Town of Morrisville

STORMWATER MASTER PLAN SUMMARY

September 2021

WR Job Number: 02200999.0

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WithersRavenel
Our People. Your Success.

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1. EXCUTIVE SUMMARY

The Town of Morrisville (Town) has contracted WithersRavenel for the development of a Stormwater Master Plan (SWMP) to review and evaluate its existing stormwater infrastructure. This study consisted of updating the Town's stormwater GIS inventory to create a Town-wide flood model assessing a "future build-out" scenario to evaluate stormwater infrastructure at a 10-acre drainage area resolution. The design storms evaluated were the 10-Year, 25-Year, and 100-Year, 24-Hr storm events. Areas of concern (AOCs) were identified after analysis of the flood model results and inundation maps. AOCs were subsequently ranked and prioritized through a weighted decision matrix and Town input. An assessment of conceptual level stormwater improvements designed to mitigate potential future flooding conditions, along with engineer's cost opinions, were provided for ten (10) priority project areas. Utilizing the priority project recommendations and cost opinions, a 10-Year Capital Improvement Plan (CIP) was developed with consideration of the Town's current stormwater utility fee (SWU) and capital budget.

2. INTRODUCTION

With increasing economic growth and development in the Town and the greater Triangle region, ensuring existing stormwater infrastructure has the capacity to handle additional runoff from development is critical. Development of the SWMP and associated CIP will assist the Town in long-range planning for implementing high priority flood improvement projects.

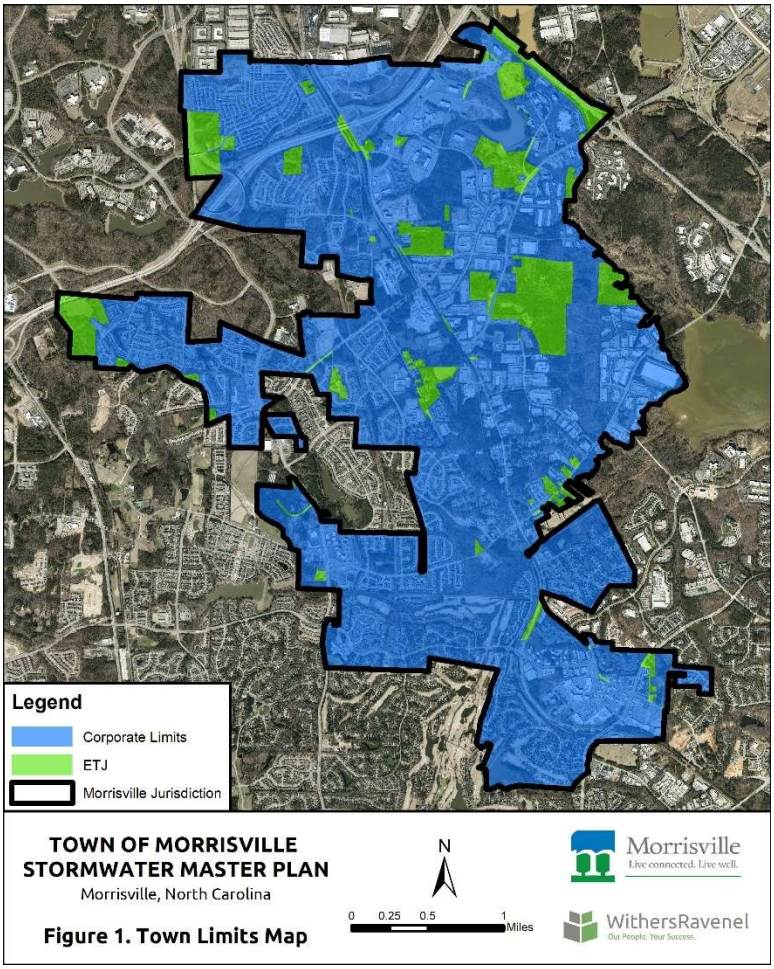


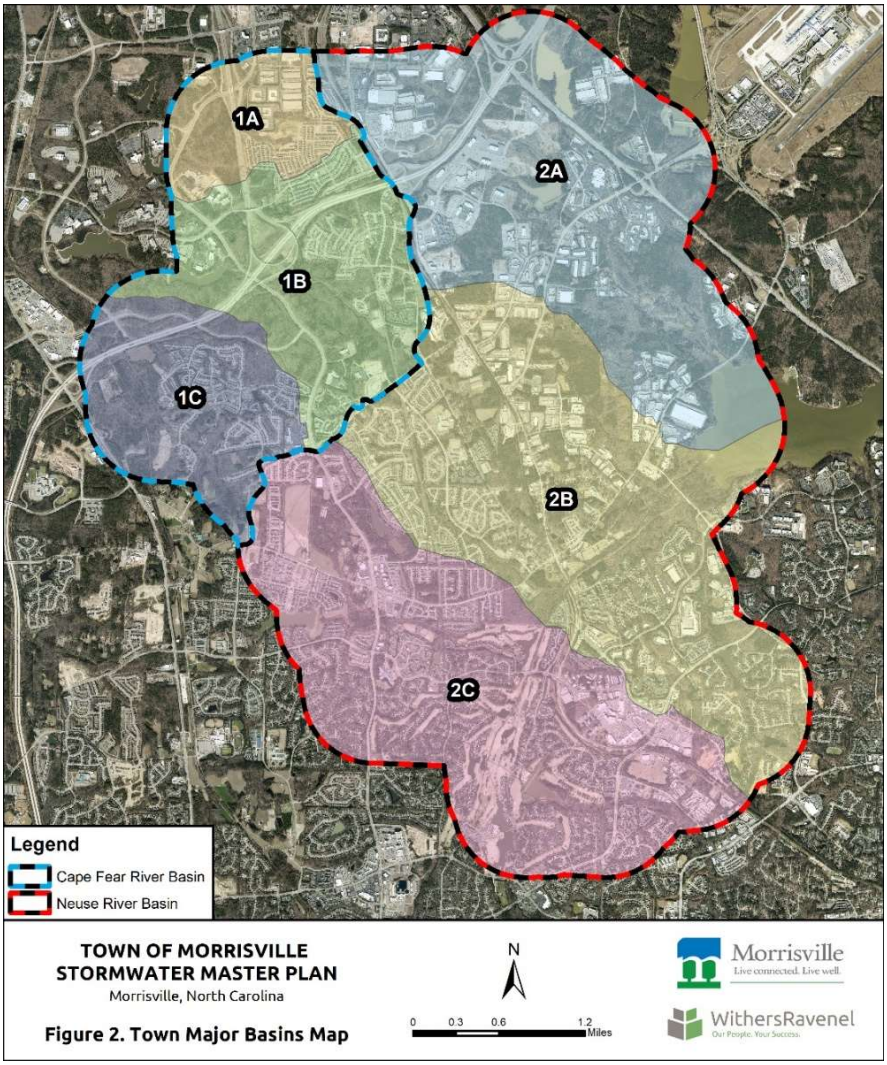
Figure 1. Town Limits Map

2.1 Town Description

The Town of Morrisville is located primarily in Wake County, North Carolina with a small portion extending into Durham County to the North. It is part of the greater Triangle Region, also referred to as the Research Triangle, which is anchored by three major research universities: North Carolina State University, Duke University and University of North Carolina at Chapel Hill. It is bounded by I-540 and City of Durham to the northwest, I-40 and Raleigh-Durham International Airport to the northeast, the City of Raleigh to the southeast, the Town of Cary to the south, and Jordan Lake to the west. The Town's municipal limits and extraterritorial jurisdiction (ETJ) encompasses approximately 9.9 square miles as shown in **Figure 1**.

2.2 Watershed Description

3. The Town is in both the Neuse and Cape Fear River basins and has 6 distinct major basins, as shown in **Figure 2**. Major basins were provided by the Town as part of the stormwater GIS inventory. Major basins 1A, 1B, and 1C lie within USGS 12-digit HUC



030300020605 which drains through unnamed tributaries to Kit Creek, eventually draining to Jordan Lake and the Cape Fear River. Major basins 2A, 2B, and 2C lies within USGS 12-digit HUC 030202010801 which drains to Crabtree Lake, eventually draining through Crabtree Creek to the Neuse River. The total drainage area to Kit Creek (major basins 1A, 1B, and 1C) is approximately 5.1 square miles and only encompasses area within the Town's jurisdiction. The total drainage area to Crabtree Lake (major basins 2A, 2B, and 2C) is approximately 45.4 square miles and includes areas outside of Morrisville's jurisdiction that drain through the Town to Crabtree Lake. These areas include sub-watersheds of Brier Creek and Stirrup Iron Creek to the north of Morrisville, Coles Branch, Upper Crabtree Creek, and Turkey Creek to the south into the Town of Cary, and Crabtree Creek. W/S Structure #2 (WAKE-223) to the west into the Town of Cary.

4. STUDY OVERVIEW

The development of the Town of Morrisville's SWMP consisted of six major components:

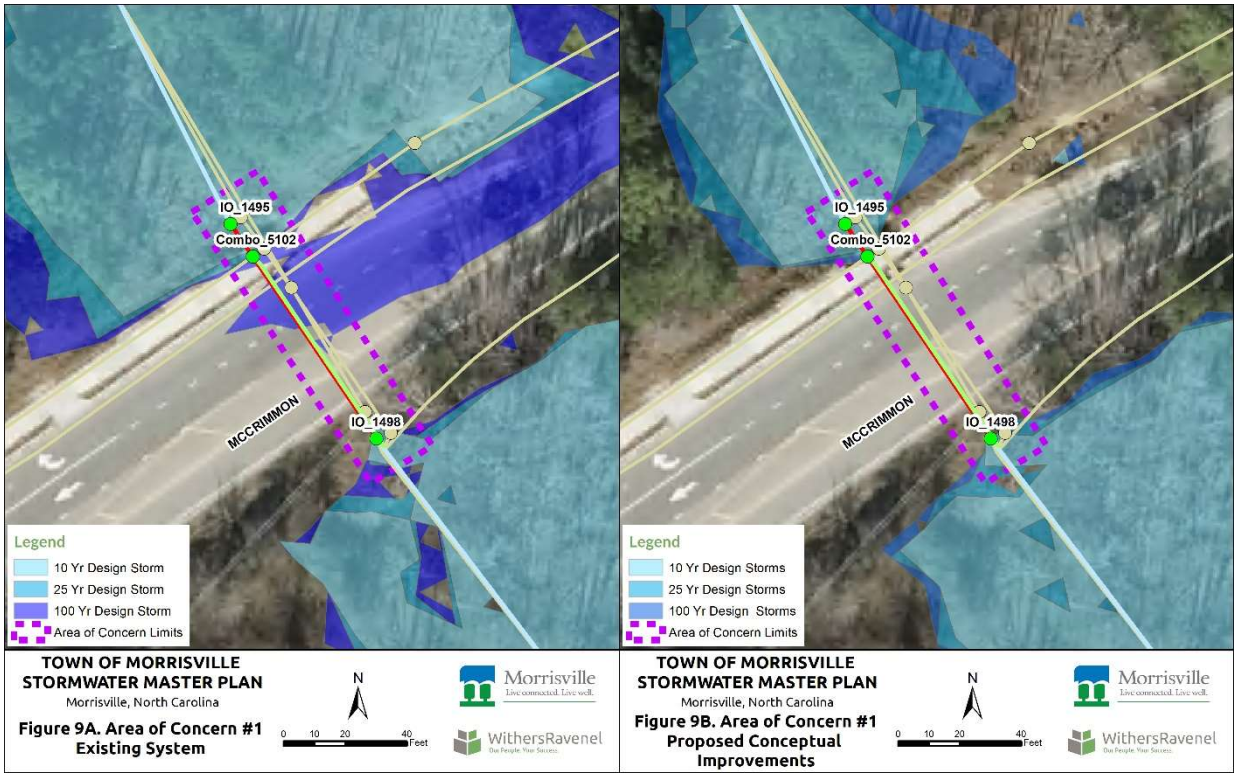
- Stormwater GIS Inventory Updates
- Hydrologic Characterization
- Hydraulics Modeling and Assessment
- Identification/Prioritization of Areas of Concern
- Assessment of Conceptual Level Stormwater Improvements
- Capital Improvement Plan

Portions of the assessed stormwater network that did not meet the above design criteria, and/or areas where flooding of structures, roadways, parking lots or residential lots was identified were flagged as potential areas of concerns. Twenty-nine (29) potential areas of concern were identified within the Town's jurisdiction.

These identified areas were reviewed with Town staff and nine (9) Area of Concerns (AOCs) expected to experience potential flooding issues were selected for assessment of potential improvements and prioritization. In addition, WithersRavenel also included an assessment of a proposed stream restoration and constructed wetland project along Morrisville Tributary per documentation provided by the Town.

4.1 Identified Areas of Concern & Proposed Conceptual Improvements

AOC #1 – McCrimmon Parkway Culvert (2B PAOC #4)	Neighborhood:	# of Houses Affected:	# of Roads Affected:
	N/A	0	1



Existing Conditions

This AOC is located within the Town maintained right-of-way ROW of McCrimmon Parkway approximately 300 feet east of the intersection with Church Street. The AOC includes the following storm drainage infrastructure:

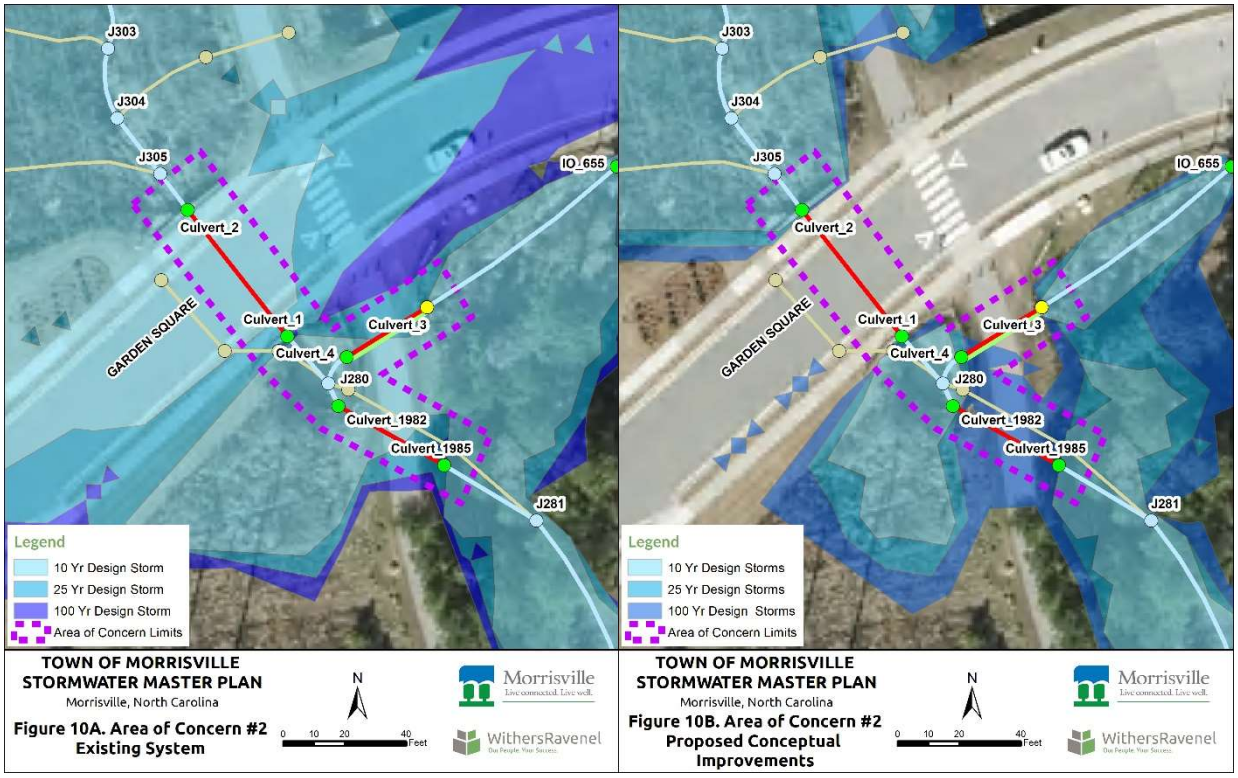
- McCrimmon Parkway
  - 2 – Combination Inlets
  - ±170 LF of 24" CMP
  - Upstream Headwall

Proposed Conceptual Improvements

After analysis of conceptual level improvements, it is recommended to upsize the existing culvert system. Currently, the system contains a double, 24" corrugated metal pipes and two combination inlets. The system should be upgraded to a double, 36" RCPs, with the two combination inlets and two headwalls replaced. Hydraulic modeling of this improvement eliminates backwater and overtopping of McCrimmon Parkway in the 100-Year storm event.

AOC #2 – Garden Square Lane Culvert & Greenway (2B PAOC #7)

Neighborhood:	# of Houses Affected:	# of Roads Affected:
Village at Town Hall Commons	2	1



Existing Conditions

This AOC is located approximately 150 feet west of the intersection of Garden Square Lane and Councilman Court and includes stormwater infrastructure within the Town maintained ROW of Garden Square Lane and the Town maintained easement along Indian Creek Greenway. The AOC includes the following storm drainage infrastructure:

- Garden Square Lane
  - ±52 LF of 5'x5' reinforced concrete box culvert (RCBC)
    - Upstream and downstream concrete headwalls
- Indian Creek Greenway
    - ±110 LF of 36" RCP
    - 6 – FES end treatments

Proposed Conceptual Improvements

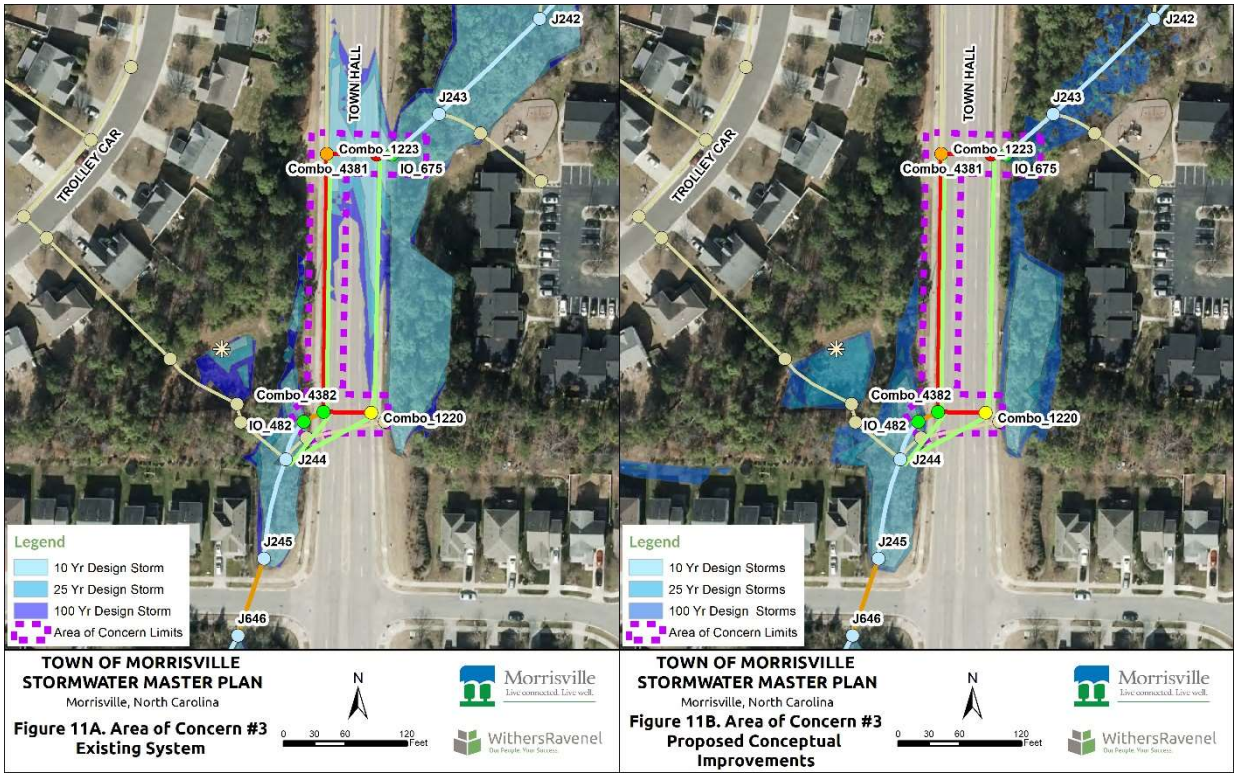
After analysis of conceptual level improvements, two improvements are provided based on cost consideration and compliance with culvert design criteria. The two improvements are outlined below:

- Improvement 1
  - Replace single, 36" pipe running parallel to the Garden Square Ln with a 10 foot bottom width drainage channel (outlet to stream)
  - Replace double 36" culvert with a 4 foot by 8 foot box culvert
- Improvement 2
  - Replace single 5'x5' RCBC with double 5'x5' RCBC
  - Replace single, 36" pipe running parallel to the Garden Square Ln with a 10 foot bottom width drainage channel (outlet to stream)
  - Replace double 36" culvert with boardwalk bridge and drainage channel (20 foot bottom width)

Hydraulic modeling of Improvement 1 eliminates flood impacts to residential structures adjacent to the stream but still overtops Garden Square Ln by approximately 0.5 feet – 1 feet of flood depth in the 100-Year design storm. However, hydraulic modeling of Improvement 2 alleviates backwater effects and prevents the roadway from overtopping in the 100-Year design storm.

AOC #3 – Town Hall Drive Culvert (2B PAOC #9)

Neighborhood:	# of Houses Affected:	# of Roads Affected:
Village at Town Hall Commons	0	1



Existing Conditions

This AOC is located within the Town maintained ROW of Town Hall Drive approximately 200 feet north of its intersection with Singer Way. The AOC includes the following storm drainage infrastructure that was assessed for potential improvements:

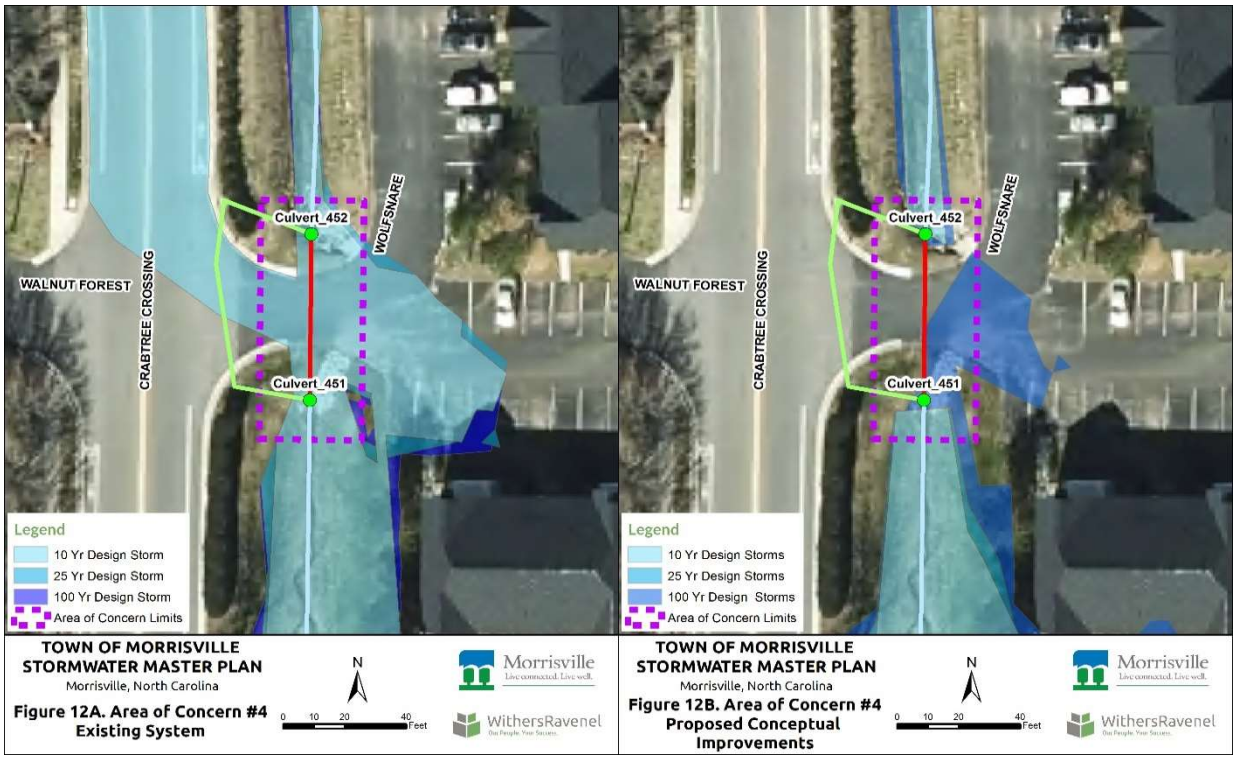
- Town Hall Drive
  - 3 – Combination Inlets
  - ±336 LF of 30" RCP
  - Upstream and downstream FES end treatments

Proposed Conceptual Improvements

After analysis of conceptual level improvements, it is recommended to upsize the existing culvert system. The existing 30" RCPs should be upgraded to 2.5' by 6' RCBC. Horizontal elliptical and arch pipes were also modeled but did not have the capacity to prevent flooding in the 100-Year design storm due to size and cover constraints. Hydraulic modeling of the recommended box culvert improvement alleviates backwater effects and prevents the flooding of Town Hall Dr in the 100-Year storm. The resulting increase in discharged flows downstream does increase water surface elevations at the Singer Way culvert from 327.51 feet to 329.11 feet. However, topographic information indicates that this does not result in the overtopping of Singer Way. In addition, the residence located at 102 Singer Way adjacent to the Singer Way culvert appears to be elevated above the roadway elevation with a retaining wall along the eastern side of the property separating the yard from the drainage swale leading to the culvert. The Singer Way culvert is outside of Morrisville's jurisdiction and within the Town of Cary and thus improvements to this 36" culvert were not assessed. Upsizing this culvert with collaboration from the Town of Cary would mitigate increases to water surface elevations upstream of the culvert.

AOC #4 – Wolfsnare Lane Culvert (2B PAOC #12)

Neighborhood:	# of Houses Affected:	# of Roads Affected:
Crabtree Crossing Apartments & Townhomes	0	1



Existing Conditions

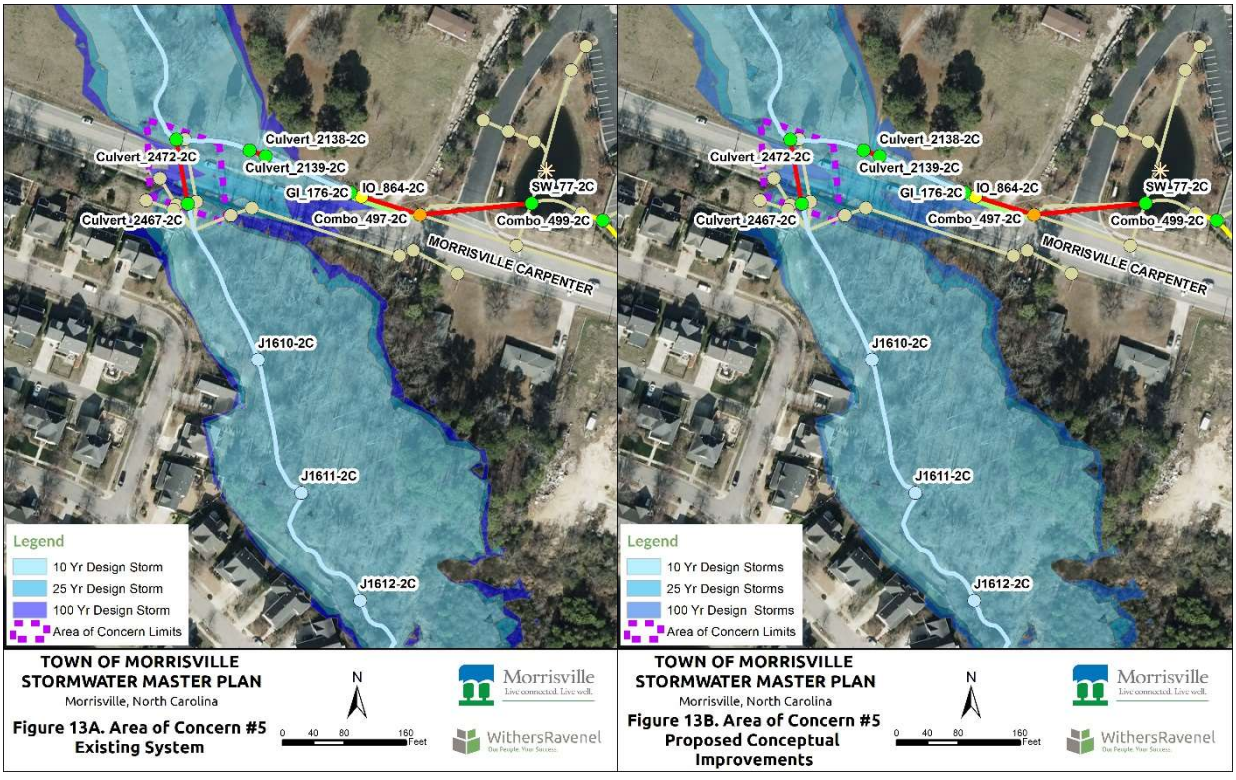
This AOC is located on private property owned by Morrisville Associates LLC and is located immediately off of Crabtree Crossing Parkway. The AOC includes the following storm drainage infrastructure:

- Wolfsnare Lane
  - ±55.3 LF of 24" RCP
  - Upstream and Downstream FES End Treatments

Proposed Conceptual Improvements

After analysis of conceptual level improvements, it is recommended to upsize the existing culvert system. The existing system, containing a single, 24" RCP, should be upsized to the largest possible aluminum box culvert (2'-6" x 8'-9") feasible given existing cover constraints. Hydraulic modeling of the recommended improvement prevents flooding to the adjacent Crabtree Crossing Pkwy while overtopping the low point of Wolfsnare Ln by 0 feet – 0.5 feet. This overtopping is deemed acceptable due to the culvert size constraints and the fact that Wolfsnare serves as a private driveway that offers other exit alternatives.

AOC #5 – Morrisville Carpenter Road Culvert (West of Davis Dr / 2C PAOC #1)	Neighborhood:	# of Houses Affected:	# of Roads Affected:
	Carpenter Village	0	1



Existing Conditions

This AOC is located within the NCDOT maintained ROW of Morrisville Carpenter Road approximately 1,300 feet west of the intersection with Davis Drive. The AOC includes the following storm drainage infrastructure:

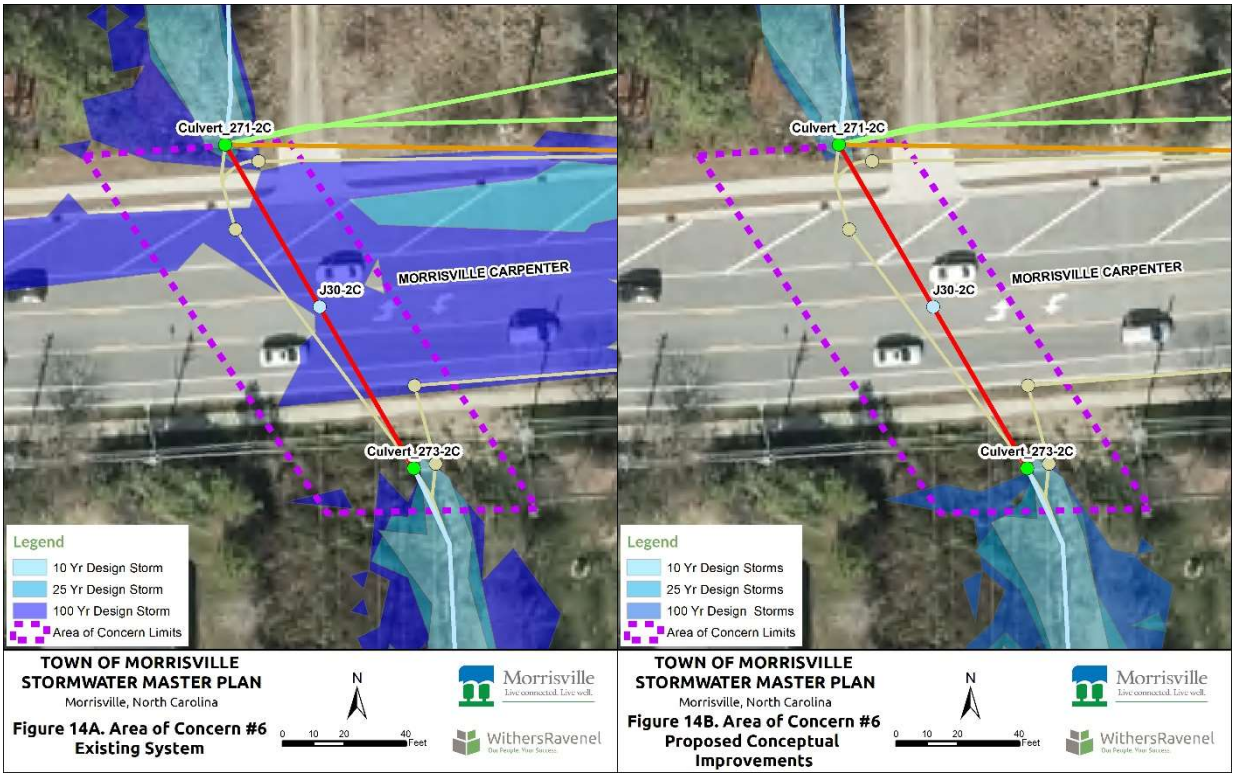
- Morrisville Carpenter Road Culvert
  - ±170 LF of 60" RCP
  - Upstream and Downstream Headwalls

Proposed Conceptual Improvements

Analysis of conceptual level improvements show continued overtopping of Morrisville Carpenter Rd in the 25-Year and 100-Year design storms. The existing system, containing two, 60" RCPs, should be upsized to the largest possible aluminum box culvert (4'-11" x 21'-11") according to Contech's Aluminum Box Culvert Design Guide and cover constraints. Inputting this improvement into the hydraulic model showed only a slight drop in water surface elevation and continued roadway overtopping. Based on topography, the sag of Morrisville Carpenter Rd sits only a few feet above the natural floodplain on either side of the road. It is WithersRavenel's opinion that a bridge or culvert at least 20 feet in span, in conjunction with elevating Morrisville Carpenter Rd, would prevent roadway overtopping in the 100-Year storm. Further analysis is required. In addition, because the peak flows for the larger storm events flow over the roadway, the increased capacity of the culvert in combination with unchanging tailwater conditions, does not result in an increase in water surface elevations downstream of the culvert between existing and proposed improvements. Private properties adjacent to the stream lie within the floodplain and will still continue to see the potential for flood impacts during the 100-yr storm event with the proposed improvement.

AOC #6 – Morrisville Carpenter Road Culvert (West of Millet Dr / 2C PAOC #4)

Neighborhood:	# of Houses Affected:	# of Roads Affected:
Carpenter Park	0	1



Existing Conditions

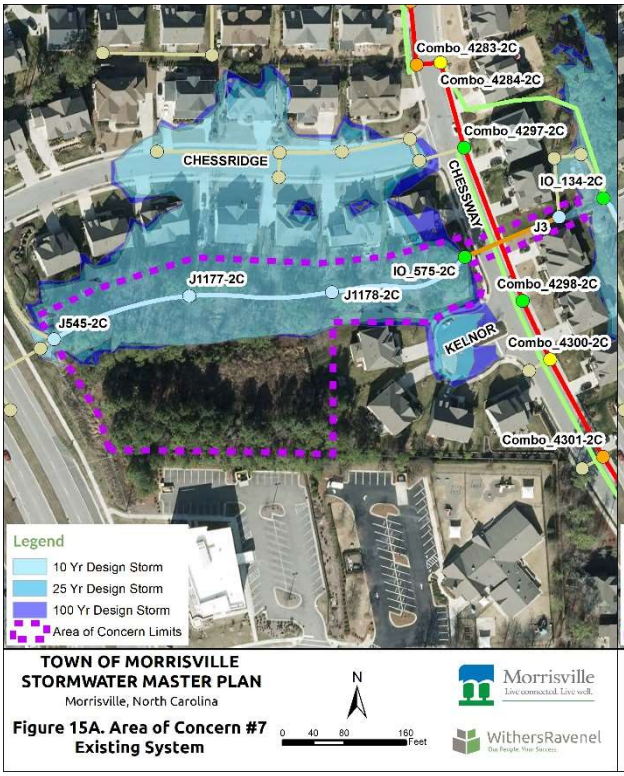
This AOC is located within the NCDOT maintained ROW of Morrisville Carpenter Road approximately 235 feet west of the intersection with Millet Drive. The AOC includes the following storm drainage infrastructure:

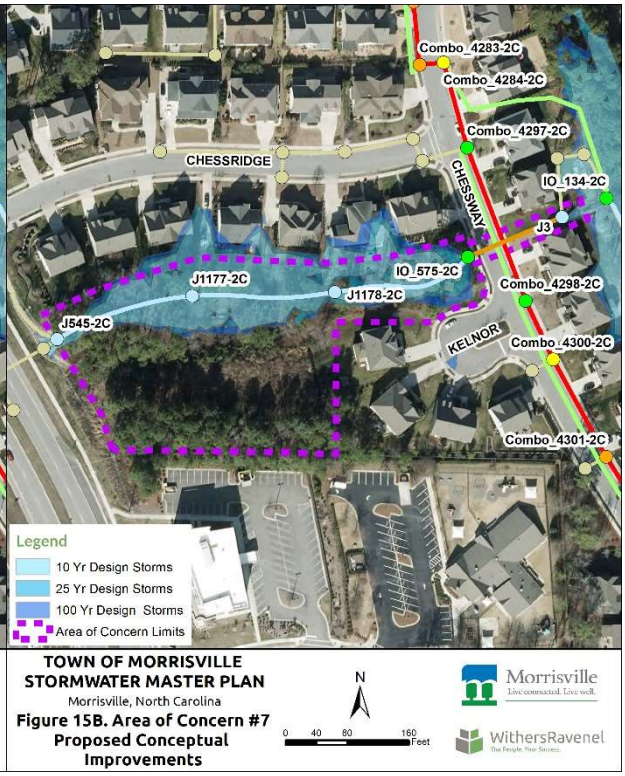
- Morrisville Carpenter Road Culvert
  - ±100 LF of 30" RCP
  - ±50 LF of 36" RCP
  - Upstream and Downstream Headwalls

Proposed Conceptual Improvements

After analysis of conceptual level improvements, it is recommended to upsize the existing culvert system. Currently, the system contains a double 30" RCPs, manhole junction box, and a single 36" RCP. The system should be upgraded to two, 3' by 5' RCBCs, with the manhole junction box replaced. Hydraulic modeling of this improvement eliminates backwater and overtopping of McCrimmon Pkwy in the 100-Year storm event, as seen with the existing system.

AOC #7 – Chessway Drive Culvert (2C PAOC #2)	Neighborhood:	# of Houses Affected:	# of Roads Affected:
	Chessington	9	1





Existing Conditions

This AOC is located within the Town maintained ROW of Chessway Drive approximately 150 feet south of the intersection with Chessridge Way. The AOC includes the following storm drainage infrastructure:

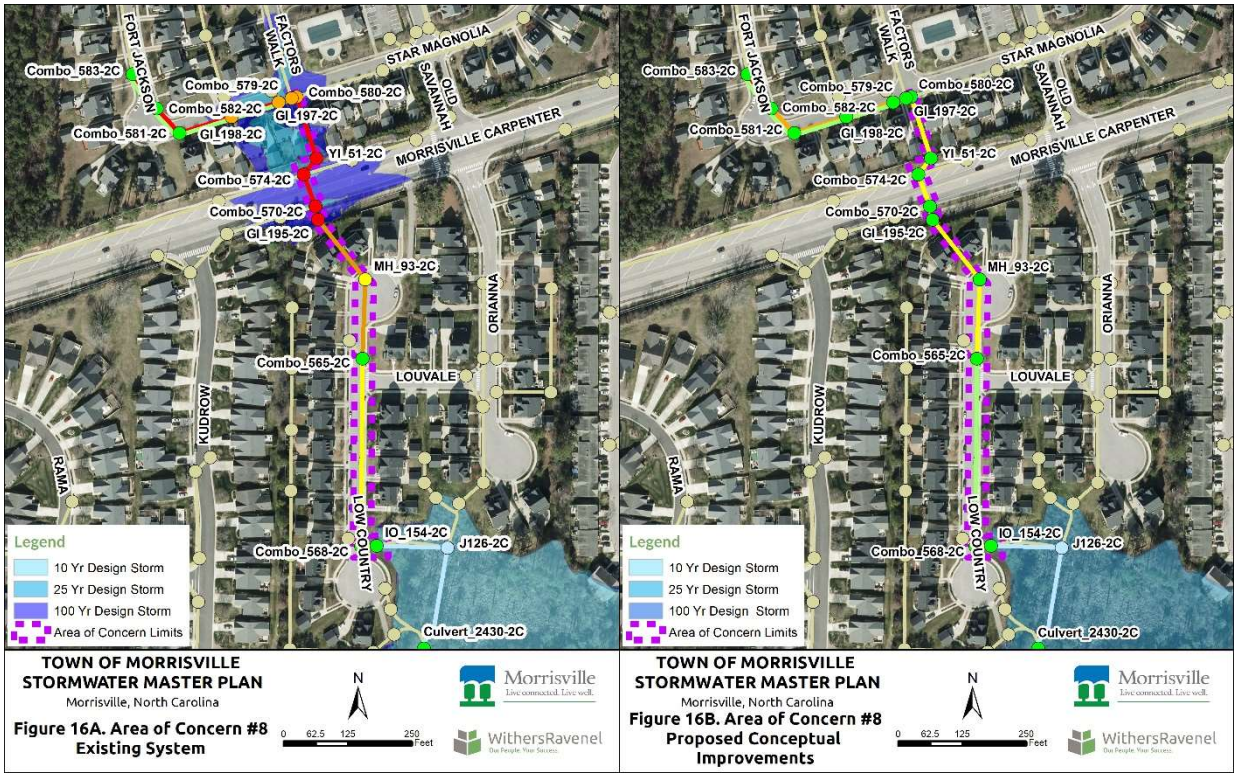
- Chessway Drive Culvert
  - ±133 LF of 36" RCP
  - ±77 LF of 15" RCP
  - Level Spreader
  - Upstream and Downstream FES End Treatments

Proposed Conceptual Improvements

Analysis of conceptual level improvements to the existing culvert system only showed continued flood impacts to residential structures, upstream of the culvert and adjacent to the stream along Chessridge Way and it was determined that storm drainage infrastructure improvements alone was not a feasible option to mitigate upstream flooding. In addition to upsizing the culvert under Chessway Drive, WithersRavenel also recommends that that upstream wooded area be utilized to construct a lowered floodplain to provide additional storage below the FFE of the adjacent houses. The modeled conceptual improvement included the construction of a meandering channel incised approximately 2' deeper than the existing channel at the upstream end while maintaining the current culvert inlet invert at Chessway Drive. In addition to the deeper channel, the conceptual design includes the excavation of a relatively flat floodplain 50' on either side of the new channel. This additional floodplain storage in addition to the increased culvert capacity appears to mitigate the 100-year flooding of the adjacent residential structures and Chessridge Way.

AOC #8 – Savannah Subdivision & Morrisville Carpenter Road Culvert (2C PAOC #7)

Neighborhood:	# of Houses Affected:	# of Roads Affected:
Savannah	3	3



Existing Conditions

This AOC is located within the NCDOT maintained ROW of Morrisville Carpenter Road and within Town maintained ROWs of Star Magnolia Drive and Low Country Court within the Savannah subdivision on either side of Morrisville Carpenter Road. A portion of the stormwater infrastructure is located on private property between 113 and 117 Star Magnolia Drive.

The AOC includes the following storm drainage infrastructure:

- Morrisville Carpenter Road Culvert
  - 7 – Combination Inlets
  - 3 – Grate Inlets
  - 1 – Yard Inlet
  - 1 – Manhole
  - ±396 LF of 36" RCP
  - ±1,179 LF of 30" RCP
  - ±66 LF 2.5' x 4.5' RCBC
  - ±27 LF 2.5' x 5.6' RCBC
  - Upstream and downstream FES end treatments

Proposed Conceptual Improvements

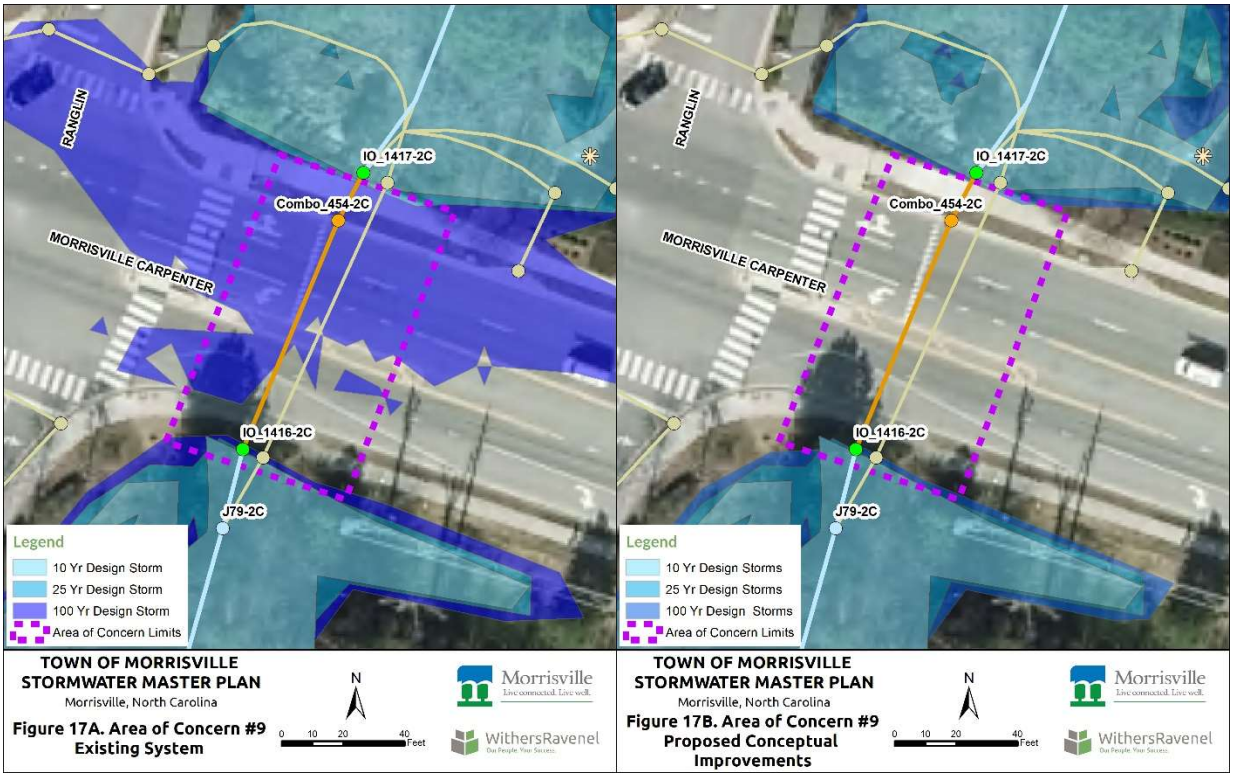
After analysis of conceptual level improvements, changes to the existing system downstream of junction Combo_580 are recommended. From upstream to downstream, the following changes are outlined below:

- Upsize Pipe_997 and Pipe_996 to double, 36" RCPs (currently double, 30" pipes)
- Replace Pipe_991 with a 2.5' by 5.65' RCBC (currently 2.5' by 4.5' RCBC) to match capacity/size of the next downstream box culvert
- Upsize Pipe_1015 and Pipe_1016 to double, 42" RCPs (currently double, 30" RCPs)
- Upsize Pipe_1013 and Pipe_1012 to double, 48" RCPs (currently double, 36' RCPs)

Hydraulic modeling of this improvement, including adjustments to junction inverts, eliminated flooding of Morrisville Carpenter Rd and adjacent residential structures on the northbound side in the 100-Year design storm.

AOC #9 – Morrisville Carpenter Road Culvert (West of Madres Ln / 2C PAOC #10)

Neighborhood:	# of Houses Affected:	# of Roads Affected:
Carpenter Park	0	1



Existing Conditions

This AOC is located within the NCDOT maintained ROW of Morrisville Carpenter Road approximately 230 feet west of the intersection with Madres Lane. The AOC includes the following storm drainage infrastructure:

- Morrisville Carpenter Road
  - 1 – Combination Inlets
  - ±192 LF of 54" RCP
  - Upstream and Downstream Headwall

Proposed Conceptual Improvements

After analysis of conceptual level improvements, it is recommended to upsize the existing culvert system. The existing double, 54" RCPs should be upgraded to a double, 5 foot by 10 foot box culvert. Hydraulic modeling of the recommended box culvert improvement alleviates backwater effects and prevents the overtopping of Morrisville Carpenter Rd in the 100-Year storm.

AOC #10 – Morrisville Tributary Stream Restoration

Neighborhood:	# of Houses Affected:	# of Roads Affected:
N/A	--*	--*

**AOC #10 not modeled as part of this study*

Existing Conditions

Stantec identified the ±2,360 foot portion of the Morrisville Tributary between 580 Church St (upstream) and where the tributary crosses under the railroad tracks (downstream) as "unstable" with "high" bank erosion and "poor" habitat qualities in their Neuse River Phase II Watershed Assessment report dated June 2, 2015. This portion of the tributary receives stormwater drainage from approximately 382-acres at the upstream with a combined drainage area of 432-acres to the culvert under the railroad. Review of model results for the area long the tributary indicate that the inundated areas are limited to undeveloped woodlands with the exception of SiteOne Landscape Supply company located at 580 Church St. The tributary transects this property via a bridge structure, and it appears that the plant nursery and stockpile areas are inundated during a 10-Year, 25-Year, and 100-Year design storm event. Results of the model indicate that 10-Year flood velocities are relatively high in this portion of the stream with some segments exceeding 6 ft/s.

Proposed Conceptual Improvements

Stantec prepared a feasibility study and conceptual design for the portion of Morrisville Tributary described above in their 228 Page Street Feasibility Study dated June 11, 2014. The conceptual design consists of the following:

- A 0.45 acre constructed wetland to receive/treat stormwater runoff from approximately 6.8 acres.
- Realignment of approximately 2,260 linear feet of stream channel and the construction of approximately 3.42 acres of floodplain wetlands.
- Extension of the existing Indian Creek Greenway along the existing sanitary sewer line easement to tie into Morris Street.

Figure 18. Area of Concern #10

Figure obtained from Stantec's 228 Page Street Feasibility Study dated June 11, 2014

4.2 Preliminary Cost Opinions for Budgeting Purposes

In order to help the Town budget for the potential conceptual improvements described above, rudimentary cost opinions were developed for each area of concern. The cost opinions were based on replacing current stormwater infrastructure quantities only; costs for engineering design, survey, and construction labor were based off a percentage of the stormwater infrastructure material costs. Additional costs associated with permitting, land or easement acquisition, utility relocation, or additional improvements were not considered. These cost opinions are based on current pricing as of the date of this report and do not consider cost increases due to inflation.

The following table summarizes the preliminary cost opinions for each area of concern described above:

Table 13. Preliminary Cost Opinions for Budgetary Purposes

Potential Project Area	Probable Costs
Area of Concern #1 - McCrimmon Parkway	$ 180,000
Area of Concern #2 - Garden Square Lane & Greenway	$ 880,000
Area of Concern #3 - Town Hall Drive Culvert	$ 1,340,000
Area of Concern #4 - Wolfsnare Lane Culvert	$ 220,000
Area of Concern #5 - Morrisville Carpenter Road Culvert (West of Davis Dr)	$ 500,000
Area of Concern #6 - Morrisville Carpenter Road Culvert (West of Millet Dr)	$ 890,000
Area of Concern #7 - Chessway Drive Culvert	$ 1,720,000
Area of Concern #8 - Savannah Subdivision & Morrisville Carpenter Road Culvert	$ 1,340,000
Area of Concern #9 - Morrisville Carpenter Road Culvert (West of Madres Ln)	$ 1,050,000
Area of Concern #10 - Morrisville Tributary Stream Restoration	$ 1,900,000
TOTAL:	$ 10,020,000

* ***Cost estimate provided is for Improvement 2 (See Appendix I – Area of Concern #2)***

5. PRIORITIZATION OF AREAS OF CONCERN

5.1 Prioritization Scoring System

The AOCs were ranked for the purpose of prioritizing potential improvement projects to mitigate flooding issues by scoring each based on the following weighted criteria. Each criterion was assigned a 0 to 100 scoring system with the higher values representing a higher priority relative to the associated criteria. In addition, each criterion was assigned a weighted value representing the relative importance of each criterion.

Age of Infrastructure (5%)

Age of assessed infrastructure scoring was determined based on review of as-built record drawings where available. When as-built information was not available, historical aerial imager was used to approximate age of the storm network based on when the network or associated infrastructure first appeared in historical aerials. The following summarizes the scoring basis for this criterion:

- 1-20 points: Assumed infrastructure age <5 years
- 21-40 points: Assumed infrastructure age 5-10 years
- 41-60 points: Assumed infrastructure age 10-20 years
- 61-80 points: Assumed infrastructure age 20-30 years
- 81-100 points: Assumed infrastructure age >30 years

Severity of Flooding (25%)

Severity of flooding scoring was determined based on the number and type of entities expected to be impacted by flood conditions for each AOC. Points were assigned for each type of impacted entity per the following:

- Private Roadway/Driveway: 10 points
- Secondary Roadway: 25 points
- Major Roadway: 35 points
- Parking Lot: 5 points
- Residential Lot: 10 points
- Residential Structure: 20 points
- Commercial Structure: 25 points

The total score for each AOC was determined by multiplying the number of each entity type impacted by the above points and totaling the number of points up to a maximum of 100 points.

Frequency of Flooding (20%)

Frequency of flooding scoring was determined based on the design storm frequency that resulted in observed flooding of entities. The existing stormwater infrastructure was assessed using 10-, 25-, and 100-Year, 24-hour design storm events. AOCs were assigned a frequency of flooding score based on the number of entities and frequency of storm event:

- 10-Year, 24-hour flooding observed: 61-100 points
- 25-Year, 24-hour flooding observed: 31-60 points
- 100-Year, 24-hour flooding observed: 0-30 points

The total score for each AOC was determined by multiplying the number entities impacted during each assessed designs storm event by the above points and totaling up to a maximum of 100 points. The type of entity was not considered for determining this frequency of flooding scoring.

Capital Costs (15%)

Capital costs scoring was based on the assumed construction costs of the proposed improvements for each AOC. Improvement plans with lower costs were assigned a higher score as it was assumed that potential Capital Improvement Projects with lower costs would be prioritized since funding would likely be more

accessible and available sooner compared to projects with high capital costs that may require additional funding sources. The following summarizes the capital costs scoring:

- <$250,000: 100 points
- $250,000 to $500,000: 75-99 points
- $500,000 to $750,000: 50-74 points
- $750,000 to $1,000,000: 25-49 points
- >$1,000,000: 0-24 points

Jurisdiction (15%)

Jurisdictional scoring was based on the current jurisdiction of the AOC. AOCs either completely or partially located within property or right-of-way currently owned and/or maintained by the Town were assigned a higher score. AOCs located on private property or within NCDOT maintained right-of ways or corridors were assigned a lower score since it was assumed that easement acquisition and general access may limit improvement options or construction accessibility. The following summarizes the general jurisdictional scoring:

- Town of Morrisville: 75-100 points
- Private Property (Residential): 50-74 points
- Private Property (Commercial): 25-49 points
- NCDOT: 0-24 points

If the proposed improvements associated with an AOC are located within multiple jurisdictions, a weighted average of the area in each is used to determine the scoring.

Coincides with Proposed Improvements (20%)

Following discussions with Town staff, each AOC was ranked based on the potential for proposed improvements to coincide with potential future Town projects. These included repaving projects, road widening, and/or replacement of other infrastructure or utilities in close proximity to the AOC. AOCs that potentially coincide with future improvement projects were scored higher while AOCs in areas with no future plans for improvements by the Town were scored lower or given a score of zero.

5.2 Area of Concern Prioritization Summary

The following table summarizes the weighted prioritization scoring of each area of concern per the scoring criteria described above:

Table 14. Area of Concern Prioritization Summary

Prioritization Matrix	Weighted %	Area of Concern									
		1		2		3		4		5	
		Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score
Age of Infrastructure	5%	80	4	50	2.5	50	2.5	60	3	80	4
Severity of Flooding	25%	30	7.5	50	12.5	35	8.75	55	13.75	25	6.25
Frequency of Flooding	20%	30	6	90	18	90	18	100	20	100	20
Capital Costs	15%	100	15	75	11.25	20	3	100	15	65	9.75
Jurisdiction	15%	100	15	100	15	100	15	90	13.5	24	3.6
Coincides with Proposed Improvements	20%	80	16	20	4	25	5	10	2	10	2
Total Weighted Score	100%	63.5		63.25		52.25		67.25		45.6	
Priority Ranking	---	3		4		8		2		9	

Prioritization Matrix	Weighted %	Area of Concern									
		6		7		8		9		10	
		Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score
Age of Infrastructure	5%	80	4	45	2.25	50	2.5	50	2.5	100	5
Severity of Flooding	25%	35	8.75	100	25	100	25	35	8.75	30	7.5
Frequency of Flooding	20%	50	10	100	20	80	16	30	6	30	6
Capital Costs	15%	50	7.5	5	0.75	18	2.7	24	3.6	24	3.6
Jurisdiction	15%	83	12.45	50	7.5	50	7.5	24	3.6	100	15
Coincides with Proposed Improvements	20%	80	16	10	2	75	15	10	2	100	20
Total Weighted Score	100%	58.7		57.5		68.7		26.45		57.1	
Priority Ranking	---	5		6		1		10		7	

6. CAPITAL IMPROVEMENT PLAN

The Capital Improvement Plan (CIP) reflects the Town's planned staffing, equipment, maintenance, and capital improvements for the current year and next ten years. The Stormwater Program Evaluation and Funding Report prepared by Freese and Nichols, Inc. dated June 2020 indicates that the Option C: Enhanced Services and 10-Year CIP includes an average annual Capital Overlay budget of $650,000 (including a 3% escalation rate per year). The following ten (10) projects have been identified as relatively high priority stormwater projects relative to flood mitigation purposes for funding through Fiscal Year 2031. It should be noted that additional priority stormwater related projects, not assessed as part of this Stormwater Master Plan, may exist, or arise based on infrastructure failure or water quality issues. A 2% cost escalation factor per year is included for all ten projects to account for inflation through the 10-Year CIP. This leads to a matter of funding approximately $11.3 million of flood mitigation projects in the proposed Capital Improvement Plan. The yearly costs are expected to reach over $700,000 during some years.

Stormwater Program Evaluation and Funding Report
Prepared by Freese and Nichols, Inc. *Town of Morrisville*

Table 20 - Option C: Enhanced Services and 10-Year CIP

Expense Status	Expense Description	Annual Cost	Annual Cost $/ERU
Current	Salary/Benefits	$193,411	$7.15
Current	Project Expenses	$8,194	$0.30
Current	Maintenance and Repair	$54,365	$2.01
Current	Professional Services	$134,203	$4.96
Current	Capital Outlay	$141,828	$5.25
CURRENT SUBTOTAL		**$532,001**	**$19.68**
New Staffing	Entry Level Engineer	$86,996	$3.22
New Equipment	2-Door Pickup	$11,560	$0.43
New PAYGO	Contract Maintenance	$151,200	$5.59
New PAYGO	Capital Outlay (10-Year Completion)	$650,000*	$24.04*
NEW SUBTOTAL		**$899,756**	**$33.28**
TOTAL		**$1,431,757**	**$52.96**
		Required SWU Fee Increase	**$27.96**

**Note: Cost is an average annual amount that includes a 3% escalation rate per year.*

Table 15. Priority Flood Mitigation Projects

Priority Ranking	Potential Project Area	Probable Costs
1	Area of Concern #8 - Savannah Subdivision & Morrisville Carpenter Road Culvert	$ 1,374,600
2	Area of Concern #4 - Wolfsnare Lane Culvert	$ 220,000
3	Area of Concern #1 - McCrimmon Parkway	$ 180,000
4	Area of Concern #2 - Garden Square Lane & Greenway	$ 934,600
5	Area of Concern #6 - Morrisville Carpenter Road Culvert (West of Millet Dr)	$ 966,800
6	Area of Concern #7 - Chessway Drive Culvert	$ 1,935,200
7	Area of Concern #10 - Morrisville Tributary Stream Restoration	$ 2,236,000
8	Area of Concern #3 - Town Hall Drive Culvert	$ 600,000
9	Area of Concern #5 - Morrisville Carpenter Road Culvert (West of Davis Dr)	$ 1,608,000
10	Area of Concern #9 - Morrisville Carpenter Road Culvert (West of Madres Ln)	$ 1,260,000
	TOTAL:	$ 11,315,200*

** **Includes 2% Cost Escalation Factor per year to account for inflation***

Table 16. 10-Year Capital Improvement Plan

Project Description	Cumulative Costs	Budget FY 2022	Budget FY 2023	Budget FY 2024	Budget FY 2025	Budget FY 2026	Budget FY 2027	Budget FY 2028	Budget FY 2029	Budget FY 2030	Budget FY 2031	Budget FY 2032+
		% Cost Escalation Factor										
		0%	2%	4%	6%	8%	10%	12%	14%	16%	18%	20%
Area of Concern #8 - Savannah Subdivision & Morrisville Carpenter Road Culvert	**$1,374,600**	$150,000	$663,000	$561,600								
Area of Concern #4 - Wolfsnare Lane Culvert	**$220,000**	$220,000										
Area of Concern #1 - McCrimmon Parkway	**$180,000**	$180,000										
Area of Concern #2 - Garden Square Lane & Greenway	**$934,600**			$114,400	$604,200	$216,000						
Area of Concern #6 - Morrisville Carpenter Road Culvert (West of Millet Dr)	**$966,800**				$84,800	$486,000	$396,000					
Area of Concern #7 - Chessway Drive Culvert	**$1,935,200**						$154,000	$1,120,000	$661,200			
Area of Concern #10 - Morrisville Tributary Stream Restoration	**$2,236,000**								$114,000	$754,000	$708,000	$660,000
Area of Concern #3 - Town Hall Drive Culvert	**$600,000**											$600,000
Area of Concern #5 - Morrisville Carpenter Road Culvert (West of Davis Dr)	**$1,608,000**											$1,608,000
Area of Concern #9 - Morrisville Carpenter Road Culvert (West of Madres Ln)	**$1,260,000**											$1,260,000
TOTAL	**$11,315,200***	$550,000	$663,000	$676,000	$689,000	$702,000	$550,000	$1,120,000	$775,200	$754,000	$708,000	$4,128,000

Includes 2% Cost Escalation Factor per year to account for inflation