Watershed Master Plan

Buckhead Creek and Beaver Creek 1
Proposed Solutions

City Council Work Session:
February 2, 2026

FAYETTEVILLE NC

Purpose

- Introduction:
  - Provide an overview of Watershed Studies - *City*
  - Provide a summary of proposed solutions approved to date - *City*

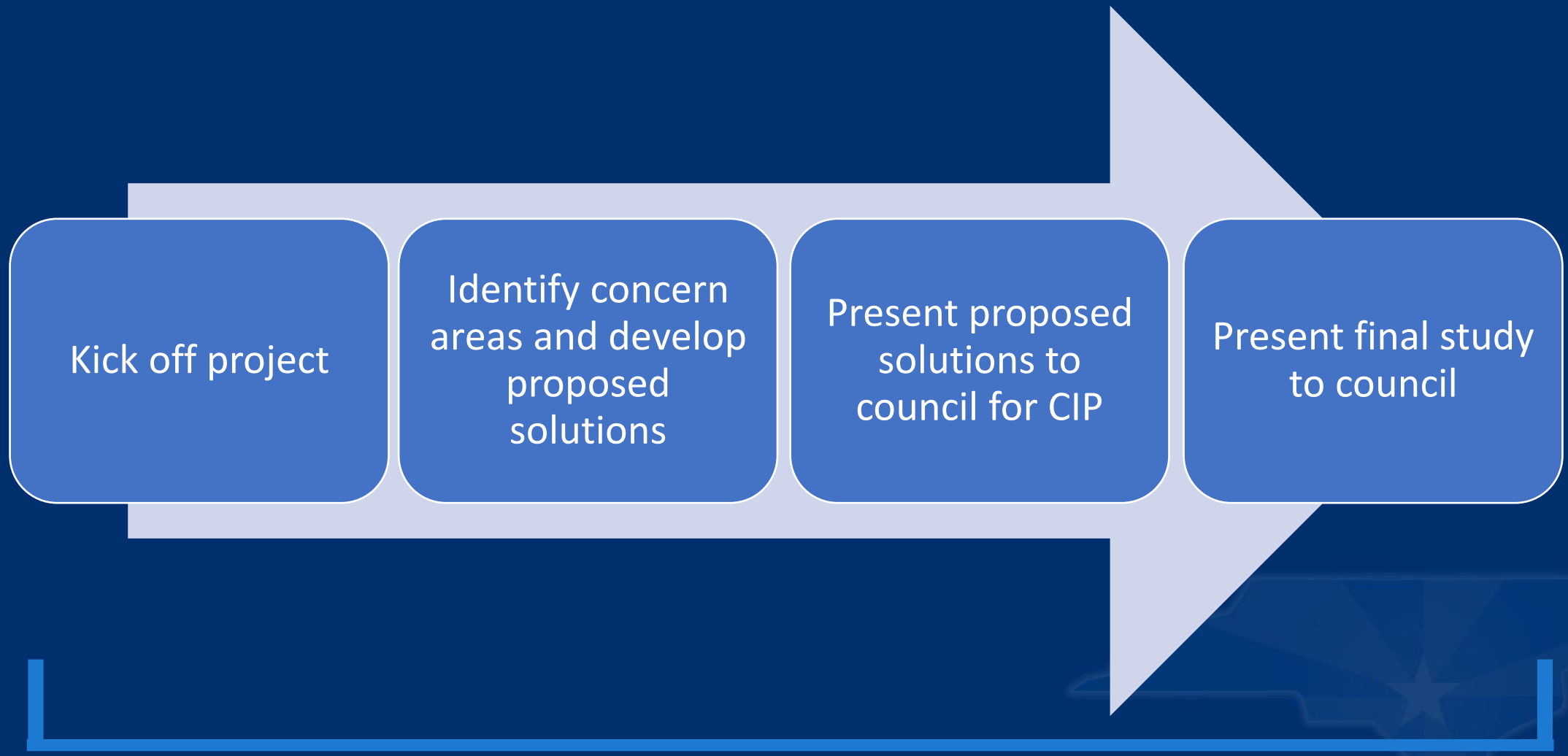
- Proposed Solutions for Buckhead Creek Watershed:
  - Present proposed solutions – *Gradient/Woolpert*
  - Request consensus to include proposed solutions in the CIP - *City*

- Proposed Solutions for Beaver Creek 1 Watershed:
  - Present proposed solutions – *Arcadis*
  - Request consensus to include proposed solutions in the CIP - *City*

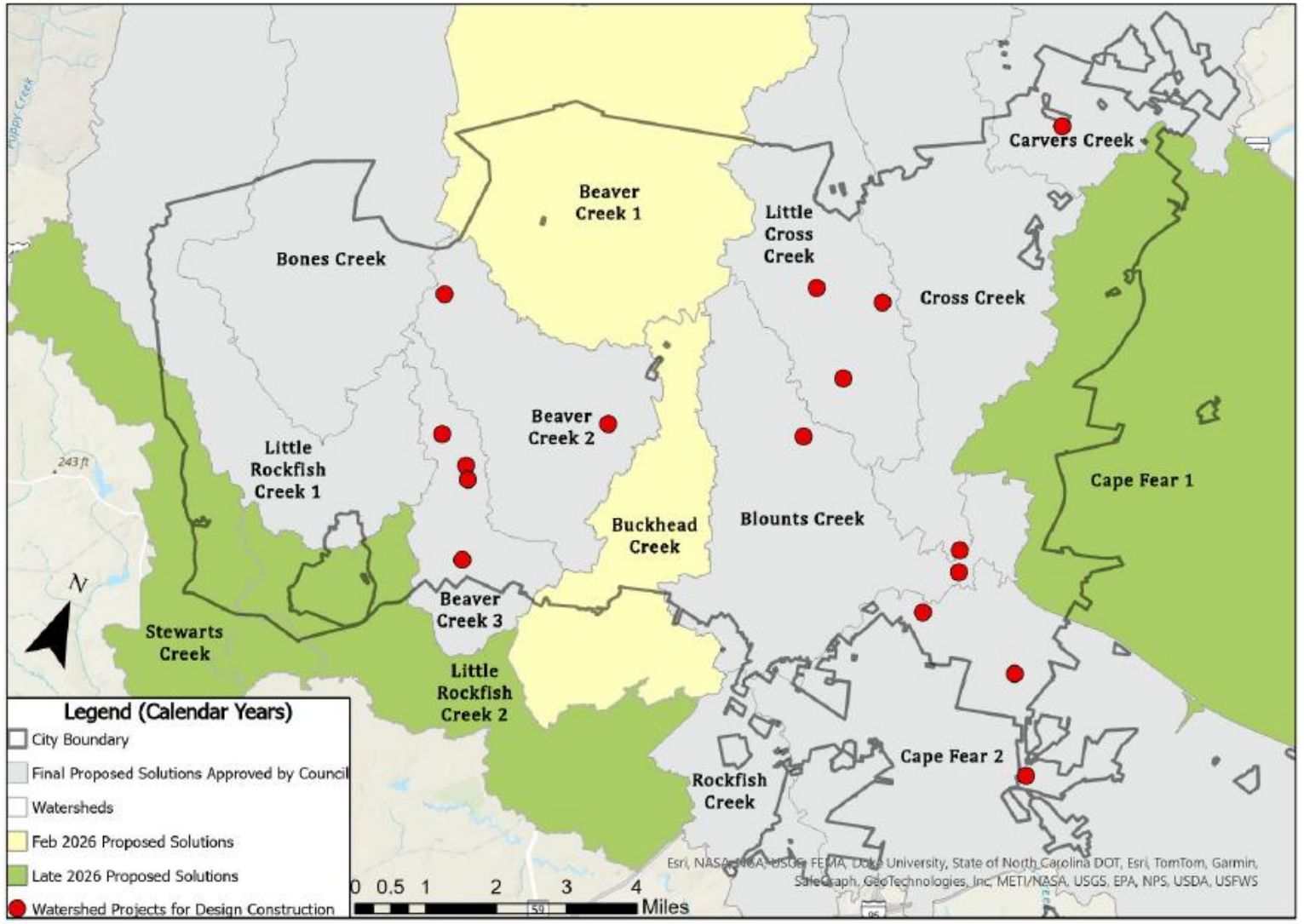
Comprehensive Vision

Visualize a Flood Resilient Fayetteville

Watershed Study Process



Watershed Studies and Projects



Watershed Projects in Design/Construction
Valid January 22, 2026

- 10 of 15 Watersheds completed (74% of encumbered $19.9 million)
- Over 360 proposed solutions
- Cost estimate of proposed solutions = $1.2B
- 16 projects in design/construction from studies to date (see details next slide)
  - Design: 14
  - Construction: 2

Funding Sources for Projects

STORMWATER MANAGEMENT

Fayetteville, North Carolina, awarded improvement

Fayetteville, North Carolina, was awarded with a $3.5 million grant for

June 4, 2024

Tony McEwen • 1st
Carolinas Director at American Flood Coalition
3mo •

Enjoyed a celebratory day in #FayettevilleNC with City officials amazing work to respond to #flooding challenges.

In 2023 the American Flood Coalition worked with our North C to successfully advocate for $25m in Transportation Flood Resil part of the North Carolina state budget.

ACHIEVERS & ACCOLADES

Fayetteville's commitment to infrastru $15.4 million grant finalist

BY STAFF REPORT, POSTED 1 YEAR AGO

Like 1

AUTODESK

Products Support Learn Community

One Water Blog | Drainage design | Water distribution | Asset management | Product news | Customer stories | Technical hubs

Search the blog

The City of Fayetteville's flood resiliency in the face of climate change: mapping 15 watersheds

NCDEQ Blueprint – Gap Funding for Shovel-Ready Ivy and Lyon Culvert F

GOVERNMENT

Golden LEAF Foundation awards City of Fayetteville $

BY STAFF REPORT, POSTED 2 MONTHS AGO

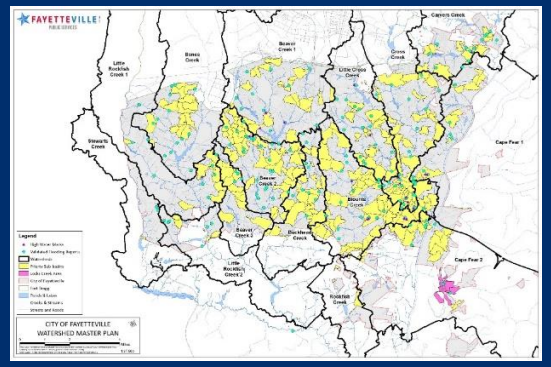
City of Fayetteville, NC @CityOfFayNC · Jul 26

We are thrilled to announce that we were recently awarded the 2024 Association of State Floodplain Managers James Lee Witt Local Award for Excellence for our Watershed Master Planning Program! 🏆
Read more: bit.ly/3WE4oZb

Break it Down – Where, What, When, How?

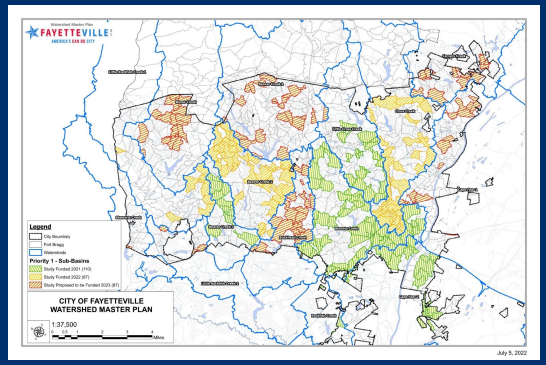
The Scaffolding, if you will…

Where?

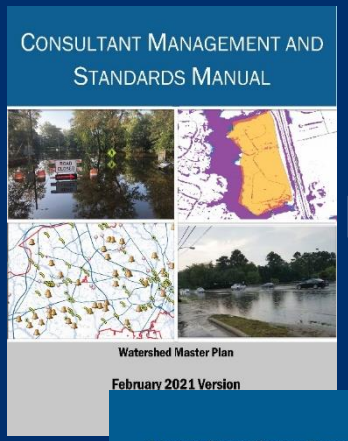


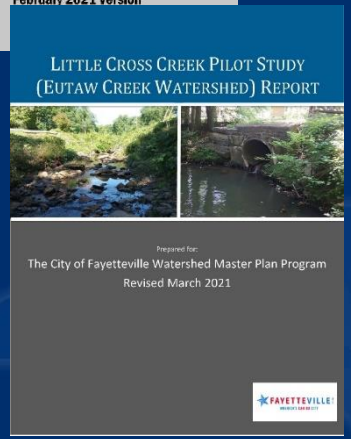
What?

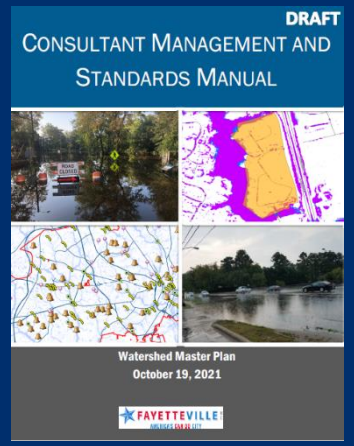
When?



How?



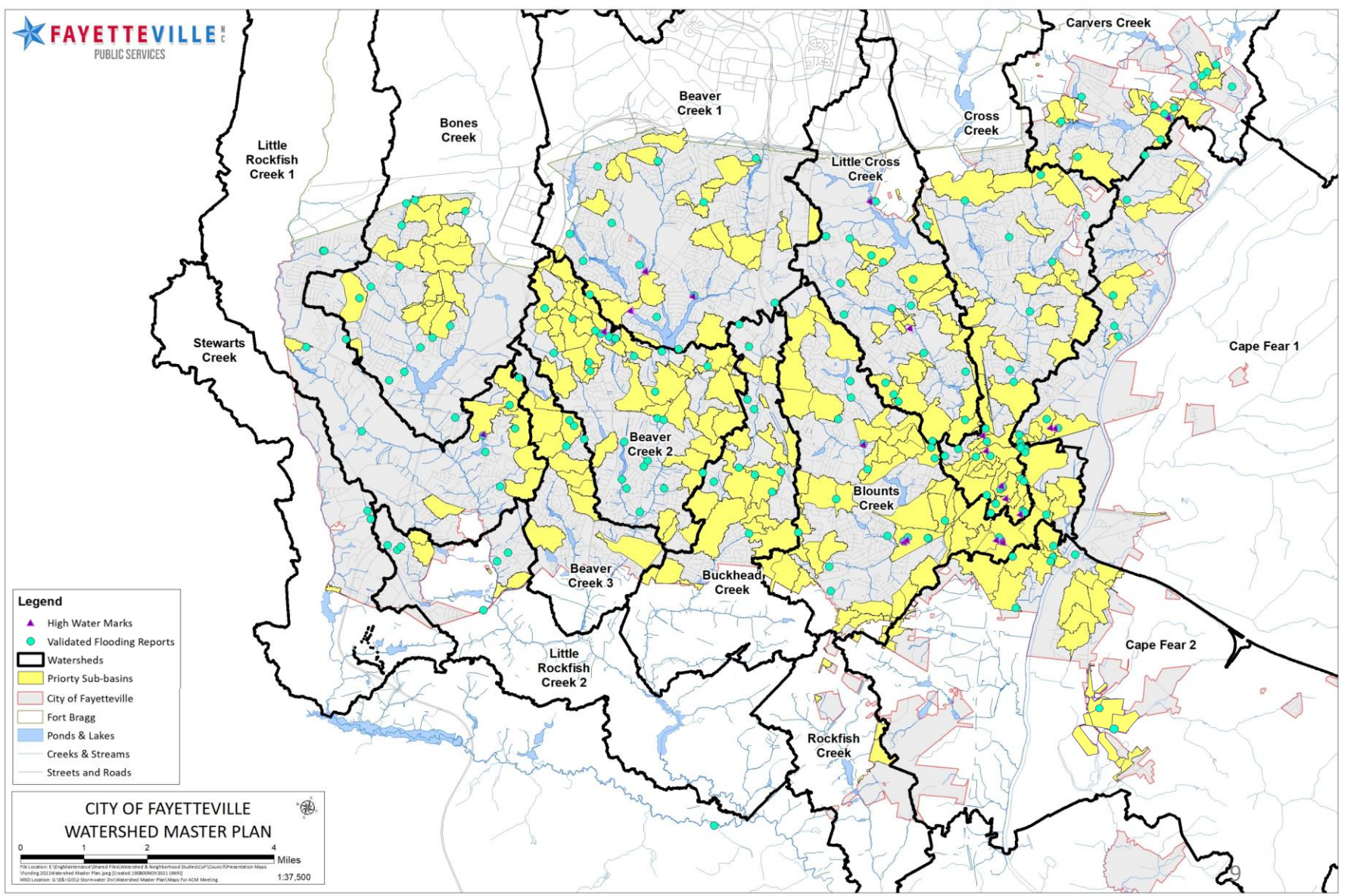




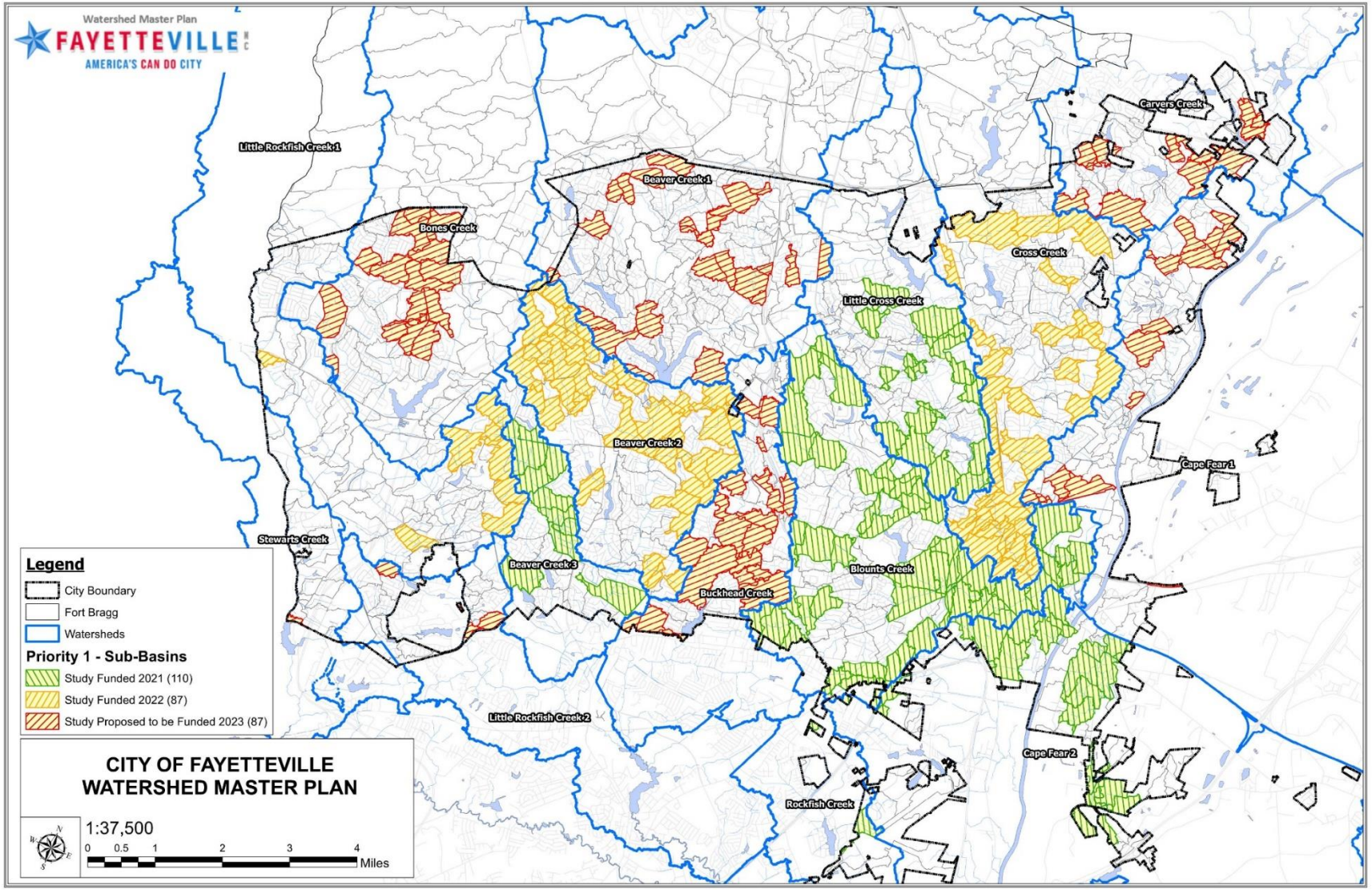
Learning and Informing- Pilot and Studies!

Where? High Priority Study Areas

- Flooded Roads
- Emergency Facilities
- Disconnected Structures (Single Access Neighborhoods)
- Structures (>400Ft2)



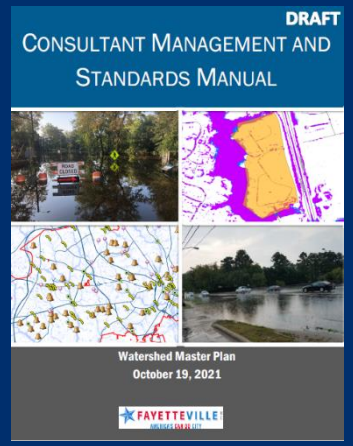
When?

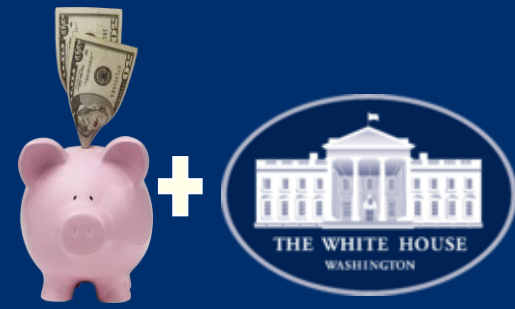


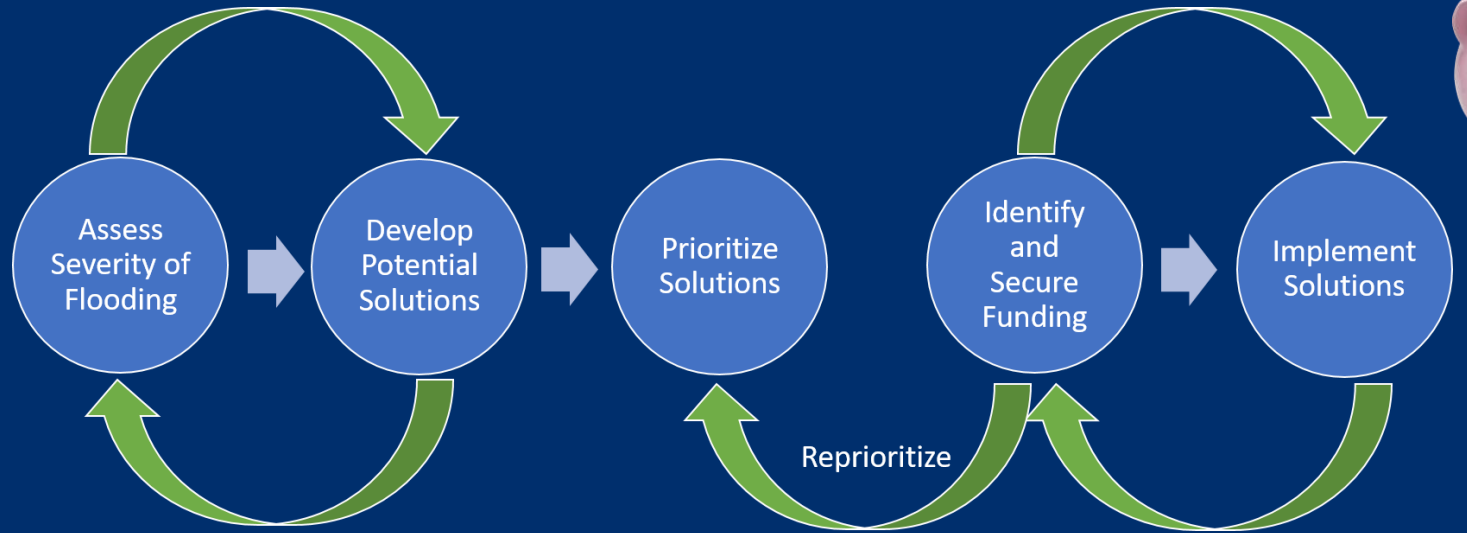
July 5, 2022

How?

Classification	Level of Service Standard Design			
	10 Year	25 Year	50 Year	100 Year
Secondary System (closed-pipe drainage)				
-Conduits and On-grade Inlets (City/Private/DOT) (10 yr)	■			
-Inlets at Sag Locations- City/Private (25 yr)		■		
-Inlets at Sag Locations- DOT (50 yr)			■	
-Major Trunk Lines (25 yr)		■		
Habitable Structures (10 yr)	■			
Emergency Spillway (Varies)	Varies			
Road Crossings				
-Culverts – City/Private (25 yr)		■		
-Culverts – DOT (50 yr)			■	
-Bridges - City/Private (25 yr)		■		
-Bridges – DOT (50 yr)			■	
Disconnected Structures (Single Access)			■	
Essential Facilities – Tier 1 (100 yr), Tier 2 (50 yr)			■	■

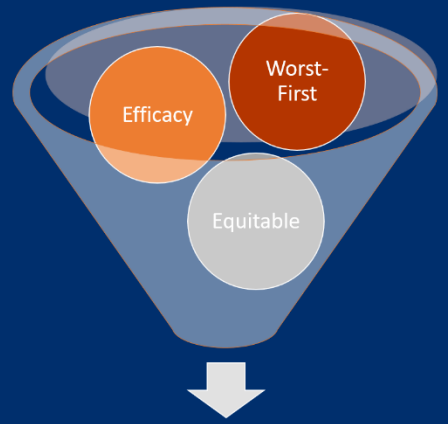






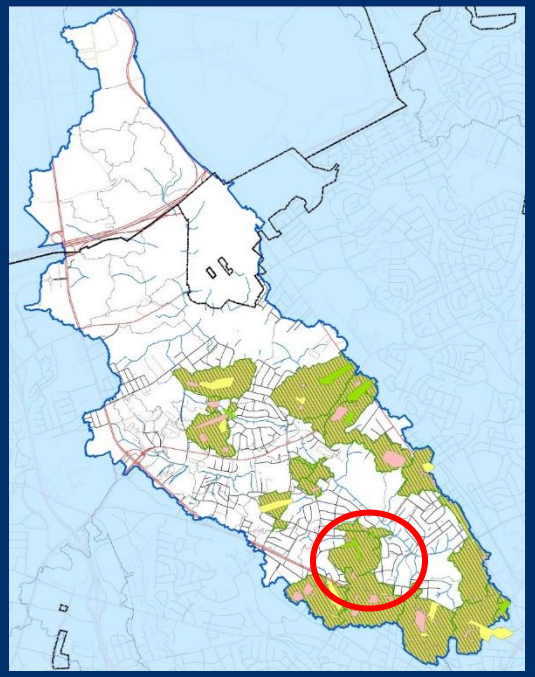
Planning Cycle

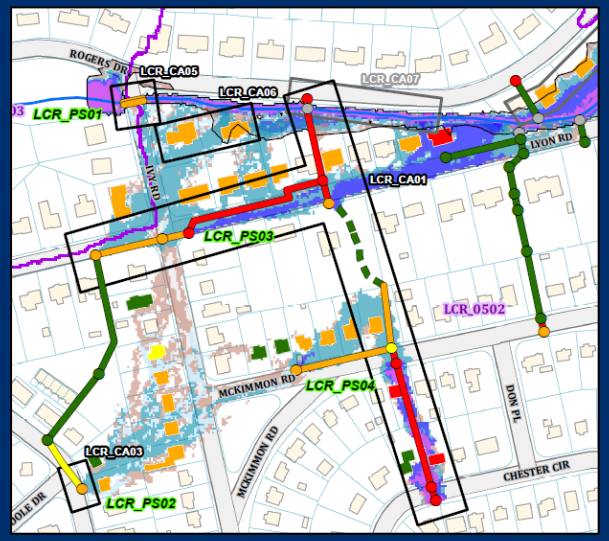
CIP Cycle



Projects to Council

Assess Severity of Flooding

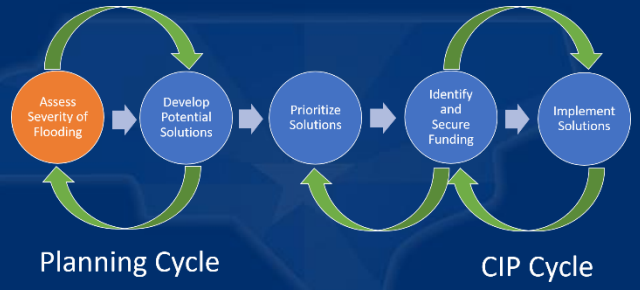




Existing Condition (Inundation)

CMT Decision: Further develop potential solutions for selected concern areas

Impacted Lane Length (feet)			Summary of Impacted Structures (>400 ft^2)				Number of Impacted Essential Facilities		Number of Disconnected Structures	Traverse Road Crossing Risk Rating (D x V)		Final Scores and Efficacy	
10-yr On-Grade Inlets (All)	25-yr Sag Location (City / Private)	50-yr Sag Location (DOT)	2-yr	10-yr	25-yr	50-yr	100-yr (Tier 1)	50-yr (Tier 2)	50-yr	25-yr (City)	50-yr (DOT)	Score	Efficacy
1098	*2772*	*0*	*1*	*3*	*14*	*14*	*0*	*0*	*8*	*0*	*n/a*	*17*	

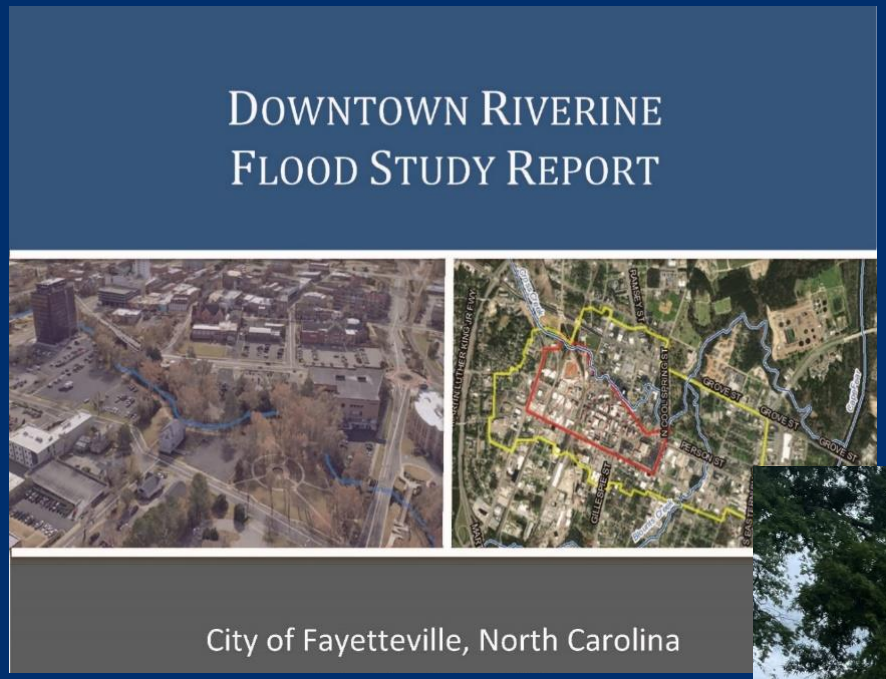


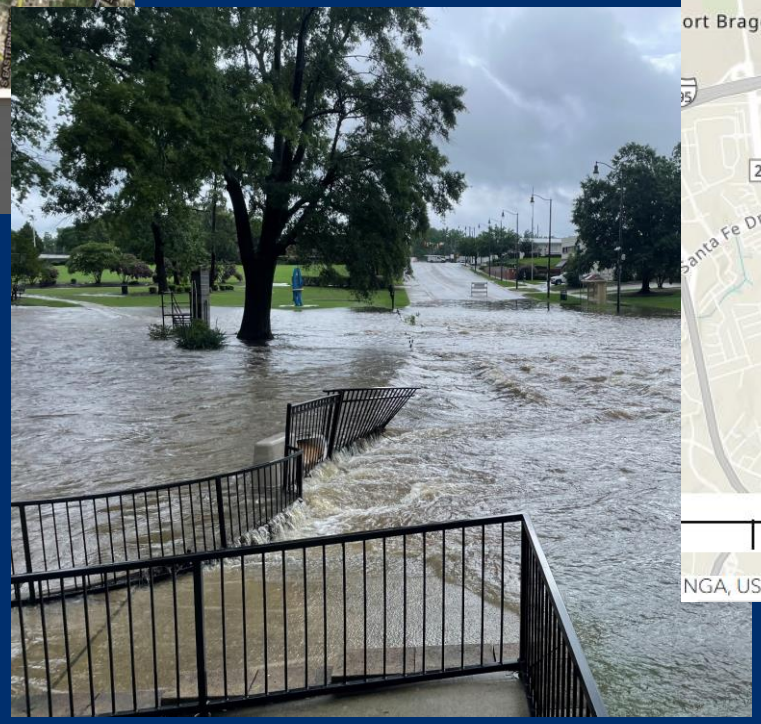
Consider Options

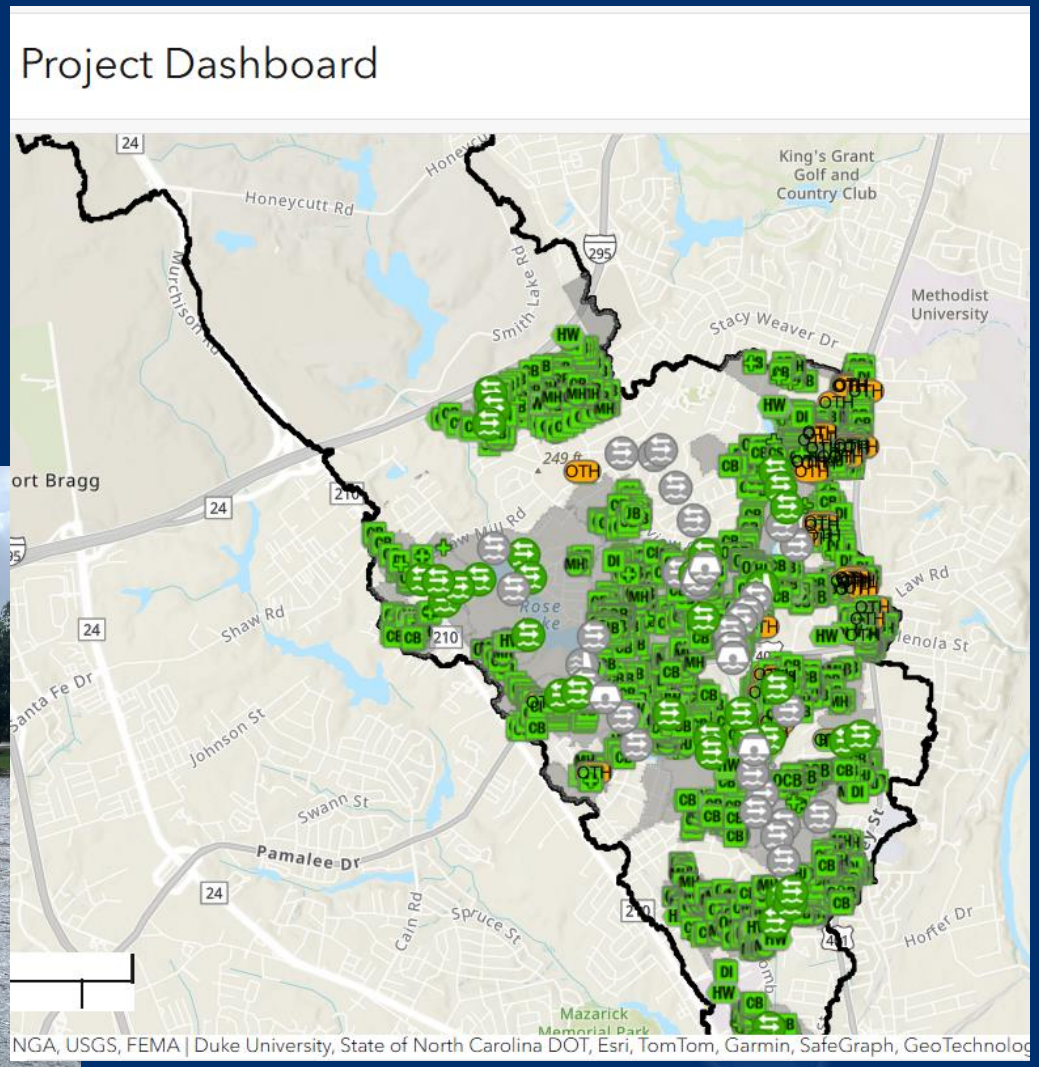
Table 12: Qualitative Analysis Summary

Concern Area ID	Concise Concern Area Description	Capacity Expansion	Stormwater Detention	Stormwater Diversion	Buyouts, Elevation, Floodproofing	Stream Restoration and Armoring	Small Projects (in public ROW)	Small Projects (Outside public ROW)	Do Nothing
	Flooded structures.								
LCR_CA74	Pipe, inlet, and gutter capacity.	Medium	None	None	None	None	High	None	Low

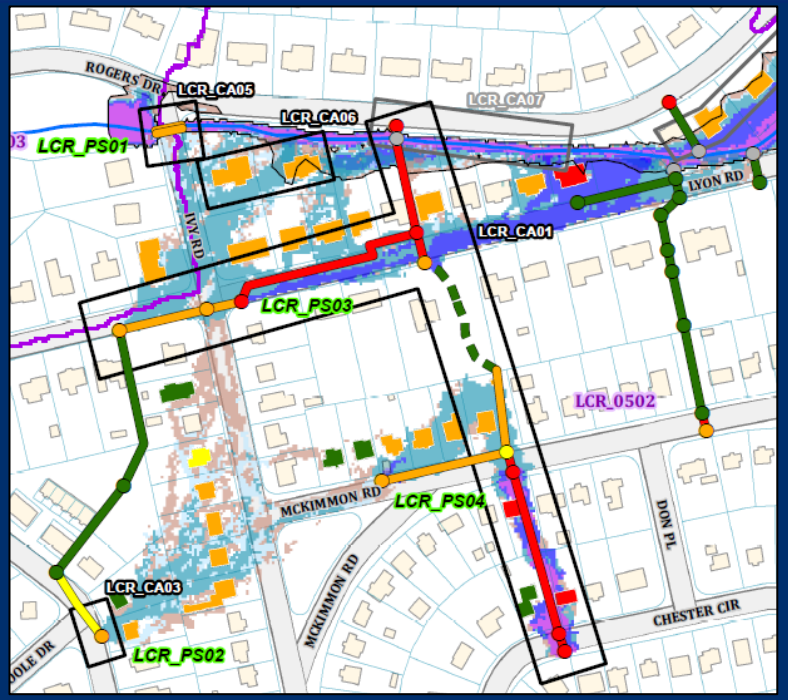
Downtown Riverine/Cross Creek and City-Wide Survey



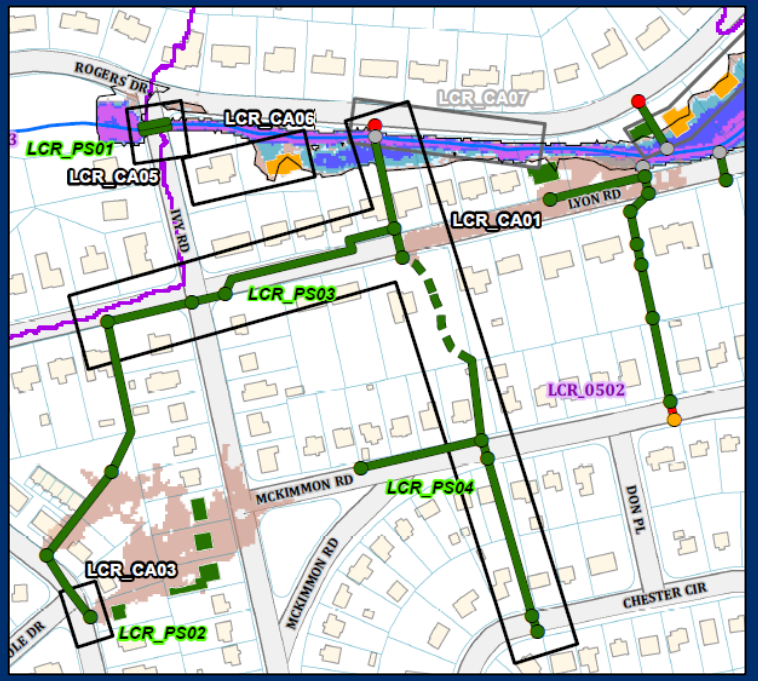




Develop Potential Solutions



Existing Condition (Inundation)



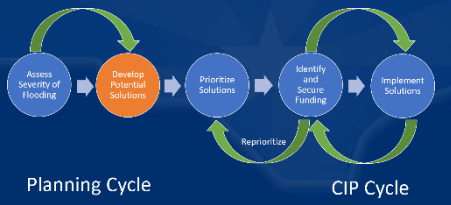
Future Condition with Proposed Solution (Inundation) 6% Increase

Table 7: Existing and Future Rainfall

Model	24-hour Rainfall Frequency Depth (inches)						
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
NOAA Distribution	A	B	B	B	C	C	C
Existing*	3.66	4.69	5.51	6.68	7.63	8.63	11.2
Future**	3.88	4.97	5.84	7.08	8.09	9.15	11.87

* NOAA Atlas 14 Rainfall Depth for City of Fayetteville, North Carolina

** 6% increase to existing rainfall depth to account for uncertainty in future precipitation characteristics

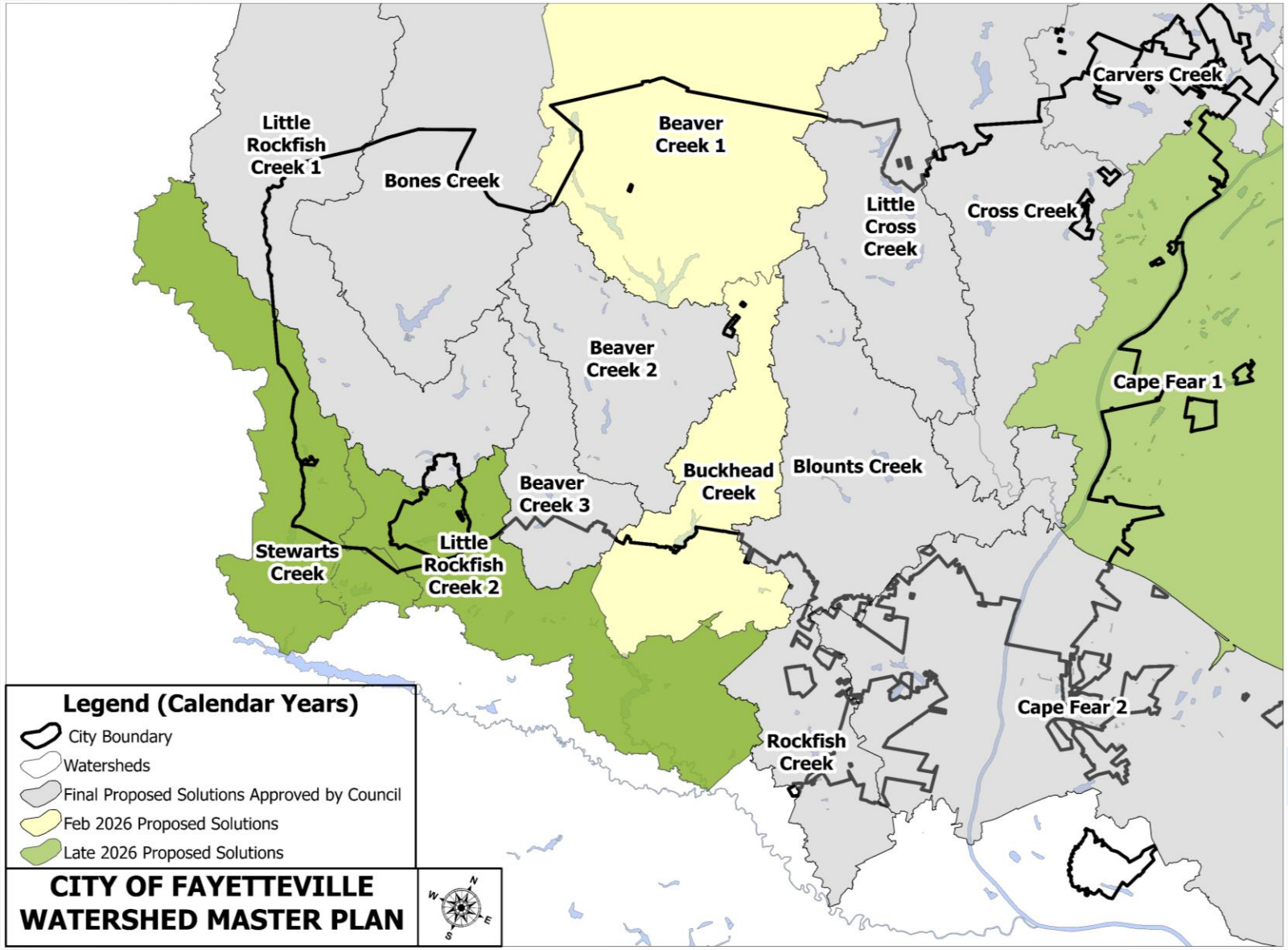


Evaluate Efficacy

Core Information	Impacted Lane Length (feet)			Summary of Impacted Structures (>400 ft^2)				Number of Impacted Essential Facilities		Number of Disconnected Structures	Traverse Road Crossing Risk Rating (D x V)		Final Scores and Efficacy	
Proposed Solution Name	10-yr On-Grade Inlets (All)	25-yr Sag Location (City / Private)	50-yr Sag Location (DOT)	2-yr	10-yr	25-yr	50-yr	100-yr (Tier 1)	50-yr (Tier 2)	50-yr	25-yr (City)	50-yr (DOT)	Score	Efficacy
Existing Conditions	*1098*	*2772*	*0*	*1*	*3*	*14*	*14*	*0*	*0*	*8*	*0*	*n/a*	*17*	100%
Lyon Road Capacity Expansion	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**n/a**	**0**	

Proposed Solutions Approved by Council

(To Date – 1st and 2nd Tranches)



Study Area

755 – Total Sub-basins

228 – Priority I Sub-basins

31 – Sq. Miles

Study Identified

684 – Concern Areas (CAs)

367 – CAs Selected

364 – Proposed Solutions

Miles of Impacted Lane Length

Identified – 170 | Resolved – 127

Number of Traverse Road Crossings

Identified – 638 | Resolved – 445

Number of Disconnected Structures

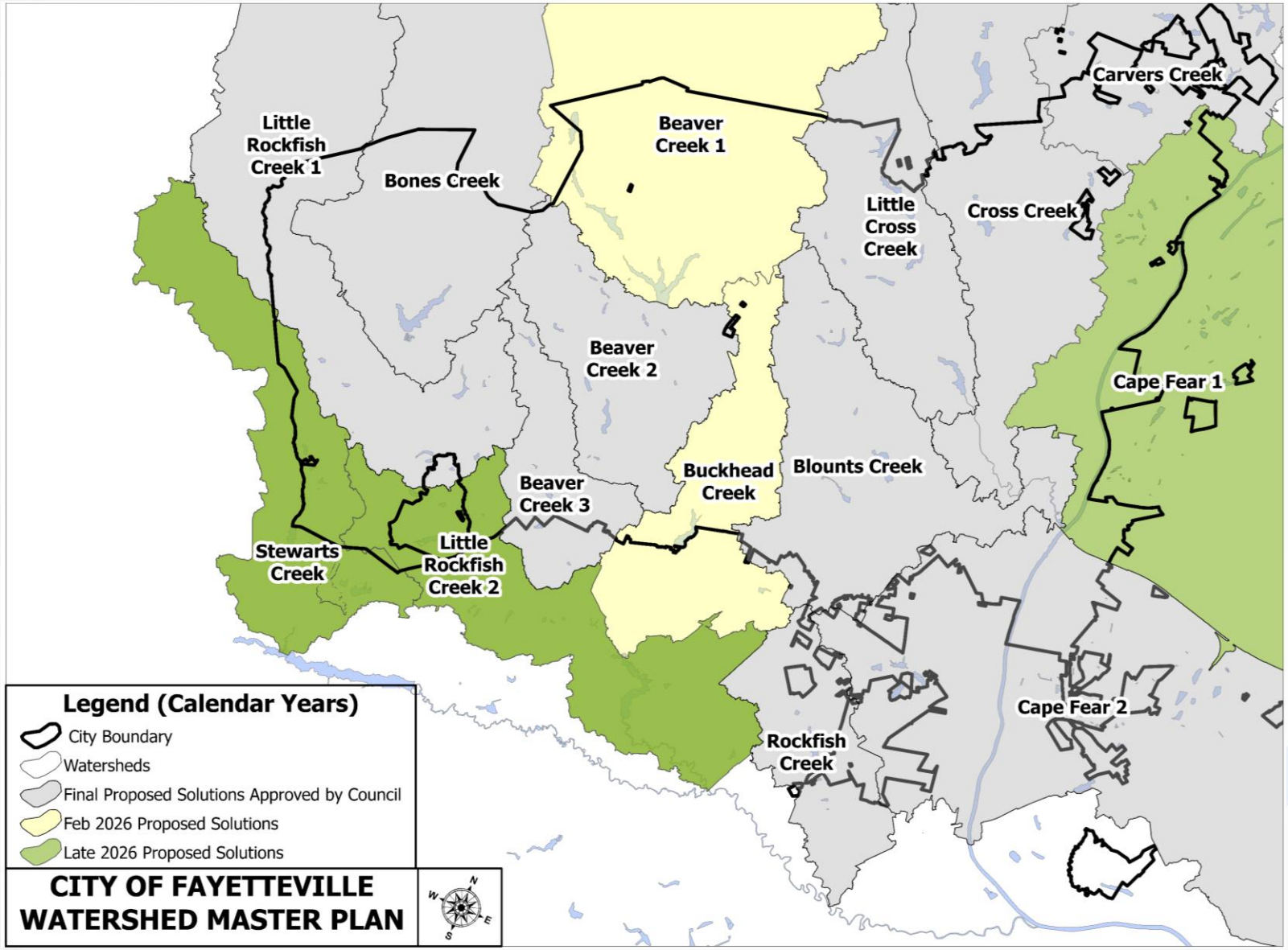
Identified – 2035 | Resolved – 1802

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified –	597	903	1019
Resolved –	408	607	724

Current Estimated Total Cost (2025) $1.2B

Feb 2026 Proposed Solutions



Study Area

229 – Total Sub-basins

39 – Priority I Sub-basins

31 – Sq. Miles

Study Identified

133 – Concern Areas (CAs)

57 – CAs Selected

55 – Proposed Solutions

Miles of Impacted Lane Length

Identified – 23 | Resolved – 10

Number of Traverse Road Crossings

Identified – 206 | Resolved – 68

Number of Disconnected Structures

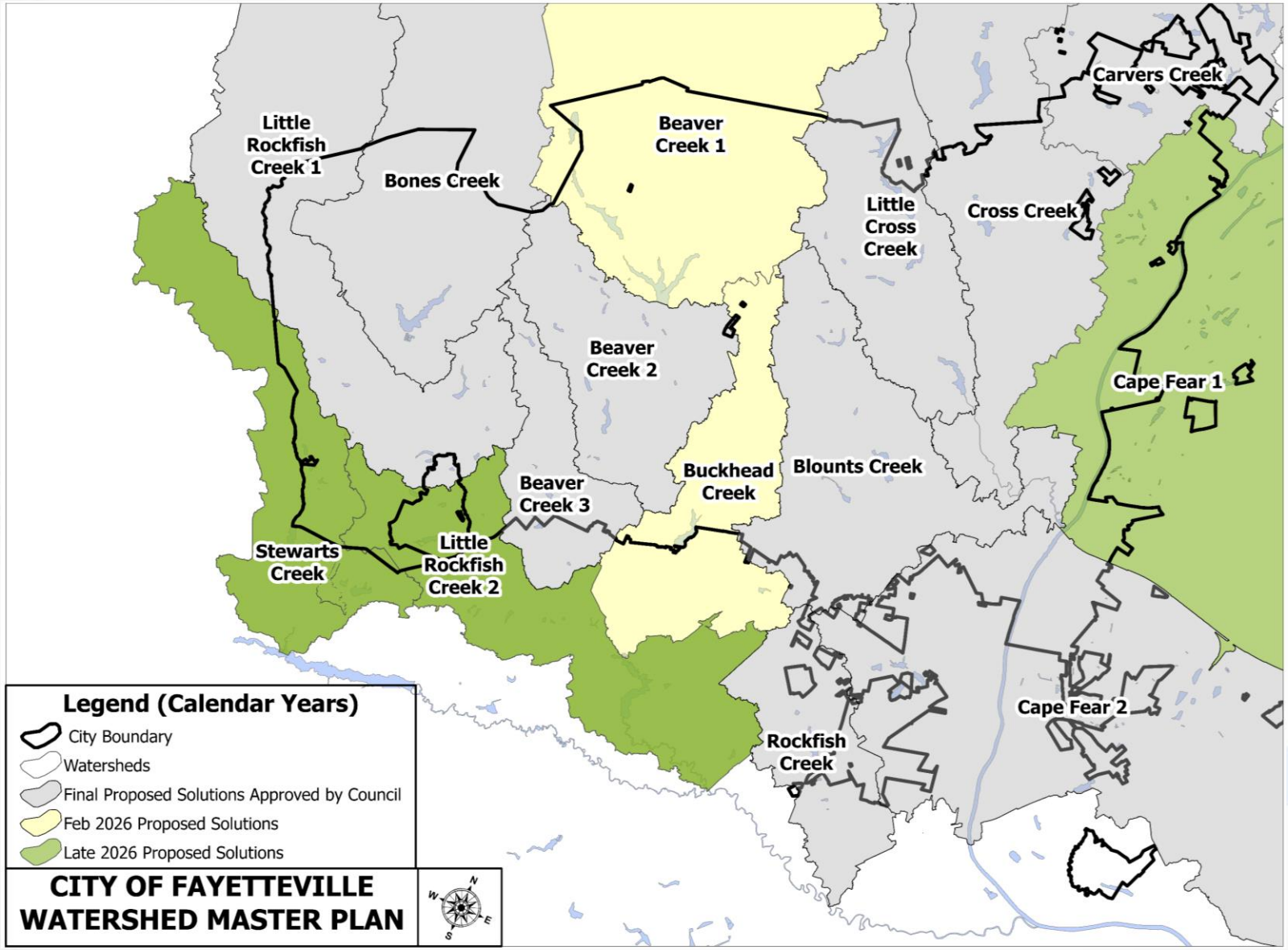
Identified – 366 | Resolved – 280

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified –	146	228	258
Resolved –	97	148	156

Current Estimated Total Cost (2025) $219M

Proposed Solutions Approved by Council and Feb 2026 Proposed Solutions



Study Area

984 – Total Sub-basins
267 – Priority I Sub-basins
62 – Sq. Miles

Study Identified

817 – Concern Areas (CAs)
424 – CAs Selected
419 – Proposed Solutions

Miles of Impacted Lane Length
Identified – 192 | Resolved – 137

Number of Traverse Road Crossings
Identified – 844 | Resolved – 513

Number of Disconnected Structures
Identified – 2401 | Resolved – 2082

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified –	743	1131	1277
Resolved –	505	755	880

Current Estimated Total Cost (2025) $1.5B

Watershed Master Plan Proposed Solutions for Buckhead Creek (BKH)

City Council Work Session: February 2026

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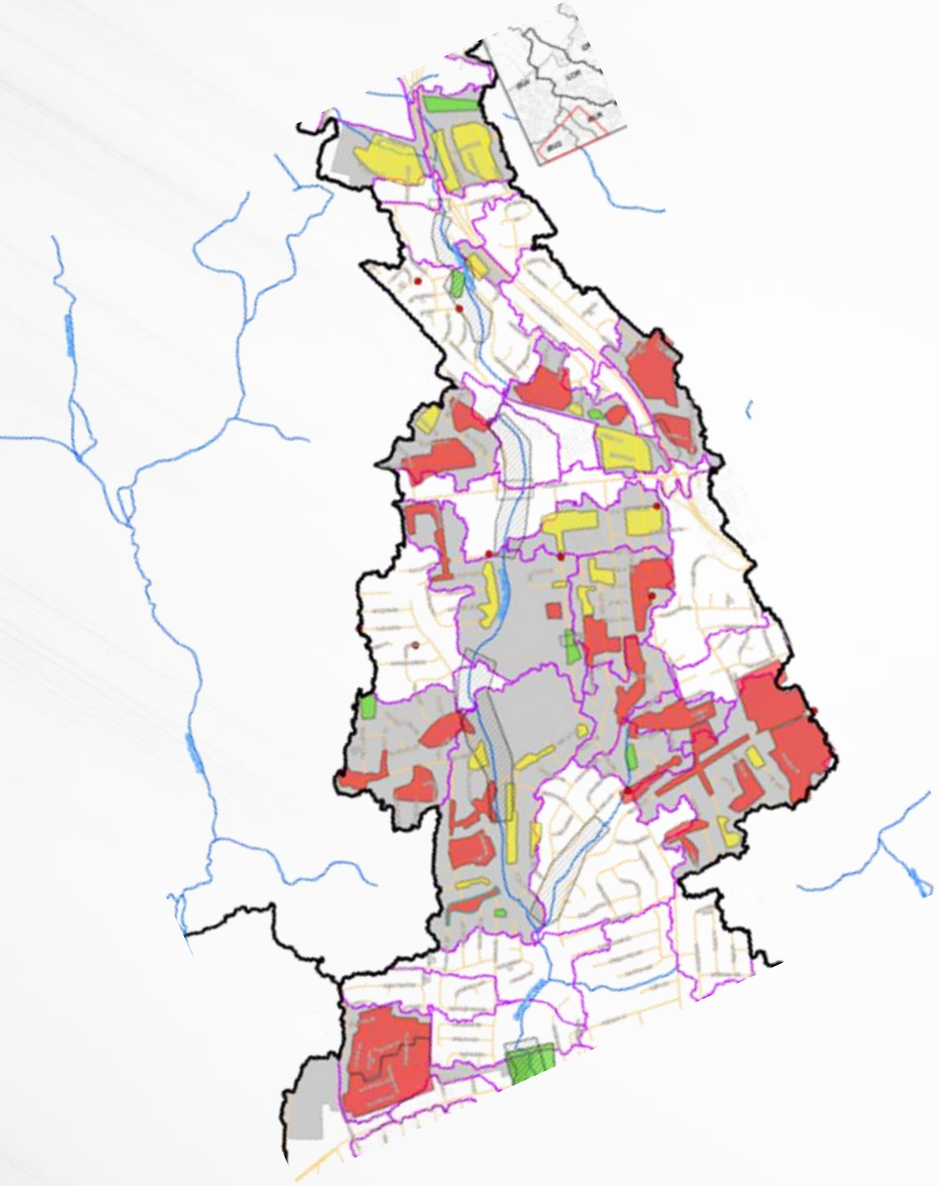
Buckhead Creek – Proposed Solutions 80%



Study Area

77 – Total Sub-basins

16 – Priority 1 Sub-basins

8.61 – Sq. Miles

Council Districts: 2, 5, 9

Study Identified

64 – Concern Areas (CAs)

35 – CAs Selected

33 – Proposed Solutions

Miles of Impacted Lane Length

Identified – 11.8 | Resolved – 2.6

Number of Traverse Road Crossings

Identified – 169 | Resolved – 45

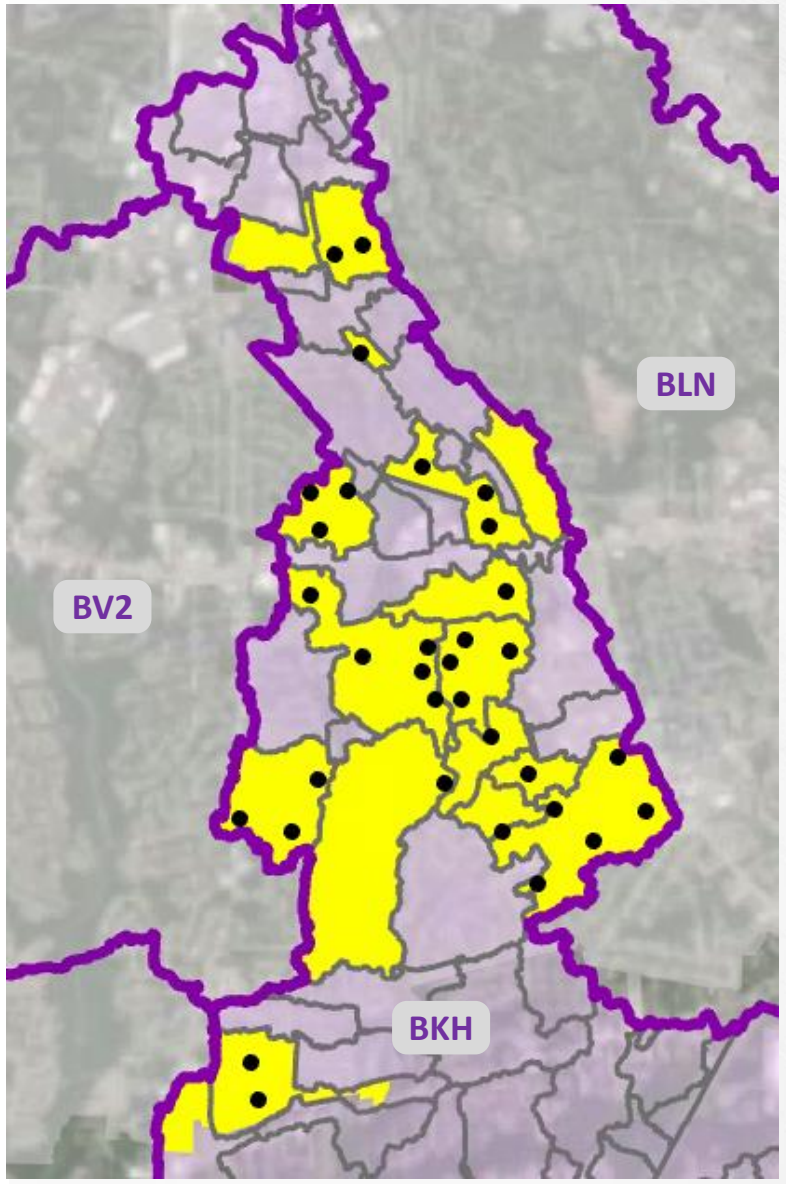
Number of Disconnected Structures

Identified – 323 | Resolved – 237

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified –	100	141	159
Resolved –	71	97	103

Current Total Cost (2025) $156M

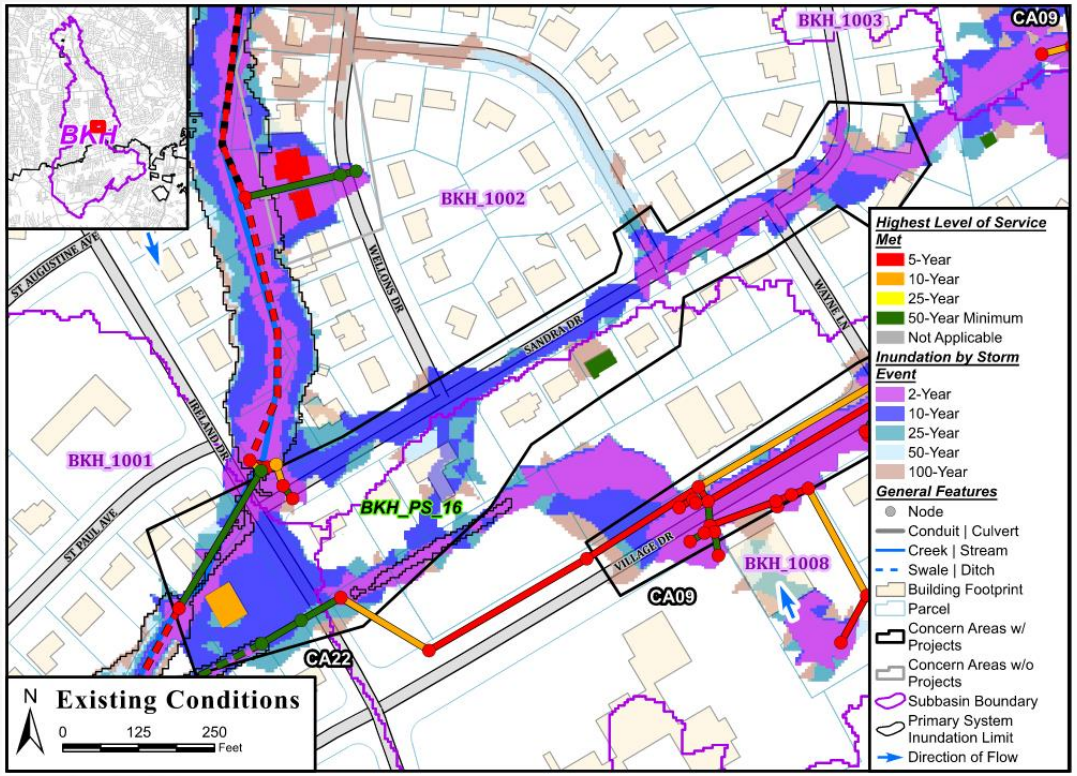


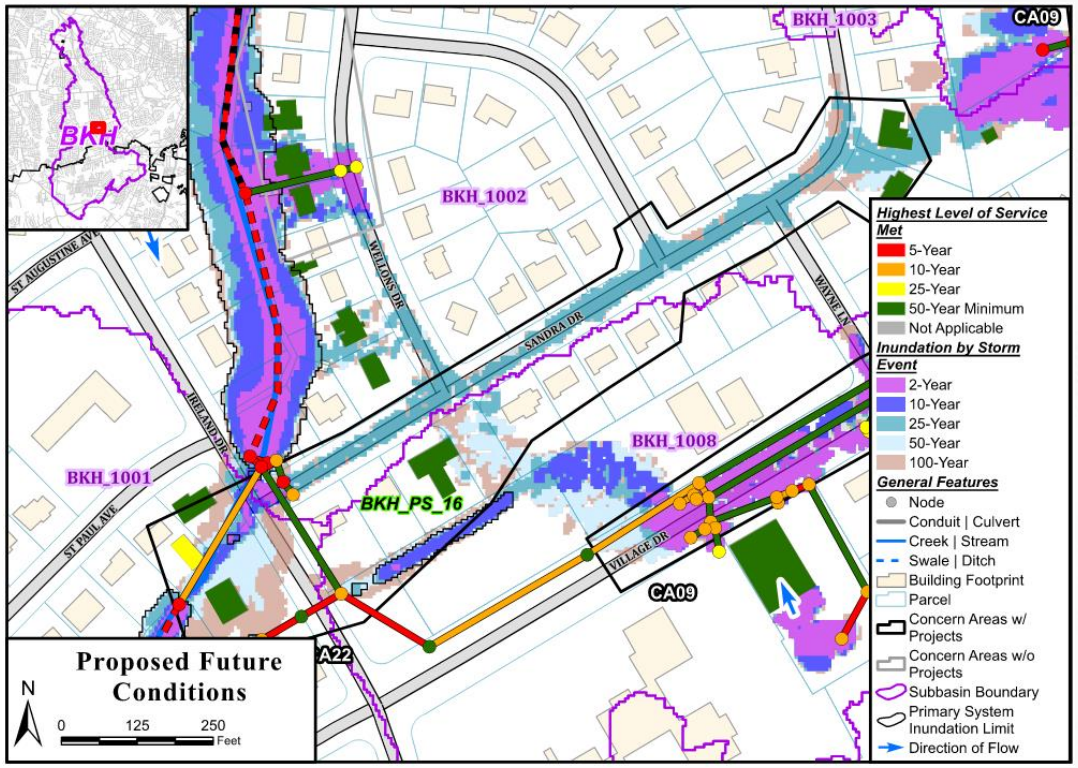
Top Proposed Solutions

Solution #	Proposed Solution Description	Score	Efficacy	Proposed Solution Cost (2025)
PS16 (CA22)*	Ireland Dr	12	75%	$3.6M
PS08 (CA09)	Village Dr	27	74%	$14.7M
PS05 (CA06)	Cape Fear Valley Medical Center & Village Dr	23	65%	$6.6M

*** Phasing**: PS16, PS08, and PS05 are part of a proposed solution package. PS 16 can be completed as a standalone project but must be completed before PS08 and PS05.

PS16 (CA22)
Village Dr & Ireland Dr

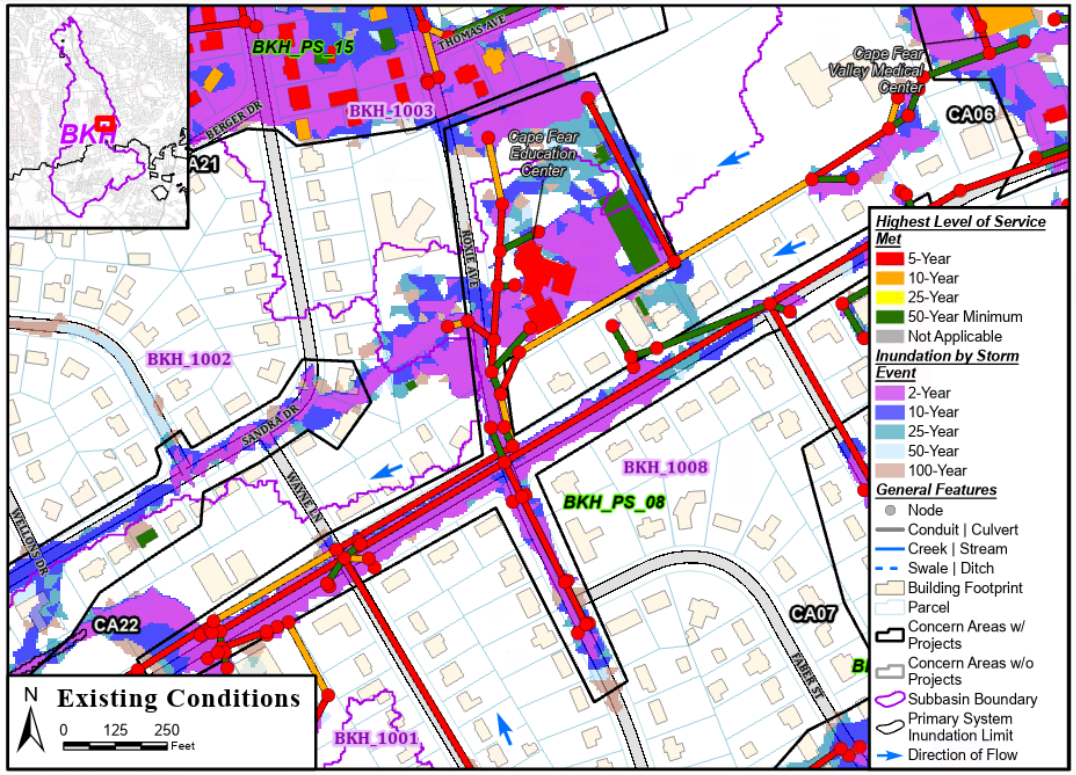




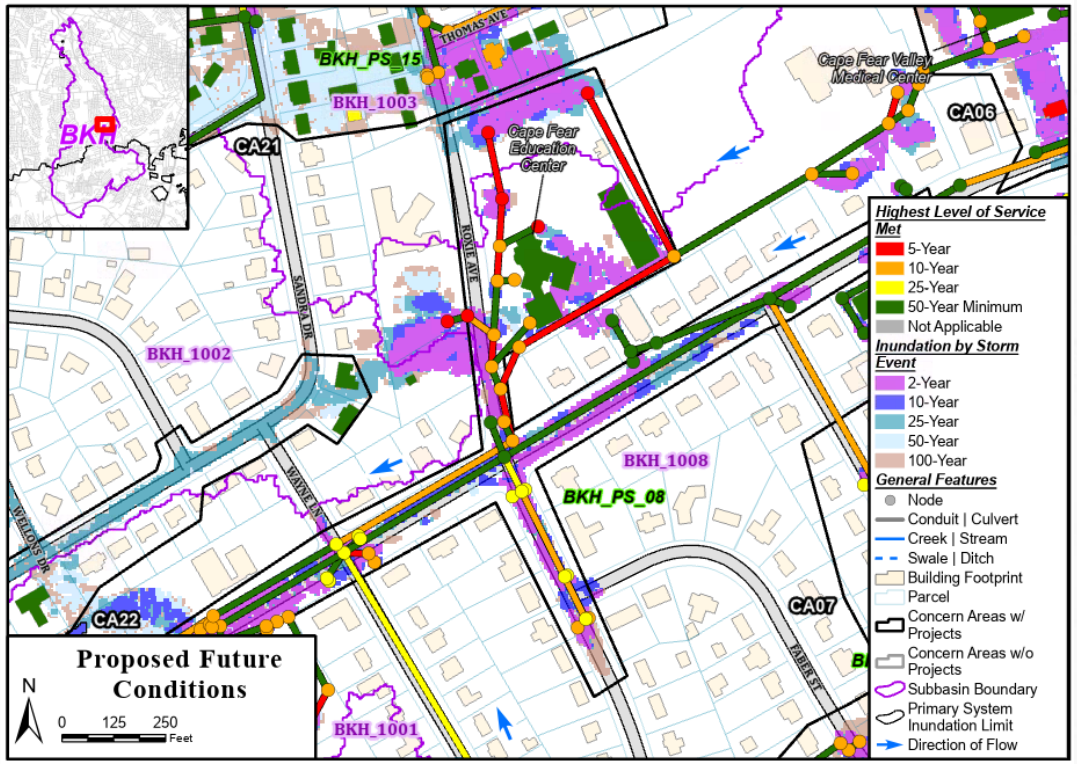
- Council District 5
- Proposed Solution = Capacity Expansion & Diversion
- CA Score = 12
- Efficacy = 75%

- Estimated Cost = $3.6M
- Reduces 1,250 LF of impacted lane length
- Reduces Impacts to 1 structure

PS08 (CA09)
Village Dr

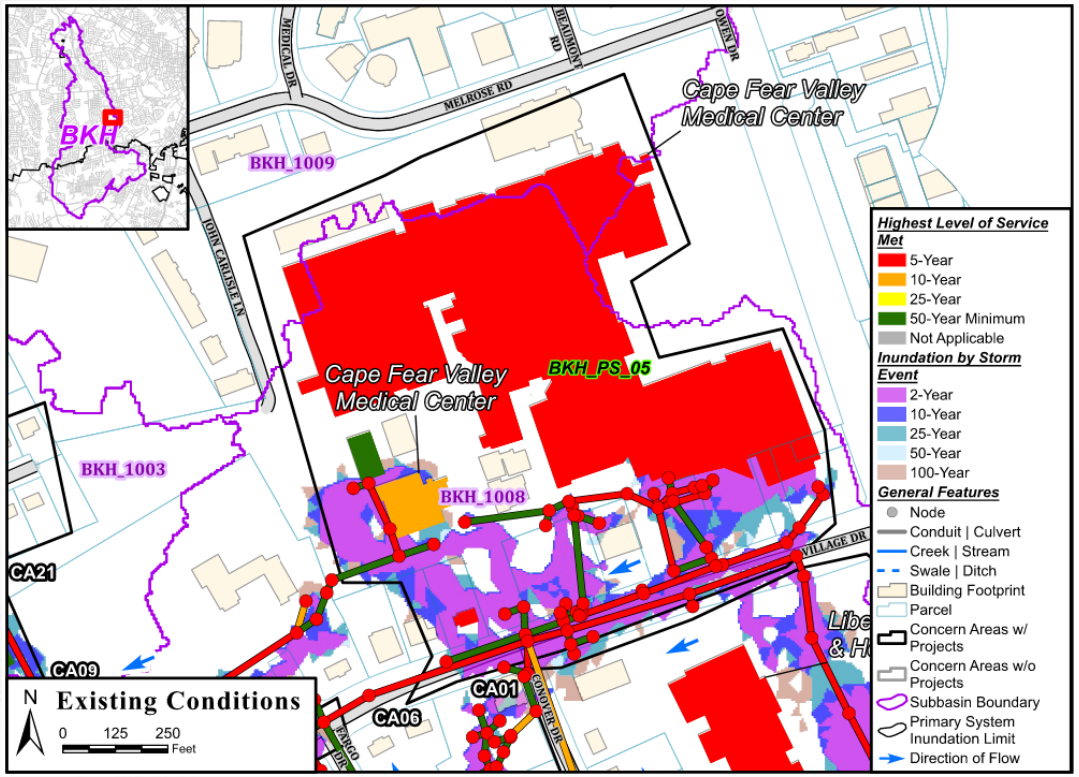


- Council District 5
- Proposed Solution = Capacity Expansion
- CA Score = 27
- Efficacy = 74%

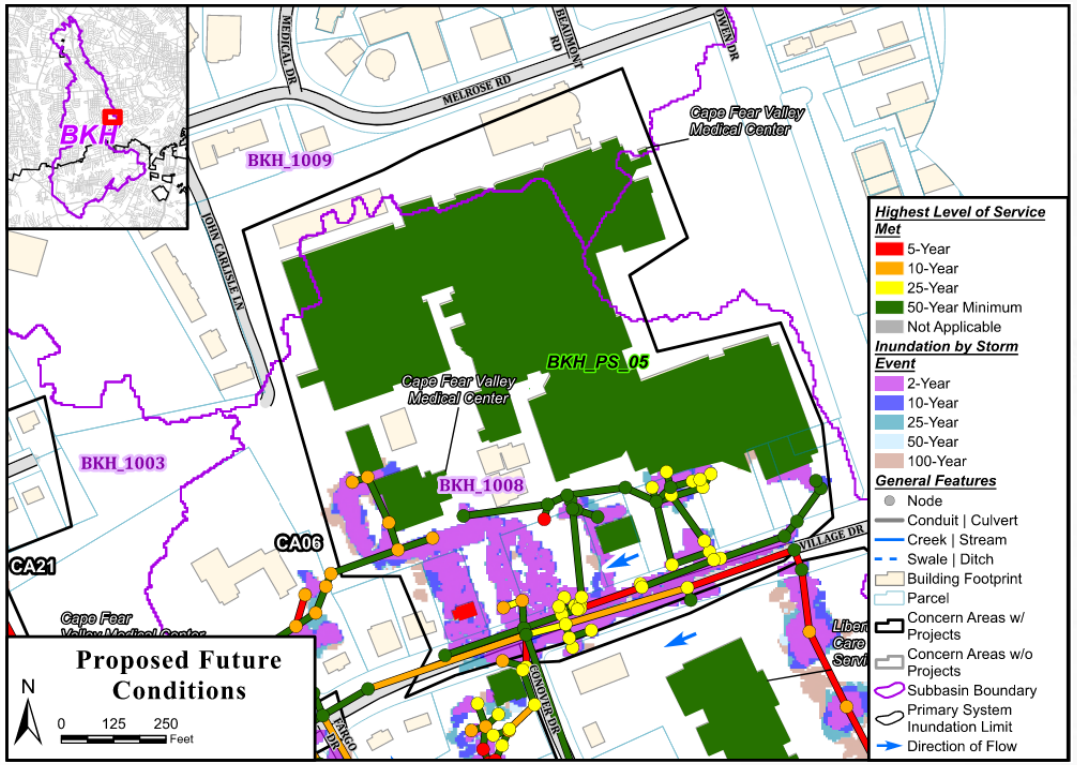


- Estimated Cost = $14.7M
- Reduces Impacts to 1 structure and Cape Fear Valley medical center buildings

PS05 (CA06)
Cape Fear Valley Medical Center & Village Dr



- Council District 5
- Proposed Solution = Capacity Expansion
- CA Score = 23
- Efficacy = 65%



- Estimated Cost = $6.6M
- Reduces 230 LF of impacted lane length
- Reduces Impacts to 2 structures and impacts to Cape Fear Valley medical center buildings

Options and Recommendation

Options:

1. Council provides consensus to approve the 33 proposed solutions from the Buckhead Creek watershed study to enable staff to program them into the annual CIP prioritization process and pursue grants as applicable.
2. Council does not provide consensus to approve the 33 proposed solutions from Buckhead Creek watershed study and remands back to staff with additional guidance.

Recommended Action:

Council provides consensus to approve the 33 proposed solutions from the Buckhead Creek watershed study to enable staff to program them into the annual CIP prioritization process and pursue grants as applicable.

Watershed Master Plan Proposed Solutions for Beaver Creek 1 (BV1)

City Council Work Session: February 2026

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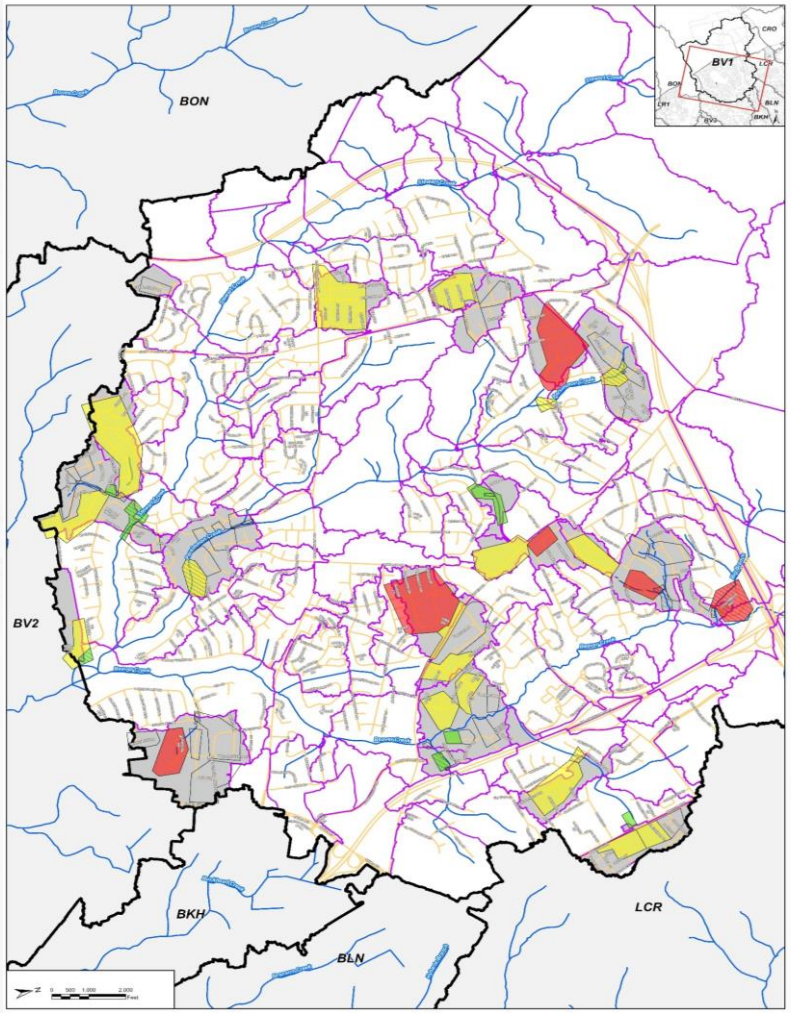
Beaver Creek 1 – Proposed Solutions 80%



Study Area

152 – Total Sub-basins

23 – Priority I Sub-basins

22.6 – Sq. Miles

Study Identified

69 – Concern Areas (CAs)

22 – CAs Selected

22 – Proposed Solutions

Miles of Impacted Lane Length

Identified – 11 | Resolved – 7.6

Number of Traverse Road Crossings

Identified – 37 | Resolved – 23

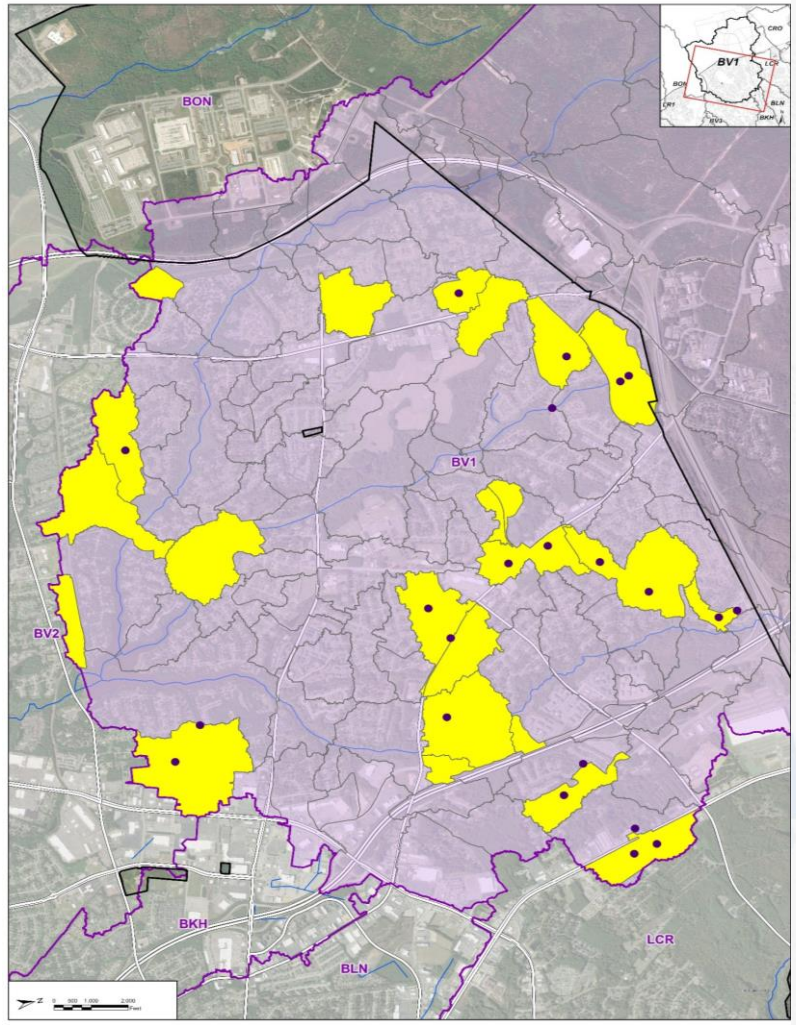
Number of Disconnected Dwellings

Identified – 43 | Resolved – 43

Number of Impacted Structures

	10-yr	25-yr	50-yr
Identified –	46	87	99
Resolved –	26	51	53

Current Total Cost (2025) $63.4M

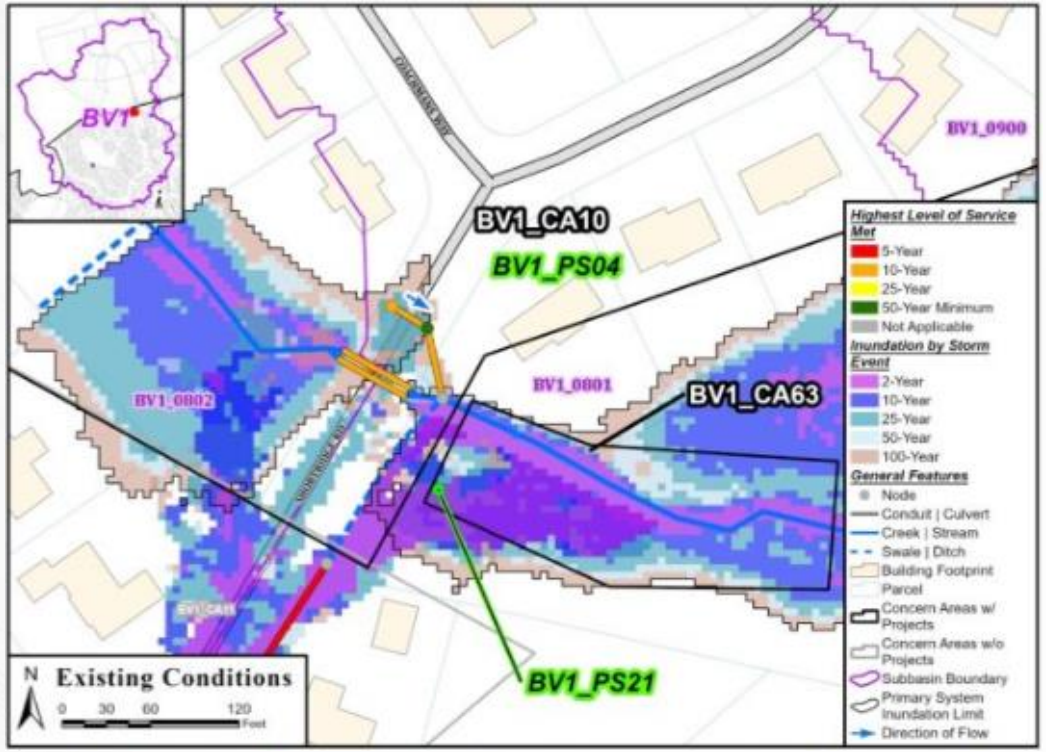


Beaver Creek 1 – Top Proposed Solutions

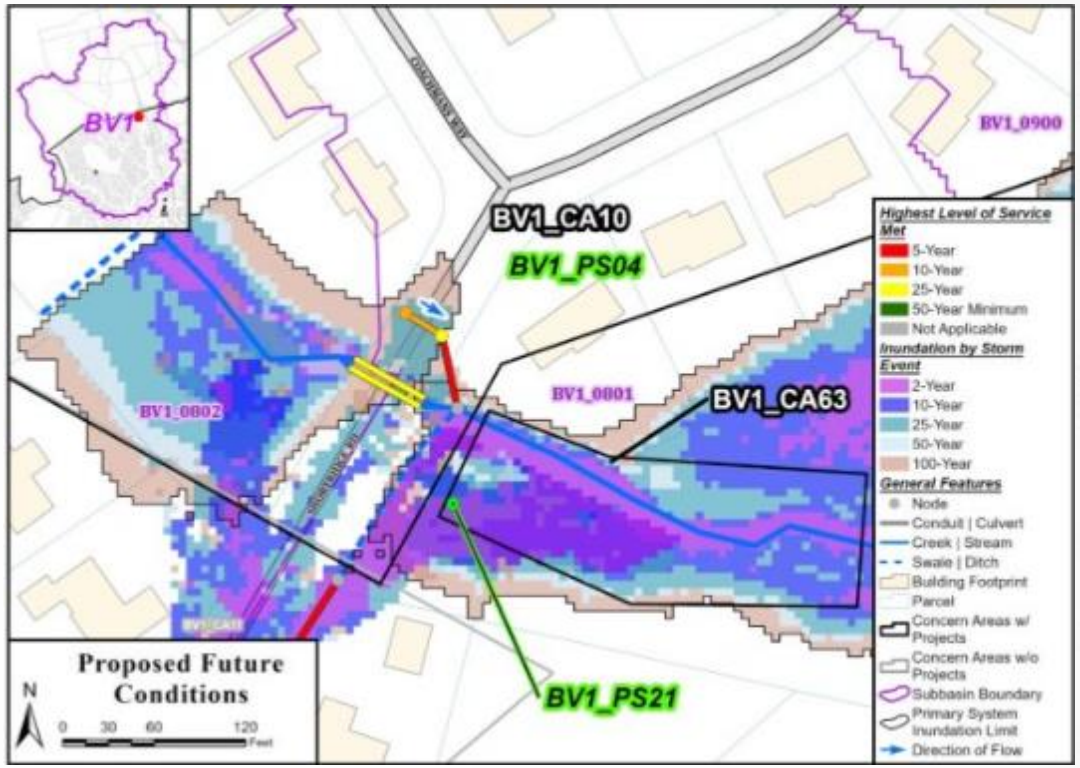
Solution #	Proposed Solution Description	Score	Efficacy	Cost
PS04 (BV1_CA10)	Cottonade Creek Culvert	22	100%	$820,920
PS19 (BV1_CA69)	Freeport Rd Culvert	8	100%	$2,380,470
PS07 (BV1_CA17)*	Yadkin Dr, between Donray Dr and Horseshoe Rd	8	98%	$4,728,900
PS08 (BV1_CA18)*	Hallmark Rd	12	100%	$8,480,850
PS15/PS16 (BV1_CA35/BV1_CA37)	Fleishman St/Clover St	10	93%	$3,868,260

* PS07 and PS08 are part of a proposed solution package. PS08 can be completed as a stand-alone project but must be completed before PS07.

PS04 (BV1_CA10)
Cottonade Creek Culvert

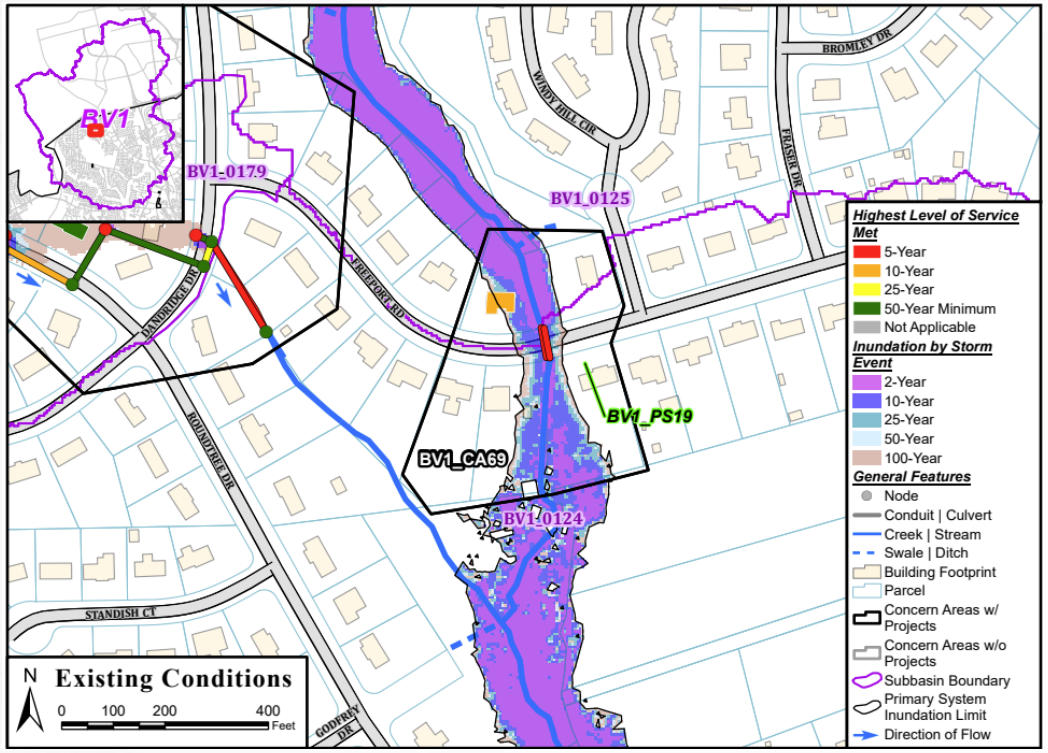


- Council District 3
- Beaver Creek 1
- Proposed Solution = Capacity Expansion
- CA Score = 22
- Efficacy = 100%
- Estimated Cost = $0.8M

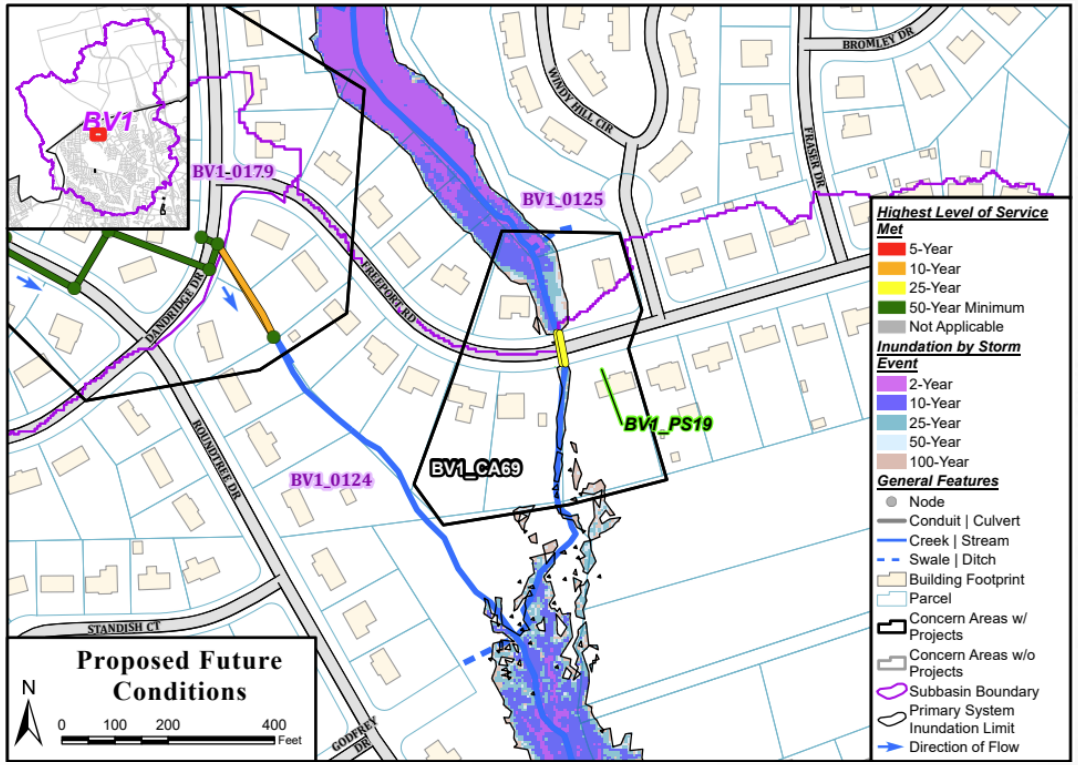


- Eliminates 260 LF of impacted lane length
- Eliminates Impacts to 36 Disconnected Structures from 50-yr event
- Eliminates 1 traverse road crossing in 25-year event.

PS19 (BV1_CA69)
Freeport Rd Culvert

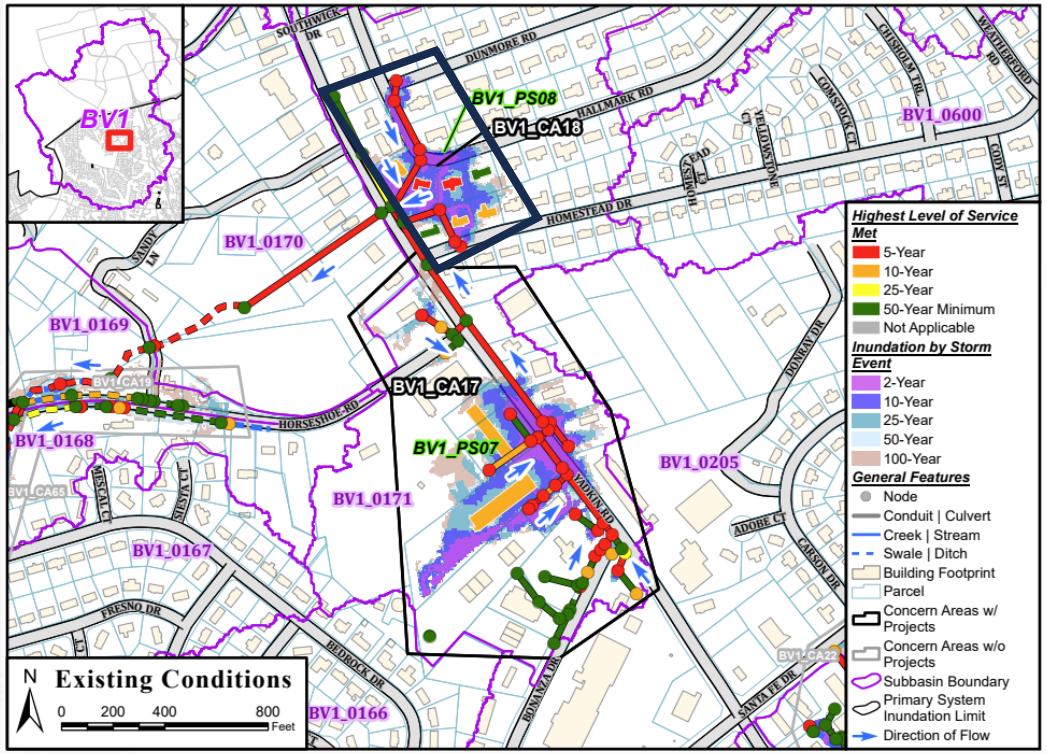


- Council District 4
- Beaver Creek 1
- Proposed Solution = Capacity Expansion
- CA Score = 8
- Efficacy = 100%
- Estimated Cost = $2.4M

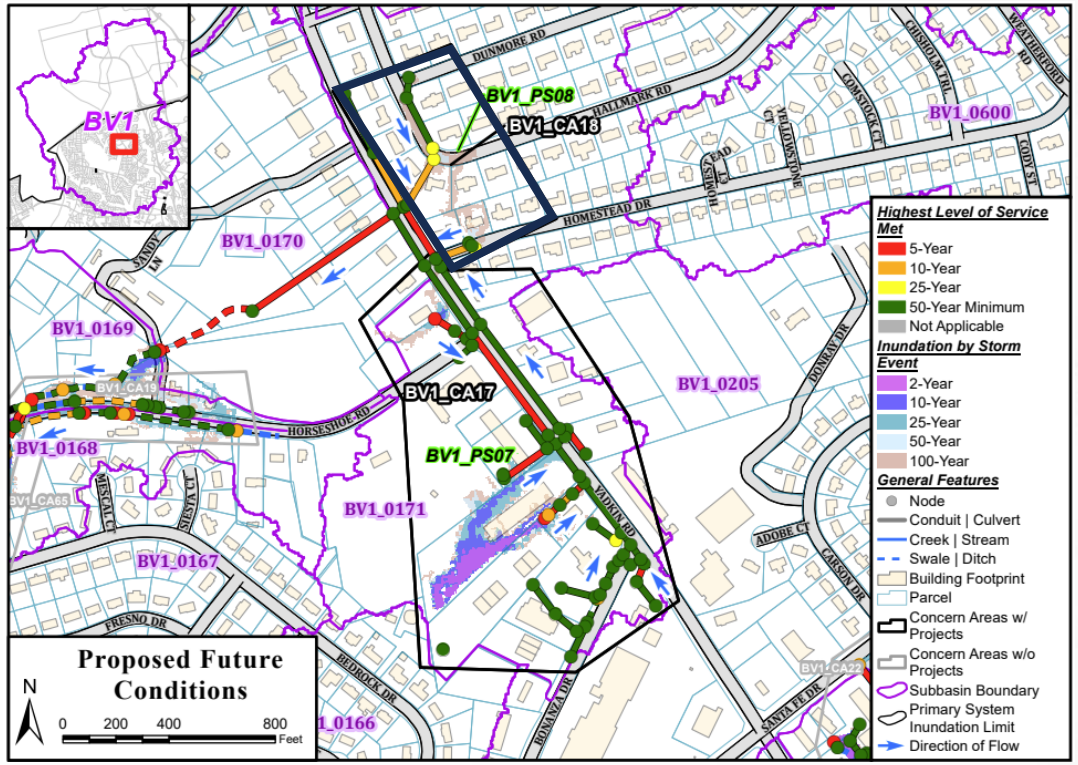


- Eliminates 250 LF of impacted lane length
- Eliminates Impacts to 1 Structure from 25-yr & 50-yr events
- Eliminates 1 traverse road crossings in 25-year event.

PS08 (BV1_CA18) Hallmark Rd

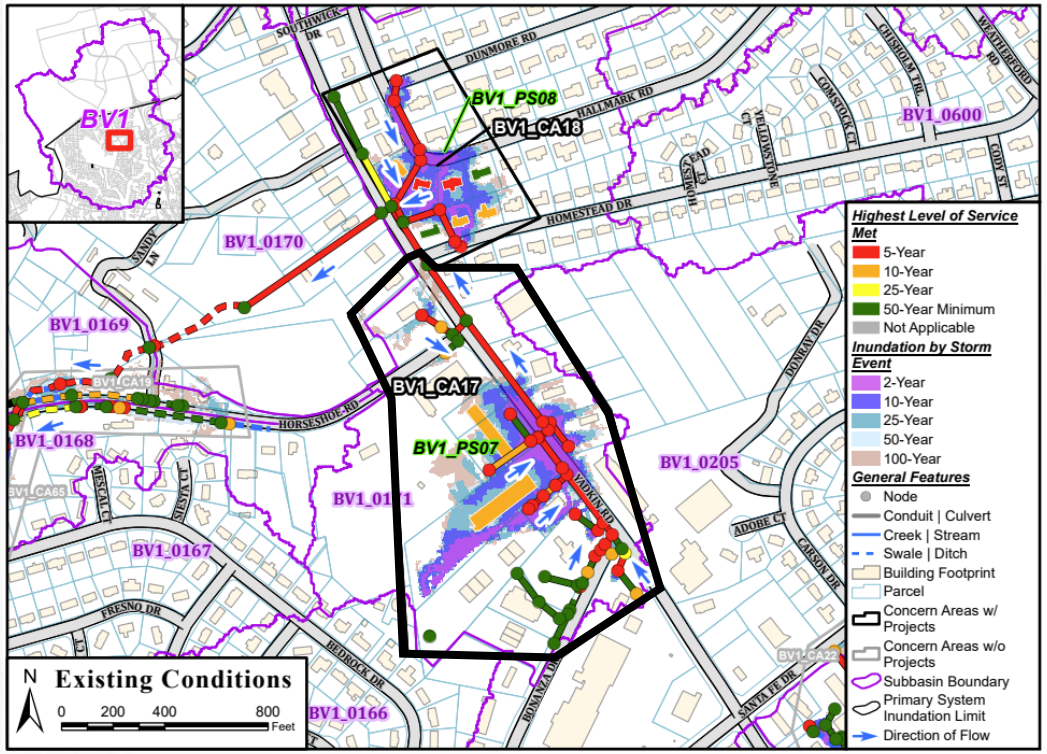


- Council District 3
- Beaver Creek 1
- Proposed Solution = Capacity Expansion
- CA Score = 12
- Efficacy = 100%
- Estimated Cost = $8.5M

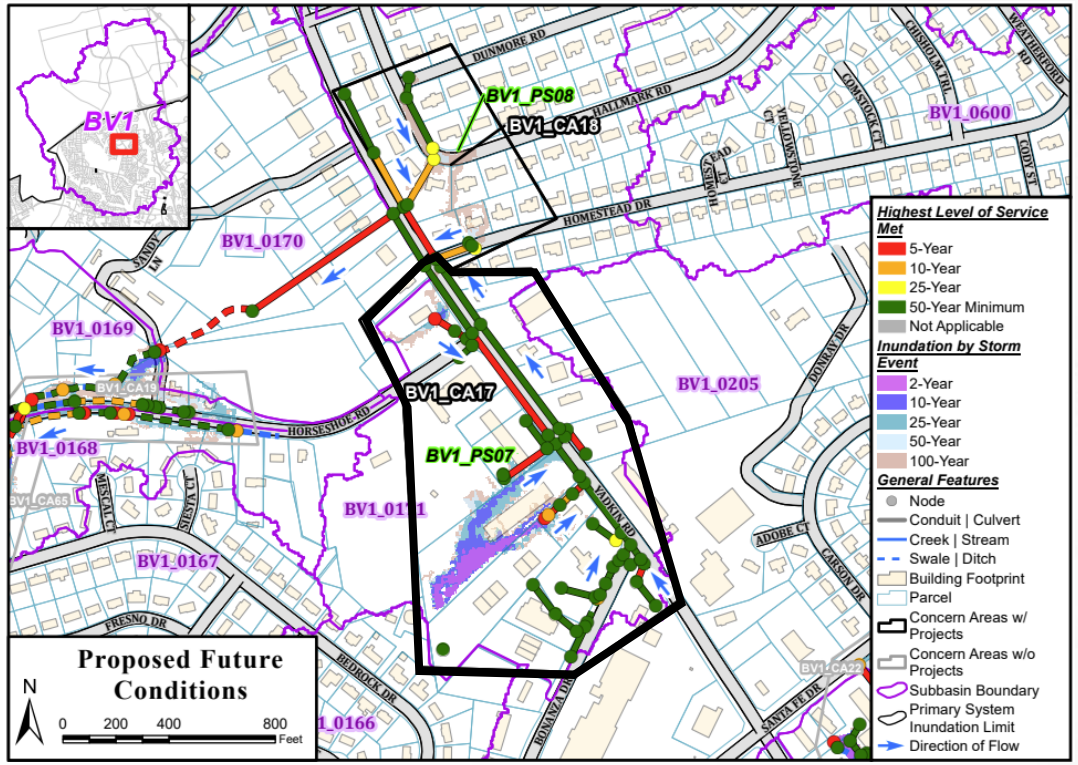


- Eliminates 1,100 LF of impacted lane length
- Eliminates Impacts to 5 Structure from 10-yr, 25-yr & 50-yr events
- Eliminates 3 traverse road crossings in 25-year event.

PS07 (BV1_CA17)
Yadkin Dr, between Donray Dr and Horseshoe Rd

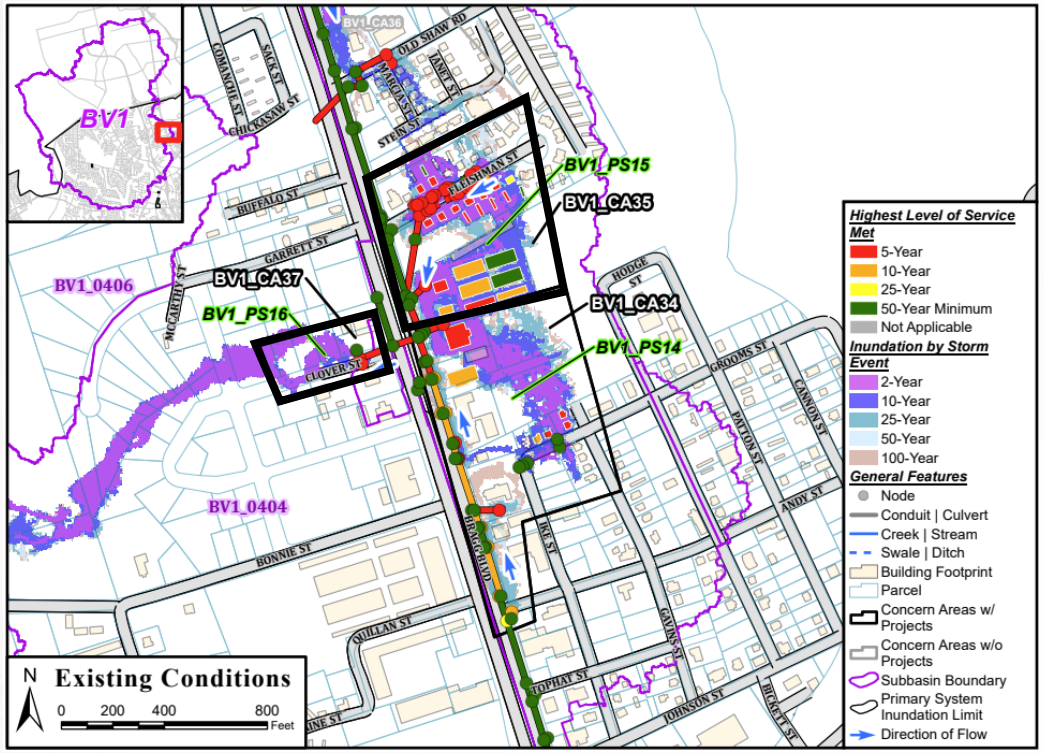


- Council District 3/4
- Beaver Creek 1
- Proposed Solution = Capacity Expansion
- CA Score = 8
- Efficacy = 97%
- Estimated Cost = $4.7M

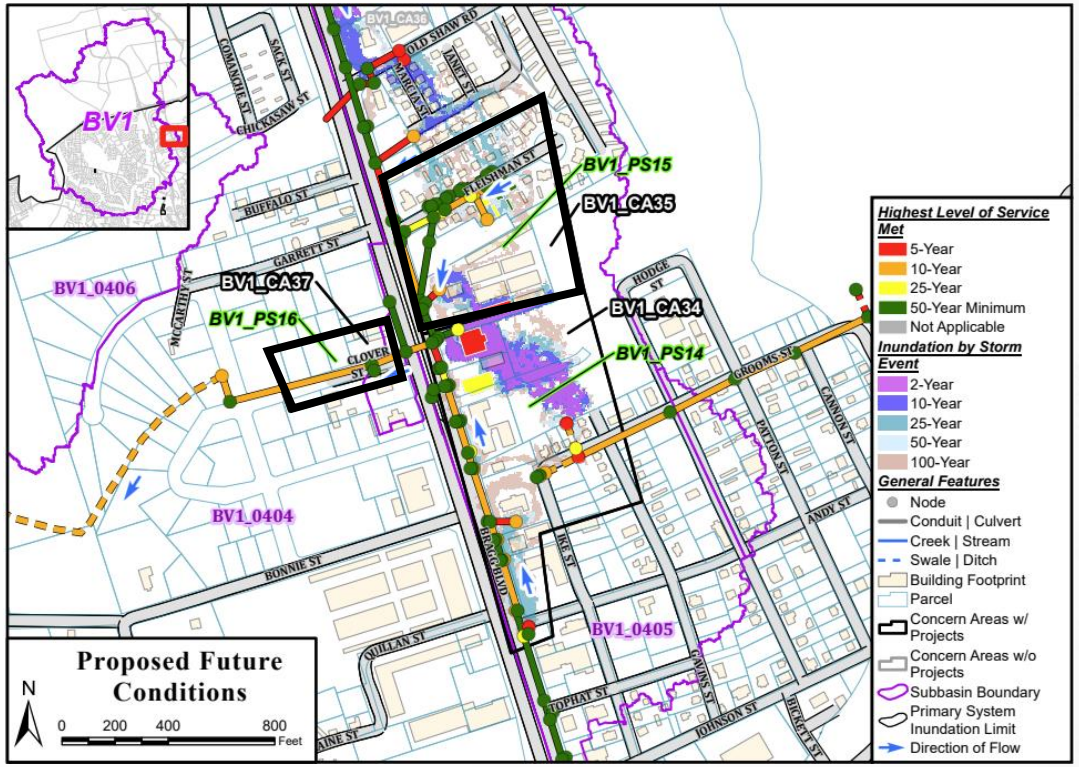


- Eliminates 2,500 LF of impacted lane length
- Eliminates Impacts to 2 Structure from 25-yr & 50-yr events
- Eliminates 1 traverse road crossings in 50-year event.

PS15/PS16 (BV1_CA35/BV1_CA37) Fleishman St/Clover St



- Council District 4
- Beaver Creek 1
- Proposed Solution = Capacity Expansion
- CA Score = 10
- Efficacy = 93%
- Estimated Cost = $3.9M



- Eliminates 685 LF of impacted lane length
- Eliminates Impacts to 15 Structure from 10-yr, 25-yr & 50-yr events
- Eliminates 1 traverse road crossings in 25-year event.

Options and Recommendation

Options:

1. Council provides consensus to approve the 22 proposed solutions from the Beaver Creek 1 Watershed study to enable staff to program them into the annual CIP prioritization process and pursue grants as applicable.
2. Council does not provide consensus to approve the 22 proposed solutions from the Beaver Creek 1 Watershed study to enable staff to program them into the annual CIP prioritization process and pursue grants as applicable.

Recommended Action:

Council provides consensus to approve the 22 proposed solutions from the Beaver Creek 1 Watershed study to enable staff to program them into the annual CIP prioritization process and pursue grants as applicable.

Thank you!

FAYETTEVILLE NC

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