



ESTABLISHING A CITYWIDE WATERSHED MASTER PLAN

*TO DELIVER STRATEGIC
FLOODING SOLUTIONS*

Presented by:

Sheila Thomas-Ambat

Ed Dickson

October 2020

SESWA



AGENDA

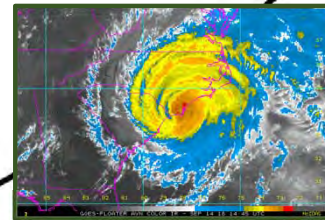
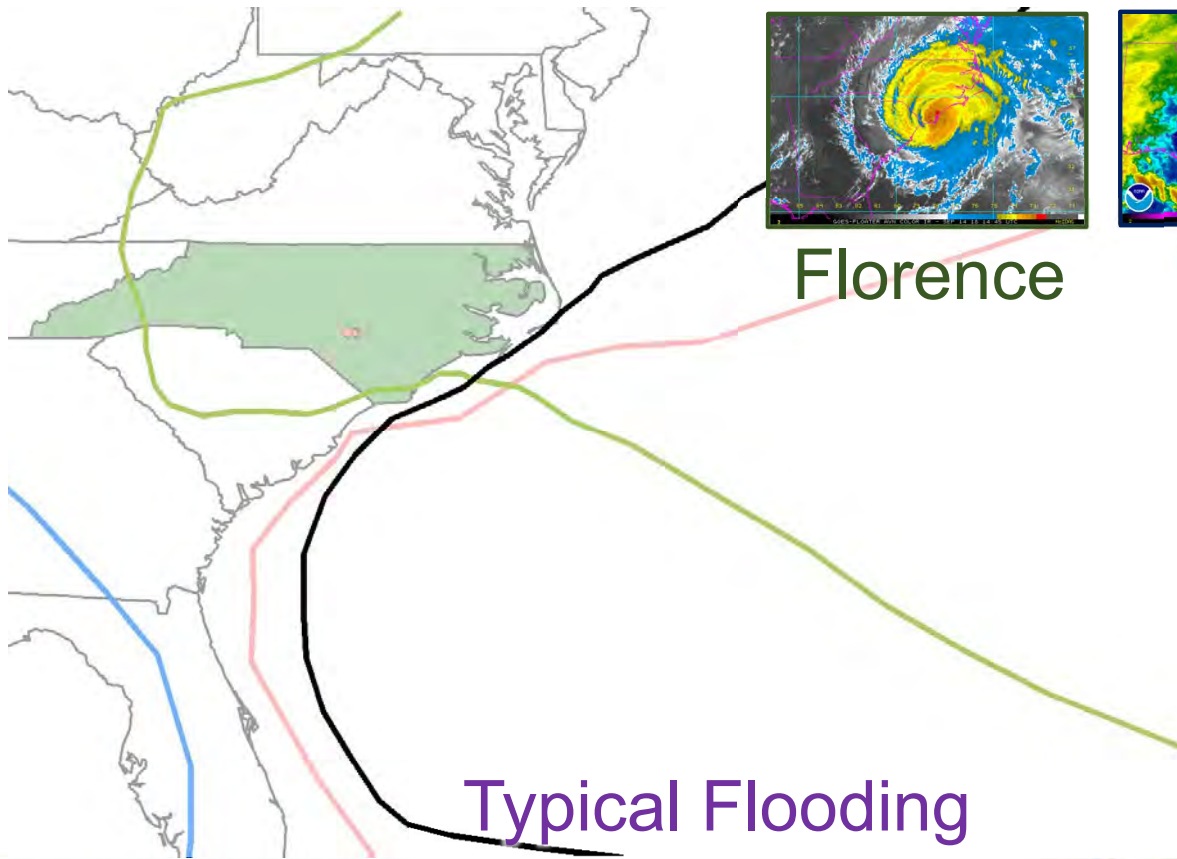
- Background
- Plan Framework
- Prioritization
- Data Maintenance
- Next Steps



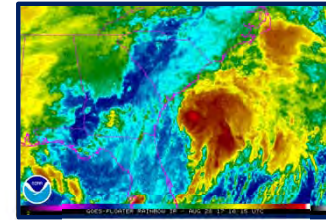
BACKGROUND



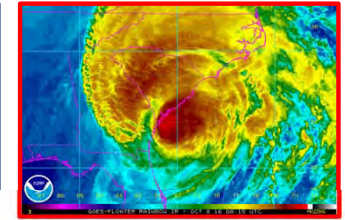
PROJECT DRIVERS



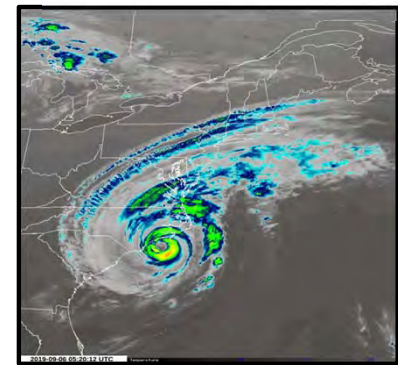
Florence



Irma

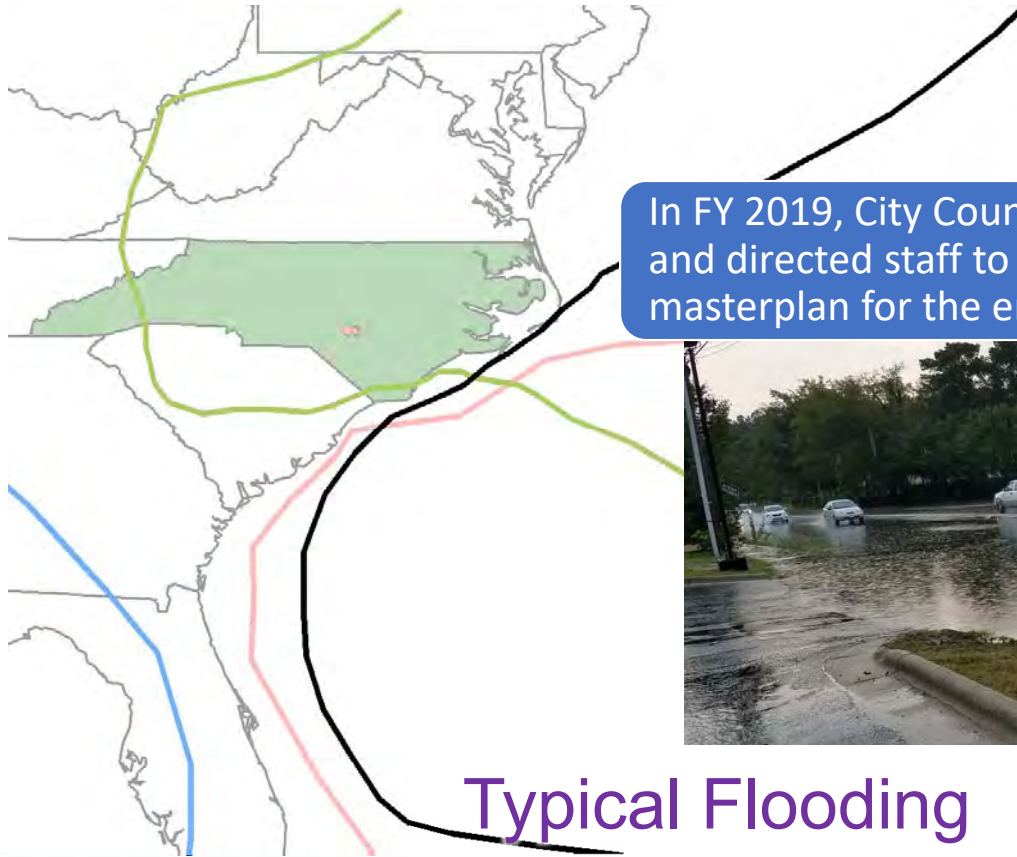


Matthew



Dorian

PROJECT DRIVERS

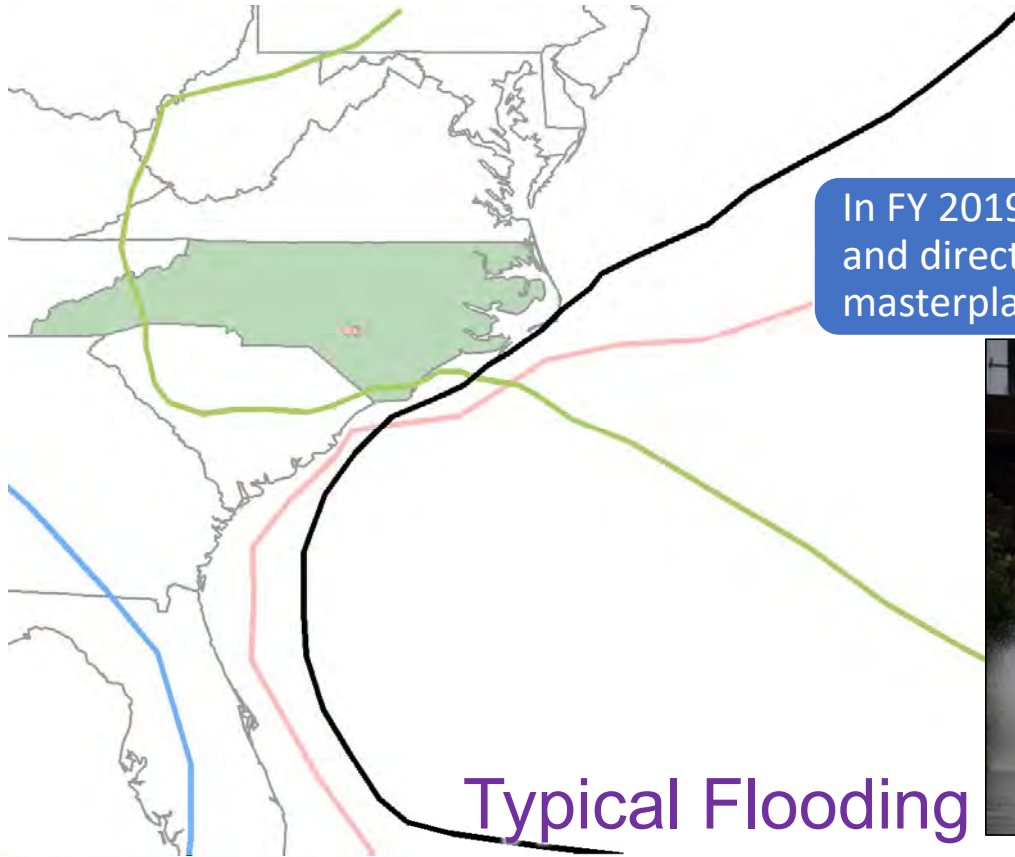


In FY 2019, City Council authorized a fee increase and directed staff to complete a stormwater masterplan for the entire City within five years.



Typical Flooding

PROJECT DRIVERS



In FY 2019, City Council authorized a fee increase and directed staff to complete a stormwater masterplan for the entire City within five years.



ORIGINAL PLAN

Stormwater utility fee increase

- Citywide Stormwater Master Plan
- Study all the Watersheds

Pros

- Comprehensive

Cons

- Slow Process
- Expensive
- Some Areas May Not Need to Be Studied



Stormwater

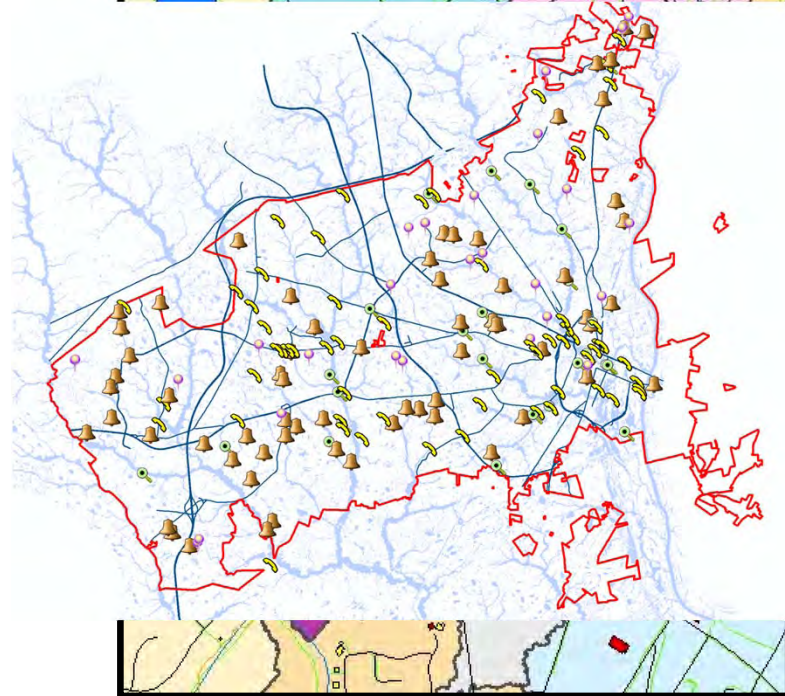
NEW PLAN

Challenges with Original Plan

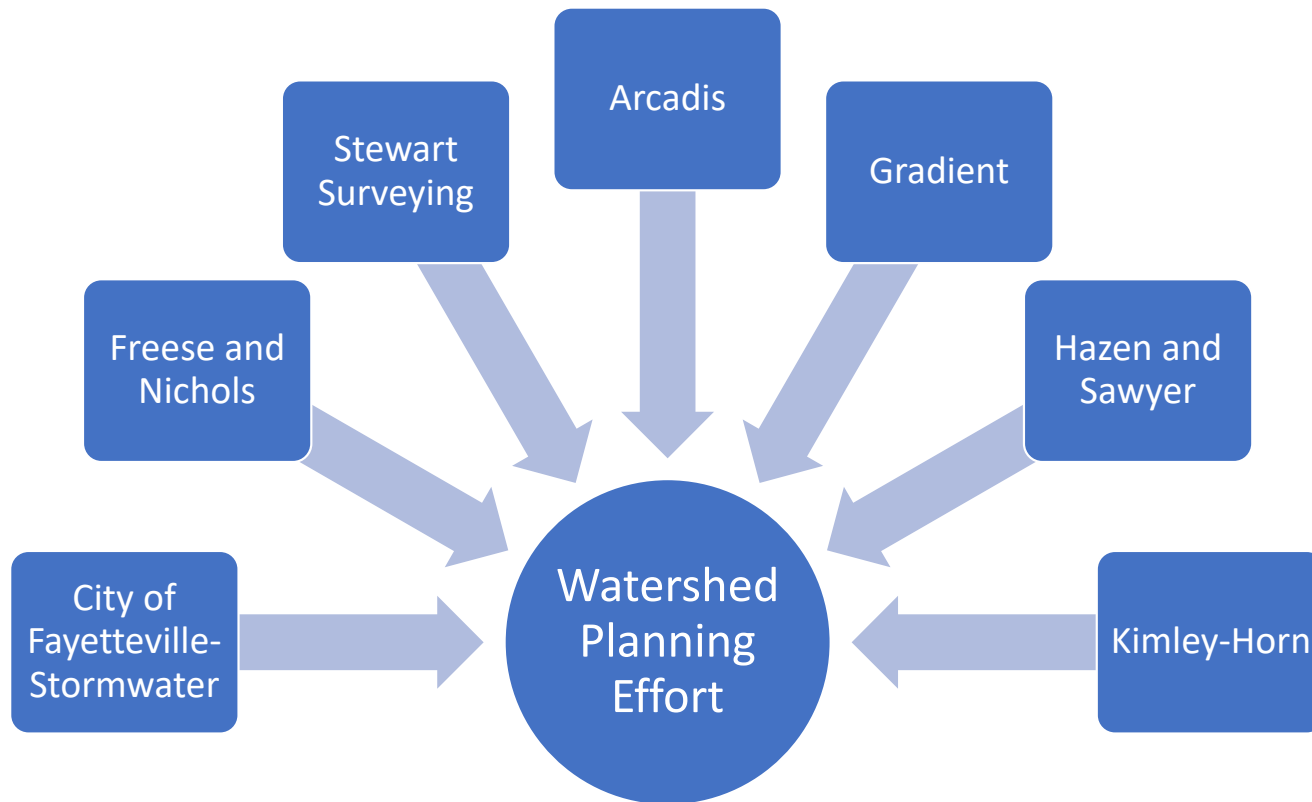
- Minimal data
- Limited resources
- No models

Path Forward

- Focus available resources
- Gather/update existing data
- Perform high-level analyses
- Prioritize study areas



TEAM EFFORT



PLAN FRAMEWORK



PLAN MISSION / CHARTER



PROGRAM



Citywide Program



1.00 PROGRAM CHARTER

1.01 PURPOSE AND OVERVIEW

With the recent hurricanes and gr... identified a need to establish a lon... watershed projects. This foundat... prepare for future challenges by in...

1.02 MISSION

- Better manage the runoff from mitigation opportunities and public safety and resiliency of
- Leverage partnerships with N and other external funding so
- Plan for existing aging infrastr... plan that integrates the need

1.03 GOALS AND OBJECTIVES

- Formulate a comprehensive damage locations and priorit... years
- Identify and prioritize potent... plan
- Begin design and developme... comprehensive watershed pl...
- Research and identify mitigat... incentive for economic devel...
- Leverage current City resourc...
- Optimize opportunities to au... information on aging stormw...
- Develop a communication pl... funding for safety mitigation
- Evaluate and identify Commu... insurance rates for citizens
- Enhance and integrate water...
- Identify opportunities to exp...
- Develop an educational volunteer monitoring program for citizens to monitor and track rain gauge and flood information



1.04 KEY PERFORMANCE INDICATORS (KPI)

Key Performance Indicators (KPIs) will be tracked throughout the program lifecycle as specified in applicable sections of the PMP. They will be used to set specific goals and track progress across various aspects of the program, including efficiency, effectiveness, risk, quality and overall project performance. By utilizing KPIs we will be able to proactively manage the program and projects, anticipating potential issues, and maintaining a comprehensive view of the entire program.

1.05 KEY STAKEHOLDERS

Sponsor	Kristoff Bauer
City Program Director	Sheila Thomas-Ambat
City's Core Team Members	John Larch, Byron Reeves
FNI Program Director	Mike Wayts
FNI Program Manager (Technical)	Ed Dickson
FNI Program Manager (Controls)	Morgan McIlwain

Key City Stakeholders

Fayetteville City Council, Stormwater Advisory Board (SWAB), Fayetteville Mayor's Stormwater City Council Committee (MS3C), Public Services, Community and Economic Development, Development Services, Fire, Information Technology, Parks and Recreation, Police, Fayetteville Public Works Commission, North Carolina Department of Transportation

1.06 APPROVAL SIGNATURES


Kristoff Bauer (City)


Mike Wayts (FNI)

FLOOD RISK ASSESSMENT

Modeling Concepts

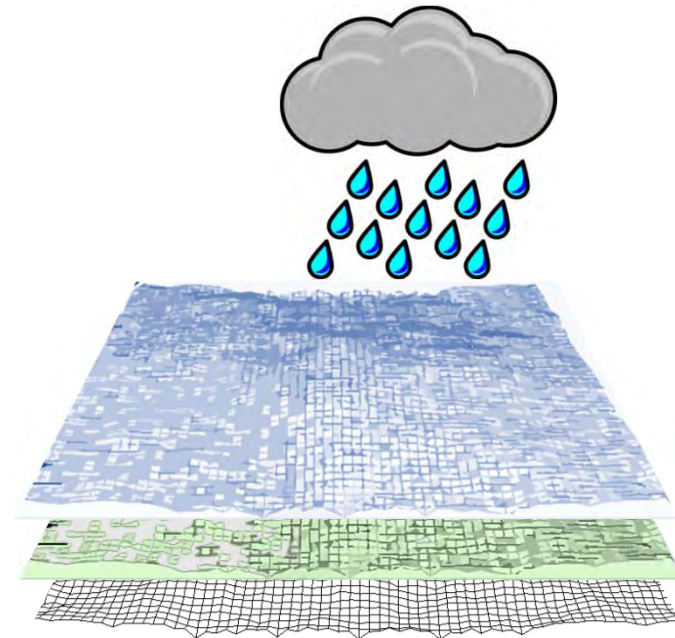
Rain on Mesh

Direct Benefits:

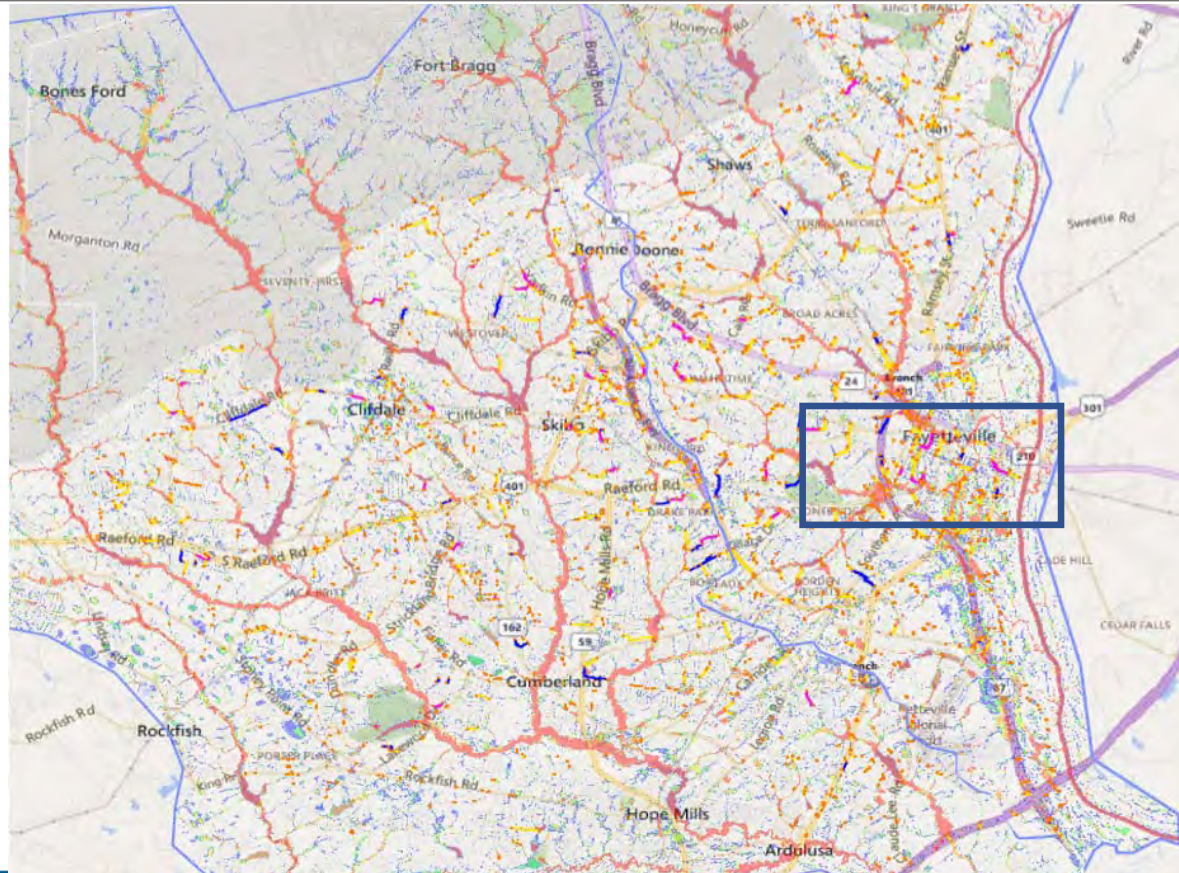
- High level planning
- Validation
- Identify problem locations

Additional Benefits:

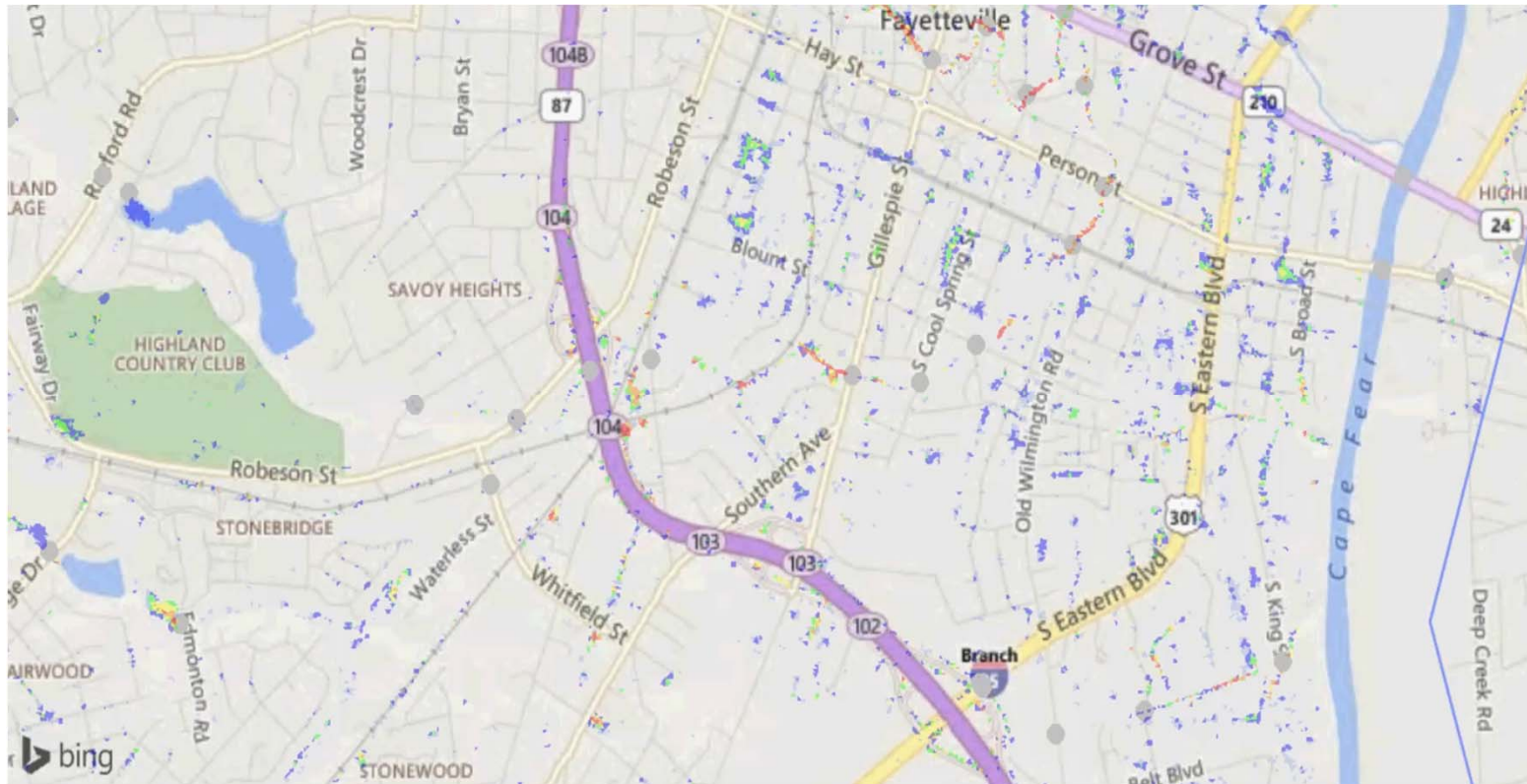
- Emergency forecasting
- Development tool



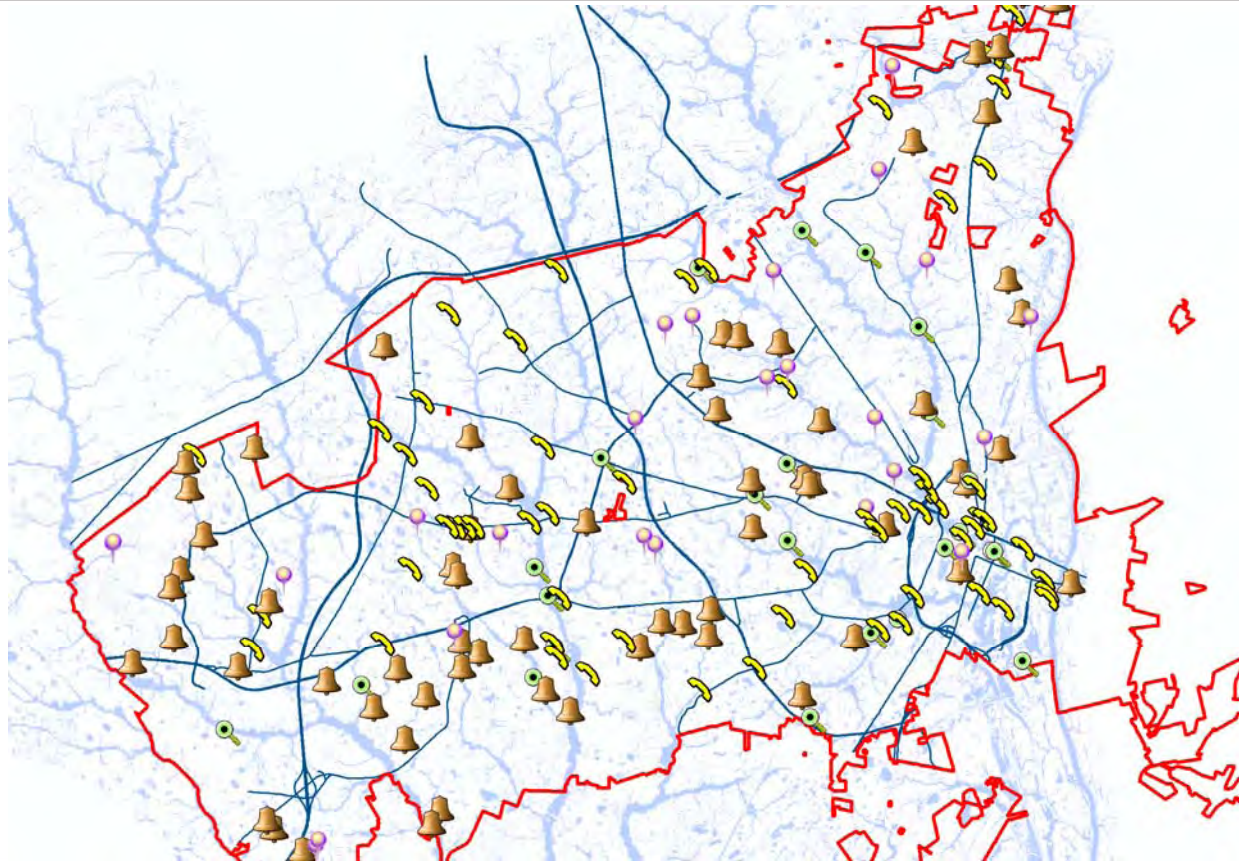
CITYWIDE RAIN ON MESH MODEL



CITYWIDE RAIN ON MESH MODEL



INTEGRATION & VALIDATION

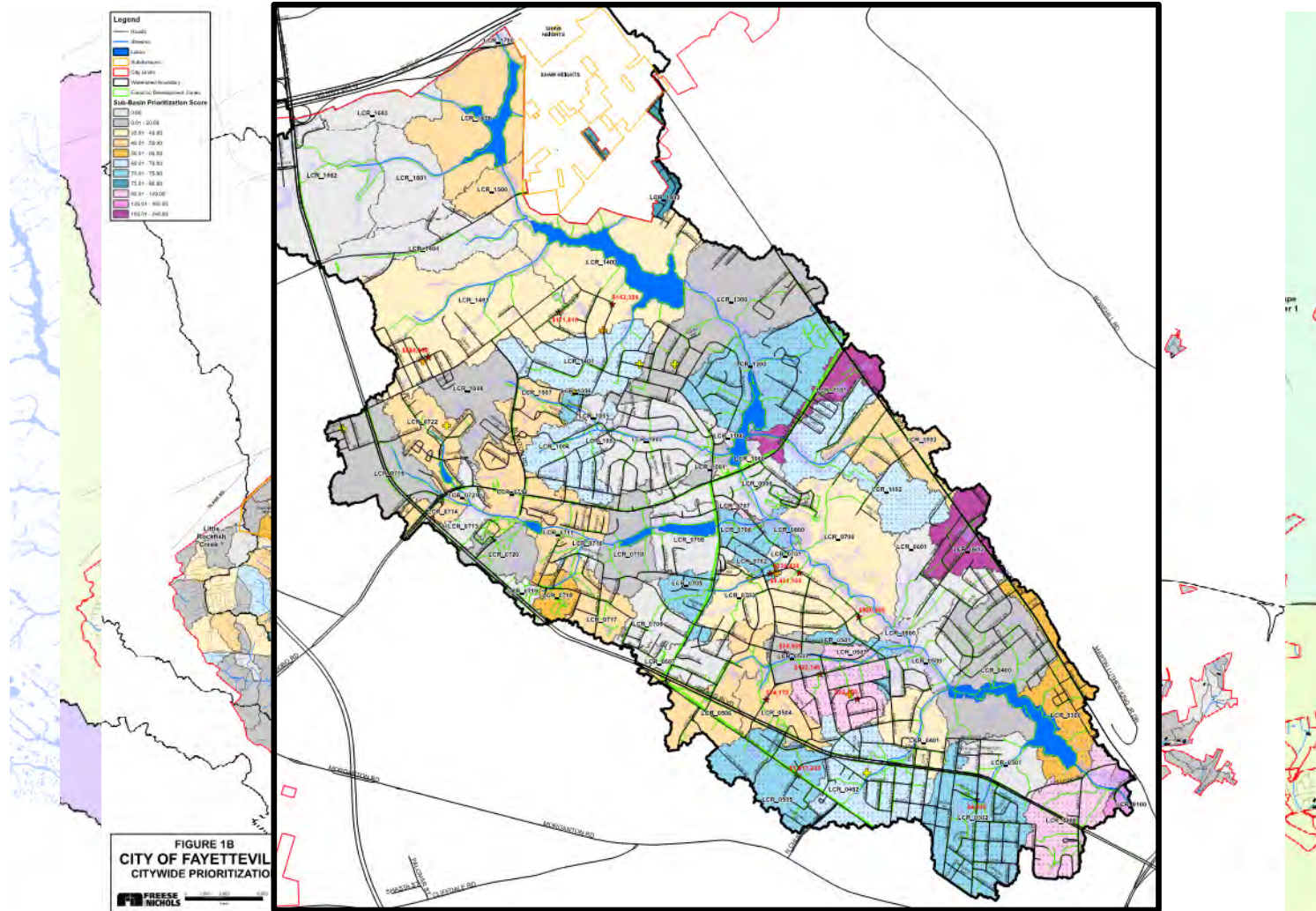


- ◆ HWMs
- 📞 911 Calls
- 🔔 CityWorks
- MainTrac
- 🔍 Interviews

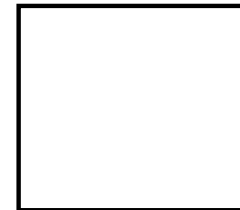
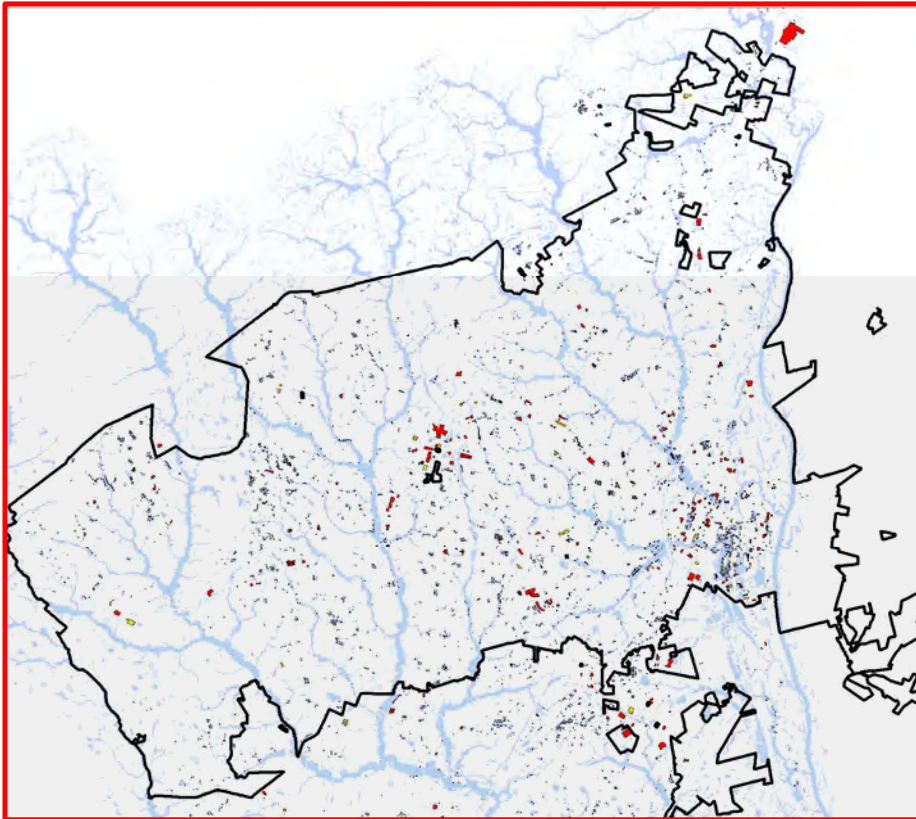
PRIORITIZATION



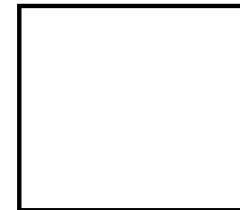
METHODOLOGY



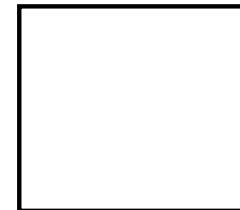
SCORING CRITERIA



Structures



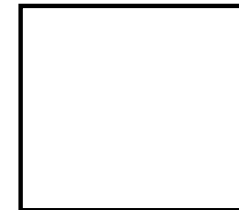
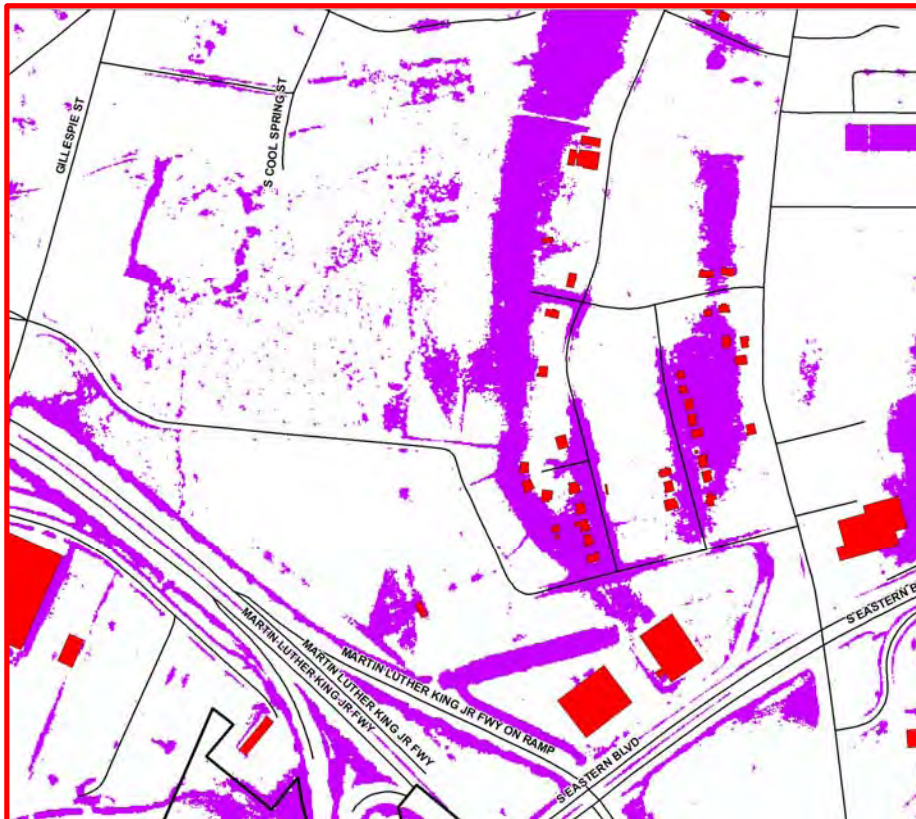
Crossings



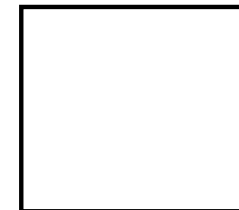
Facilities

Impacted Structures

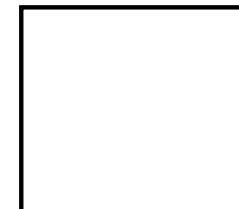
SCORING CRITERIA



Structures



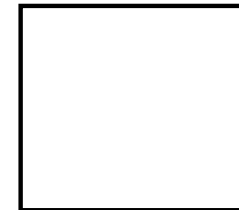
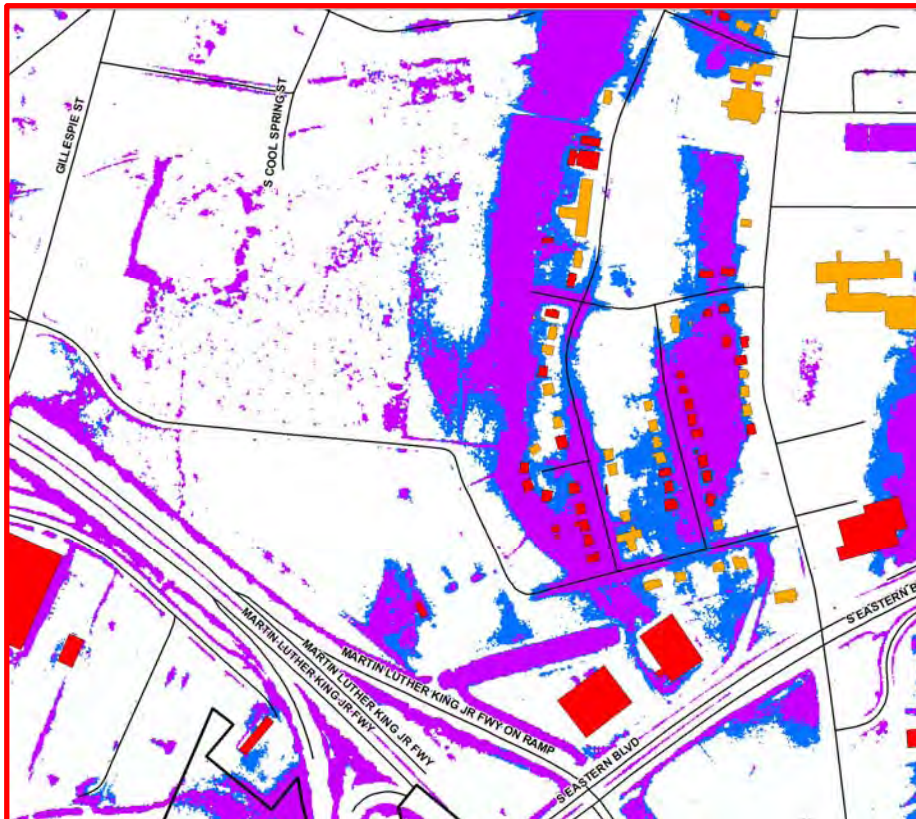
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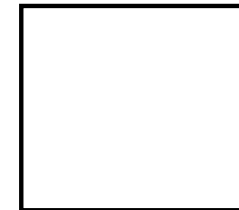
Facilities

Impacted Structures

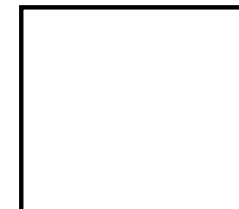
SCORING CRITERIA



Structures



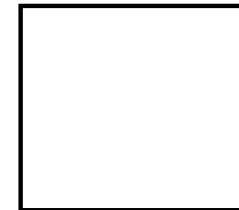
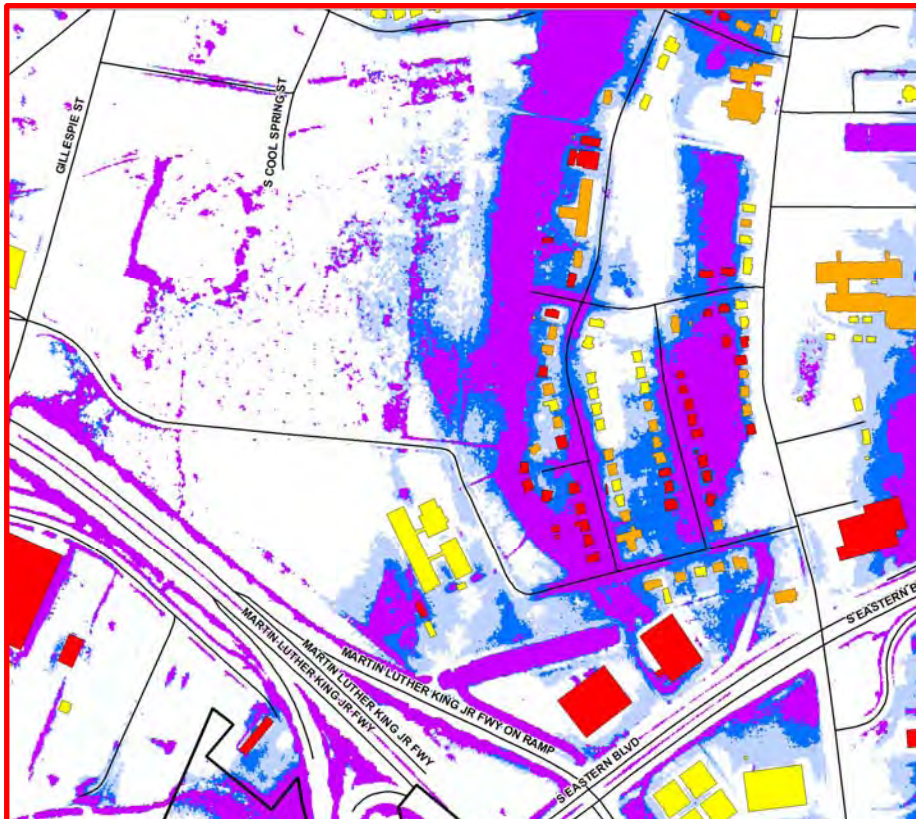
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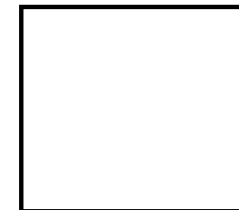
Facilities

Impacted Structures

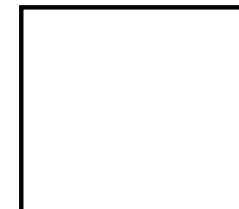
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Structures



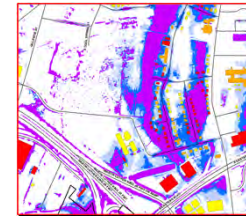
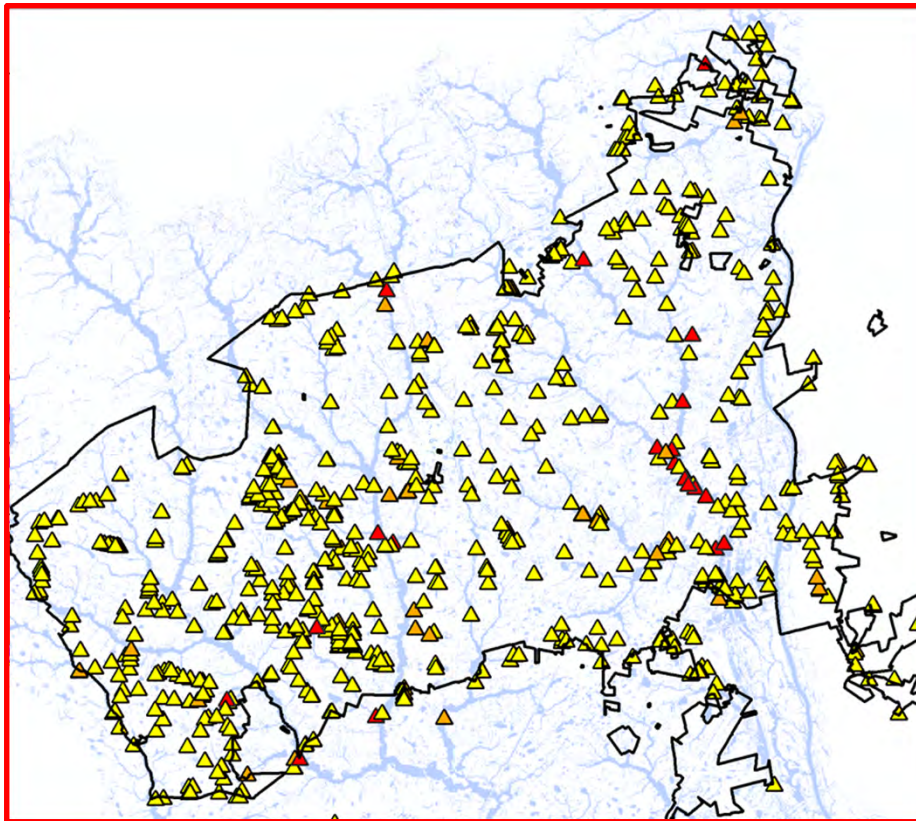
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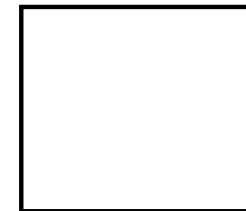
Facilities

Impacted Structures

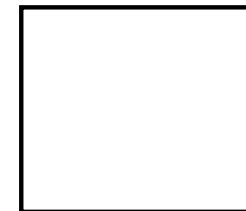
SCORING CRITERIA



Structures



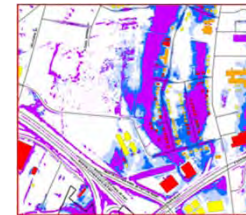
Crossings



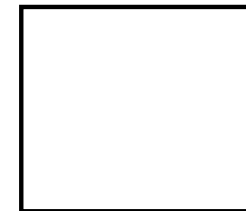
Facilities

Road Crossing Risk

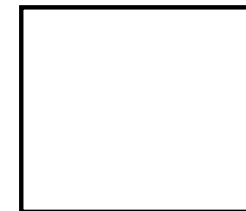
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Structures



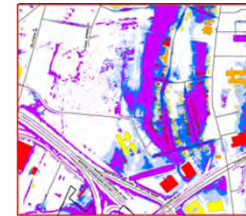
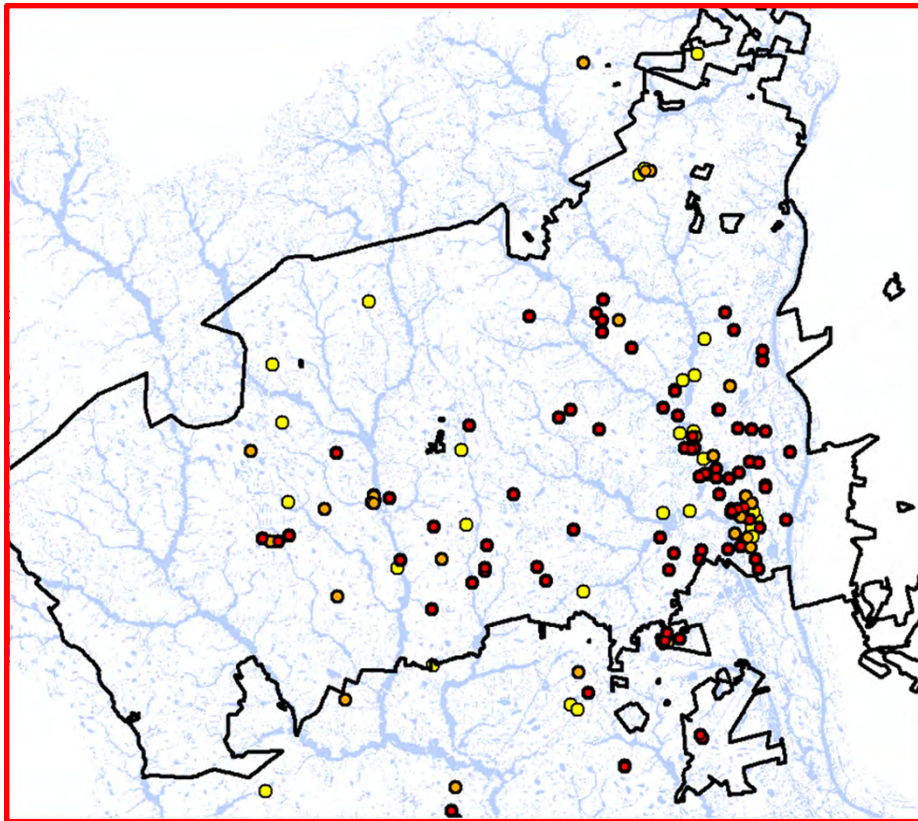
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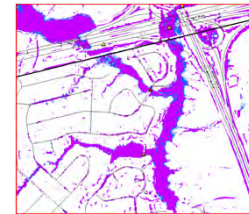
Facilities

Road Crossing Risk

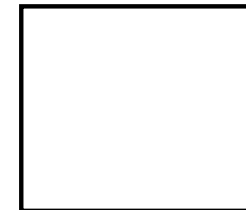
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Structures



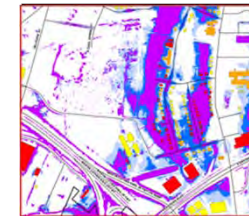
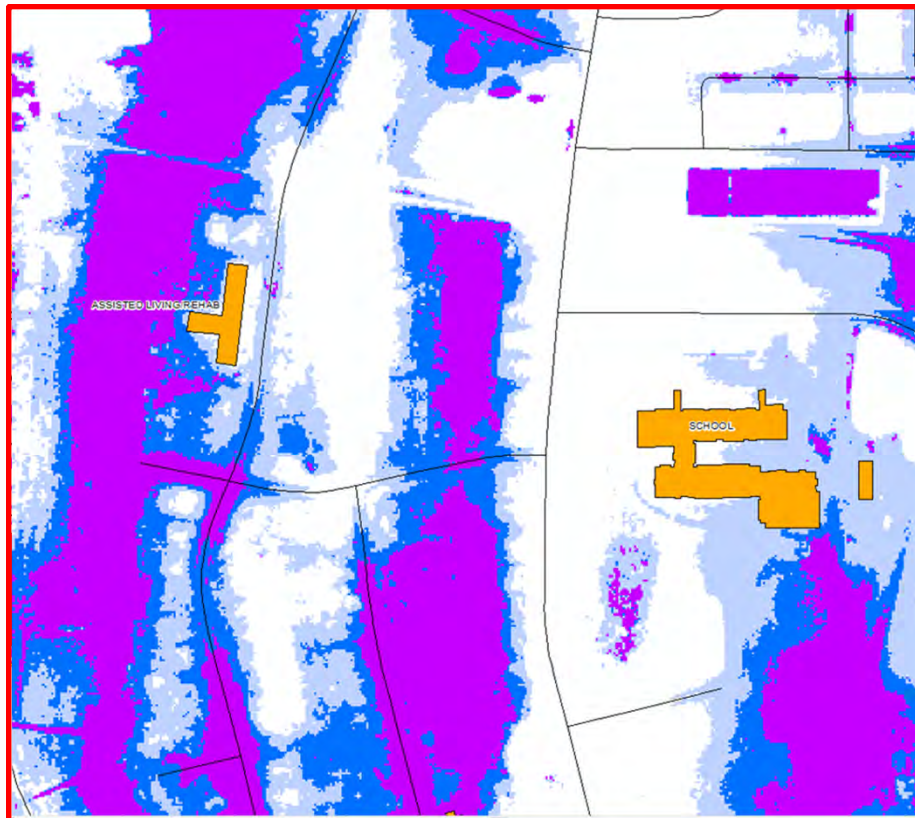
Crossings



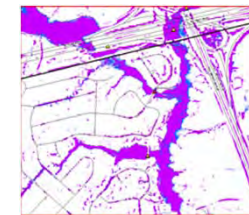
Facilities

Essential Facilities

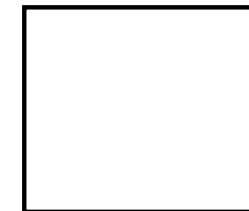
SCORING CRITERIA



Structures



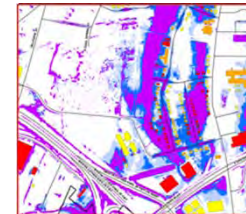
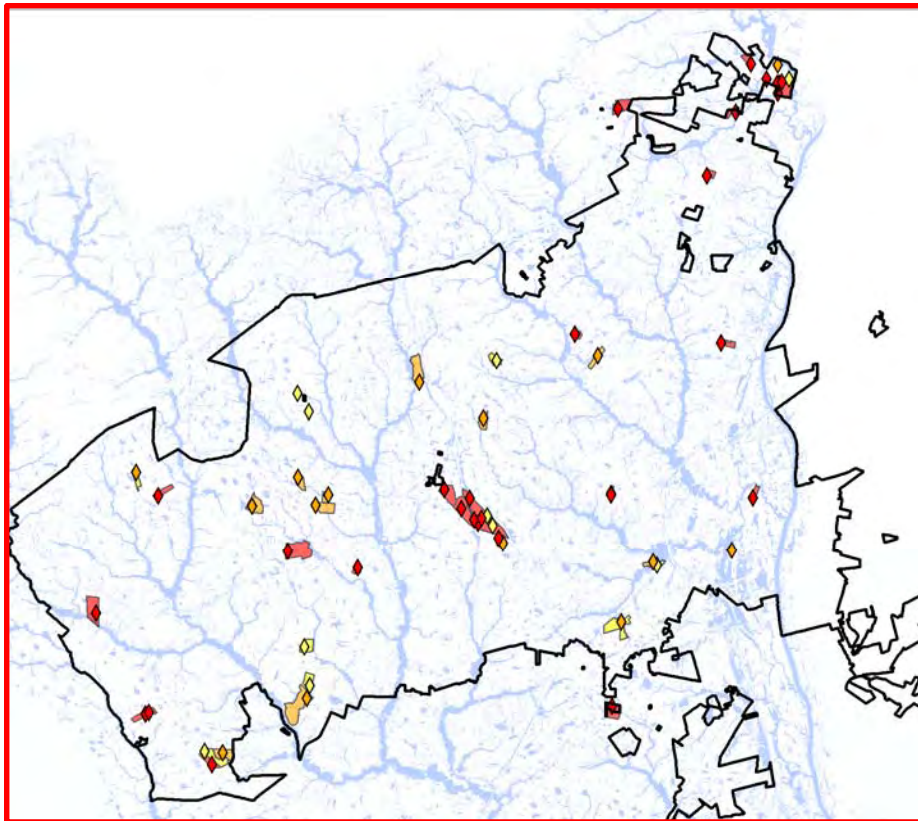
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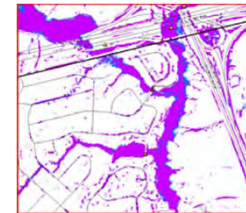
Facilities

Essential Facilities

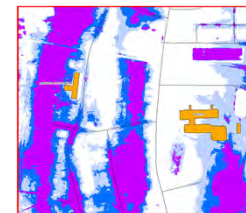
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Structures



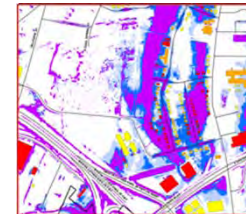
Crossings



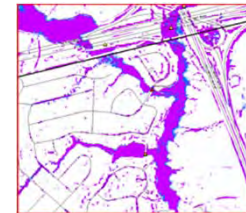
Facilities

Disconnected Areas

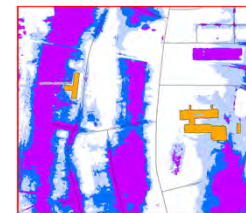
SCORING CRITERIA



Structures



Crossings



Facilities

Disconnected Areas

SCORING



Structures
Criteria

Information		10 - year event		25 - year event		100 - year event	
Sub-Basin	Area	Impacted	Blds per	Impacted	Blds per	Impacted	Blds per
Sub-Basin Information				Structures	Acre	Structures	Acre
Sub-basin	Watershed	Area (ac)	Stream Length (LF)	51	0.375	90	0.662
BKH_0501	BKH	138.31	1248.21	15	0.041	18	0.050
BKH_0603	BKH	114.85	72.28	2	0.016	4	0.033
BKH_0700	BKH	70.26	1845.38	0	0.000	0	0.000
STW_1300	STW	371.43	4151.19				
STW_1301	STW	758.61	1633.65				
STW_1400	STW	291.62	0.00				

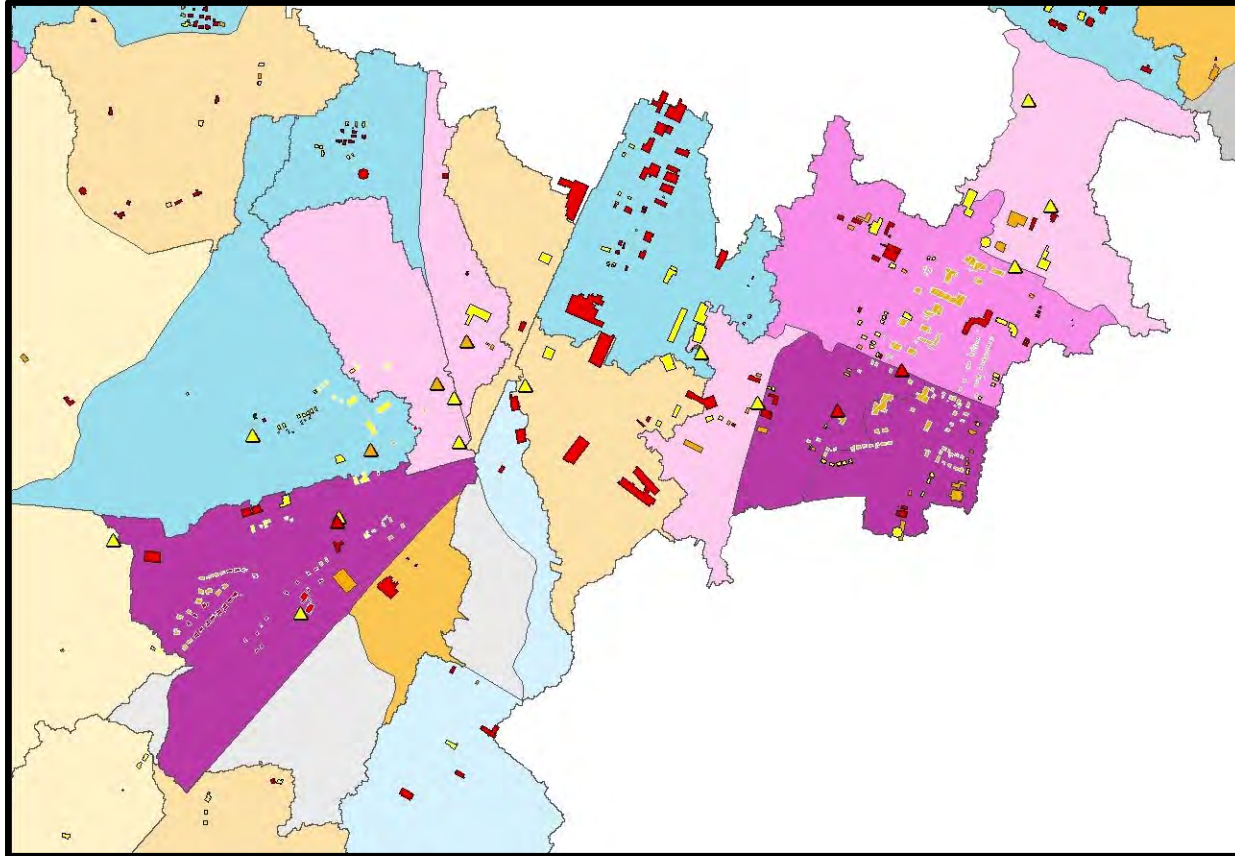
~1,000 City Sub-Basins
Ranked

Final score for
structures criteria

Sub-Basin	Criteria Scoring (Normalized)		Criteria Totals					Criteria Scoring (Weighted)		
	10-yr	100-yr	Impacted Structures	Road Crossing	Essential Facilities	Disconnected Areas	Combined Totals	10-yr	100-yr	TOTAL
BLN_0600			72	19	16	30	137	24	14	72
RCK_0823			43	0	0	0	43	14	5	43
BKH_1004			0	19	0	0	19	5	0	14
STW_0800			14	0	0	0	14	0	0	0

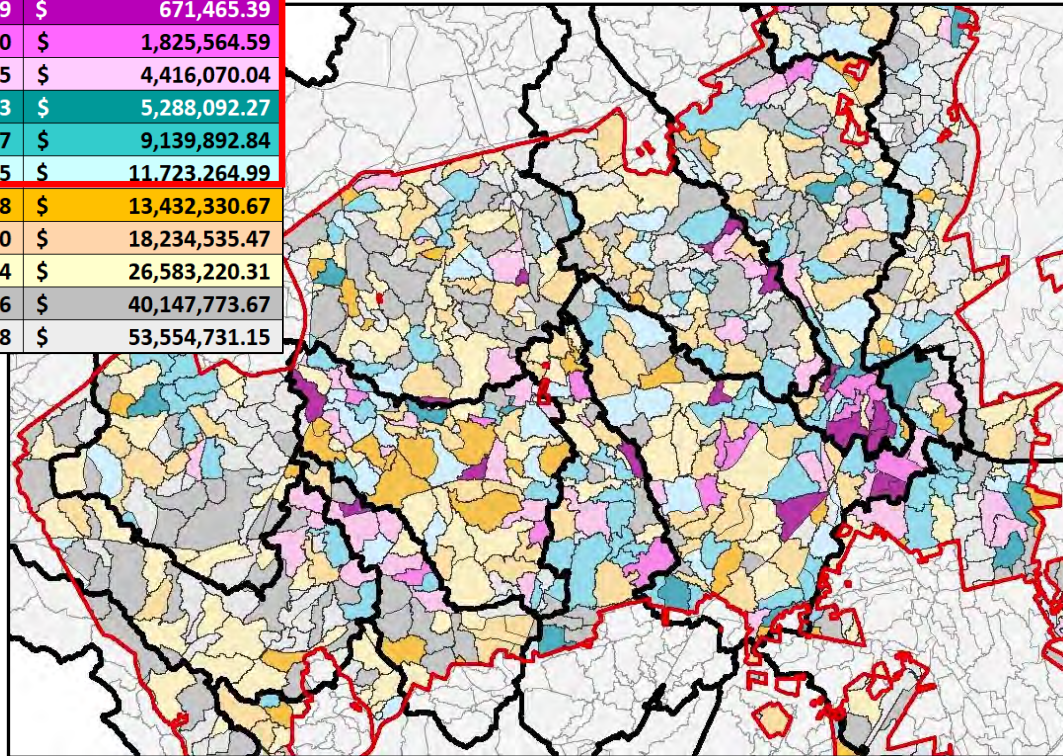
considered when
determining thirds

SUB-BASIN PRIORITIZATION

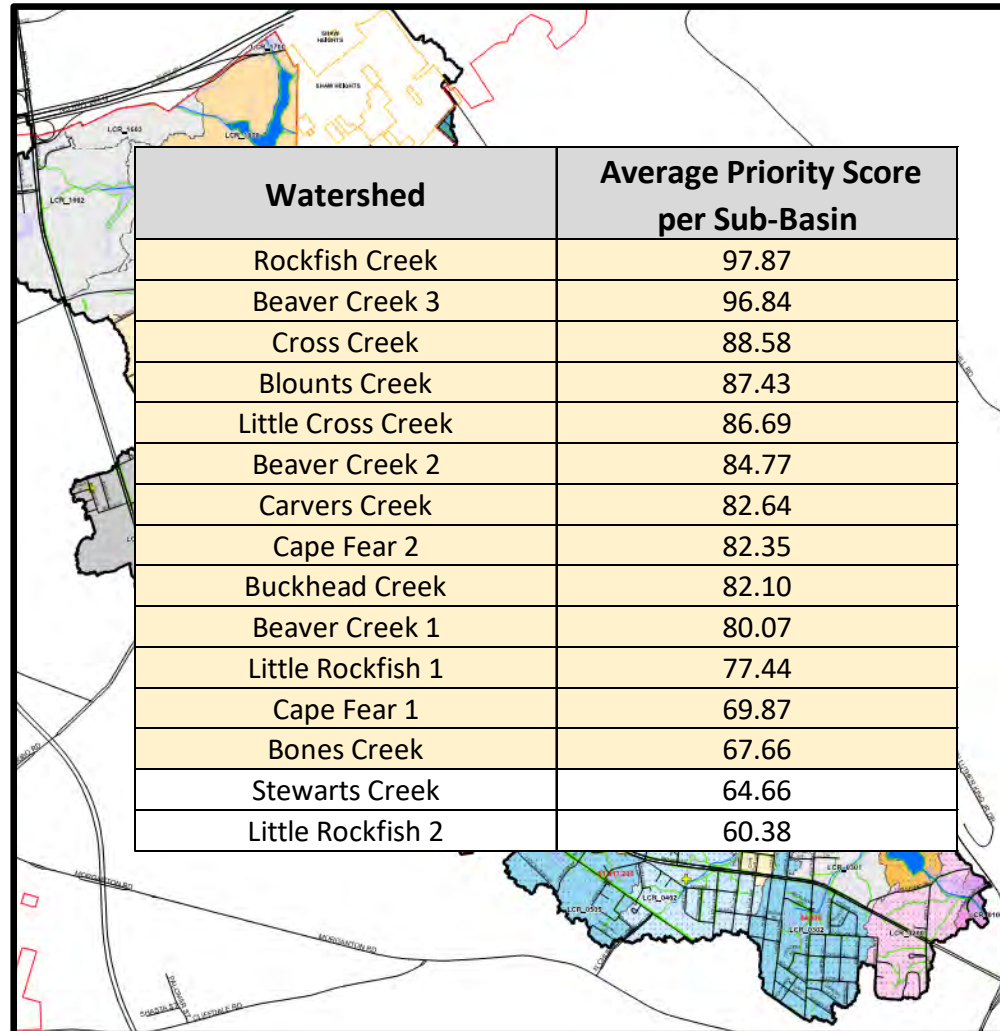


SCORING SUMMARY

Score	Cost per Category	Cumulative Cost
106.01-240.00	\$ 671,465.39	\$ 671,465.39
120.01-160.00	\$ 1,154,099.20	\$ 1,825,564.59
80.01-120.00	\$ 2,590,505.45	\$ 4,416,070.04
75.07-80.00	\$ 872,022.23	\$ 5,288,092.27
70.01-75.00	\$ 3,851,800.57	\$ 9,139,892.84
60.01-70.00	\$ 2,583,372.15	\$ 11,723,264.99
50.01-60.00	\$ 1,709,065.68	\$ 13,432,330.67
40.01-50.00	\$ 4,802,204.80	\$ 18,234,535.47
20.01-10.00	\$ 8,348,684.84	\$ 26,583,220.31
0.01-20.00	\$ 13,564,553.36	\$ 40,147,773.67
0.00	\$ 13,406,957.48	\$ 53,554,731.15



WATERSHED PRIORITIZATION



SubbasinID	Weighted Score
LCR_0100	134.15
LCR_0200	99
LCR_0300	38.49
LCR_0302	72.45
LCR_0402	62.79
LCR_0501	74.32
LCR_0502	90.96
LCR_0505	177.9
LCR_0602	160.45
LCR_0702	86.94
LCR_0705	43.47
LCR_0707	33.81
LCR_0708	72.45
LCR_0800	239.6
LCR_1004	77.3
LCR_1006	176.45
LCR_1101	115.47
LCR_1102	43.47
LCR_1200	72.45
LCR_1401	14.49
LCR_1402	20.66
	86.7

PROGRAM DEVELOPMENT



		Watershed				Average Priority Score per Sub-Basin				
CALENDAR YEARS	2020		2021				2022			
QUARTERS	Jul - Sep	Oct - Dec	Jan - Mar	Apr - Jun	Jul - Sep	Oct - Dec	Jan - Mar	Apr - Jun	Jul - Sep	Oct - Dec
Rockfish Creek										
Beaver Creek 3										
Cross Creek										
Blounts Creek										
Little Cross Creek										
Beaver Creek 2										
Carvers Creek										
Cape Fear 2										
Buckhead Creek										
Beaver Creek 1										
		Bones Creek				67.66				
		Stewarts Creek				64.66				
		Little Rockfish 2				60.38				

DATA MAINTENANCE



SCHEMA AND GEODATABASE



FayettevilleNCAssetManagement.gdb

IDCA

- IDCA_BMP
- IDCA_BRIDGE
- IDCA_CULVERT
- IDCA_DAM
- IDCA_General
- IDCA_SWCHANNEL
- IDCA_SWCONDUIT
- IDCA_SWNODE

Modeling

- _1D_MannN
- _1D_StrLn
- _1D_XS
- _2D_BreakLn
- _2D_MannN
- _2D_MeshShp
- HydroBasin
- HydroLink
- HydroNode

Dam_Channel

MainTrac_SW_Pipes

MainTrac_SW_Structures

Output_1D_DEP

Output_1D_VEL

Output_1D_WSE

Output_2D_DEP

Output_2D_VEL

Output_2D_WSE

Summ_Q

Field Name	Attribute Domain Value	Description
REVISED	Yes No N/A	Revised. Domain values in this field reflect whether the feature information has been updated following field inspection.
REV_DAT	None [Last Revision Date]	Revision Date. This value reflects the date of each feature's most recent revision. This value is to be updated every time
REV_NOTES	None [Free Text Field for Revision Notes]	
CON_SCORE	None [Integer space for CityWorks import]	
GENERAL_CO	None [Free text field for comment]	
LASTUPDATE	None [Last Revision Date]	automatically updated every time an update is made to each feature's geometry or attribute values.
LASTEDITOR	None [Name of the User to make the Last Revision]	Last Editor. This value identifies the user responsible for each feature's most recent revision. This value is automatically updated every time an update is made to each feature's geometry or attribute values.

Field Name	Required / Required if Applicable / Calculated	Type
FACILITYID	R	Integer
GRIDID	R	Text
STRUCT_TYP	R	Text
STR_TYP_OT	A	Text
MATERIAL	R	Text
MAT_OTHER	A	Text
CONSTR_BY	A	Text
CONSTR_DAT	A	Date
OWNED_BY	A	Text
OWNER_TYPE	A	Text
MAINT_BY	A	Text
LOS_CAP	R	Text

NEXT STEPS & LONG TERM SOLUTIONS



NEXT STEPS



Execution of Studies

Development of Project Prioritization

Project Identification

Leverage Funds

Project Execution

ADDITIONAL INITIATIVES

Watershed Studies

- Develop Solutions
- Prioritize Implementation

Economic Incentive Analysis

- Evaluate Existing Processes
- Provide Capacity for New Development

Public Outreach

Downtown Riverine Assessment

- Evaluate Capacity and Options
- Develop Unique Opportunities

Flood Warning System

- Gauge System
- Road Crossings
- Leverage Grants

QUESTIONS?

