to do?

## Responsibility to Maintain, Remove and Replace

Except ~ 42 Stormwater Management Facilities from Single Family Residential Development's post 2008 ordinance

### RoW (Non-DOT) ✓



**743 Miles**

- 19 Bridges
- 6 CoF Dams
- ~ 243 mi. Pipes-Culverts
- ~ 20 mi. of Open Conveyance
- ~17401 Network Structures
- 743 mi. - Street Sweeping
- <1 mi. Streams

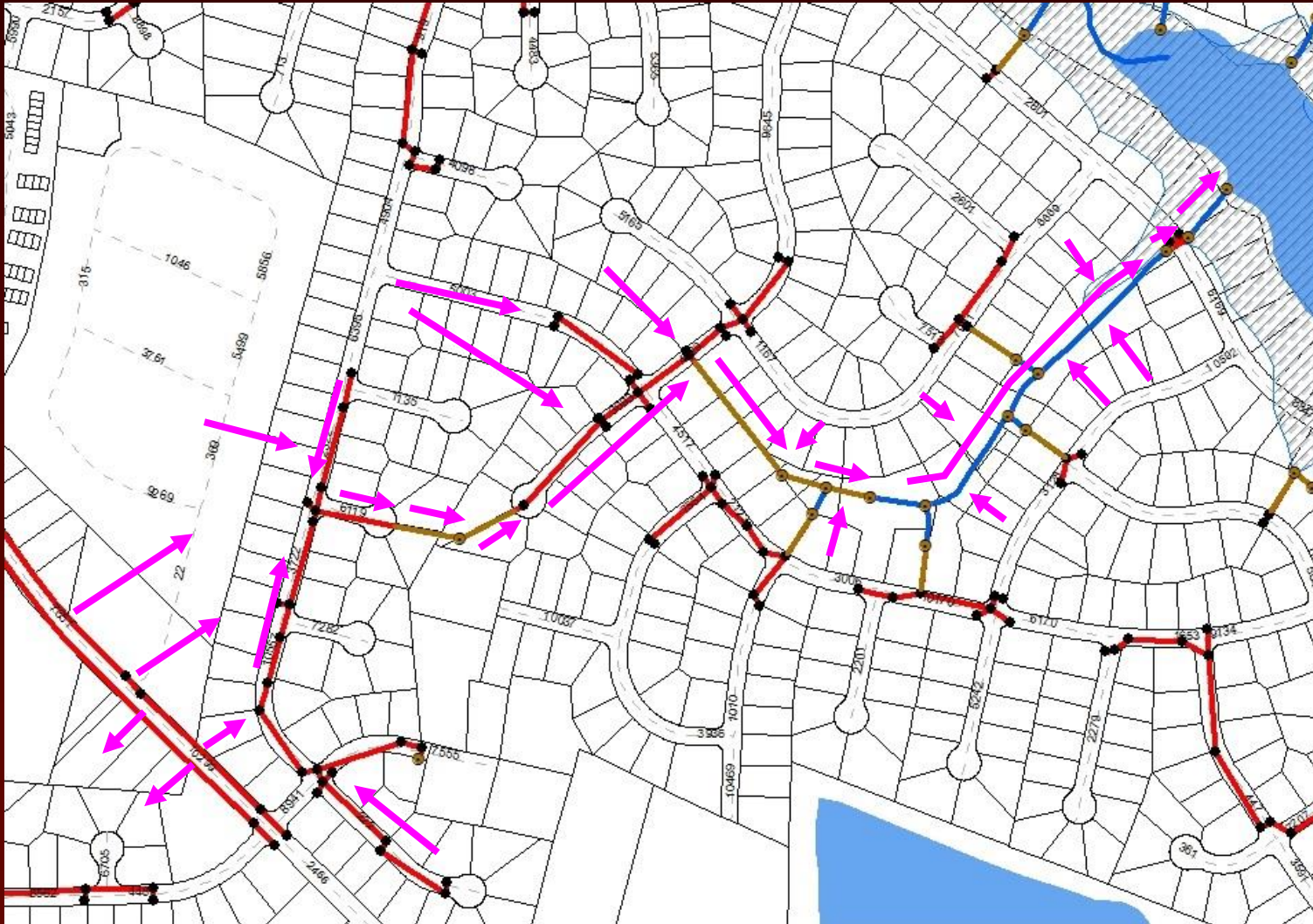
### Off RoW – Private ✗



- ~13 Bridges
- ~45 Dams, 4 PWC
- ~ 180 mi. Pipes-Culverts
- ~ 106 mi. Open Conveyance
- ~9354 Network Structures
- 0 mi. Street Sweeping
- ~180 mi. Streams



# What is Stormwater Infrastructure: Public RoW versus Off RoW - Stormwater Flow



## Stormwater Flow Path

- Stormwater flows through the storm sewer systems, ditches, and channels located in the:
  - public RoW
  - on a dedicated private storm sewer easements
  - private property without easement
- Majority of the runoff is off private property

# Legal Responsibility versus Practice

Off Row - Removed and cleared debris in ditches, removed sediment and blockages, fixed sinkholes and inlet structures, removed trees in creeks, provided grading and realignments to prevent yard flooding

**RoW** ✓

**Off RoW**

Inconsistent in applying administration of core responsibilities

Staff have offered and applied various interpretations of easement and plat language in an attempt to be customer focused

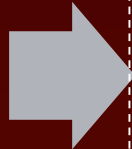
Conflicting Information

Not been focused and/or unable to provide services uniformly and fairly within the bounds of a vetted process

# What is our Potential Liability

# Potential Liability – Asset Management Approach

**RoW** ✓



off  
**RoW** ✗

Asset management is a strategic approach to maintaining and sustaining infrastructure in order to meet the needs of the community at the lowest overall life cycle cost.

**Calculate Financial Liability for Stormwater Infrastructure in CoF**

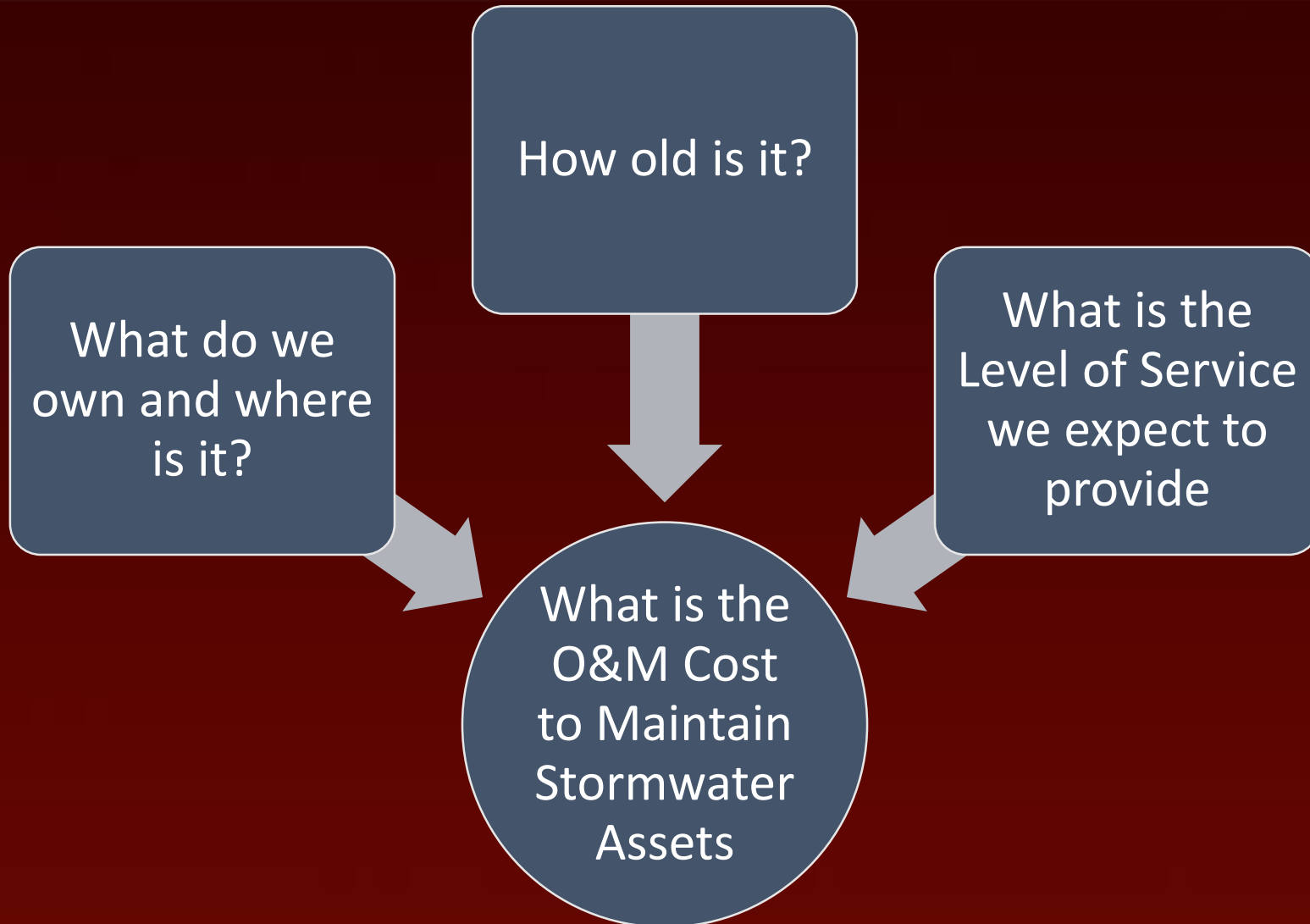
- **Operations and Maintenance Cost** (~100 yrs.)
- **Replacement Cost** (~100 yrs.)

This approach helps communities know how and where to prioritize limited funds in order to achieve the greatest benefit.

Asset management is a strategic approach to maintaining and sustaining infrastructure in order to meet the needs of the community at the lowest overall life cycle cost.

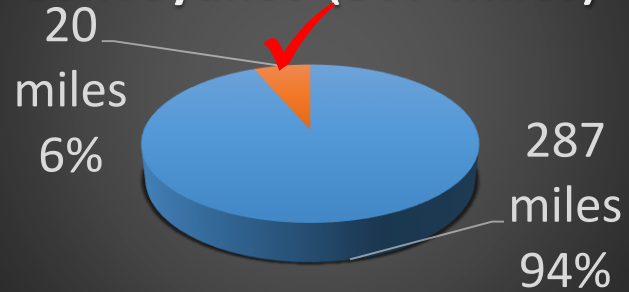
This approach helps communities know how and where to prioritize limited funds in order to achieve the greatest benefit.

# What is the O&M Cost to Maintain Stormwater Assets

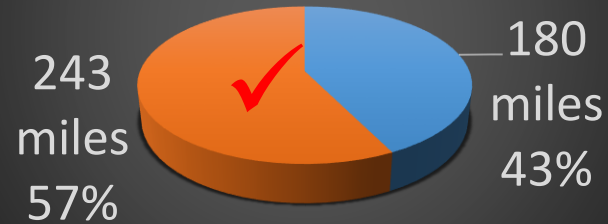


# Potential Liability - What do we own and Where is it?

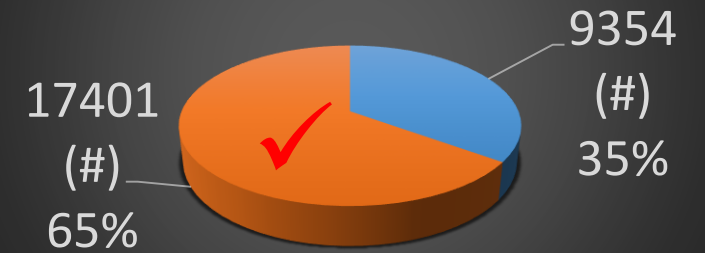
**Streams and Open Conveyance (307 Miles)**



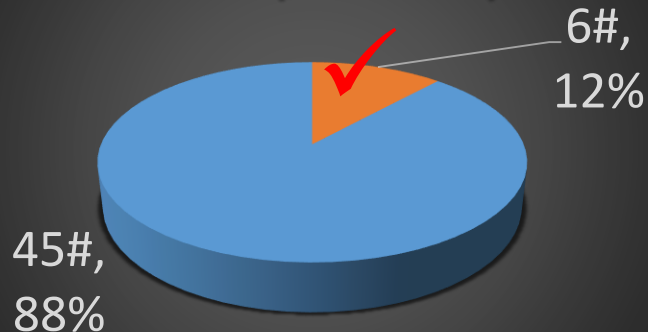
**Stormwater Pipes and Culverts (423 Miles)**



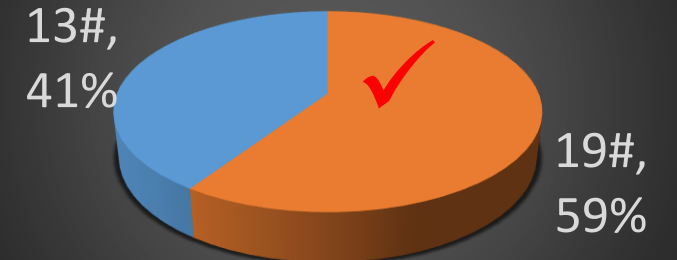
**Stormwater Network Structures 26755 (#)**



**Dams (Total 51)**



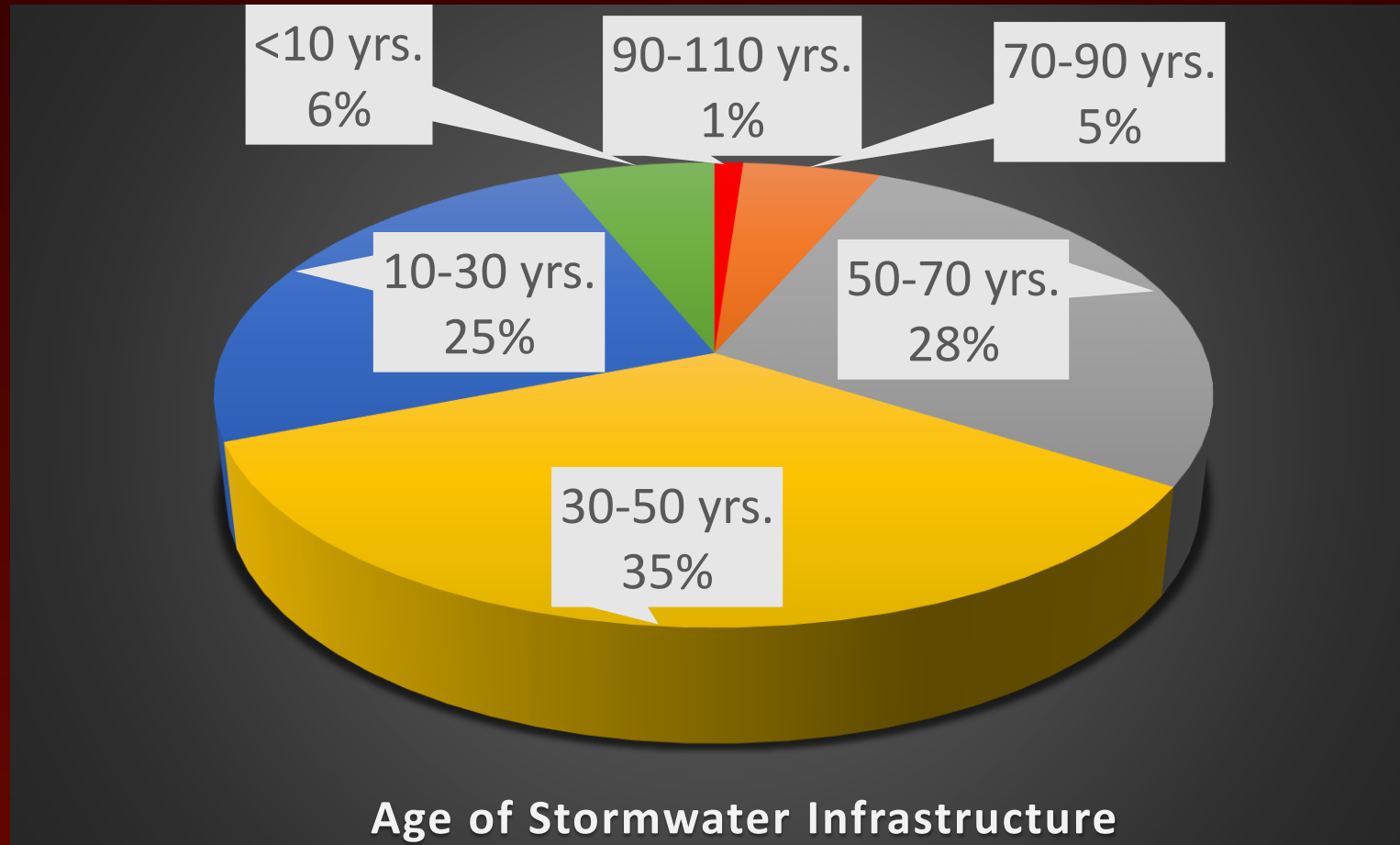
**Bridges (Total 32)**



■ Off RoW - Private  
■ Non DoT Public RoW



# O&M – What is the age of Infrastructure



Age ↑  
O&M ↑  
Replace →

# O&M Cost based on Level of Service

Level of Service is defined as the service quality for a given activity. Levels of Service are often documented as a commitment to carry out a given action or actions within a specified time frame in response to an event or asset condition data.

Minor Rehab. – Pipe/Structures – 20 Yr. Cycle  
Minor Rehab. Dams – 10 Yr. Cycle  
Minor Rehab. Bridge Structures – 10 Yr. Cycle

Street Sweeping –  
OF Streets – 6 Cycles/yr.

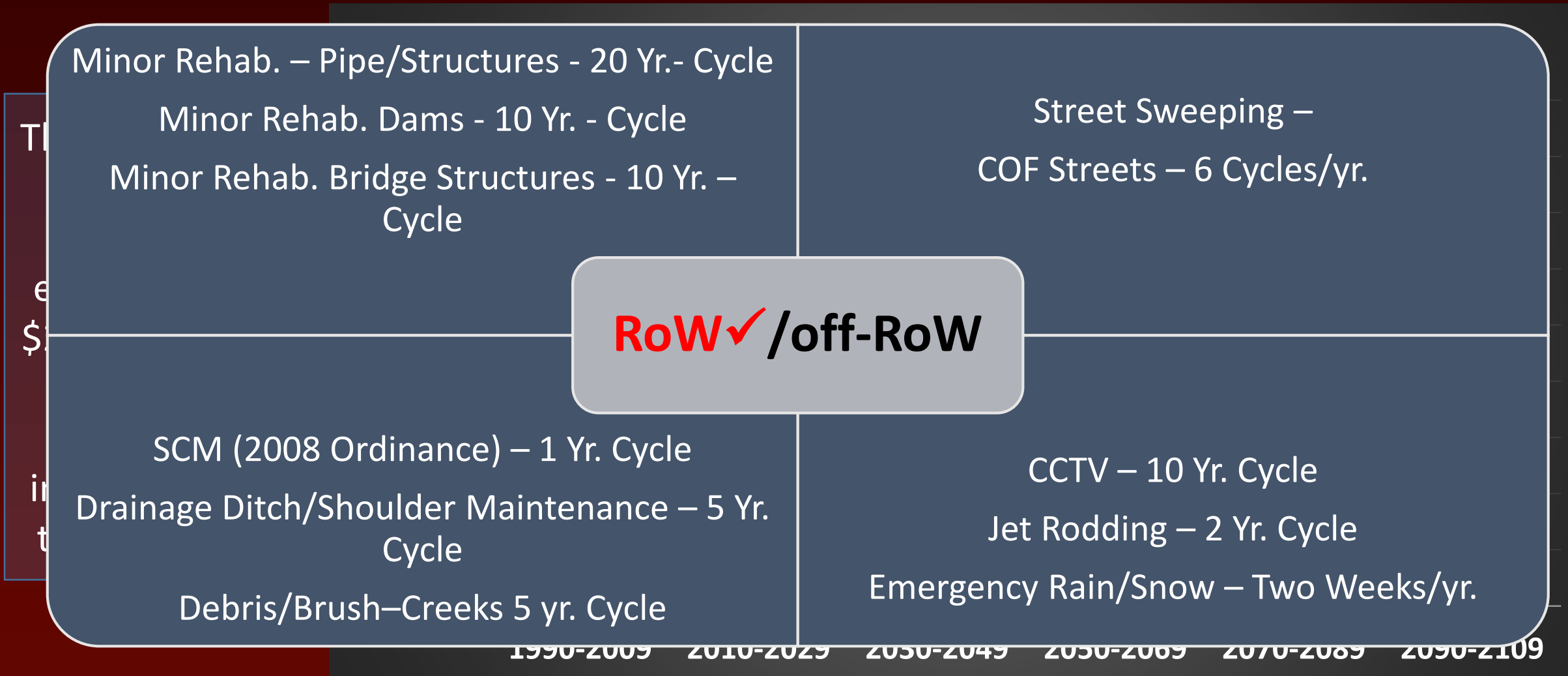
**RoW✓/off-RoW**

SCM (2008 Ordinance) – 1 Yr. Cycle  
Drainage Ditch/Shoulder Maintenance – 5 Yr. Cycle  
Debris/Brush–Creeks 5 yr. Cycle

CCTV – 10 Yr. Cycle  
Jet Rodding – 2 Yr. Cycle  
Emergency Rain/Snow – Two Weeks/yr.



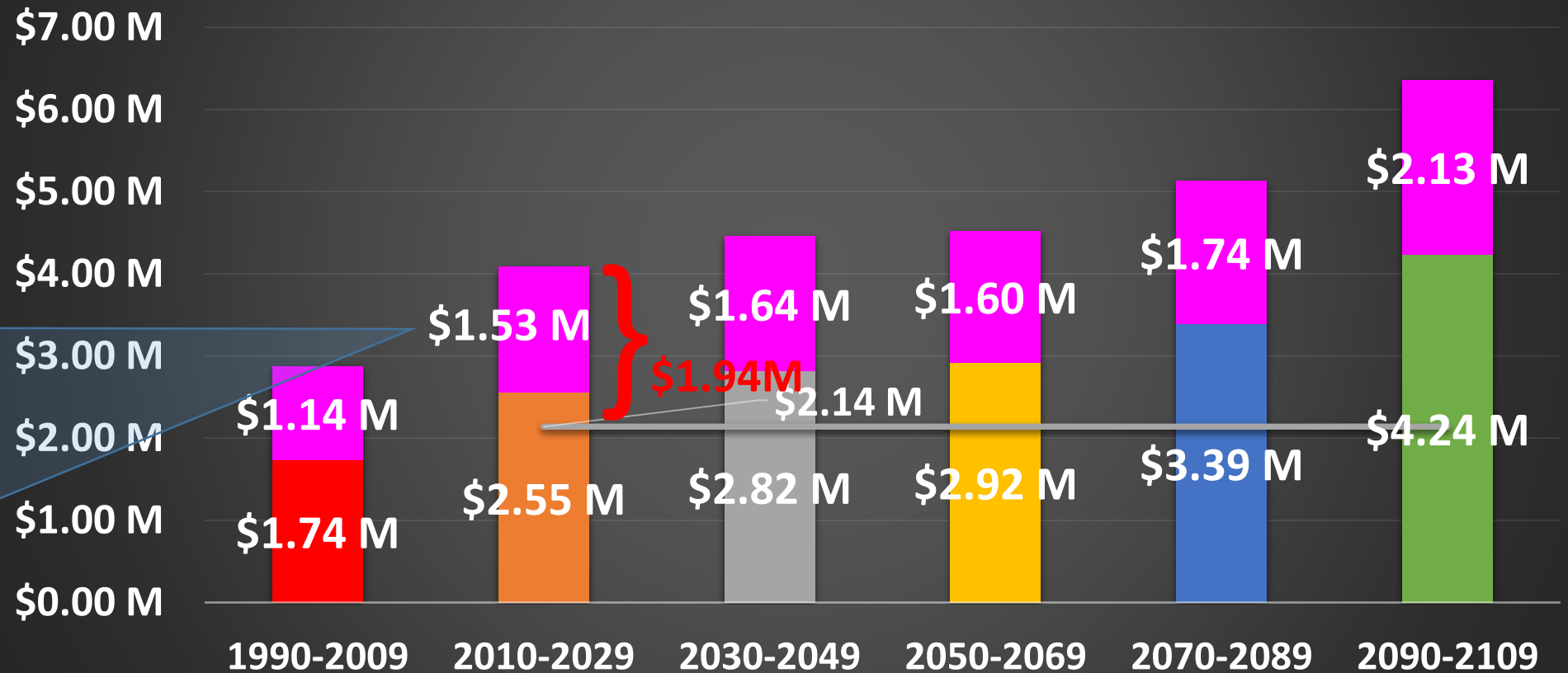
# Potential Liability – Public RoW O&M Costs



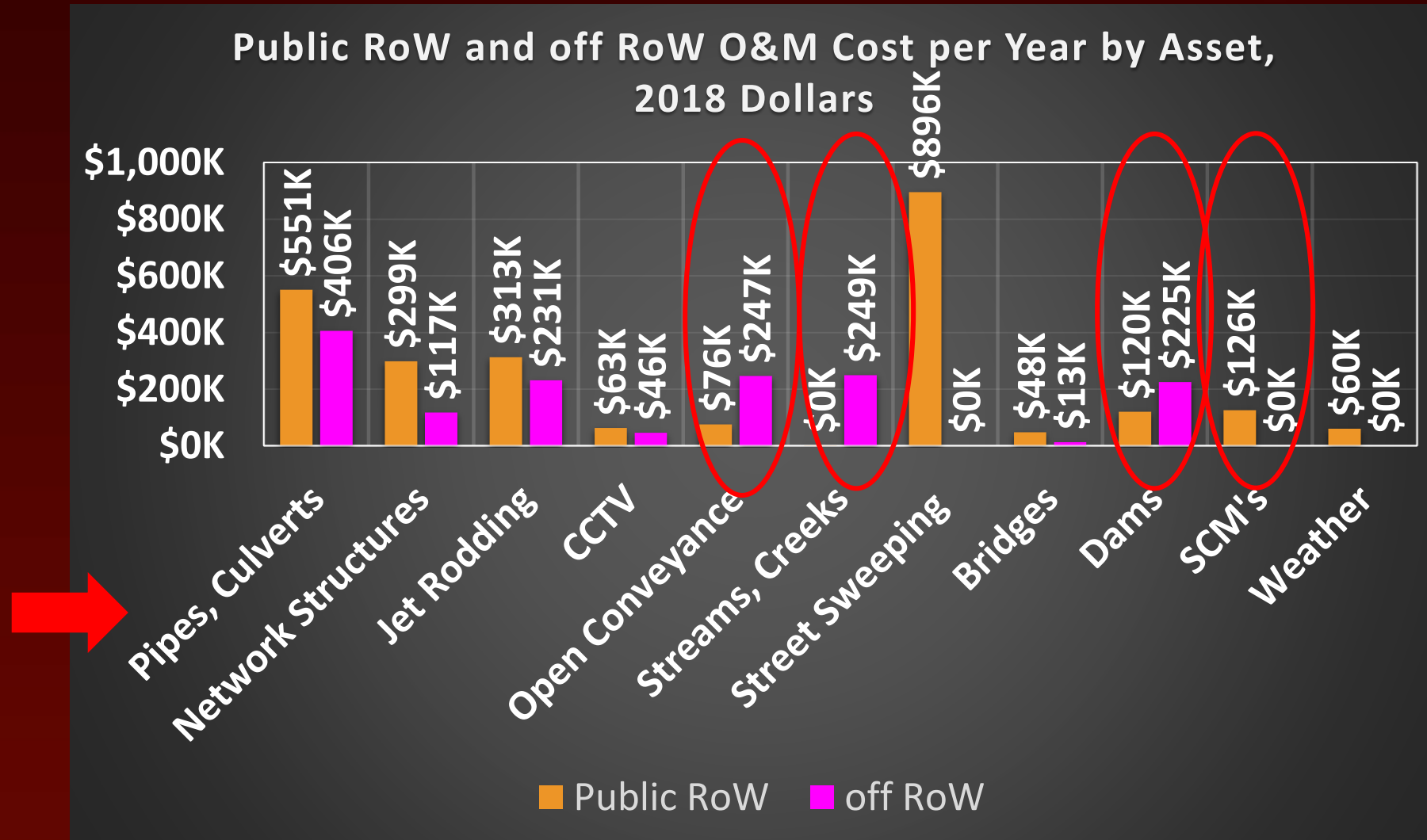
# Potential Liability – Public RoW and off RoW O&M Costs

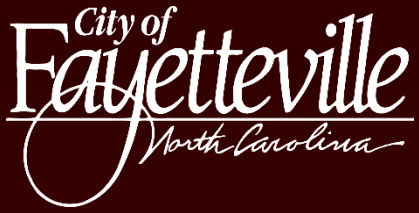
The O&M cost to meet the LOS described is estimated to increase by \$1.53M per year for the years 2010-2029 for additional services outside the public RoW

Public RoW and Off RoW O&M Costs Per Year (2018 Dollars)

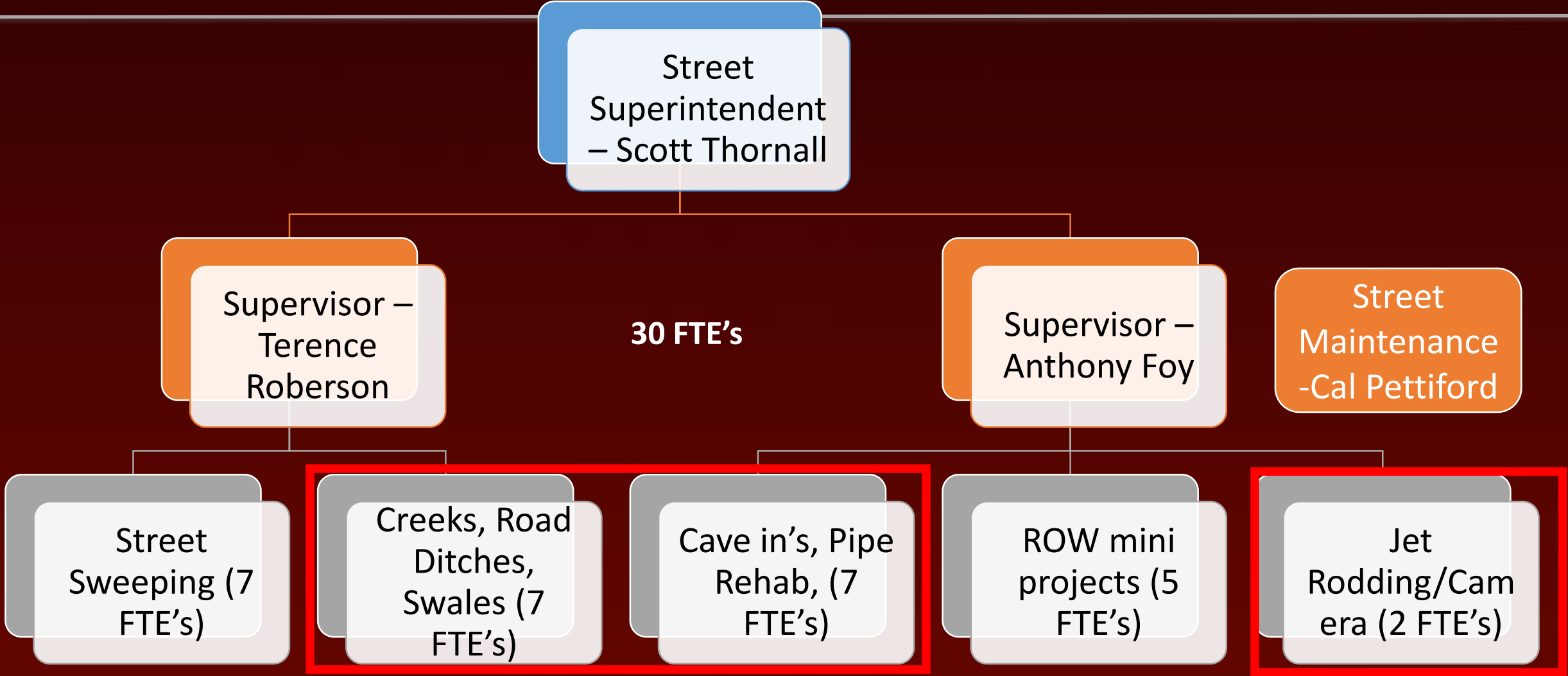


# Public RoW and off RoW O&M Cost per Year by Asset, 2010-2029

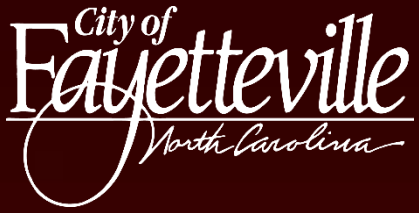




# CoF O&M Staff Resources-Stormwater Maintenance



~Approximately add these three units – minimum 18 FTE's plus equipment for off RoW at LOS



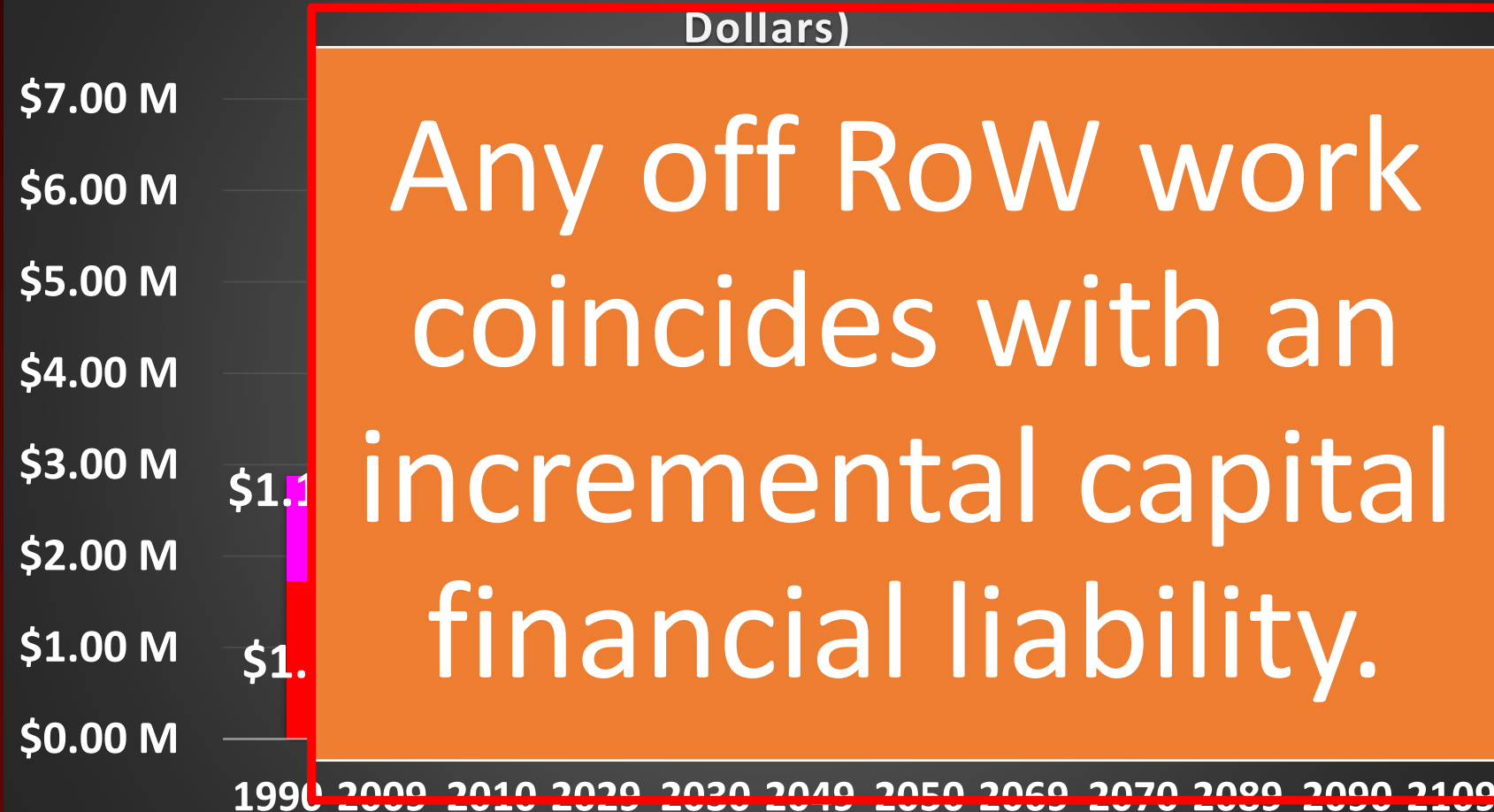
# Staff Resources - Comparison with other Municipalities

| Municipality | Area<br>(Square<br>Miles) | RoW | Off RoW | FTE's | Square<br>Miles per<br>FTE | CoF %<br>greater<br>workload |
|--------------|---------------------------|-----|---------|-------|----------------------------|------------------------------|
| Raleigh      | 145                       | ✓   | ✗       | 52    | 2.8                        | 12%                          |
| Durham       | 108                       | ✓   | ✗       | 45    | 2.4                        | 24%                          |
| Fayetteville | 95                        | ✓   | ✗       | 30    | 3.2                        |                              |

Maintain, repair,  
replace in the public  
RoW

# Summary Potential Liability - O&M

Public RoW and Off RoW O&M Costs Per Year (2018 Dollars)

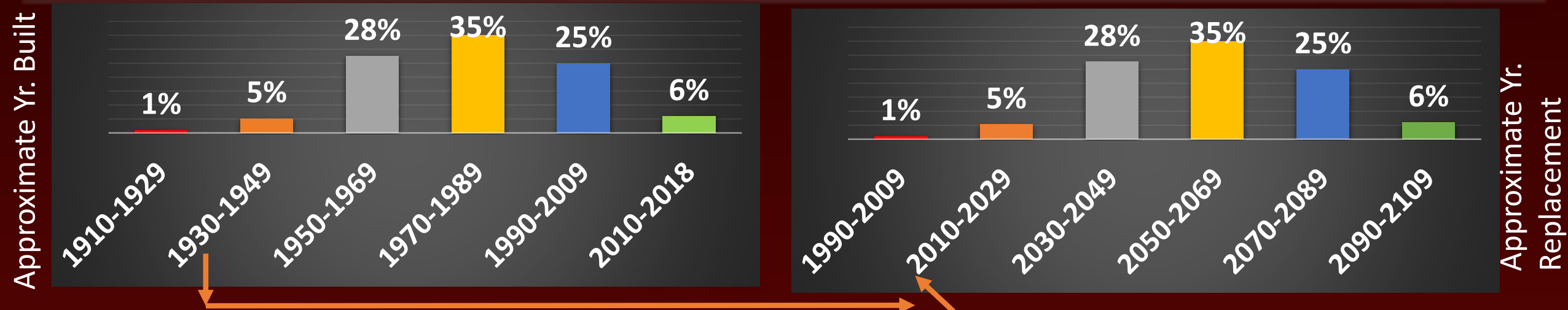


Any off RoW work coincides with an incremental capital financial liability.

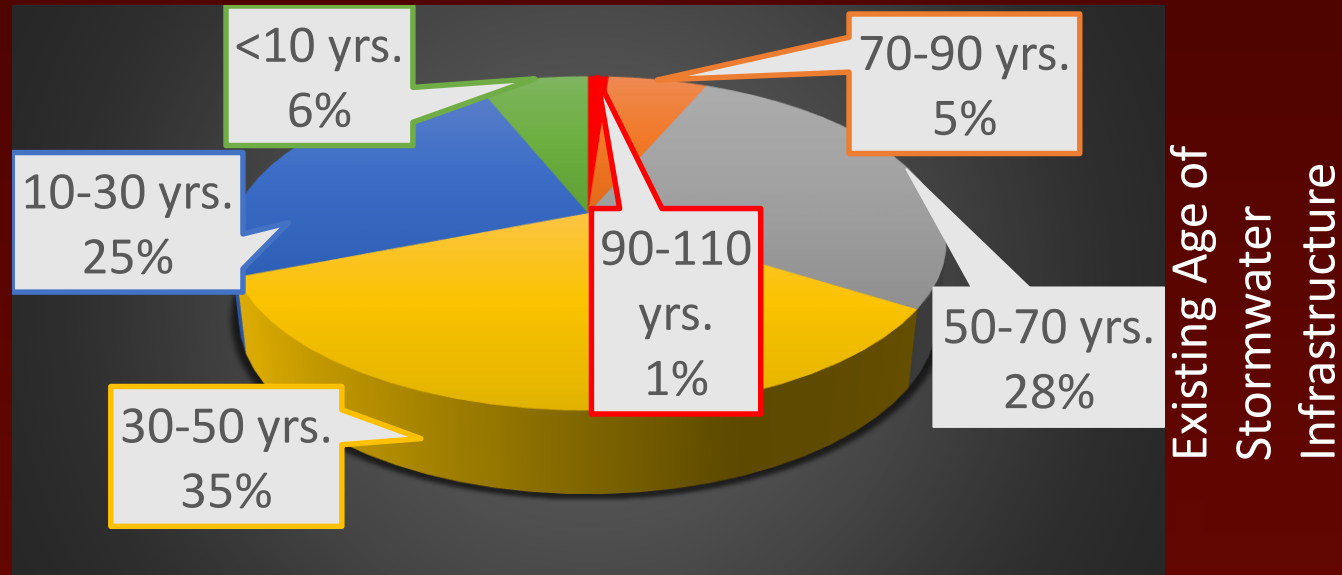
- Public RoW - Significantly understaffed and underfunded (\$410K)
- off RoW – Severely understaffed and underfunded (\$1.94M)

# **Potential Liability - What is the Capital Cost to Remove, Replace and Reinstall Stormwater Assets**

# When will we have to replace it (condition)?



Pipe and Network Structures have 80 year life span





# Capital Cost to Replace – Level of Service Core Responsibilities – RoW

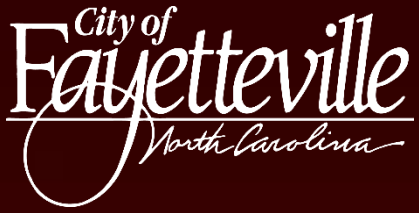
Full Replacement– Pipe/Structures - 80 Yr.- Cycle  
Major Dams (RoW)– 120 yr. Cycle (1 every 20 years)  
Minor Dams (off RoW) – 225 yr. Cycle (4 every 20 years)  
Bridge Structures – 95 Yr. Cycle (1 every 5 years)

Street Sweeping – Equipment Replacement

**RoW✓/off-RoW**

SCM (2008 Ordinance) – 20 Yr. Cycle  
Drainage Ditch/Shoulder – 20 Yr. Cycle  
Creeks 400 yr. Cycle (5% in 20 Yrs.)

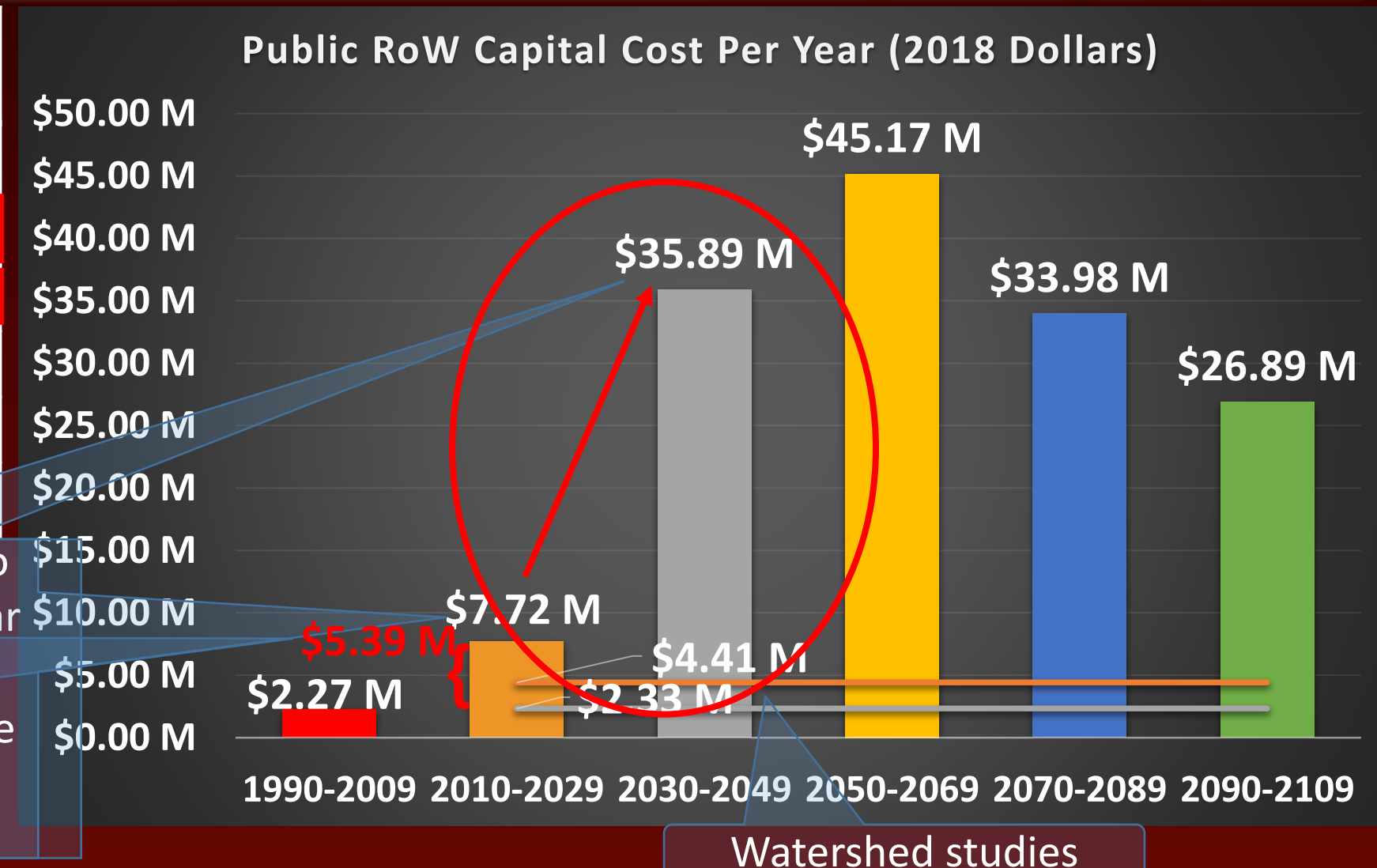
CCTV – Equipment Replacement  
Emergency Prep – NA

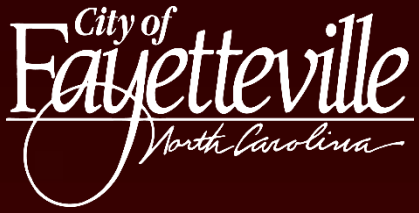


# Potential Liability – Public RoW Capital Costs

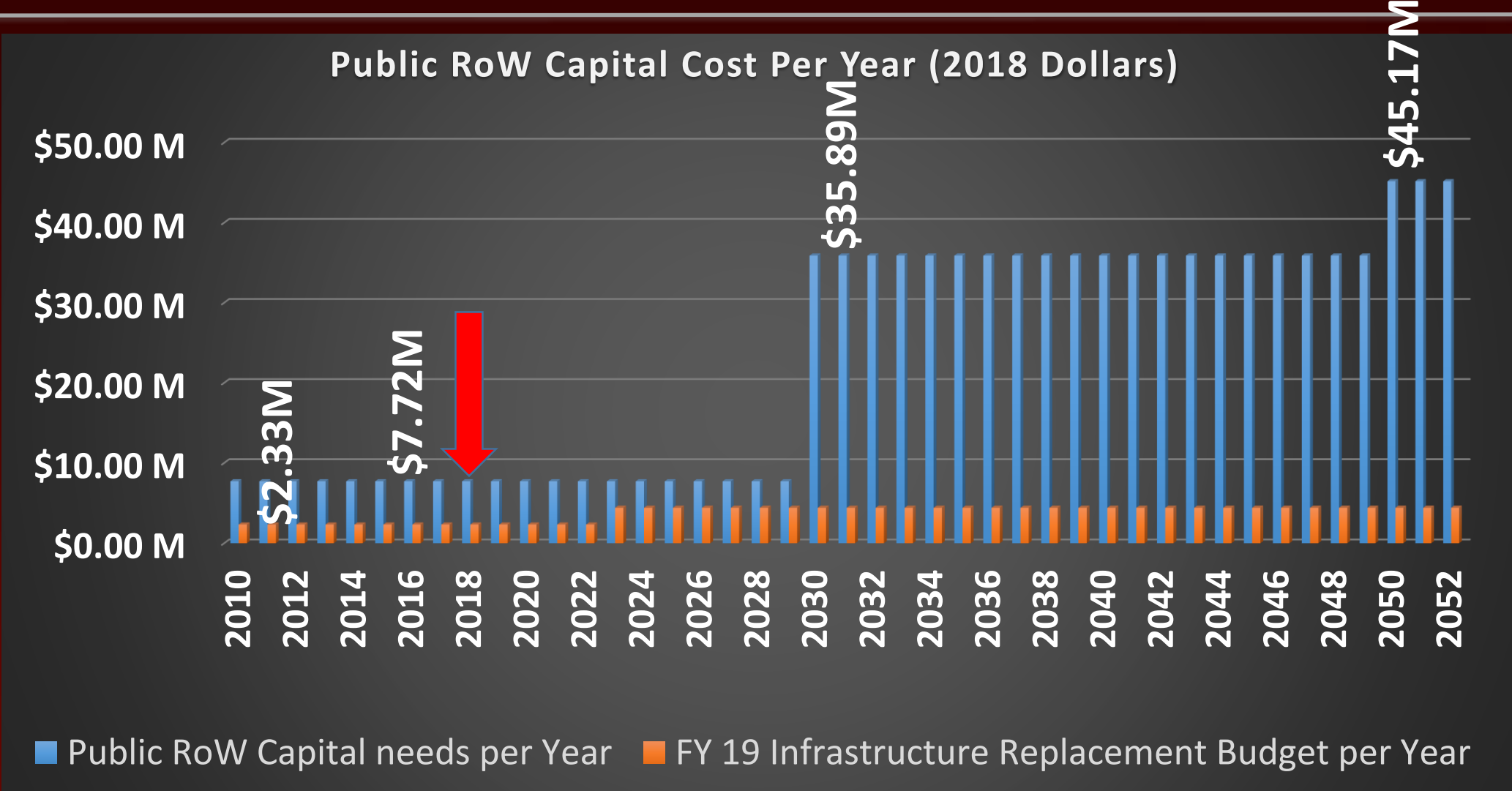
| Current Age (yr) | Max. Lifespan |     |
|------------------|---------------|-----|
| 90-110           | 1990-2009     | 1%  |
| 70-90            | 2010-2029     | 5%  |
| 50-70            | 2030-2049     | 28% |
| 30-50            | 2050-2069     | 35% |
| 10-30            | 2070-2089     | 25% |
| <10-proj.        | 2090-2109     | 12% |

The capital needs will increase to \$35.89 M/yr. by 2030-2049. We are currently \$5.39 M/yr. in the 2010-2029 period. 28% of the existing infrastructure will have reached or exceeded its lifespan by this time span.

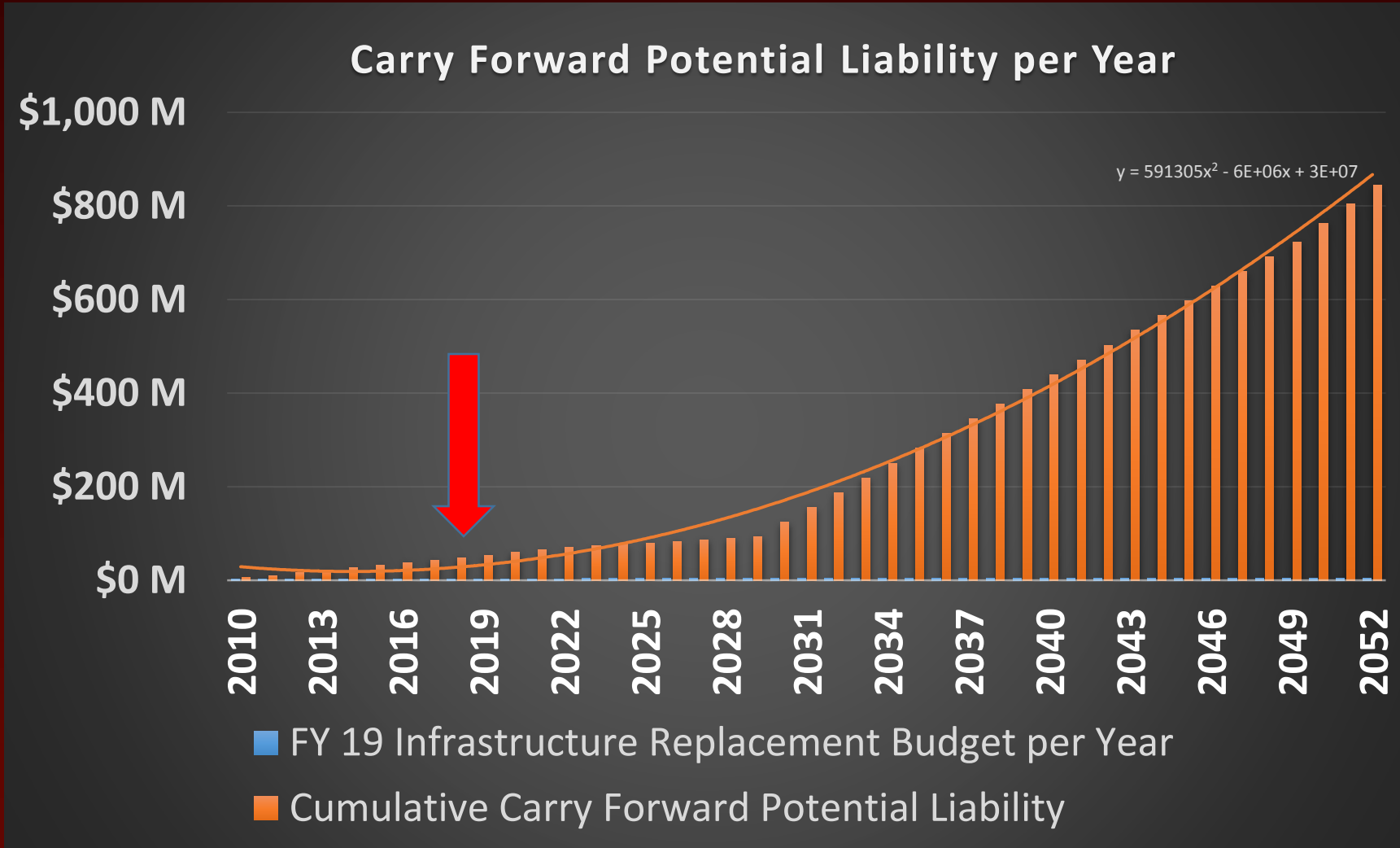




# Potential Liability – Public RoW Capital Costs (2010-2052)



# Potential Carry Forward Liability – Public RoW Capital Costs (2010-2052)



# Potential Liability – RoW ✓ and off RoW ✕ Capital Costs

Full Replacement– Pipe/Structures - 80 Yr.- Cycle  
Major Dams (RoW)– 120 yr. Cycle (1 every 20 years)  
Minor Dams (off RoW) – 225 yr. Cycle (4 every 20 years)  
Bridge Structures – 95 Yr. Cycle (1 every 5 years)

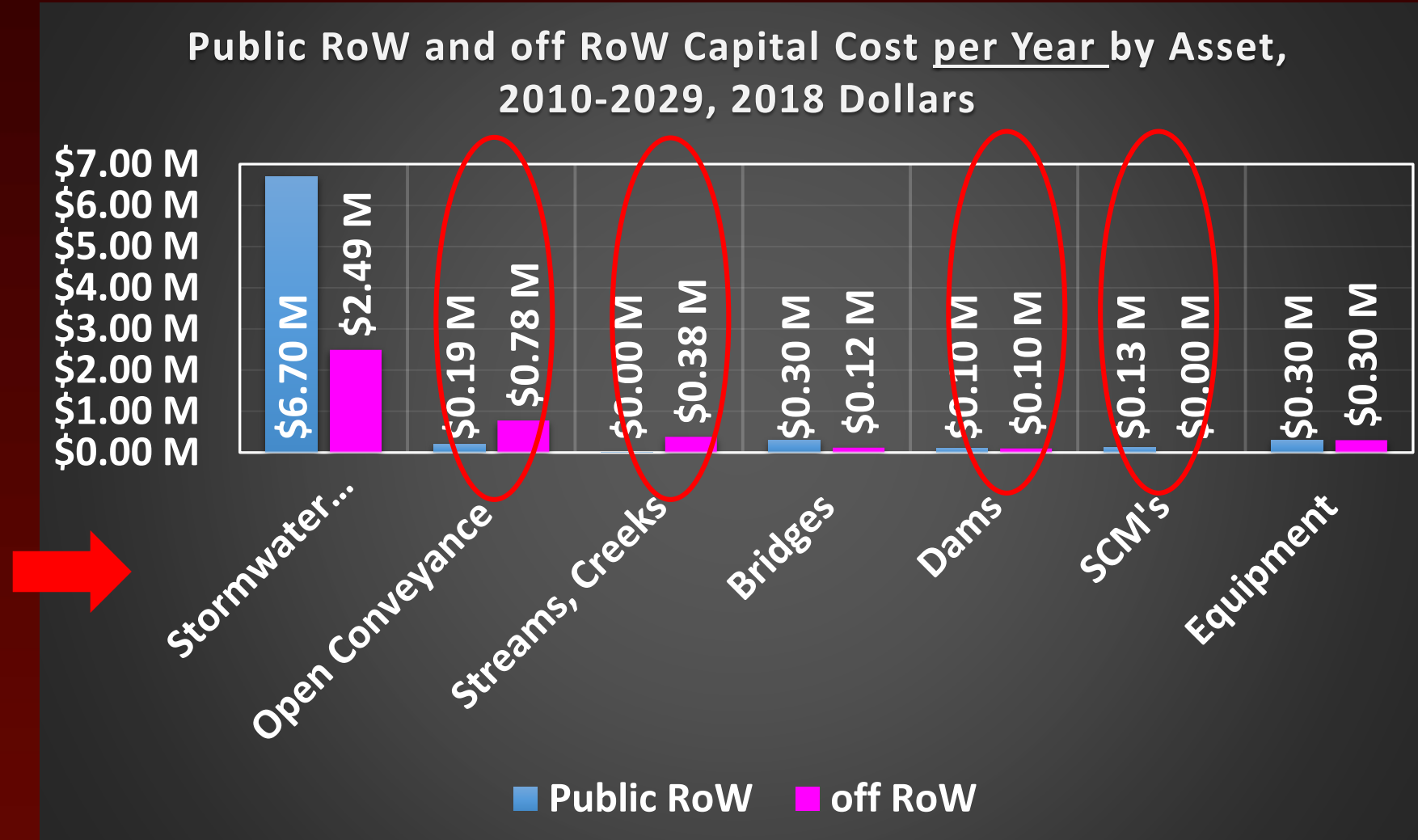
Street Sweeping – Equipment Replacement

**RoW ✓ / off-RoW**

SCM (2008 Ordinance) – 20 Yr. Cycle  
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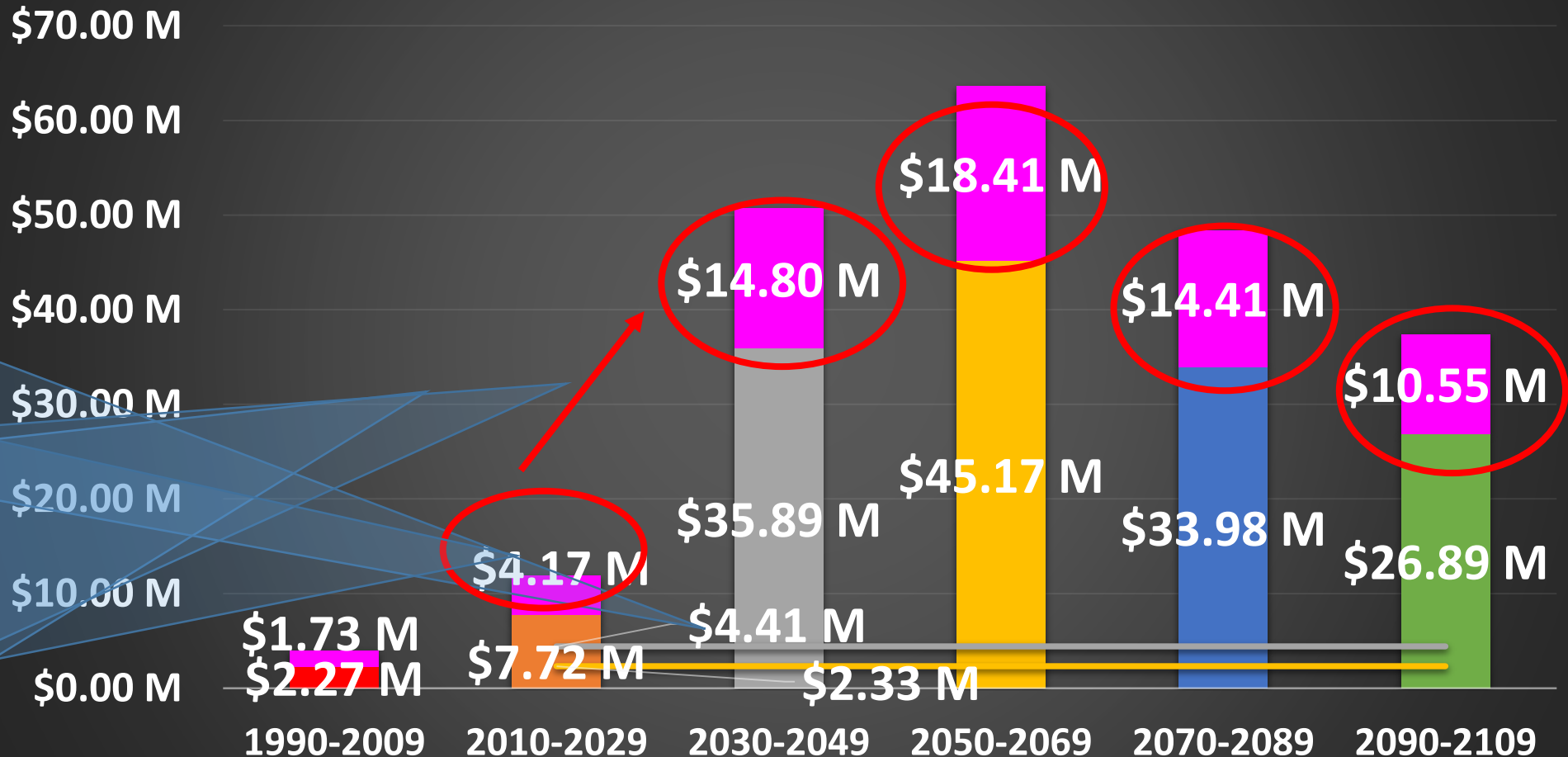
CCTV – Equipment Replacement  
Emergency Prep – NA

# Public RoW and off RoW Capital Cost per Year by Asset, 2010-2029



# Summary

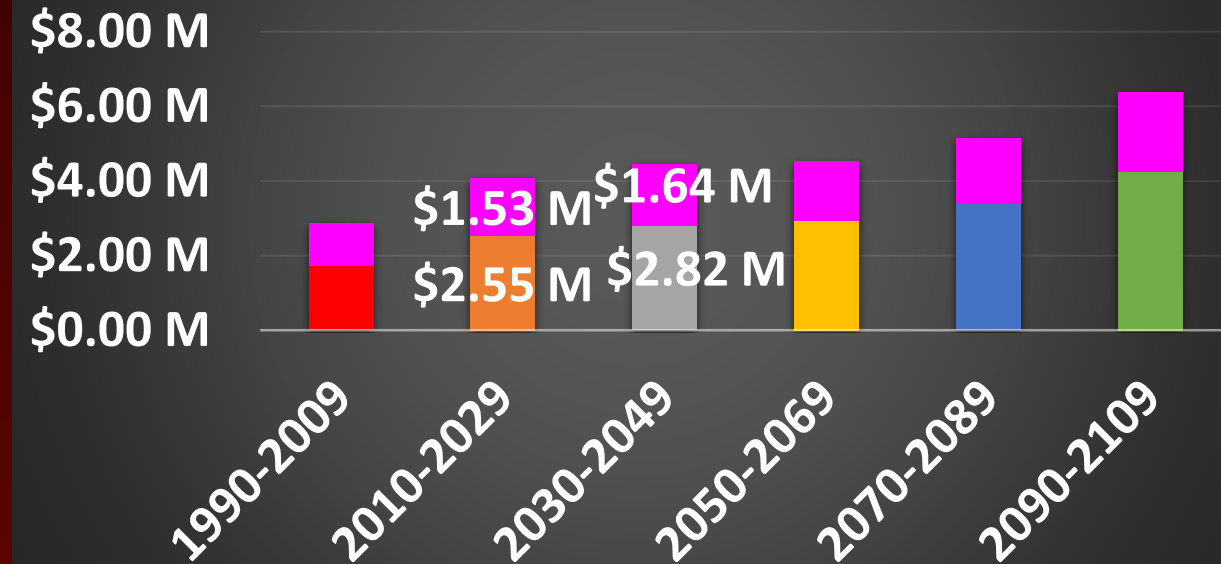
Public RoW and Off RoW Capital Cost Per Year (2018 Dollars)



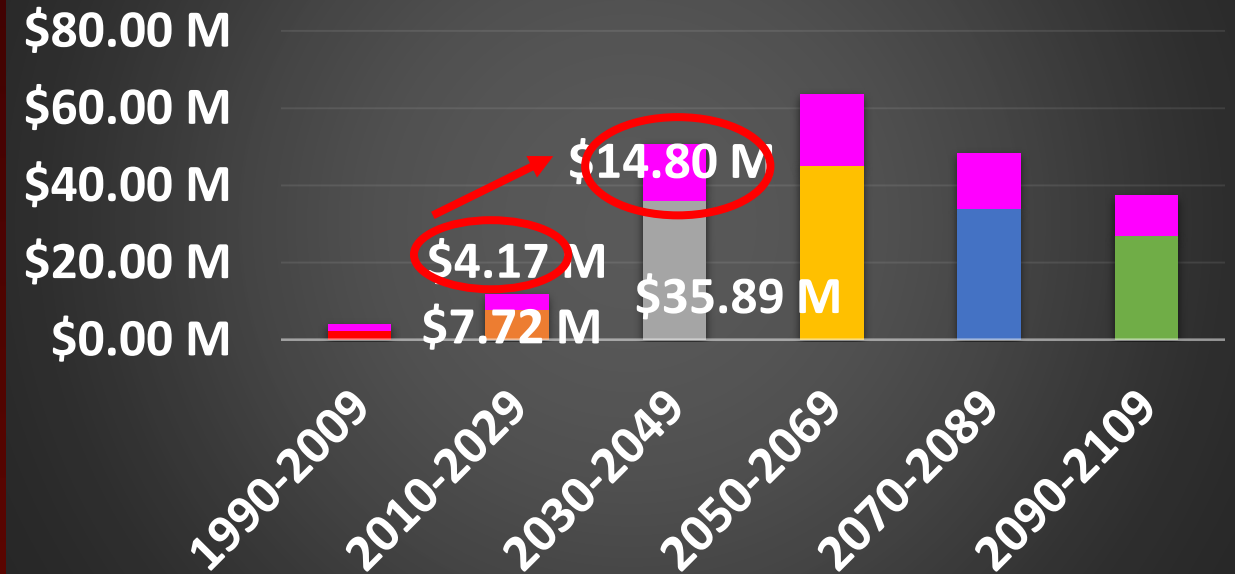
While this is a high level analysis, our current data indicates that ~28% of our infrastructure was built between 1950-1969 and ~35% between 1970-1989. This rapid change in growth will undoubtedly require replacement of existing roads and this infrastructure matures to maximum life. **\$1.53M** may seem insignificant to take on additional O&M services for 'off-RoW' services, it presents a substantial additional liability of **\$4.17M/yr** of capital needs for existing years and upwards of **\$15M/yr.** in future years.

# Summary

Public RoW and **Off RoW** O&M Costs Per Year (2018 Dollars)

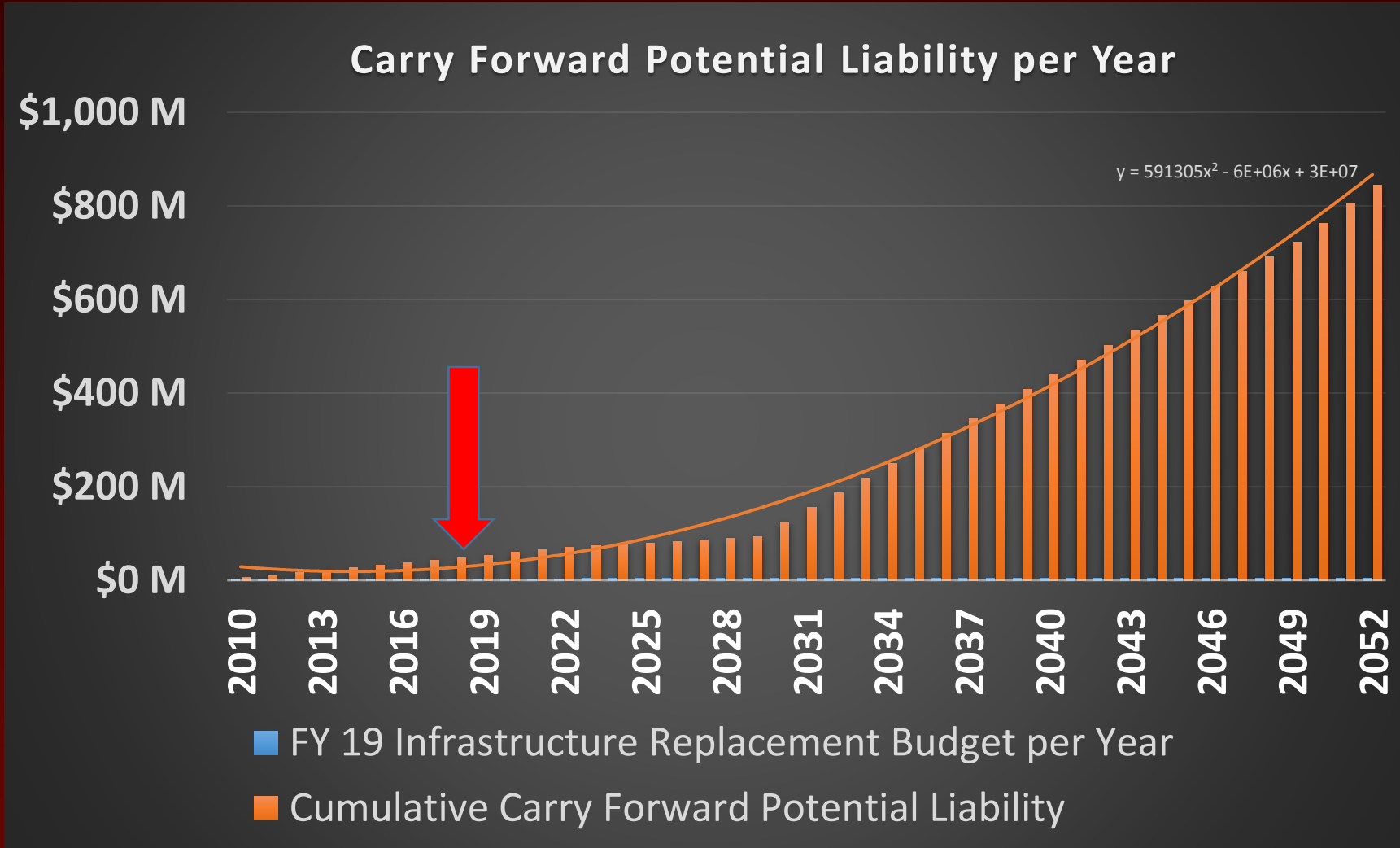


Public RoW and Off RoW Capital Cost Per Year (2018 Dollars)





# Potential Carry Forward Liability – Public RoW Capital Costs (2010-2052)



# Options for Private Properties

# What do Other Municipalities do?

## Drainage Assistance Program for off-RoW

Usually for  
minor  
projects

Cost Share

Municipality  
portion is  
funded  
through CIP  
process

Public  
contribution  
of runoff

Priority  
based

Projects are  
approved by  
Stormwater  
Board

# What do Other Municipalities do?

| City          | Allocated Funds from CIP | Cost Share | Limits                             | Priority Based |
|---------------|--------------------------|------------|------------------------------------|----------------|
| Raleigh       | \$1.25M                  | 100        | No Cap<br>Indv.<br>Cap per Project | ✓              |
| Durham        |                          | 80/20      | \$25K per property                 | ✓              |
| Winston Salem |                          | 70/30      | \$35K per property                 | ✓              |
| Cary          |                          | 50/50      |                                    | ✓              |

# Stormwater Infrastructure - Maintenance, Repair and Replacement

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## Direction Needed:

- What is the appropriate “Level of Service” or scope of responsibility for Fayetteville stormwater maintenance?

## Key questions:

- Cost
- Sustainability
- Peer Communities

# Summary - Legal

## Issues/Analysis

- ♦ Maintain, repair, remove, replace: public RoW ✓, off RoW ✕
- ♦ Inconsistently applied of our understanding of this obligation.
- ♦ CoF ordinance does not currently articulate or distinguish a defined scope of responsibility for stormwater infrastructure maintenance.

## Staff Recommendations

- ♦ City Council adopts future revisions to the ordinance that clearly articulates scope of responsibility for stormwater infrastructure maintenance.
- ♦ Staff move forward with policy changes to future plat and easement requirements.

## Options

- ♦ Endorse future revisions to the ordinance that articulates scope of responsibility for stormwater infrastructure maintenance
- ♦ Do not endorse revisions to the ordinance and provide further direction to the City Manager.

# Summary - Resources

## Issues/Analysis

- ♦ Severely understaffed and underfunded to support O&M obligations in the public RoW and off-RoW within a consistent and defined LOS.
- ♦ Any additional extension of our core responsibilities (public RoW) will result in substantial capital liability.

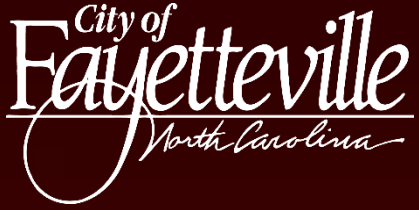
## Staff Recommendations

- ♦ CoF staff perform O&M only within the public RoW.
- ♦ CoF staff develop a 'Drainage Assistance Program' to address off RoW issues for future Council review and guidance.

## Options

- ♦ Endorse a policy for staff to perform O&M only within the public RoW.
- ♦ Direct CoF staff to develop a 'Drainage Assistance Program'.
- ♦ Do not endorse policy changes
- ♦ Direct CoF staff to provide specific budgetary and staffing needs to meet Council's desired LoS





# Questions?

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**Sheila Thomas-Ambat**  
**Interim Public Services Director, PE, CCM, CFM**

**Alicia Young**  
**Assistant City Attorney**

**Team Members: Kristoff Bauer, Giselle Rodriguez, John Larch, Scott Thornall, Kecia Parker, Terence Roberson**