

# Eastwood Lake Subwatershed Study Report & Recommendations

*May 5, 2021*



# Decision Points

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

# 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 links the Council-approved program mission and strategic goals to the day-to-day stormwater program activities.

It assists the Town Council and staff in prioritizing, funding, and implementing the Town's Stormwater program.

A key recommendation of the master plan was to continue the subwatershed studies.

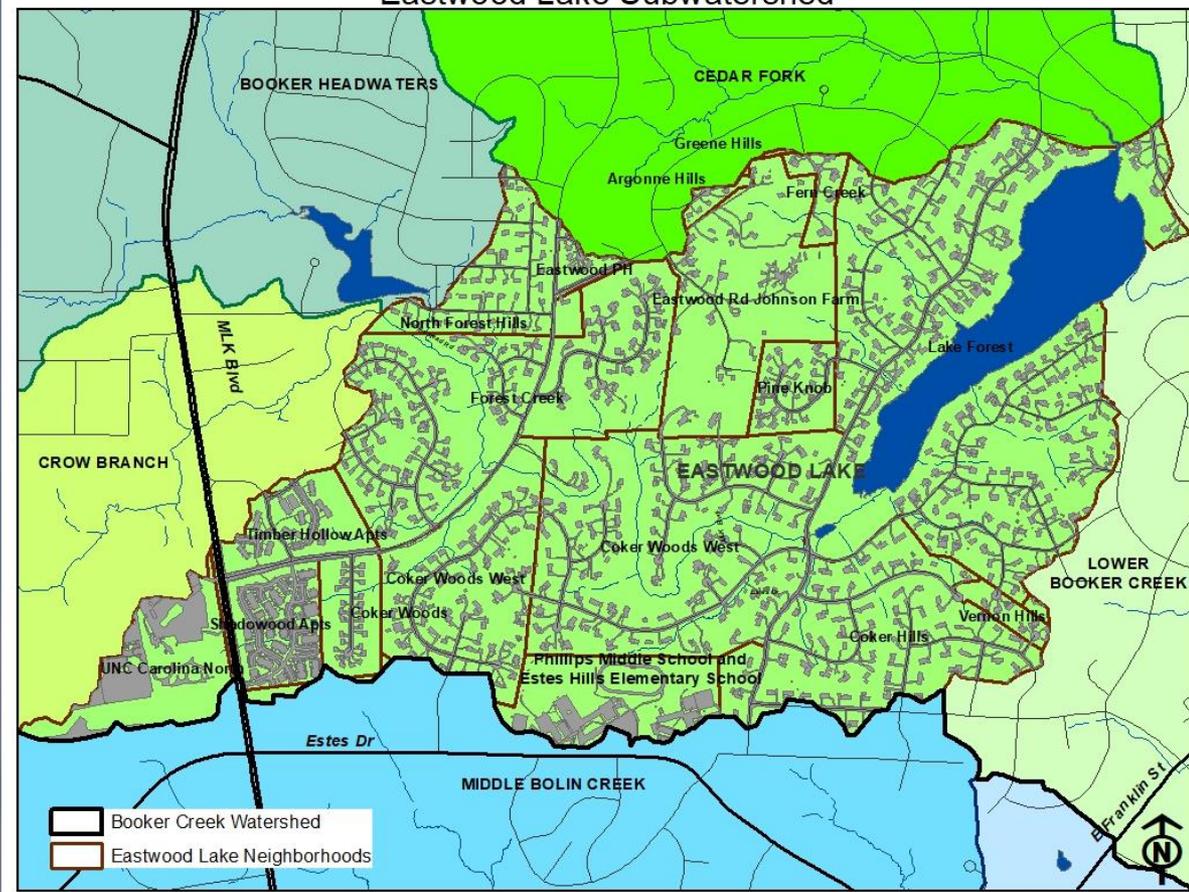


# Town Watersheds

- Booker Creek Watershed
- Eastwood Lake Subwatershed



Eastwood Lake Subwatershed

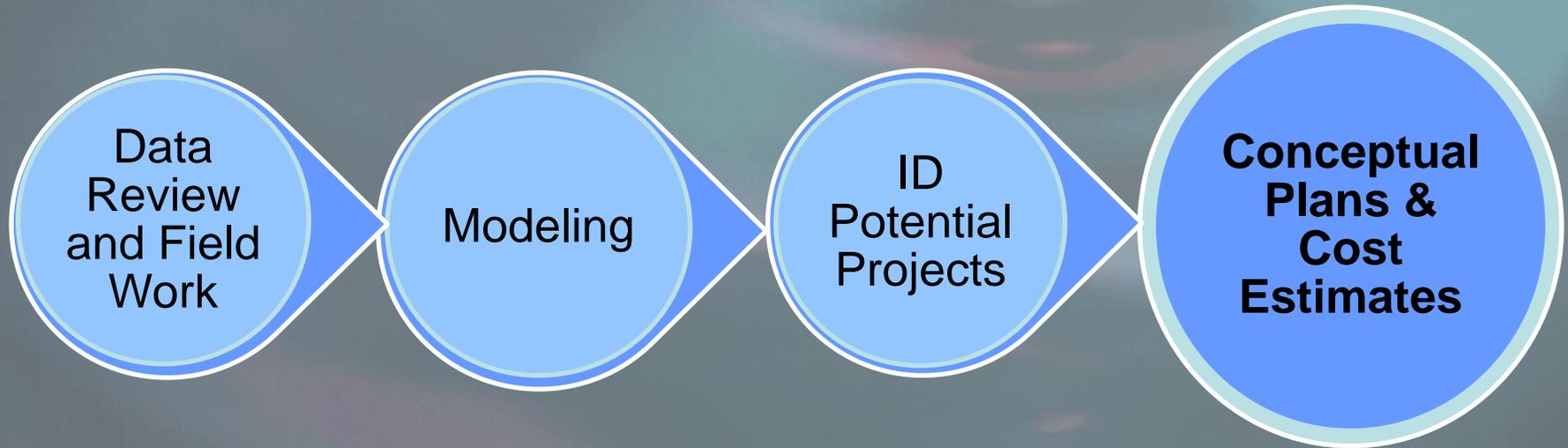


# Impervious Area

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



# Subwatershed Study Tasks



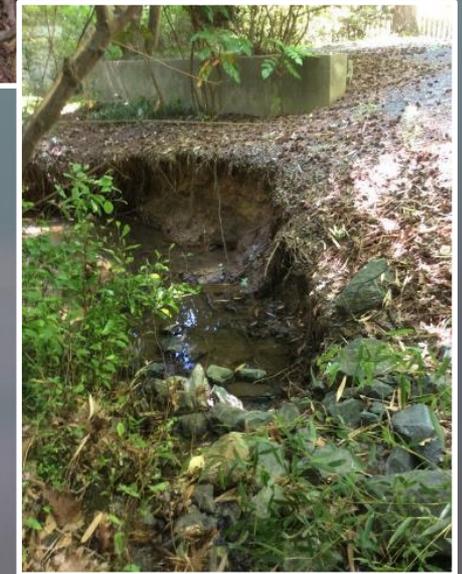
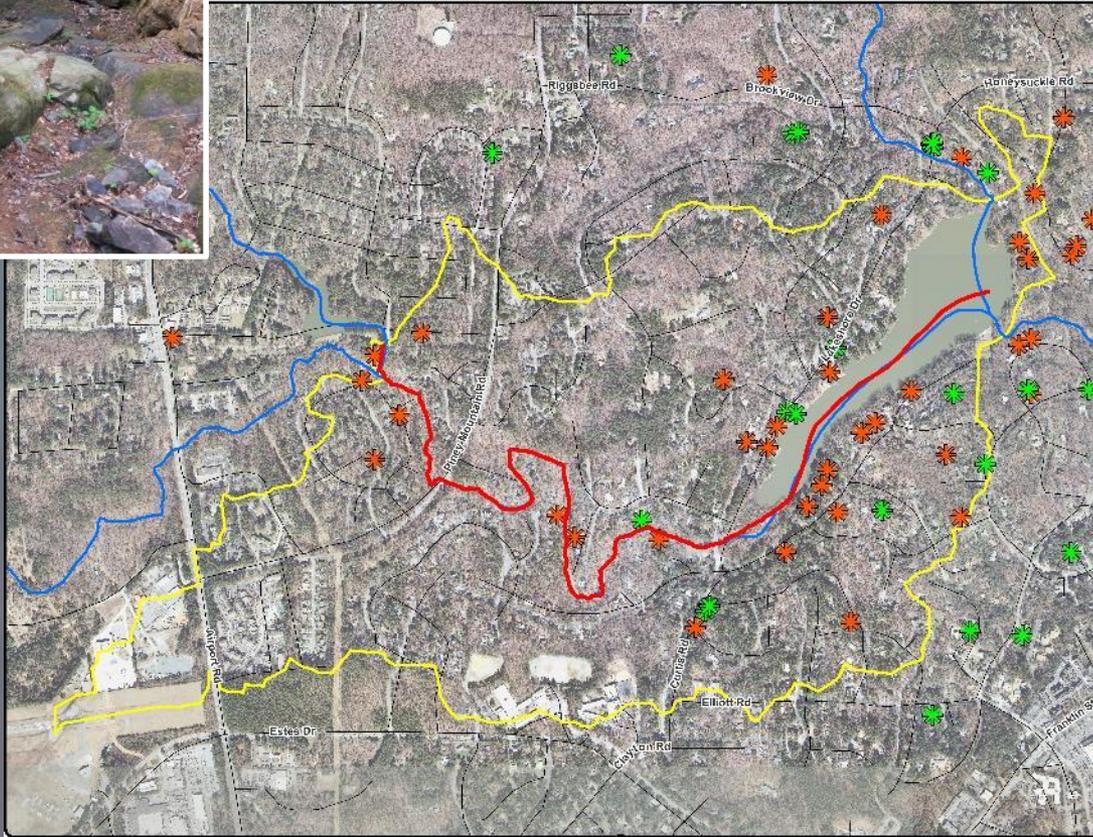
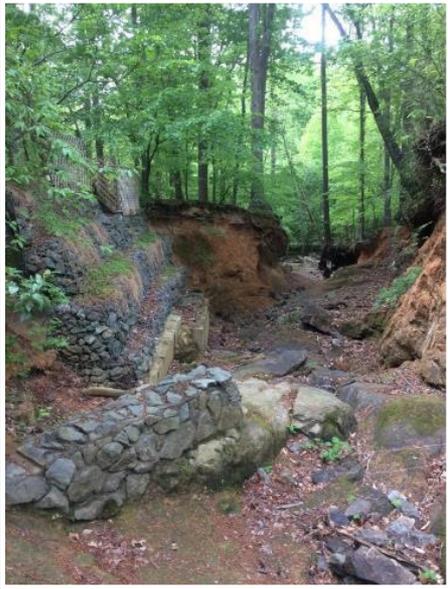
**Public outreach is conducted throughout the study process**

# 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

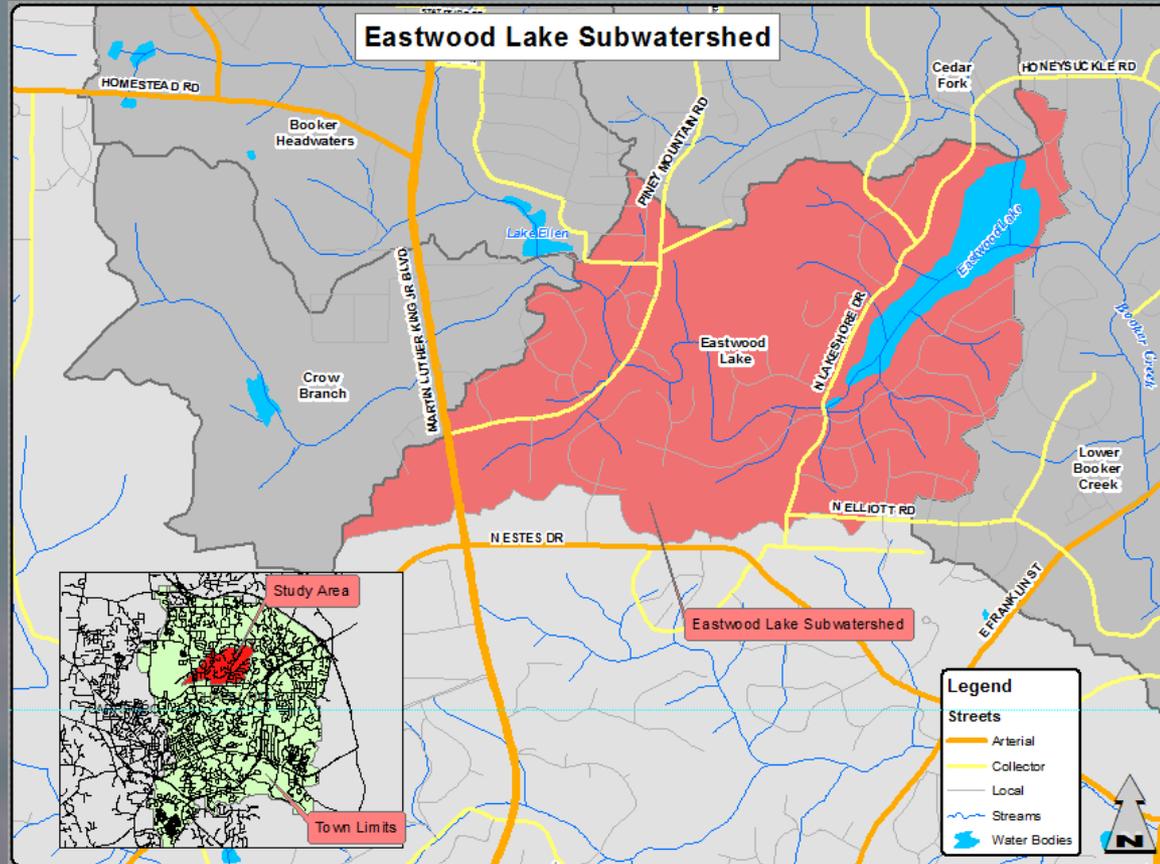


# Public Outreach



# Subwatershed Characteristics

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

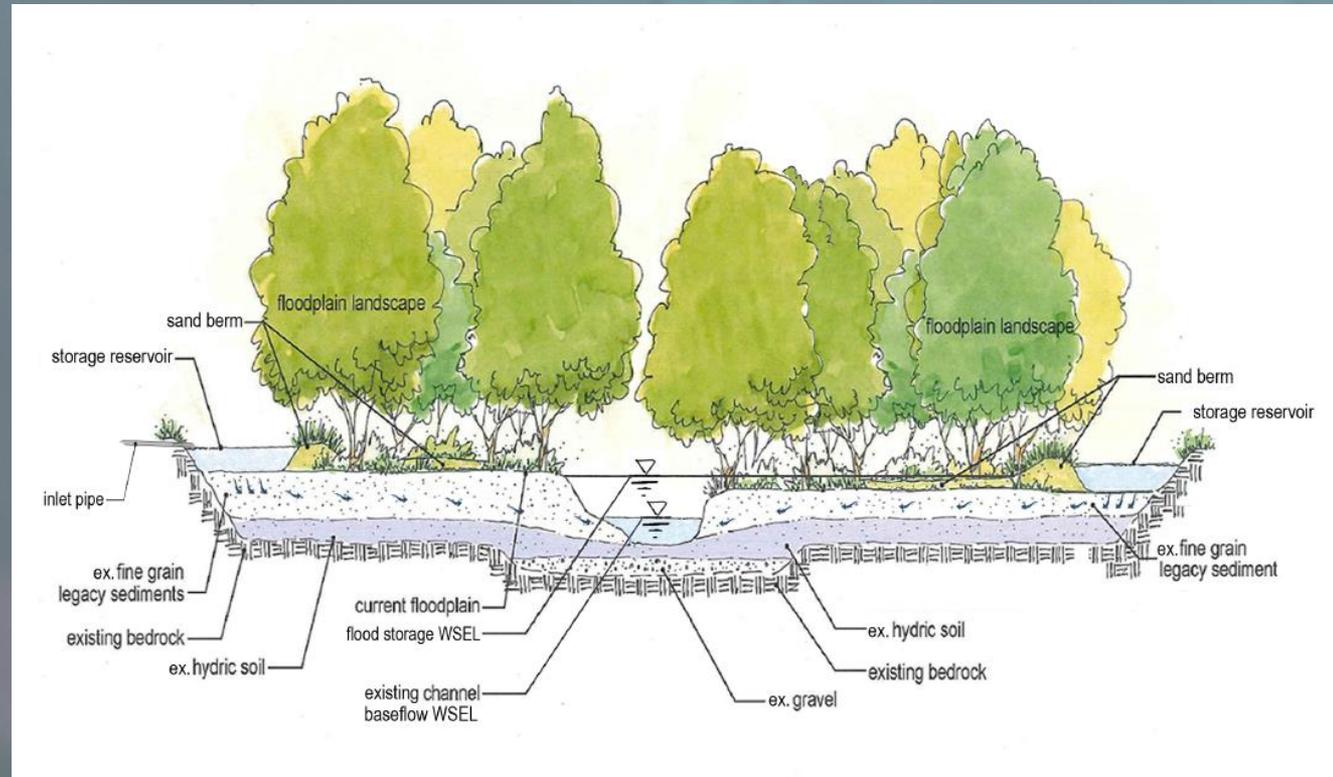


# Project Recommendations

- 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

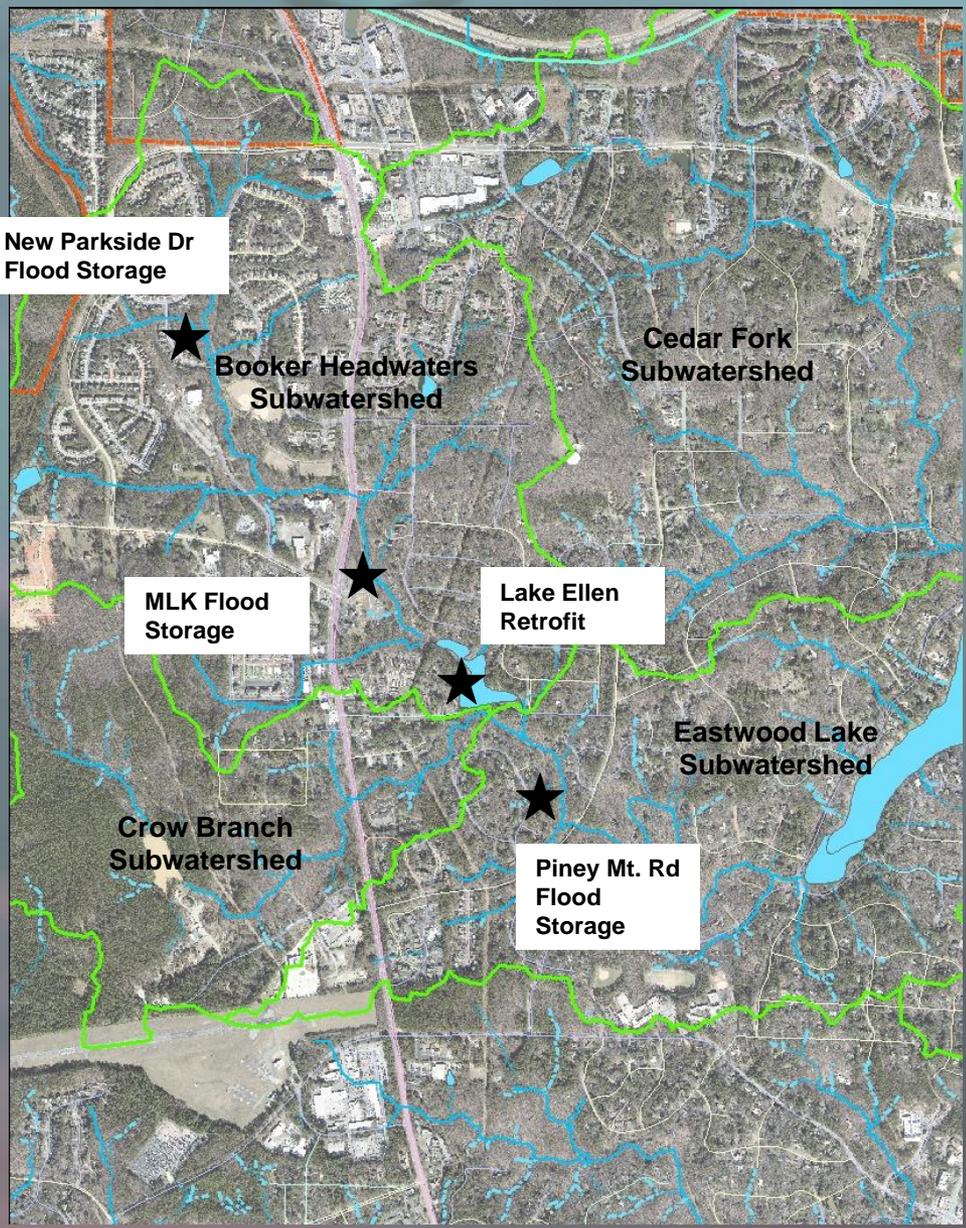
- Grading and excavation in floodplain to provide detention and lower water surface elevation
- Floodplain remains dry except for rainfall events
- Floodplain areas can be landscaped and include passive recreation (e.g. walking trails)



# 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



# 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

# Prioritization

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

Prioritization	Project	Cost
1	Piney Mountain Road Culvert	\$456,800
	<b>Total</b>	<b>\$456,800</b>

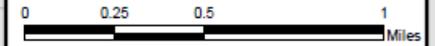
Table ES-2: Flood Control Project Prioritization – Secondary Systems

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
	<b>Total</b>	<b>\$1,105,100</b>



# Eastwood Lake Subwatershed Study

Figure ES-1  
Project Overview Map

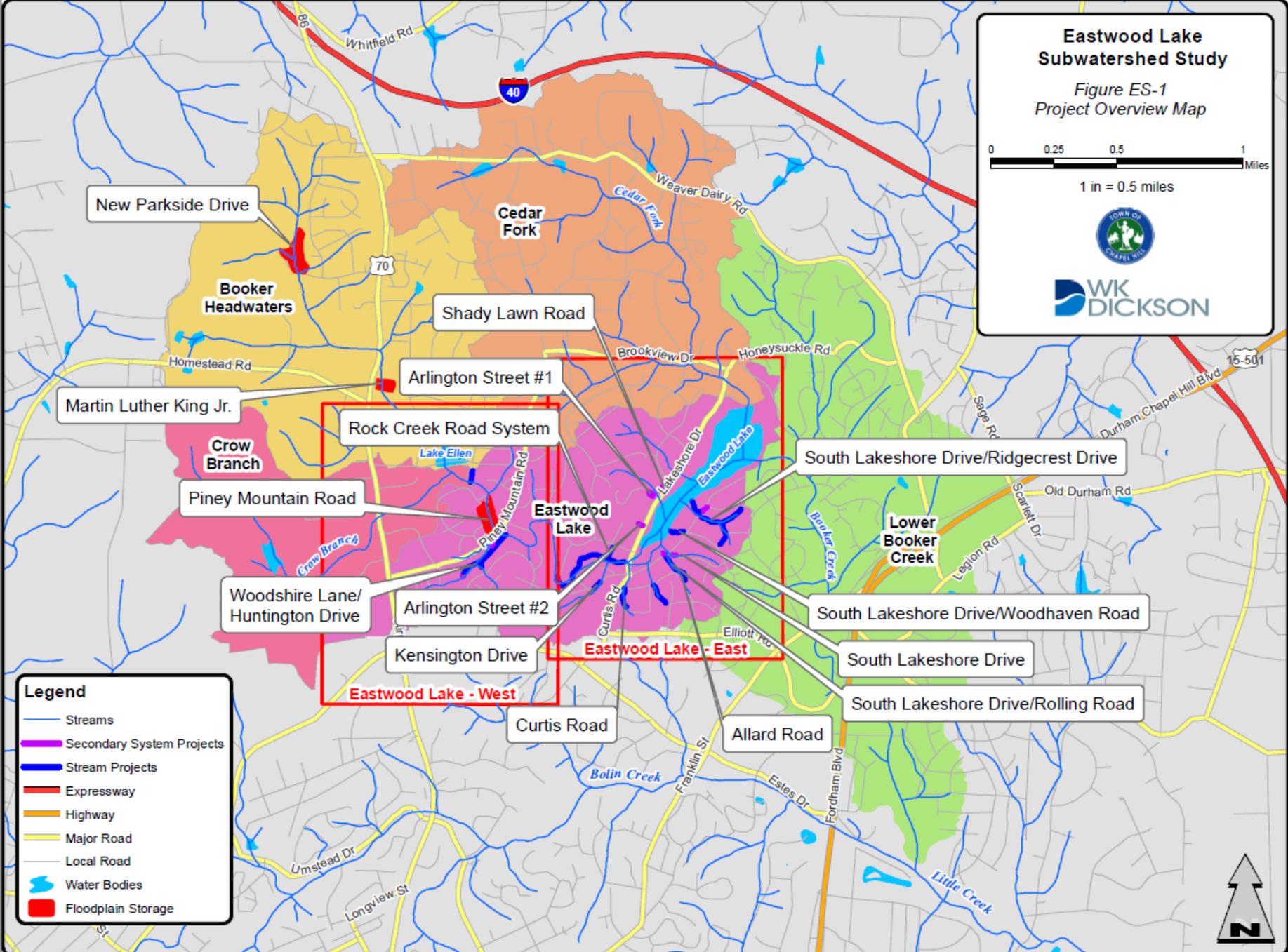


1 in = 0.5 miles



### 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" RCP to 18" RCP under Ridgecrest and S. Lakeshore
- Stream stabilization



# Improving Water Quality

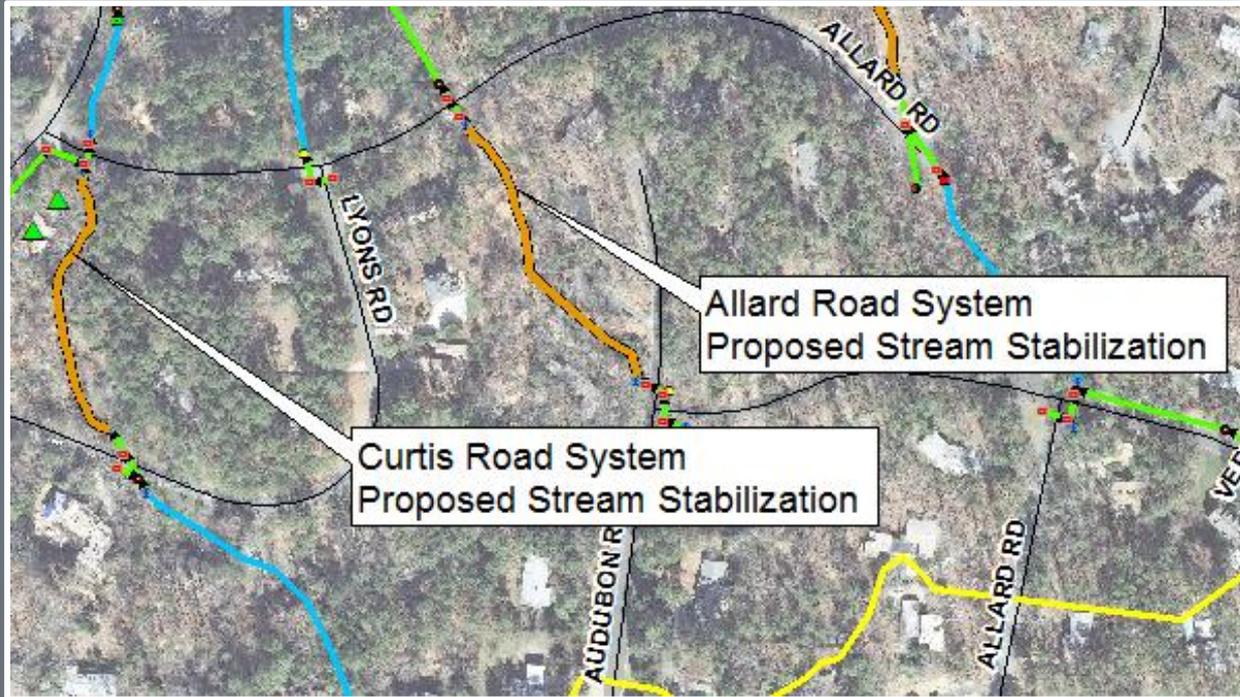
- Incorporate water quality treatment into drainage projects
  - Storage areas
  - Outfall treatment
  - Stream stabilization
  - Reestablish buffers
- Treat runoff at the source
  - Neighborhood retrofits
  - Pilot projects

# 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



W.K. DICKSON



# 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*
	<b>Elliott Storage (Booker Creek Park) – substantially completed</b>	<b>Lower Booker Creek (LBC)</b>	<b>\$2,900,000</b>
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 budget for the design of Red Bud Flood Storage.
- Construction of Red Bud and the design & construction of up to two additional projects will use the remainder of the 2015 Stormwater Bond funds.
- FEMA Building Resilient Infrastructure and Communities (BRIC) 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*



# Decision Points

- Adoption of the Eastwood Lake Subwatershed Study and Appendices
- Approval of the merged priority lists of projects
- Adoption of Resolution R-11