Eastwood Lake Subwatershed Study Report & Recommendations

DRAFT

May 5, 2021

Decision Points

- Adoption of the Eastwood Lake Subwatershed Study and Appendices
- Approval of the merged priority lists of projects

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Background

Town Council approved stormwater goals in 2004.

Goal 1 – Develop and implement a comprehensive Stormwater Program Master Plan that supports all the stormwater program priorities.

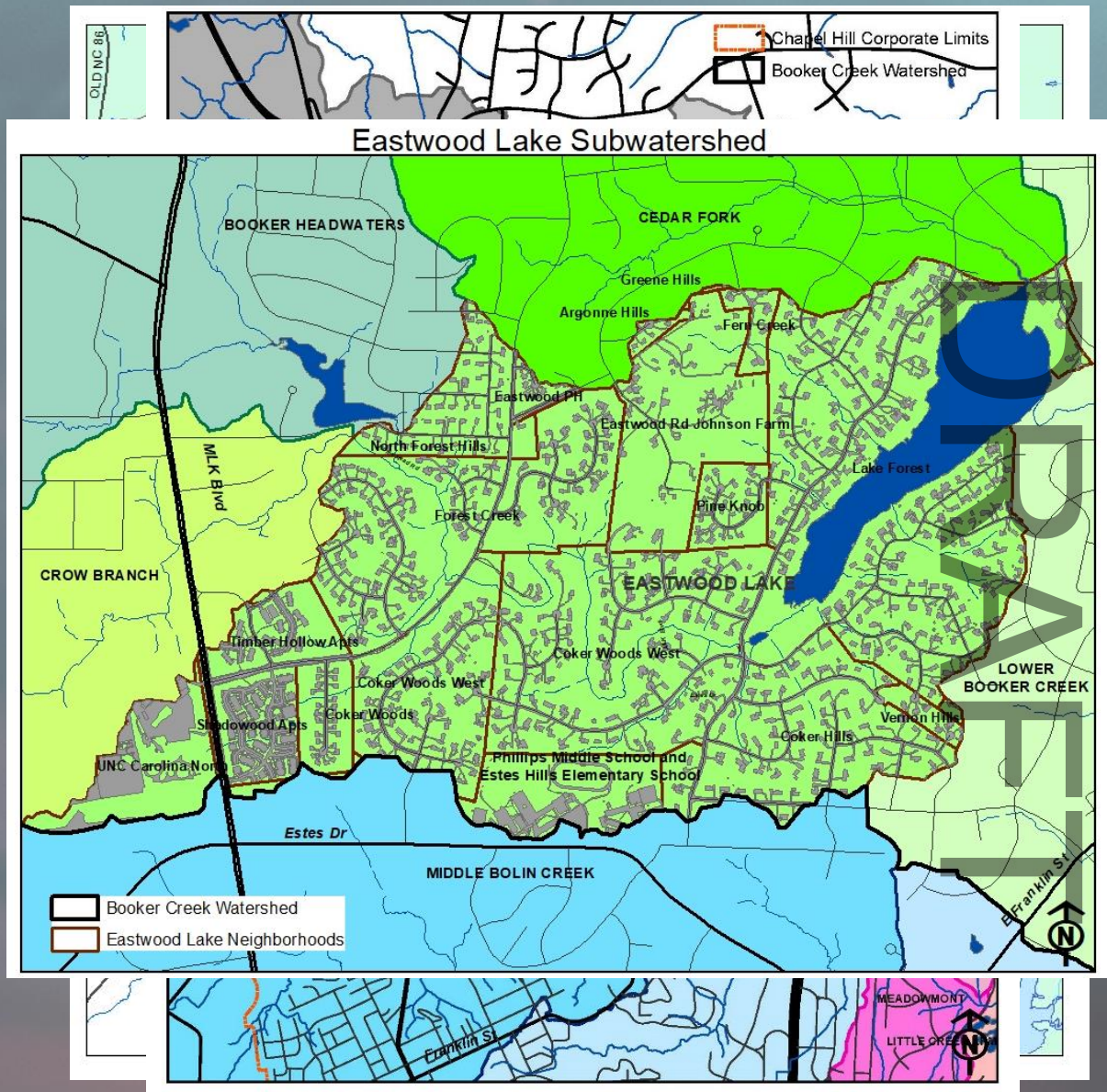
Background

The Stormwater Master Plan is a framework that links the Council-approved program mission and strategic goals to the day-to-day stormwater program activities townwide.

It is both a comprehensive strategic plan and operational work plan.

Town Watersheds

- Booker Creek Watershed
- Eastwood Lake Subwatershed



Impervious Area

Subwatershed	Area (ac)	Existing Impervious	Future Impervious	Percent Increase
Booker Headwaters	864	21.7%	30.4%	40%
Cedar Fork	895	20.0%	26.8%	34%
Crow Branch	435	8.4%	48.8%	480%
Eastwood Lake	703	19.6%	25.2%	29%
Lower Booker Creek	1,127	30.1%	36.9%	23%
Booker Creek Watershed Total	4,024	21.8%	32.5%	48%

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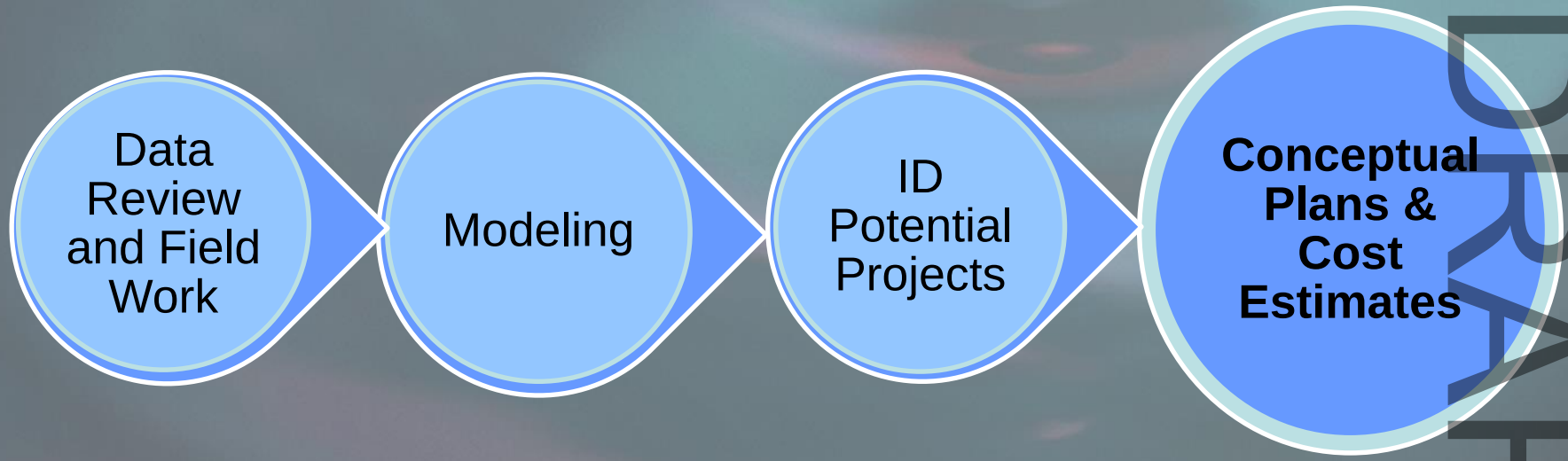
Subwatershed Study Tasks



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Public outreach is conducted throughout the study process

Public Outreach

- Questionnaires
  - 54 total responses
  - 27 indicated some type of flooding
  - 33 respondents located in Eastwood Lake subwatershed
  - Additional 9 surveys received for the Eastwood subwatershed during the LBC study
- Stakeholder update meetings
  - Public Information
  - Stormwater Management Utility Advisory Board
  - Lake Forest Association

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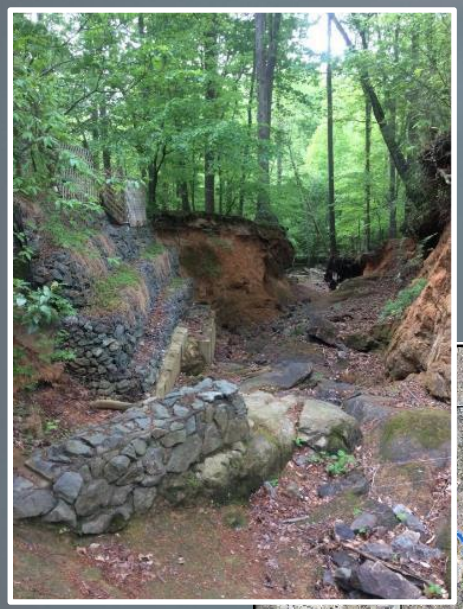
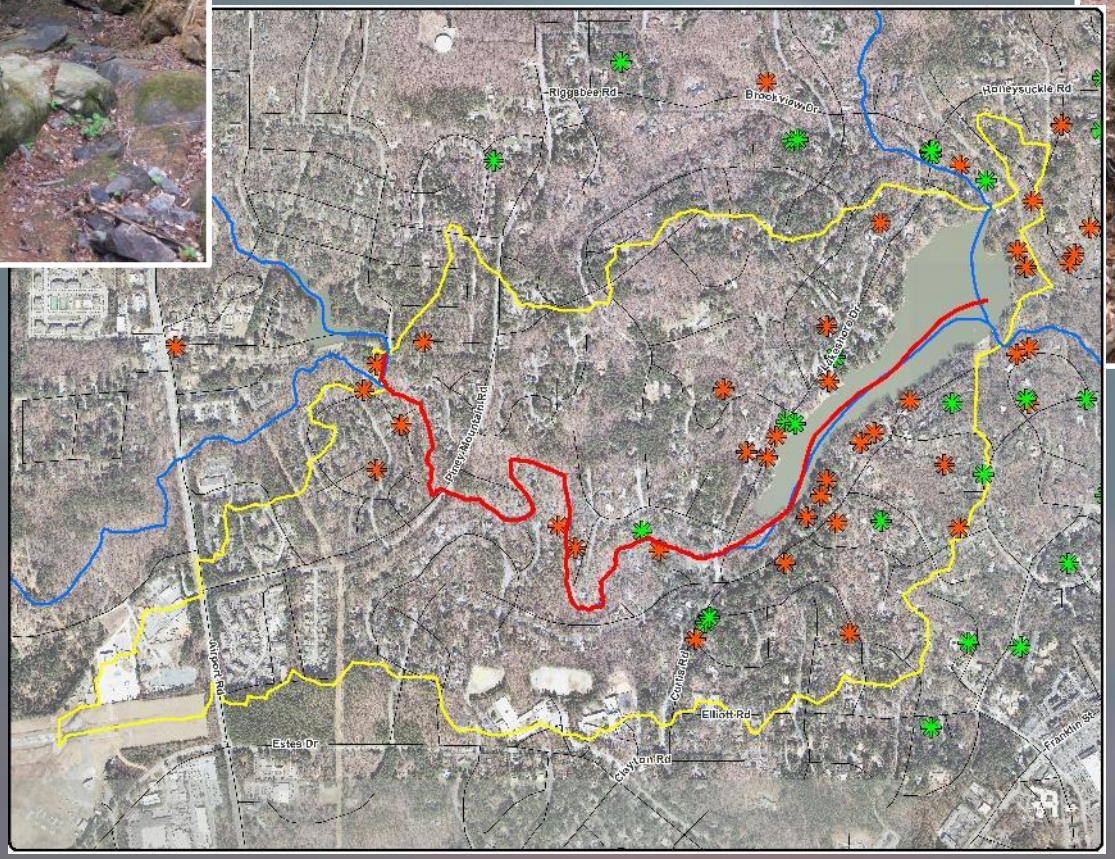
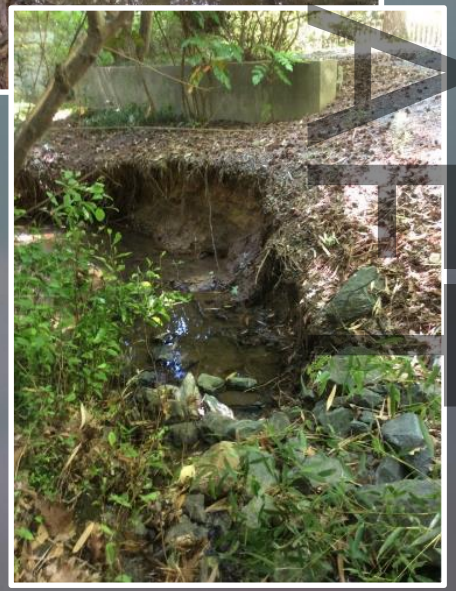
Public Outreach

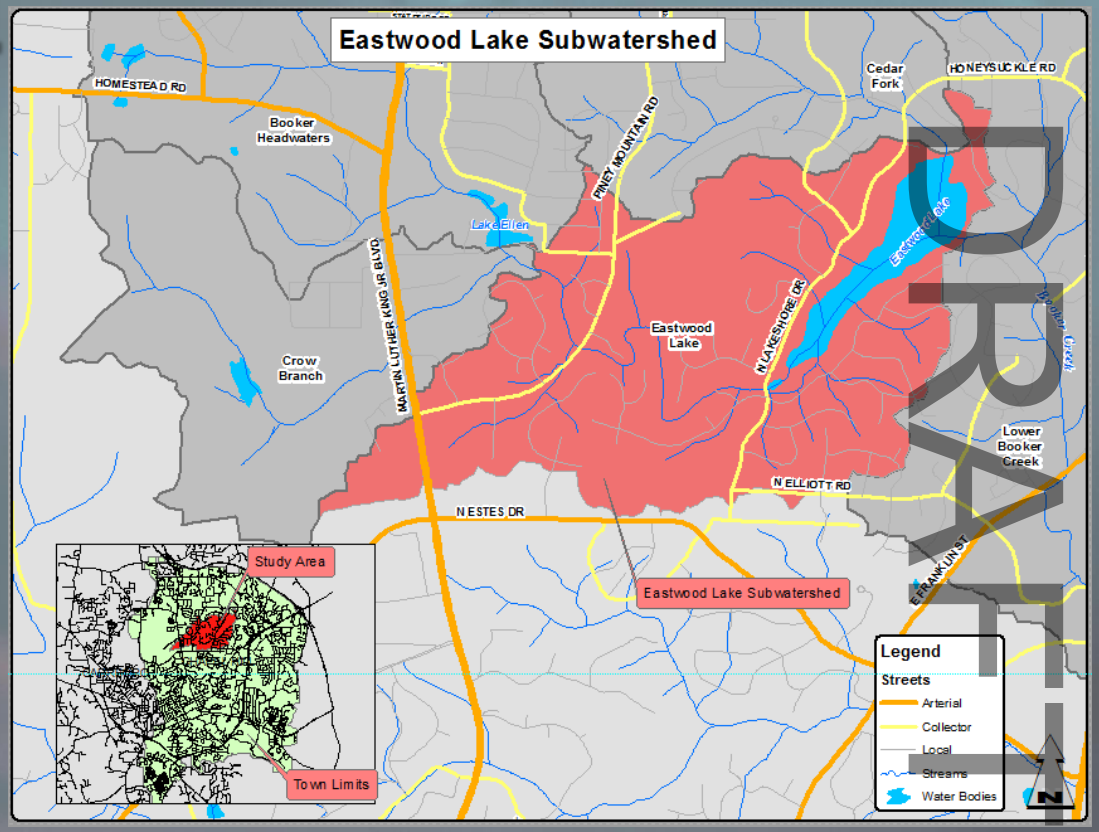






Subwatershed Characteristics

- Predominantly single-family residential
- All drainage goes to Eastwood Lake
- Steep terrain in upland areas
- Drainage system is largely open channel and culverts

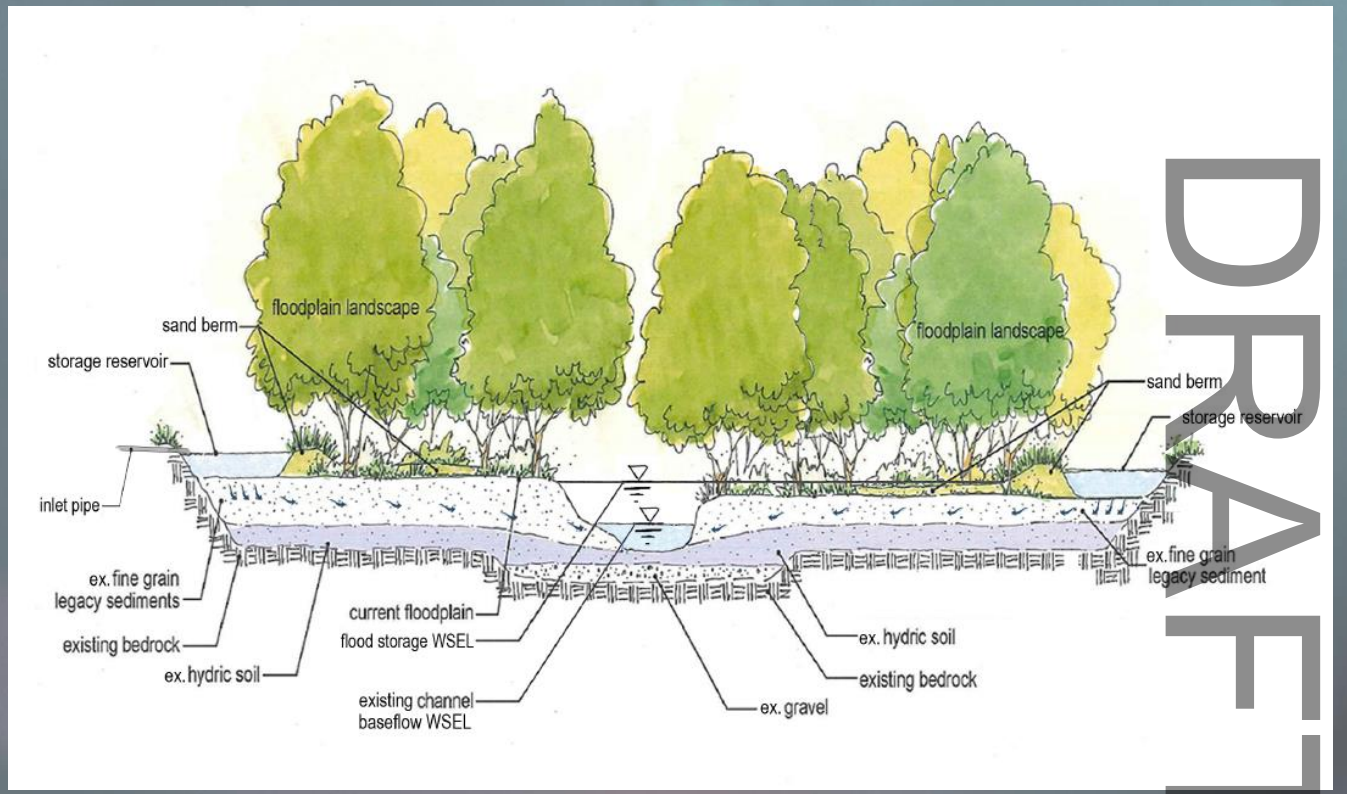


Project Recommendations

- Design for future conditions (full build-out) land use
- Address:
  - Flooding (by increasing flood storage, increasing capacity, infiltration)
  - Water quality, including stream stabilization
- Proactive Maintenance

Floodplain Storage

- Grading and excavation in floodplain to provide detention and lower water surface elevation
- Floodplain remains dry except for rainfall events



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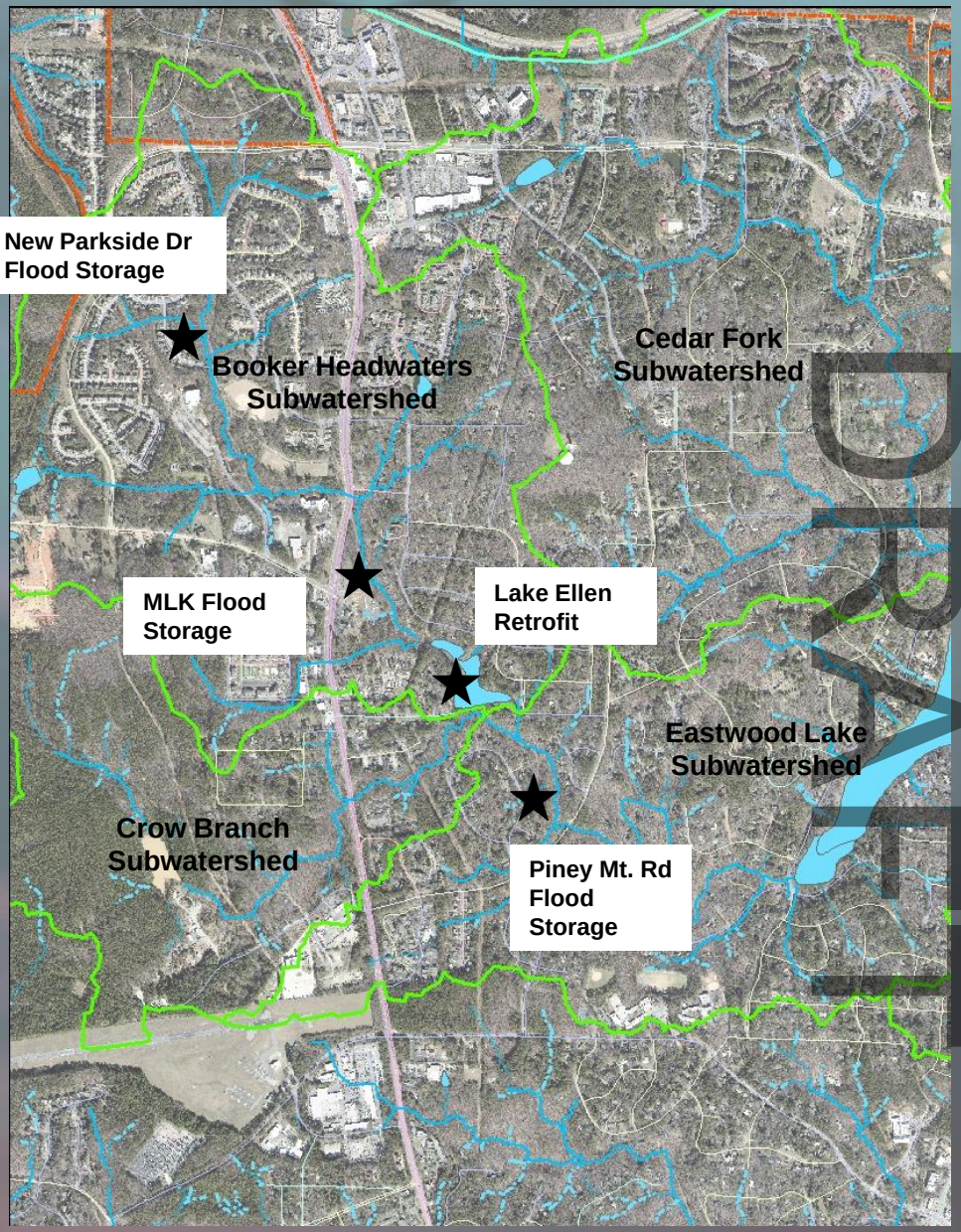
- Floodplain areas can be landscaped and include passive recreation (e.g. walking trails)

Lower Booker Creek Study Flood Storage Sites

These upstream flood storage projects can impact downstream flows in the Eastwood Lake sub-watershed by delaying the peaks

- New Parkside Dr & Piney Mtn. Rd are Town property
- MLK and Lake Ellen are private property



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Flood Reduction Project Prioritization

- Public health and safety
- Street flooding
- Cost effectiveness
- Effect of improvements
- Project dependency
- Water quality
- Open channel – erosion control
- Implementation constraints
- Grant funding
- Constructability

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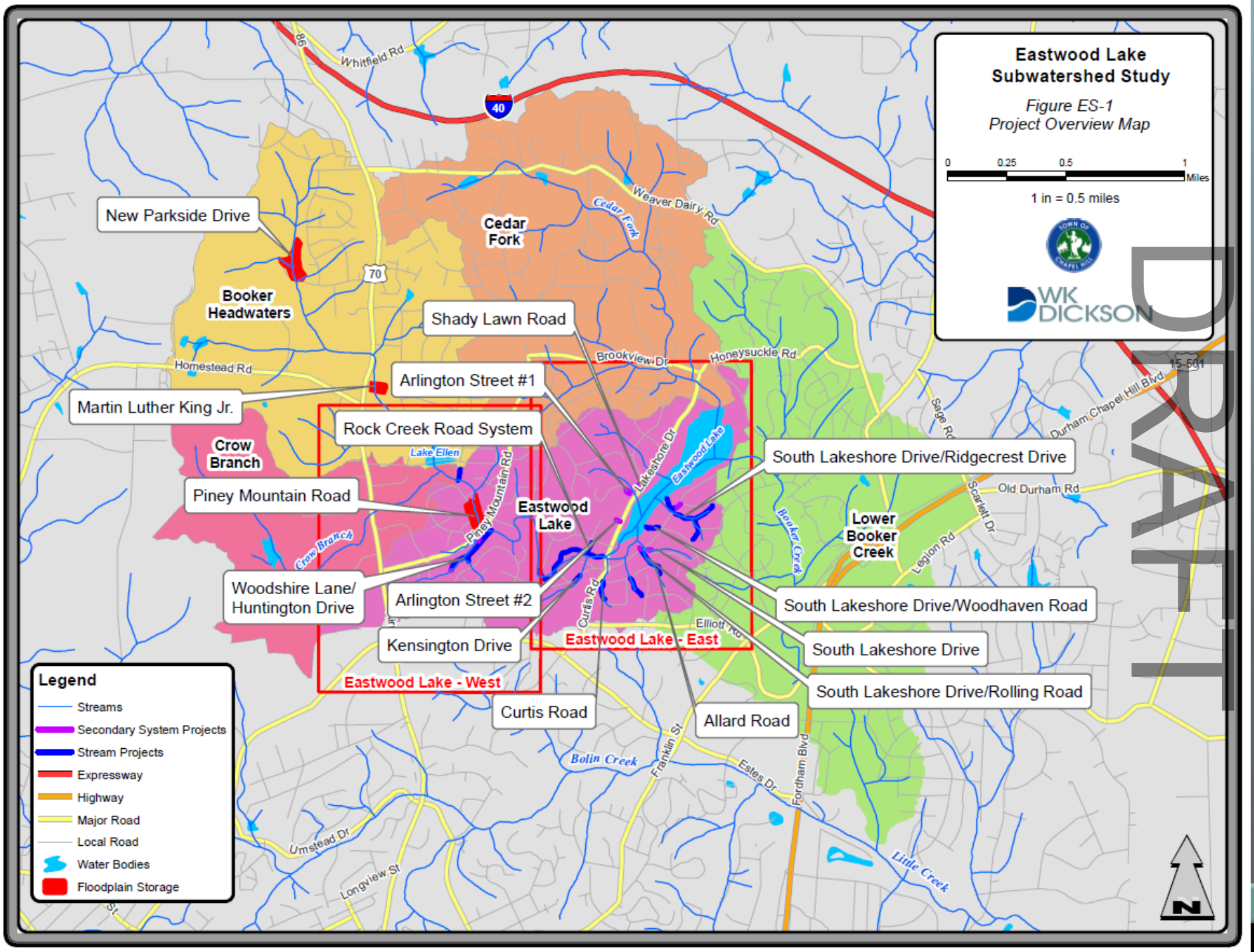
Prioritization

Table ES-1: Flood Control Project Prioritization – Primary Systems

Prioritization	Project	Cost
1	Piney Mountain Road Culvert	$456,800
	Total	$456,800

Table ES-2: Flood Control Project Prioritization – Secondary Systems

Prioritization	Project	Cost
1	South Lakeshore Dr/Ridgecrest Dr	$125,200
2	South Lakeshore Dr/Rolling Rd	$216,800
3	Arlington St #1	$104,400
4	Woodshire Ln/Huntingdon Rd	$372,300
5	Shady Lawn Rd	$153,300
6	Arlington St #2	$133,100
	Total	$1,105,100


Eastwood Lake Subwatershed Study
Figure ES-1
Project Overview Map
0 0.25 0.5 1 Miles
1 in = 0.5 miles
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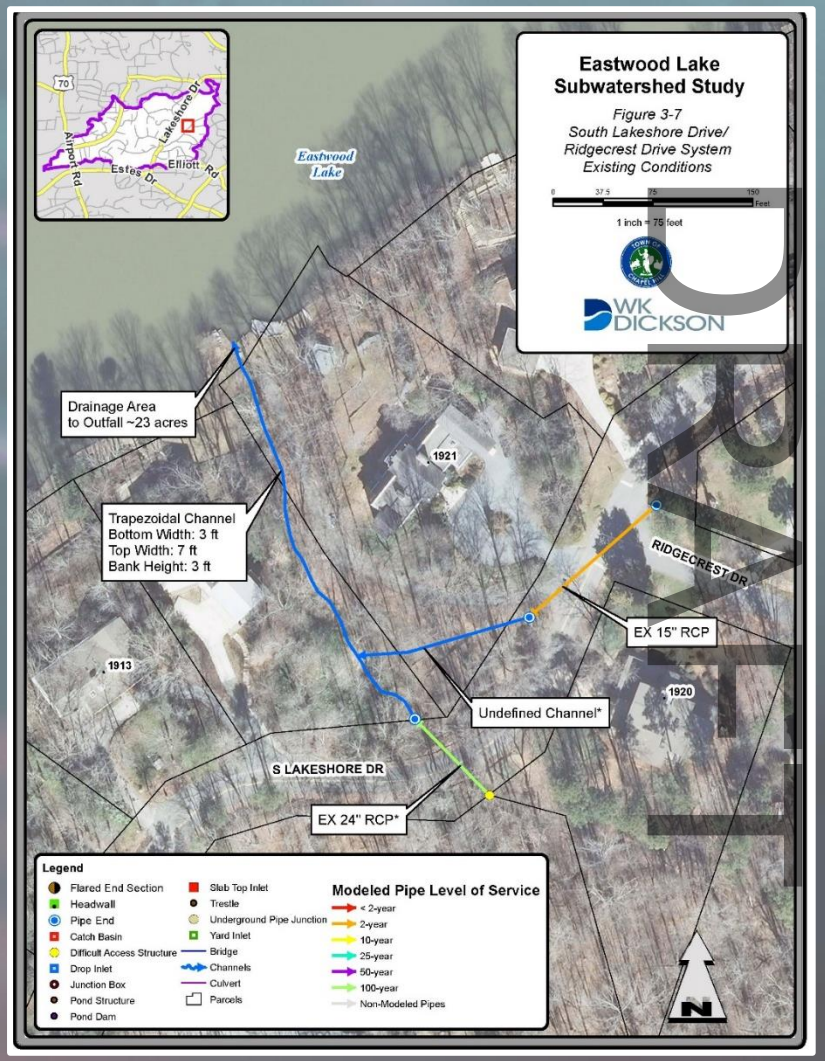
New Parkside Drive
Booker Headwaters
Cedar Fork
Shady Lawn Road
Arlington Street #1
Martin Luther King Jr.
Rock Creek Road System
Crow Branch
Piney Mountain Road
Eastwood Lake
South Lakeshore Drive/Ridgecrest Drive
Lower Booker Creek
Woodshire Lane/ Huntington Drive
Arlington Street #2
Kensington Drive
Eastwood Lake - East
Eastwood Lake - West
South Lakeshore Drive/Woodhaven Road
South Lakeshore Drive
South Lakeshore Drive/Rolling Road
Curtis Road
Allard Road
Whitfield Rd
Weaver Dairy Rd
Homestead Rd
Brookview Dr
Honeysuckle Rd
Durham Chapel Hill Blvd
Old Durham Rd
Scarlett Dr
Legion Rd
Lakeshore Dr
Lake Ellen
Piney Mountain Rd
Curtis Rd
Elliott Rd
Bolin Creek
Franklin St
Estes Dr
Fordham Blvd
Umstead Dr
Longview St
Little Creek
Legend
Streams
Secondary System Projects
Stream Projects
Expressway
Highway
Major Road
Local Road
Water Bodies
Floodplain Storage

South Lakeshore/Ridgecrest

- Pipe system improvements
- Upsize 15” culvert to 18” RCP under Ridgecrest and S. Lakeshore
- Stream stabilization



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Improving Water Quality

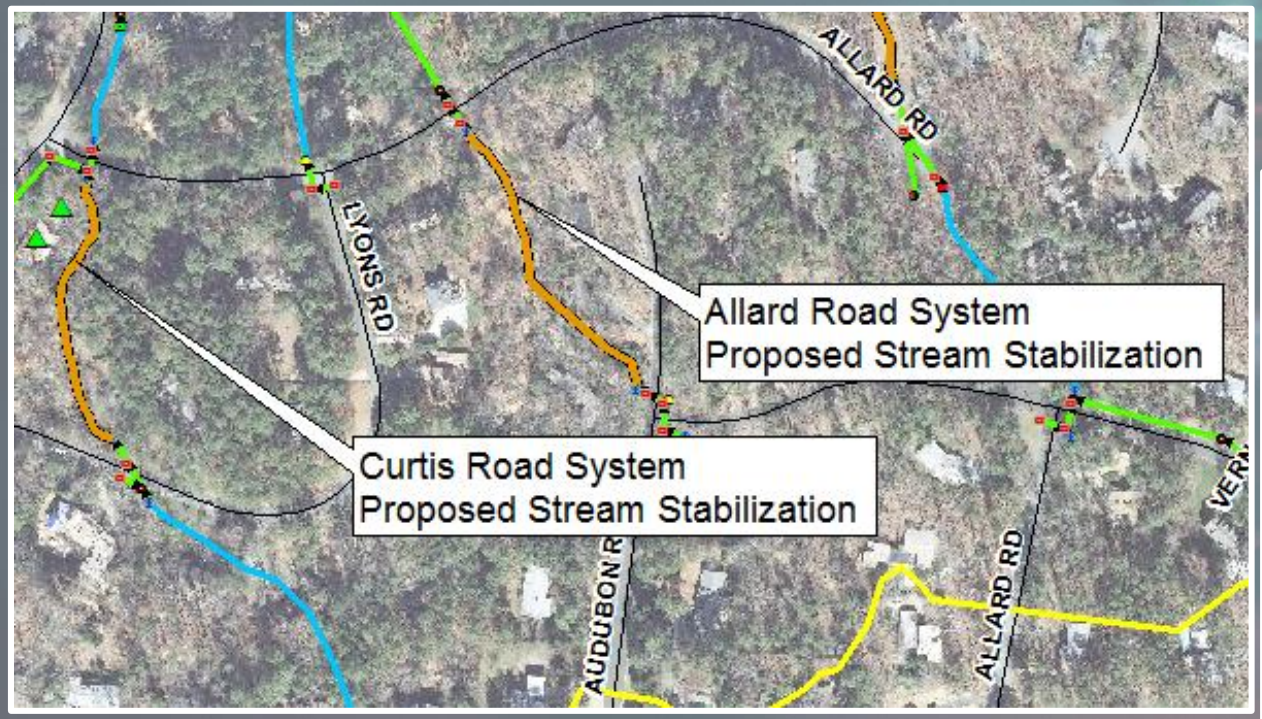
- Incorporate water quality treatment into drainage projects
  - Storage areas
  - Outfall treatment
  - Stream stabilization
  - Reestablish buffers
- Treat runoff at the source
  - Neighborhood retrofits
  - Pilot projects

Stream Stabilization

- Streambank erosion
  - Lack of vegetation on banks
  - Direct connections from piped systems
  - Steep terrain and high flows
- Typical solutions
  - Vegetate banks & flatten side slopes
  - Grade control
  - Hardened banks

Allard Road/Curtis Road

- Stream stabilization projects



Policy Recommendations

Based on the existing flooding in the watershed, it is highly recommended the Town review any development/redevelopment applications that will increase the impervious area and determine if additional stormwater measures are required.

It is also highly recommended that the Town require green infrastructure and low impact design to the extent possible for new development and redevelopment to promote infiltration and minimize increases to peak flow and volumes.

Merged PRIMARY System Project List

PRIORITY	PROJECT	STUDY	COST*
	Elliott Storage (Booker Creek Park) – substantially completed	**Lower Booker Creek (LBC)**	**$2,900,000**
1	Red Bud Storage	LBC	$1,058,000
2	Lake Ellen	LBC	$1,160,000
3	Piney Mtn Rd Storage	LBC	$2,206,000
4	Booker Creek Rd U/S	LBC	$1,488,000
5	Honeysuckle Rd	LBC	$408,000
6	Dobbins	LBC	$232,000
7	Piney Mtn Rd - Culvert	Eastwood	$529,000
8	Willow	LBC	$4,642,000
9	New Parkside Dr	LBC	$3,225,000
10	Daley Storage	LBC	$3,635,000
11	Martin Luther King Jr. Blvd	LBC	$4,386,000
12	Foxcroft Dr	LBC	$764,000
*2021 Dollars		TOTAL	$23,733,000

Merged Secondary System Project List

PRIORITY	PROJECT	STUDY	COST*
1	Old Oxford/Booker Creek Rd	LBC	$718,000
2	Markham Dr/Old Oxford Rd	LBC	$522,000
3	S Lakeshore/Ridgecrest Dr	Eastwood	$145,000
4	S Lakeshore Dr/Rolling Rd	Eastwood	$251,000
5	Chesley Ln Closed System	LBC	$169,000
6	Booker Creek Rd/Lakeshore Ln	LBC	$214,000
7	Arlington St #1 System	Eastwood	$121,000
8	Old Oxford Rd	LBC	$341,000
9	Wood Cir/Velma Rd System	LBC	$197,000
10	Woodshire Ln/Huntington Rd	Eastwood	$431,000
11	Ephesus Church Rd	LBC	$1,210,000
12	Shady Lawn Rd System	Eastwood	$177,000
13	Summerfield Crossing System	LBC	$95,000
14	Arlington St #2 System	Eastwood	$154,000
*2021 Dollars		TOTAL	$4,745,000

Fiscal Impacts/Resources

- There are funds in the FY21 Stormwater for the design of Red Bud Flood Storage.
- Construction Red Bud and the design & construction of the next projects will use the remainder of the 2015 Stormwater Bond funds.
- FEMA BRIC (Building Resilient Infrastructure and Communities) grant application, which would fund the design and construction of up to five projects.

Stormwater Management Utility Advisory Board Recommendation

- *Adoption of the Eastwood Lake Subwatershed Study Report and Appendices*
- *Approval of the merged lists of primary and secondary system projects from the Lower Booker Creek and the Eastwood Lake Subwatershed Study Reports*
- *Supports pilot and demonstration water quality and stream stabilization projects*
- *Supports non-structural policy recommendations for additional stormwater measures, low impact design, and green infrastructure*

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Decision Points

- Adoption of the Eastwood Lake Subwatershed Study and Appendices
- Approval of the merged priority lists of projects

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