Town of Mayesville, SC

Stormwater Study

April 13, 2023

Prepared for: South Carolina Office of Resilience

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Executive Summary

This report provides an overview of the Town of Mayesville, South Carolina's comprehensive stormwater study for the South Carolina Office of Resilience (SCOR). Mayesville has experienced recurring flooding at various locations within the town limits which has obstructed traffic and damaged buildings. The most severe flooding has occurred within the Main Street district in the vicinity of Lafayette Street and the Mayesville Museum. The town's drainage system is comprised of a network of drainage inlets, pipes, open ditches, and larger drainage channels. Areas of the town's open drainage systems have been converted to piped systems over the last quarter of a century including large channels along the abandoned railroad bed and Main Street.

To determine the level of service provided by the existing stormwater infrastructure, a hydrologic and hydraulic model has been developed. PCSWMM (2D modeling) was utilized to conduct the analysis for the 2-, 10-, 25-, 50-, and 100-year storm events to identify the effectiveness of the existing drainage systems. Future land cover changes and changes in rainfall patterns caused by climate change were also considered in a separate model. The results of the existing conditions and future conditions analysis is discussed in greater detail within this report.

The consultant team completing this study is comprised of engineers from WSP Environment & Infrastructure and McCormick Taylor, Inc (Team). At the onset of the project, the Team met with SCOR and Town officials to identify focus areas within the town limits. A public meeting was held on March 8, 2022, during a Town of Mayesville Council Meeting. During the public meeting additional areas of reoccurring flooding were identified as well as anecdotal testimony on sources of flooding, historical development within the Town, and the timeline for the conversion of open swales to piped systems, specifically along Main Street and the railroad.

Data Collection and Processing

As there was little available data regarding the existing drainage system, the Team conducted field investigations and collected inventory of the existing stormwater infrastructure within the town limits. Prior to commencing the field inventory data collection, the Team researched SCDOT plan archives for state owned roads within the study area. These historical documents depicted drainage system components along the roads and was used to guide the field work. Data collection included horizontal location of drainage structures, depth of drainage structure, size of pipe or ditch, and flow direction. Areas of ponding or ineffective flow were denoted. These data sets were compiled and processed into a ARCGIS dataset to support the modeling and study analysis.

Hydrologic Modeling

Detailed hydrologic modeling was performed using PCSWMM (2D modeling) rain-on-grid to estimate existing and future condition runoff, peak flows, and flood depths. The hydrology of Mayesville is rather complex given the relatively flat terrain and construction of interconnected agricultural ditches that divert runoff in multiple directions. Additionally, some drainage systems had dual outfalls. Using LIDAR digital elevation model obtained from SCDNR, contours were generated within the study area and drainage area boundaries delineated. Sixteen (16) drainage areas were identified within the project limits and were based on major outfall points. These drainage areas were then referenced to the drainage network developed during the data collection phase and finally field verified for accuracy. Due to the interconnected agricultural ditches, some assumptions on ditch flow were required. In these cases, a conservative approach was taken in developing the drainage area boundaries. This conservative approach will ensure worst case conditions are considered within the model. Land uses and soil types were determined from GIS data obtained from Sumter County and NRCS.

Hydraulic Modeling

The existing drainage systems (inlets, manholes, pipes, and swales) were imported into the PCSWMM model and overlaid with the hydrology inputs and the digital elevation model (DEM). The use of a DEM allows for automated importing of drainage channels and larger roadside ditches. In areas where the DEM did not accurately depict open ditches and channels, these features were hand entered into the model. To meet SCDOT design criteria for storm drains and roadside ditches with drainage over 40 acres, the recommended stormwater design storm for this study is the 24-hour 25-year storm event. Understanding that infrastructure lifespan is approximately 75-years, the 50-year event was modelled as well to identify the resultant flooding that may occur during a larger storm event. Once the drainage conveyance system is surcharged and overflows, the model considers overland flow across roads, yards, and other land surfaces. The model will exhibit the depth of flow (flooding) across these surfaces.

Existing Conditions Model Results

The analysis and mapping results show that during the 25-year design storm event, the Town's existing drainage infrastructure does not adequately convey stormwater runoff. Overcapacity and surcharges through the drainage structures affect well over 90% of the existing storm drain network, contributing to overland flooding. Furthermore, the results show that 1 to 2 feet of flooding may occur during the 25-year design storm event in 8% of buildings within the town limit as shown in Table 11 and 12. Other storm events were modelled as well and are depicted in further detail within the report. The flooding can be attributed to undersized drainage pipes and roadside ditches, inadequate number and spacing of drainage inlets and or lack of actual drainage conveyance system. There was not one area that was spared from flooding within the Town. As storm intensity increases in the future due to climate change, the inundation areas are expected to expand, and the flooding will become deeper. The results of these models indicate that improved drainage conveyance systems are required throughout the town, which will be explored in the next phase of the study.

Existing Conditions Mapping and Impact Assessment

The results of the models have been depicted in various displays and maps, found in Appendices A and B. The displays depict the depth of flooding during the various storm events and the various drainage system's lack of capacity. The number of flooded buildings was used to quantify the extent of the flooding. The results from the PCSWMM model indicate that for 25-yr storm event, 34 buildings out of 397 total (8%) are vulnerable to flooding depths of 1 to 2 feet. Flooding of less than 1 foot was considered nuisance flooding and in general would not result in structural damage to buildings.

Mitigation Strategy Considerations

Flooding within the Town of Mayesville is a result of substandard or non-existent stormwater conveyance systems. In general, the repetitive flooding was found to occur in the downtown core including N. Lafayette Street, Republic Street, Main Street, and the residential area between Main Street and Sumter Street. While flooding impacted both properties and roadways, it was found that the flooding was generally a result of the substandard drainage systems along the roadways and irregular lot grading resulting in low spots within the properties. The roadways have limited piped stormdrain conveyance systems and generally lack swales and ditches. A variety of mitigation measures were considered, including measures associated with riverine-type flooding, detention facilities, structure relocation or demolition, and indirect methodologies. Overall drainage system improvements were determined to be the most appropriate alternative for the flooding issues in Mayesville.

Mitigation Evaluations

The proposed mitigation alternatives result in a total of 7,714 LF (1.5 miles) of circular pipe and 13,973 LF (2.6 miles) of horizontal elliptical pipe, as well as 12,572 LF (2.4 miles) of proposed improved ditches.

Should all of the drainage system improvements be implemented to mitigate the flooding issues in Mayesville, for a 25-year storm event, 65 buildings would be removed from being vulnerable to flooding of depths of 0.5 to 1 ft, 22 buildings would be removed from being vulnerable to flooding of depths of 1 to 2 ft, two buildings would be removed from being vulnerable to flooding of depths of 2 to 3 ft and one building would be removed from being vulnerable to flooding of greater than 3 ft depth.

Prioritization

Based on input from the town and location of modelled flooding, four drainage areas were prioritized for additional evaluation: 7.1, 7.4, 7.8, and 7.10. The Benefit Cost Analysis was conducted on these 4 drainage projects, resulting in BCRs of 0.14, 0.65, 19.55 and 0.52, respectively. A Ranking System was developed to evaluate these 4 drainage projects, which resulted in scores of 67.4, 62.5, 62 and 77.2, respectively. The estimated costs of these prioritized projects are: $9.6M, $6.8M, $0.5M and $2.0M, respectively. Buyouts and elevations are considered as options for some of the more expensive projects, thought these would not solve the road flooding. Because of the high BCA and reasonable overall cost, the drainage project 7.8 would be prioritized first. Although it's BCA is less than 1.0, drainage project 7.10 was ranked the highest and has a significantly lower cost than 7.1 or 7.4. Each of drainage projects 7.8 and 7.10 would remove 7 structures from being vulnerable to flooding and would eliminate street flooding.

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1.0 Introduction

1.1 Purpose

The South Carolina Office of Resilience (SCOR) has contracted the WSP Environment and Infrastructure Team, which includes McCormick Taylor (Team) to complete a stormwater study for the Town of Mayesville, SC. The study is funded by a US (United States) Housing and Urban Development (HUD) Community Development Block Grant-Mitigation (CDBG-MIT) grant and is intended to identify flooding issues, conduct an assessment of existing stormwater systems; develop and prioritize projects, and establish an implementation strategy for the identified projects.

The goal of each project is to meet the following criteria:

- Meet the following definition of a Mitigation Activity: Activities that increase resilience to disasters and reduce or eliminate the long-term risk of loss of life; injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future flood events.
- The calculated Benefit Cost Analysis (BCA) ratio must be greater than 1.

The purpose of this report is to summarize the modeling and level of service performance of the existing stormwater infrastructure. Hydrologic and hydraulic models have been prepared to determine discharge values for the 2-, 10-, 25-, 50-, and 100-year 24-hour storm event. The analysis will evaluate the existing and future conditions for both Land Use and precipitation.

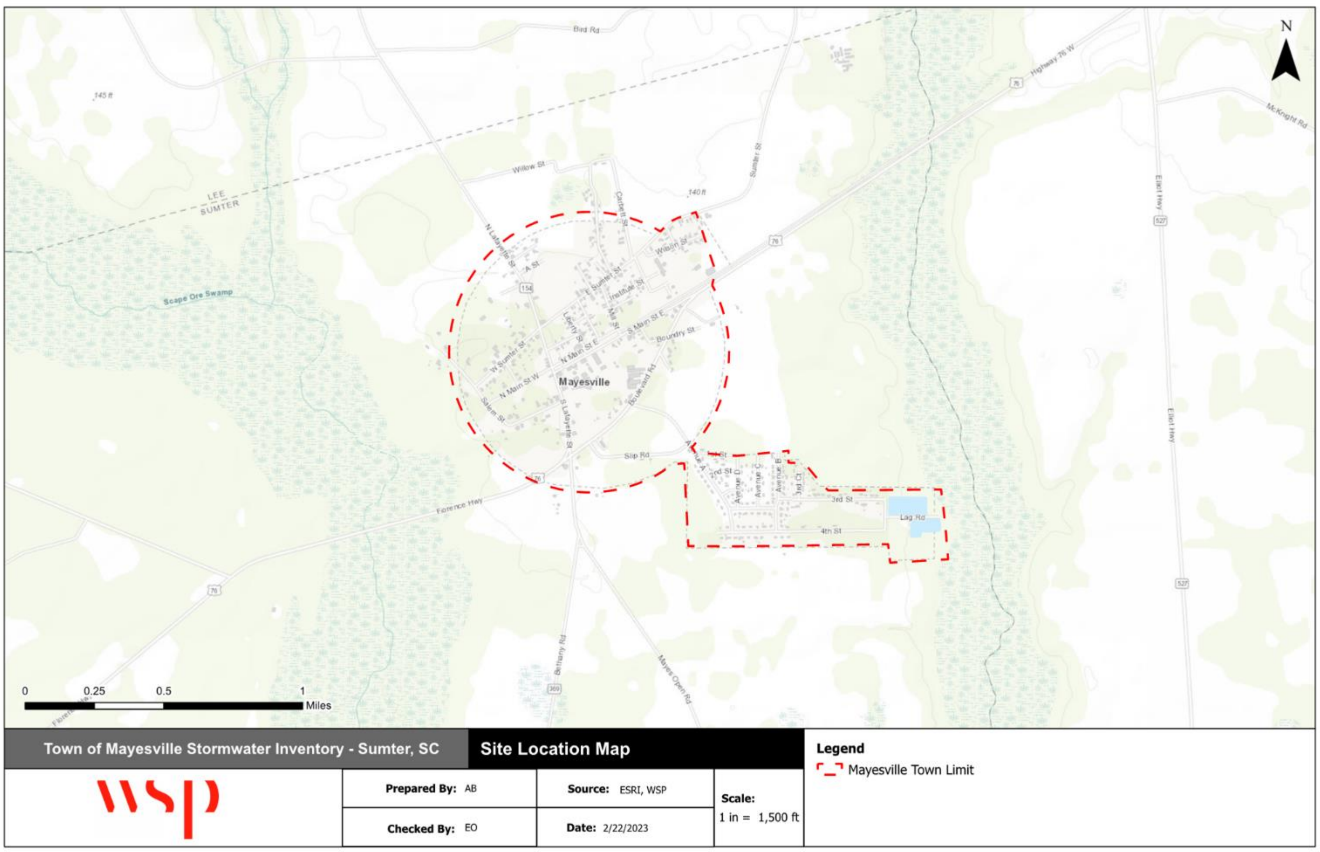
1.2 Study Area

The Town of Mayesville is located in Sumter County in the Lower Coastal Plain physiographic province of South Carolina. The town limits encompass approximately 690 acres of land. It is divided into a mix of agricultural and low-density residential parcels. Additionally, there are a few blocks of light commercial areas primarily on Main Street and Lafayette Street. The Town's historic area is located within the circular jurisdictional boundary, while a mid to late 20th century residential neighbourhood is located within the offset area south of the main portion of town. US Hwy 76 (Florence Highway) passes through the town in an east-west direction from Atkins to towards East Sumter.

The Town of Mayesville is located between the Black River to the east and the Scape Ore Swamp to the west, both of which are in Federal Emergency Management Agency (FEMA) Zone A's. However, the Town itself, is not within a FEMA flood plain. The topography of the area is dominated by lowland terrain with no steep slopes or sudden change in direction. Elevations are generally between 110 to 156 feet, NAVD 88, with higher elevations towards the upper northern boundary (North bound on Lafayette Street). The relatively flat terrain is drained by a series of interconnected agricultural channels, roadside ditches and substandard stormdrain systems that direct runoff to multiple discharge points located along the Town's municipal boundary. These discharge points ultimately drain into the Black River or Scape Ore Swamp via agricultural ditches. The lack of substantial change in elevation within the Town as well as between the Town and the two rivers, provides a challenge to designing stormwater flow to an outfall location and beyond.

Figure 1: Location Map, Mayesville, SC

The town's watershed extends beyond its northern boundary, with drainage outfalls to both the Black River and Scape Ore Swamp. The watershed contains no major stream or river. However, runoff from upstream agricultural areas is collected via a network of small to medium-sized channels that eventually empty into the nearby tributaries. The area of the town depicted within the circular boundary contains mostly subsurface drainage pipes and shallow swales to convey runoff which ultimately discharge into larger in sized drainage channels along the outskirts of town. The offset residential area southeast of downtown contained no organized drainage system except for several cross culverts that conveys a stream through the eastern portion of the neighborhood.



1.3 History of Flooding

Discussions with town residents and municipal officials revealed that flooding has occurred in several locations within the town limits. The town residents are concerned about recurring street flooding during and following rainfall events. During the public meeting on March 8, 2022, additional areas of reoccurring flooding were identified as well as anecdotal testimony on sources of flooding, historical development within the Town, and the timeline for the conversion of open swales to piped systems, specifically along Main Street and the railroad. The photo in Figure 2 shows flooding on N. Lafayette Street in downtown Mayesville, which occurred during Hurricane Sally, in 2020.

Figure 2: Photo of flooding from Hurricane Sally in the Town of Mayesville, 2020

During a site visit on February 11, 2022, municipal officials identified known areas of flooding or stormwater concerns as shown in Figure 3.

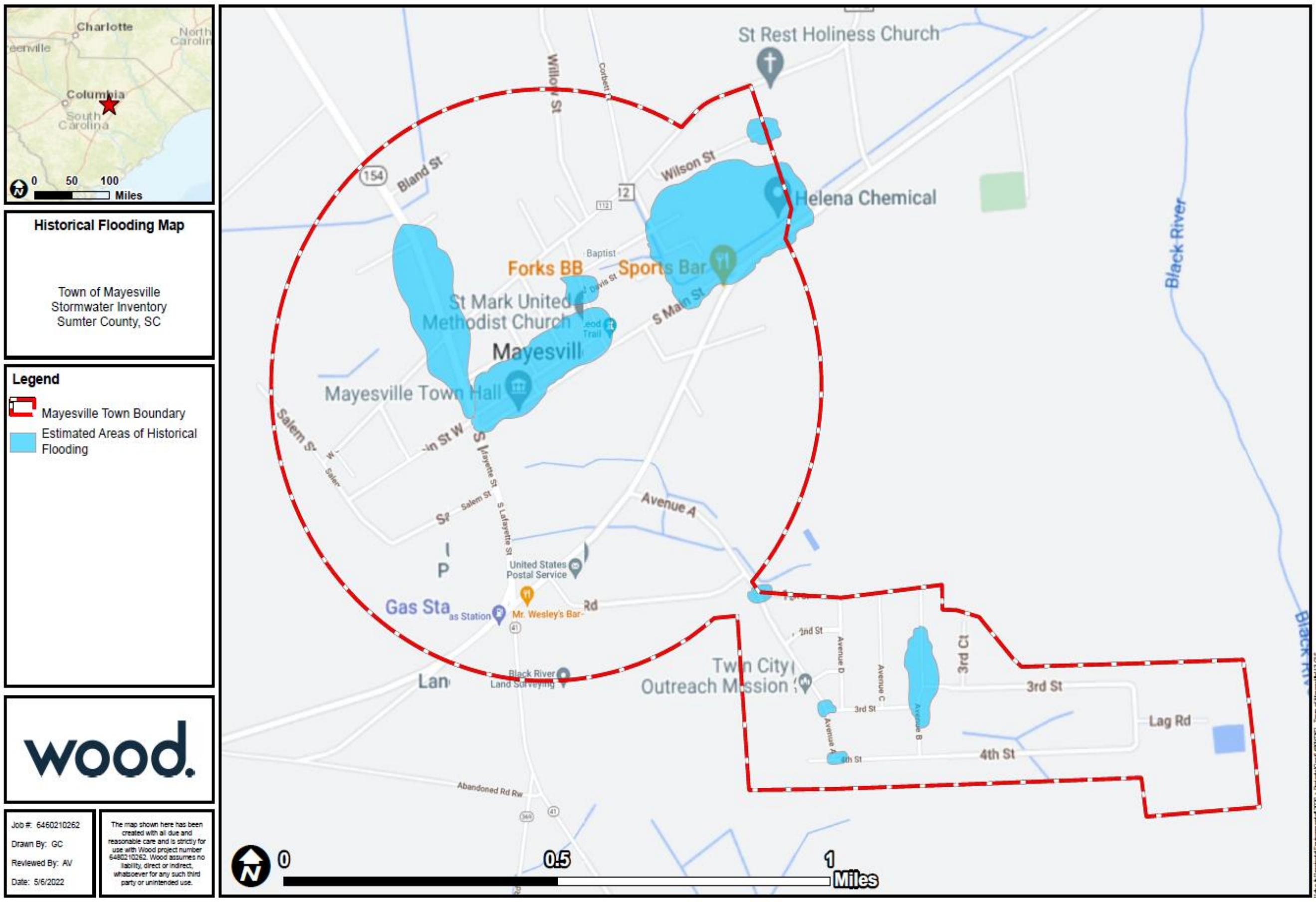


Figure 3: Areas of identified flooding and stormwater concerns, Mayesville, SC

FEMA Flood Hazard Mapping

According to FEMA FIRM Map 4502250350D, the Town is located between Black River and Scope Ore Swamp. There is no FEMA study stream within the town limit and no part of the town is in a FEMA flood zone A. Zone A denotes areas that would be inundated by a 100-year (1% annual chance) flood event.

The FEMA A zones indicates areas identified to have a 1% chance of flooding annually. A review of the FEMA floodplains near Mayesville indicate all access roadways to Mayesville may be inundated during the 1% annual chance flood. This could prevent evacuation from the Town or prevent outside resources such as essential services and first responders from accessing Mayesville.

Growth along the outskirts of Mayesville that fall in the FEMA A zone would be subject to NFIP regulations, which includes higher standards than for development in Mayesville. These higher standards would include submittal of floodplain development permits for any development, elevation of buildings to known higher water marks or two feet above adjacent grade (whichever is higher), and for larger developments, a hydrologic and hydraulic study would be needed to determine the 1% annual chance elevations that development would then be required to be built at or above.

Figure 4a: Snapshot of FEMA Floodplain Map, DFIRM 45085C0350D, Mayesville, SC

2.0 Data Collection and Processing

The Team conducted both desktop and field investigations of the study area to document the existing hydrologic parameters and watershed features. The initial assessment started with data collection from existing, available sources. The collected data included hydrologic data in tabulated and digital formats. Table 1 includes the description of the technical data and sources that were utilized for the study. The data were utilized to create the input files for the hydrologic and hydraulic modeling.

Table 1: Data Sources and Uses

Data	Source	Description/Use
LiDAR	USGS	2020 USGS LiDAR, 2ft DEM
Drainage System Inventory	SCDOT Archive, Field observations	PDF scan of Record drawings (Appendix C)
Building Footprints	Microsoft Open Street	GIS Shapefile
Existing Land Cover	NLCD 2019; Aerial Imagery	GIS Shapefile
Soils Data	USDA-NRCS Web soil data	GIS Shapefile
Rainfall Precipitation	SCDHEC Design Storm Criteria	24-hr duration, Type B rainfall Distribution

2.1 Field Survey and Observations

The field investigation was conducted by the Team to document the existing stormwater management and drainage infrastructure. Prior to conducting the field investigation, the Team researched the SCDOT Plan Archives website and retrieved applicable construction plans for the various roads within the study area. The drainage information within these plan sets were transcribed into a GIS data set to aid in the field inventory. The information included within the archived plans varied in quality and detail ranging from basic information such as pipe size and inlet and pipe location to inverts, pipe slope, etc. The field inventory entailed conducting a location survey of the existing drainage networks, including conduit and ditch size, material type, flow direction, and outfall. Junctions (Manhole, junction boxes, catch basin. Inlets) were included in the site data. Depths of each junction were measured relative to the ground surface. Using this depth, the approximate structure invert elevation was calculated by subtracting the measured depth from the ground surface elevation. In areas of open conveyance such as ditches and drainage channels, the cross-section dimensions were recorded.

Several locations were found to be clogged with debris or completely buried, making them inaccessible. In these cases, the location of the likely existing pipes was assumed to connect to the nearest junction. The storm drain network starting from Lafayette Street and Florence Hwy (US-76), Main Street, Republic Street, and East Sumter Street were verified using the available SCDOT as-built/record drawings (Appendix C). Conduits were inferred to hydraulically connect to nearby junctions and outfall into downstream ditches where the existing subsurface system could not be completely assessed or mapped to form a full and uninterrupted storm drain network from end to end, which is required for modeling.

2.2 LiDAR

The Digital Elevation Model (DEM) was created using LiDAR data collected by USGS in 2020 (www.dnr.sc.gov/GIS/lidar.html) for the Savannah Pee-Dee Watershed. Using GIS, this DEM was sampled to 2 feet by 2 feet cell size and was used to define the surface elevations in the model. The vertical datum used for this project is the North American Vertical Datum of 1988 (NAVD 88). The horizontal datum used for this project is the North

American Datum of 1983 in the State Plane Coordinate System. The terrain elevation values range from elevation 110.0 feet to 156.0 feet, NAVD 88.

2.3 Land Use Data

The land use data was obtained from the most recent 2019 National Land Cover Database (NLCD, www.mrlc.gov/data). The land use is determined by the land cover characteristics, which are then spatially classified into various categories. The data was verified and adjusted using aerial imagery and photos from site visits. To be more conservative, agricultural areas were converted to grass/open space for this study. Other than an amphitheatre on South Main Street and Miles Street and a possible Community Center behind the Museum, no major future development is planned within the town limits. However, for this study, the two open space parcels where the amphitheatre would be built were converted to developed (shown on Land Cover Map in Appendix E), high density future land use as a worst-case scenario for future development of that parcel.

The Sumter County 2040 Comprehensive Plan states "In areas near the County's small towns and enclaves, including Pinewood, Mayesville, Wedgefield, Rembert, and Dalzell, higher density clusters may be supported, especially if development is a clear extension of the rural village pattern and if public water and sewer is available." It is important to note that any potential higher density cluster in the unincorporated area near Mayesville (as well as development within Mayesville) would be required to meet current stormwater regulations which include the requirement that post-development peak discharge rates not exceed pre-development peak discharge rates for the 2- and 10-year frequency 24-hour duration storm event. In addition, post-development release rates from new development to an SCDOT highway right-of-way for the 2-year, 10- year, and 25-year storm events must be equal to or less than those calculated for the pre-development condition for the 2-year, 10-year, and 25-year storm events, respectively, as determined in accordance with Department design policy for the given site conditions. In addition, if a proposed development discharges onto SCDOT ROW, or is connected directly to a SCDOT crossline pipe, the applicant will be required to meet the pre- and post-development quantity for the 25-year storm so as to not overburden the stormdrain system.

It is also important to note that the only areas which drain into the town from outside of the town are DA-5 and DA-8. The land use in DA-5 and DA-8 upstream of the town are zoned as rural, and the Comprehensive Plan did not reflect any plans to develop in either of these upstream areas. The population trend in Mayesville has been decreasing since 2000. Thus significant new development in or near Mayesville is unlikely. Further, per the 2040 Sumter Comprehensive Plan, the Rural Development Area planning policies include the following limitations on development in the Rural Development Areas:

- Residential densities supported at one unit per acre or more
- Public sewer shall not be extended into the Rural Development Planning Area to support increases in density, except when providing utilities to residential and non-residential uses alike in close proximity (500 feet) to Mayesville (and Pinewood).

Rural Development Planning Area Policies

1. Residential densities shall be supported at one unit per acre of more. However, in an effort to consider steps toward a more environmentally sustainable community, the County will consider zoning ordinance amendments designed to encourage cluster development - the practice of allowing smaller lot sizes clustered more closely together, yet achieving the balance of the development in preserved open space.
2. Manufactured homes and single family homes are appropriate in the Rural Development Planning Area.
3. Small scale, rural serving non-residential commercial uses are directed to locate at intersections with arterial roads or major crossroads. Agribusiness and other rural employment options are encouraged to locate at major crossroads as well.
4. Schools, libraries, government facilities, police stations, and fire stations should be located on arterial/major highways and at major intersections to better serve the community. The location of these facilities should be in relation to the populations that they will serve.
5. Public Sewer shall not be extended into the Rural Development Planning Area to support increases in density, except when providing utilities to residential and non-residential uses alike in close proximity (500 feet) to Mayesville and Pinewood.
6. Public water should only be extended into the Rural Development Planning Area for the purposes of health and safety, provided commercial and residential uses are being developed consistent with the Planning Area.
7. Development in the I-95 Corridor, particularly at the interchanges is strongly encouraged. The County will consider a specific I-95 Corridor Plan to address the land-use future of this critical economic development asset.

Figure 4b: Rural Development Planning Area Policies from the Sumter County 2040 Comprehensive Plan

3.0 Hydrologic Analysis

3.1 Precipitation

Two sources, "NOAA Atlas 14 and SCDHEC County Level Precipitation values" were compared for the study area. The NOAA-14 precipitation depth estimates were lower than SCDHEC criteria. SCDHEC design storm criteria were chosen as a conservative approach. The 24-hour design storm depths for Sumter County with NOAA Type B distribution were used to derive hyetographs for the design storm scenarios used. The design storm scenarios included 2-, 10-, 25-, 50-, and 100-year.

In order to account for the effect of climate change, future precipitation was determined using the top range of the SCDHEC rainfall-duration-frequency (IDF) curves, per direction from SCOR, and then adjusted to include a future climate factor of a 20% increase in total rainfall, as referenced in Wood's Folly Beach Drainage Study.

Table 2: Precipitation Depths for Design Storm Events

Design Storm Event	Current Condition (inches)	Future Condition (inches)
2 -year (50% annual chance)	3.6	4.32
10-year (10% annual chance)	5.5	6.6
25-year (4% annual chance)	6.9	8.28
50-year (2% annual chance)	8.1	9.72
100-year (1% annual chance)	9.5	11.4

3.2 Soils

The subsurface soil types and their distribution across the study area inform the infiltrative capacity of soils and runoff potential. These soil characteristics influence the surface runoff. Soil data was obtained from Web Soil Survey portal managed by United States Department of Agriculture Natural Resources Conservation Service (USDA-NRCS, https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx). The predominant soil series in the watershed are Coxville sandy loam (CxA, 19%) and Goldsboro sandy loam (GoA, 12%).

Table 3 illustrates the Hydrologic Soil Group (HSG) classifications in the watershed. The HSG describes a group of soils having similar runoff potential under similar storm and cover conditions:

- Group A are soils having a high infiltration rate (or low runoff potential) when thoroughly wet. These consist mainly of deep, well-drained sands or gravelly sands. These soils have a high rate of water transmission.
- Group B are soils having a moderate infiltration rate when thoroughly wet.
- Group C are soils that have a slow infiltration rate when thoroughly wet. These soils typically have a layer that impedes the downward movement of water.
- Group D are soils that have a slow infiltration rate (or high runoff potential) when thoroughly wet. Generally, these are soils that have a clay layer at or near the surface; soils that have a high-water table; and/or soils that are shallow over nearly impervious material.

Table 3: Mayesville Hydrologic Soil Group (HSG) Classification:

HSG	Area (Acres)	Area (%)
A	58.3	4.8%
B	58.3	4.8%
C	173.7	14.3%
D	924.3	76.1%
Total	1214.6	100%

3.3 Curve Number

During storm events, the Curve Numbers (CNs) method is used to simulate stormwater infiltration into the ground. The soil data from the USDA NRCS Web Soil Survey and the Land Cover data were used to compute the watershed's Curve Number parameter. Each subcatchment area in the 2D mesh was spatially assigned an area-weighted average Curve Number. Overall, the Curve Number ranges from a high of 98 for impervious to a low of 35 for Grass and Open space.

Table 4: Mayesville Curve Number Classification

NLCD Code	National Land Cover Dataset (NLCD) 2020	Cover Description (NEH Ch9)	Curve Number (CN)			
			HSG A	HSG B	HSG C	HSG D
11	Open Water	Water	98	98	98	98
12	Perennial Ice/Snow	Water	98	98	98	98
21	Developed, Open Space	Open Space - Fair	49	69	79	84
22	Developed, Low Intensity	Residential - 1/3 acre lots	57	72	81	86
23	Developed, Medium Intensity	Residential - 1/8 acre lots	77	85	90	92
24	Developed, High Intensity	Urban Commercial	89	92	94	95
31	Barren Land (Rock/Sand/Clay)	Gravel Roads	76	85	89	91
41	Deciduous Forest	Woods - Fair	36	60	73	79
42	Evergreen Forest	Woods - Fair	36	60	73	79
43	Mixed Forest	Woods - Fair	36	60	73	79
52	Shrub/Scrub	Brush - Grass - Fair	35	56	70	77
71	Grassland/Herbaceous	Meadow - Continuous Grass	30	58	71	78
81	Pasture/Hay	Pasture - Good	39	61	74	80
82	Cultivated Crops	Row Crops - Contoured and Crop Residue	69	78	83	87
90	Woody Wetlands	Woods - Poor	45	66	77	83
95	Emergent Herbaceous Wetlands	Brush mixture - Poor	57	73	82	86
6	Roads/Impervious	Roads/Impervious	98	98	98	98

3.4 Roughness Coefficient

Manning's roughness coefficients, also known as n-values, represent flow resistance and influence the flow capacity of the pipes, open channels, and overland flows. The PCSWMM model uses the Manning equation to compute the overland flow rate, including the flows in the channel and pipes. The roughness values were determined and assigned based on the landcover classification within the study area.

Table 5: Manning's n-values

NLCD ID	NLCD	n
11	Open Water	0.03
12	Perennial Ice/Snow	0.03
21	Developed, Open Space	0.04
22	Developed, Low Intensity	0.08
23	Developed, Medium Intensity	0.07
24	Developed, High Intensity	0.05
31	Barren Land (Rock/Sand/Clay)	0.03
41	Deciduous Forest	0.16
42	Evergreen Forest	0.16
43	Mixed Forest	0.16
52	Shrub/Scrub	0.1
71	Grassland/Herbaceous	0.07
81	Pasture/Hay	0.06
82	Cultivated Crops	0.06
90	Woody Wetlands	0.12
95	Emergent Herbaceous Wetlands	0.07
1	Small Channel	0.05
2	Medium Channel	0.045
3	Large Channel	0.04
4	Building Footprints with Raised Terrain	0.015
5	Building Footprints Without Raised Terrain	1.0
6	Roads/Impervious	0.015

3.5 Impervious Area

To account for areas where infiltration cannot occur, an impermeable shapefile was created by combining SCDOT highways shapefile and the building shapefile obtained from Microsoft Open Street. For each subcatchment, the percent impervious was calculated by dividing the area of the impermeable shapefile by the total area of the watershed. The percent impervious for each sub-catchment in the existing conditions model ranged from 0% to 98%.

Table 6: Subcatchment Impervious Area Summary

Subcatchment Area	Area (Acres)
Total Subcatchment Area	1,216
Total Impervious Area	59.0
% Impervious	5%

3.6 Subcatchment Areas

The entire watershed that contributes runoff to the town was delineated using the DEM and the existing conveyance system. The drainage flow direction and outfall locations were field verified. A total of 16 drainage subbasins were identified. Since 2D modeling was to be considered for this study area, hexagonal 2D mesh with 30 feet resolution were generated over the entire watershed with elevations sampled from the DEM. The 2D mesh was then utilized as the subcatchments layer. The process resulted in approximately 68,800 discretized subcatchments that represent the entire watershed. This allows for better spatial distribution of the hydrologic parameters and more accurate representation of the overland flooding that may occur. The subcatchments flow length and slope were calculated from the DEM.

Table 7: Summary of Watershed Subbasins

Name	Notes	Area (acre)
DA-1	drains to DA-13	1.6
DA-2	drains to Little Long Branch	19.2
DA-3	drains to Black River	34.7
DA-4	drains to DA-13	27.7
DA-5	drains to Little Long Branch	20.7
DA-6	drains to Little Long Branch	57.2
DA-7	drains to Little Long Branch	105.2
DA-8	drains to DA-12	292.5
DA-9	drains to Black River	116.3
DA-10	drains to Black River	48.4
DA-11	drains to DA-16	114.2
DA-12	drains to Black River	147.5
DA-13	drains to Little Long Branch	56.8
DA-14	drains to Little Long Branch	19.9
DA-15	drains to DA-9	53.9
DA-16	drains to Black River	99.9

3.7 Hydrologic Analysis

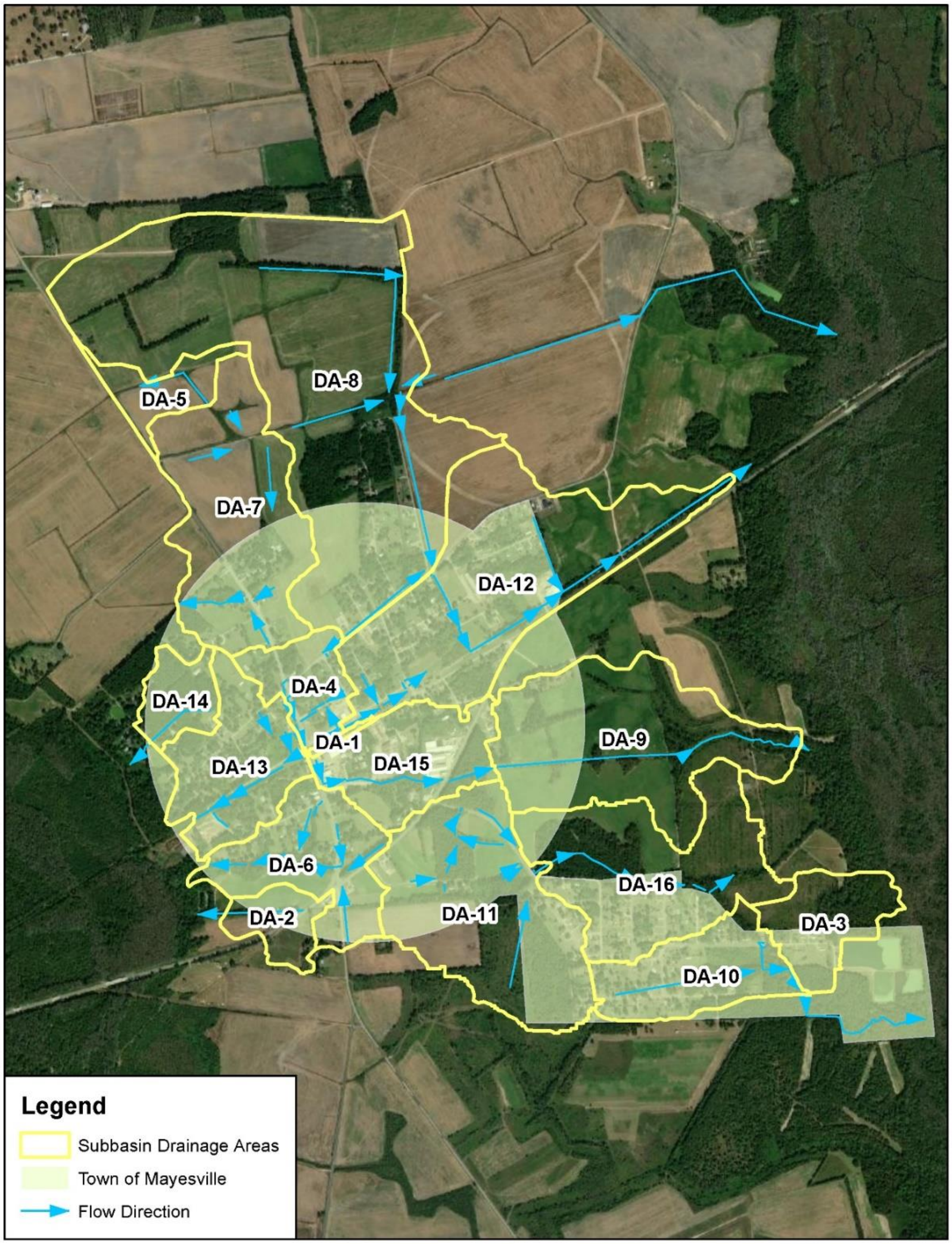


Figure 5: Existing Watershed Subbasin Map, Mayesville, SC

PCSWWM was used to analyze the watershed response to 24-hour design storm events. The hydrologic parameters (Roughness, Curve number, Slope, Percent impervious, Manning's n, Flow length) were applied to the discretized 2D subcatchments. The subcatchment outlet was spatially set to the next closest downstream subcatchment. Each subcatchment received direct rainfall from the rainfall hyetograph. Finally, the simulation was run for a total duration of 24 hours plus 12 hours to ensure all the peak flows are captured.

4.0 Hydraulic Analysis

4.1 Model Description and Setup

PCSWMM was used to perform the hydraulic routing of the excess runoff within the existing drainage system. PCSWMM is a GIS-based version of EPA Stormwater Management Model (SWMM) used to perform dynamic rainfall-runoff simulation. To better simulate the overland flow and subsurface conveyance system, 1D-2D modeling was used. With 1D-2D modeling, PCSWMM can accommodate the seamless integration of hydrologic and hydraulic analysis within the same spatial extent or 2D mesh.

The 1D component consists of the existing storm drain network and conveyance system. This included 170 junctions (inlets and manholes) and 127 conduits ranging in diameter from 12- to 48-inches. There are 30 culvert crossings with free outfall in the model. Manning's n value was assigned based on pipe material from the field data collection and As-built records. For all unknown conduits, a Manning's n-value of 0.013 was assumed, which is consistent with most pipes observed during the site visit being concrete material. Because topographic surveys of the drainage structures were unavailable and not included in the scope of this project, LiDAR contours supplemented with manual measurements of depth of critical structures and conveyance systems were used to estimate pipe invert elevations beginning at the downstream outfall. When accessible, invert depths were measured in the field and analyzed with DEM to spatially assign invert elevations. For junctions that were not accessible, a minimum pipe slope of 0.1 percent was used to ensure positive drainage. The existing stormwater pipe configuration is shown in Figure 6.

Table 8: Summary of Existing Conduit inventory

Pipe Diameter (inch)	Number of Pipes	Length of Pipes (LF)
12	3	77
15	39	2,767
18	52	6,552
21	1	50
24	26	3,076
30	2	72
36	3	189
48	1	27
TOTAL:	**127**	**12,810**

To model overland flow, a hexagonal 2D mesh covering the entire watershed with a resolution of 30 feet per cell was generated. To capture the overland flow in the drainage channels, a channel centerline layer was used as an alignment for the 2D directional mesh with 30 feet resolution. The 30 feet resolution was chosen to best capture the spatial variation of the relatively flat terrain. SCDOT roadway GIS layer was used as breaklines in the 2D mesh to represent elevated roadway and grade changes. An obstruction layer, a shapefile of building polygons, was used to represent physical structures that would influence overland flow. This model contains no bridges or weirs.

In developing the 1D-2D model, 2D orifice nodes were created to connect the 1D storm drain network to the 2D overland mesh. This is where flow in excess of the storm drain capacity spills into the 2D portion of the model. A boundary layer was used to identify outfall locations and was set to free outflow condition, which allows overland flow to leave the model unimpeded.

For the purpose of this study, it was assumed that the receiving tributaries have sufficient capacity to handle the runoff and that there is no tailwater or backwater condition.

The dynamic wave approach with a time step of 0.5 seconds was used for the flow routing computations. The model was setup to simulate rainfall runoff continuously for 36 hours to ensure that all the peak flows were captured even after the 24-hour rainfall event.

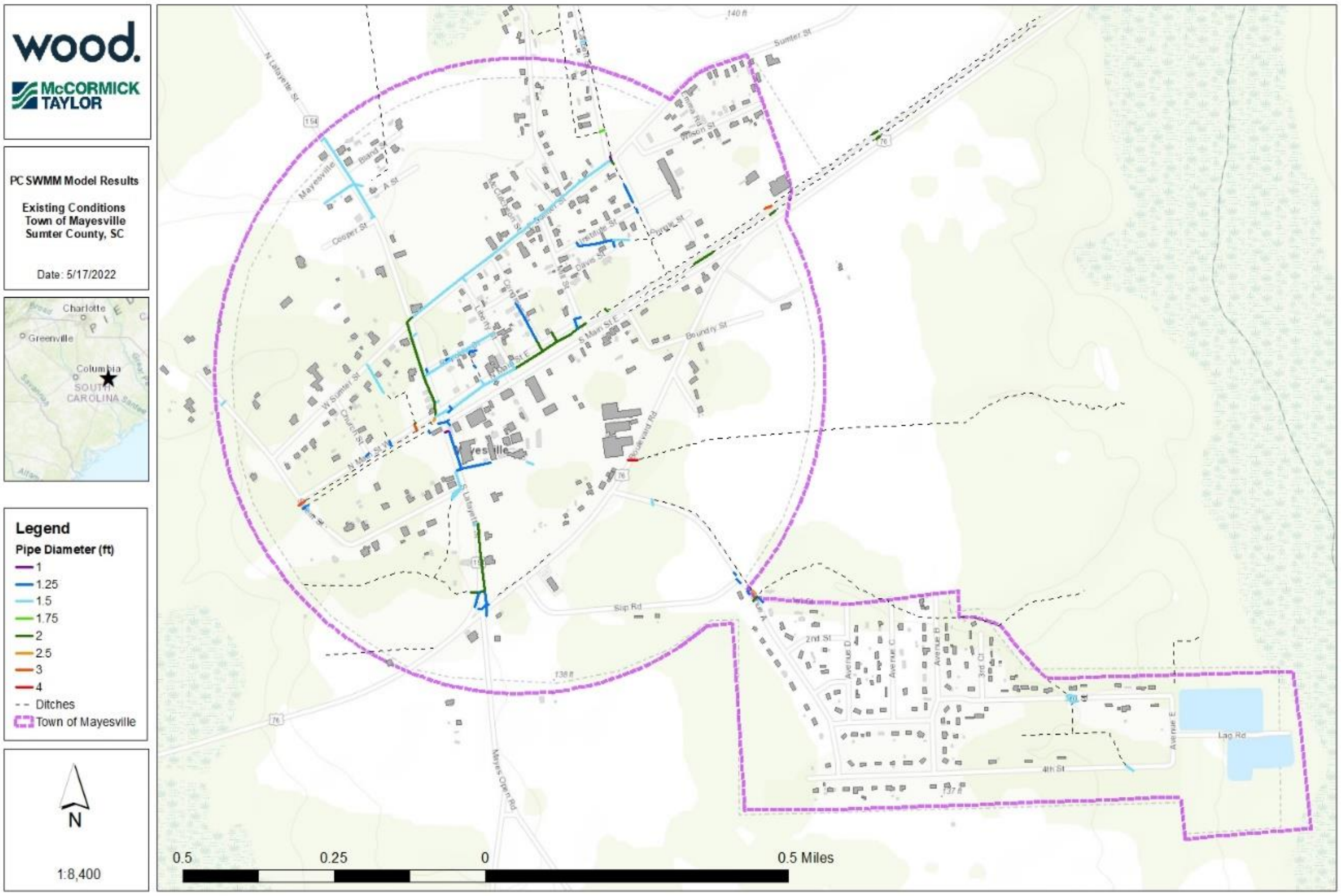


Figure 6: Existing Stormwater pipe system

4.2 Hydraulic Results

The volume of runoff and peak flows generated during the design storm in PCSWMM quantifies the level of service that the town's existing drainage infrastructure can provide. The capacity of the drainage network in PCSWMM was calculated as a ratio of the maximum depth of flow in a pipe or channel divided by its diameter (pipe) or maximum depth for channels. Storm drainage pipes with a ratio less than 1 are flowing below their capacity; ratios greater than or equal to 1 indicate a pipe is undersized and conveying water under pressure (greater velocity for the same cross-sectional area), which may cause surcharging (cause water to come out of manholes/inlets and contribute to overland flooding). The SCDOT Requirements for Hydraulic Design Studies (2009) stipulates in Section 2.2.9 Storm Drain Systems that design flow depths in pipes should equal to 0.94 times the pipe diameter for maximum free surface flow capacity. Storm sewer systems should not be designed for pressure flow. As we move forward with recommendations for resizing the conveyance system, our goal will to be to aim for a depth of flow/pipe diameter ratio of 0.8 to allow for an additional factor of safety.

For each junction, a surcharge elevation at the maximum hydraulic grade line (HGL) was calculated. Surcharge occurs when a closed conduit is filled to capacity and under pressure. This means that the water level is above the crown of the pipe connecting to the junction, and it is potentially flowing out of the junction and contributing to flooding in the street. The surcharge was calculated as the junction rim elevation subtracted from the maximum HGL, and anything greater than zero is considered a surcharge. The yellow, orange and red dots Figure 7 and Figure 8 below depict areas where stormwater (surface water) may surcharge onto the ground and cause overland flooding for current and future condition. The maps in Appendix A and Appendix B show flooded areas with varying flood depths across the study area for 2-, 10-, 25-, 50- and 100-year storm events.

In the PCSWMM model, we evaluated five different design storms; however, the design storm for the drainage system will be the 25-year storm. This is the required design storm that the SCDOT stipulates for storm drains and roadside ditches with drainage areas from 40 to 500 acres. As summarized in Table 9, the town's existing stormwater infrastructure does not adequately convey stormwater runoff even during the smallest design storm.

In evaluating the 25-yr design storm scenario for the existing condition, 112 of 127 drainage pipes (88%) are above 94 percent capacity. With a total of 170 Junctions, 109 or 64% of the structures (inlets, manholes) have higher than 1 ft of surcharge. The table below compares the number of pipes exceeding its flow capacity and junction surcharges for the various design storm scenarios.

Table 9: Summary of Existing Pipes Exceeding Flow Capacity with Current Precipitation

Design Storm Scenario	Junctions Surcharging		Pipes Exceeding Capacity	
	Number	Percent	Number	Percent
2yr	66	39%	88	69%
10yr	101	59%	101	80%
25yr	109	64%	112	88%
50yr	116	68%	115	91%
100yr	122	72%	118	93%

Appendix A contains maps showing the pipe capacity and junction surcharges for all five design storms with current conditions.

Table 10: Summary of Existing Pipes Exceeding Flow Capacity with Future Precipitation

Design Storm Scenario	Junctions Surcharging		Pipes Exceeding Capacity	
	Number	Percent	Number	Percent
2yr	81	48%	96	76%
10yr	97	57%	109	86%
25yr	117	69%	115	91%
50yr	123	72%	119	94%
100yr	124	73%	122	96%

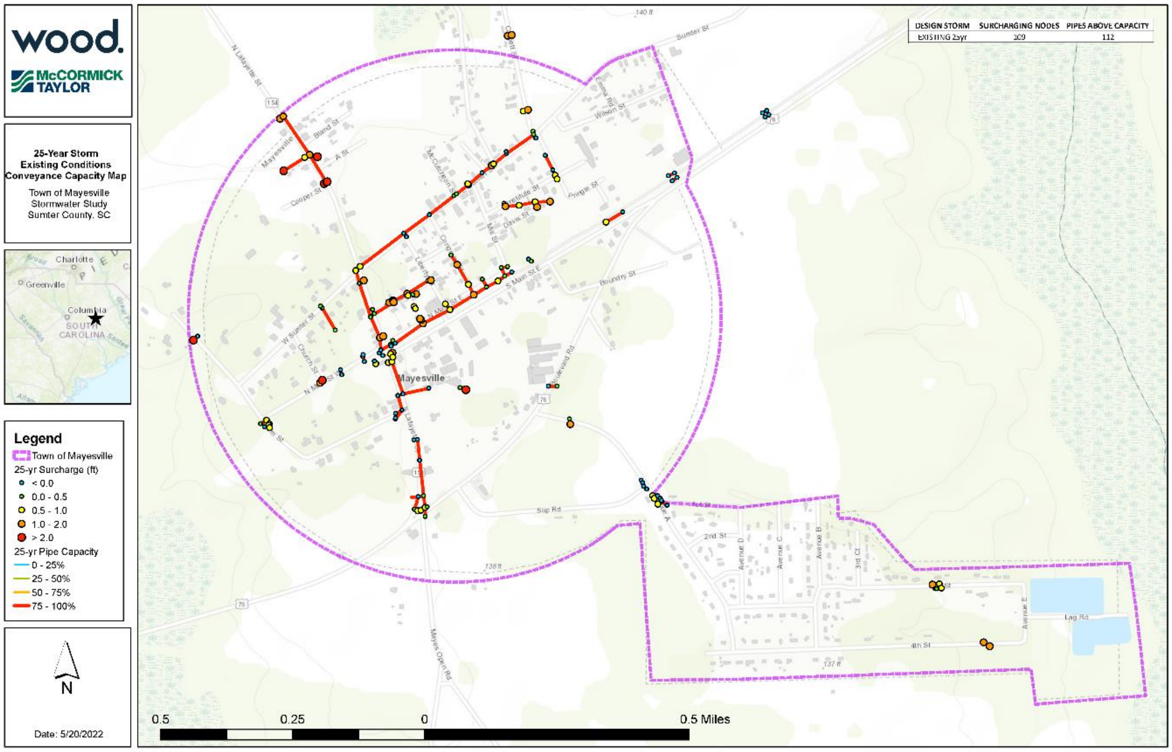


Figure 7: Mayesville 25-yr Existing system capacity with Current Precipitation

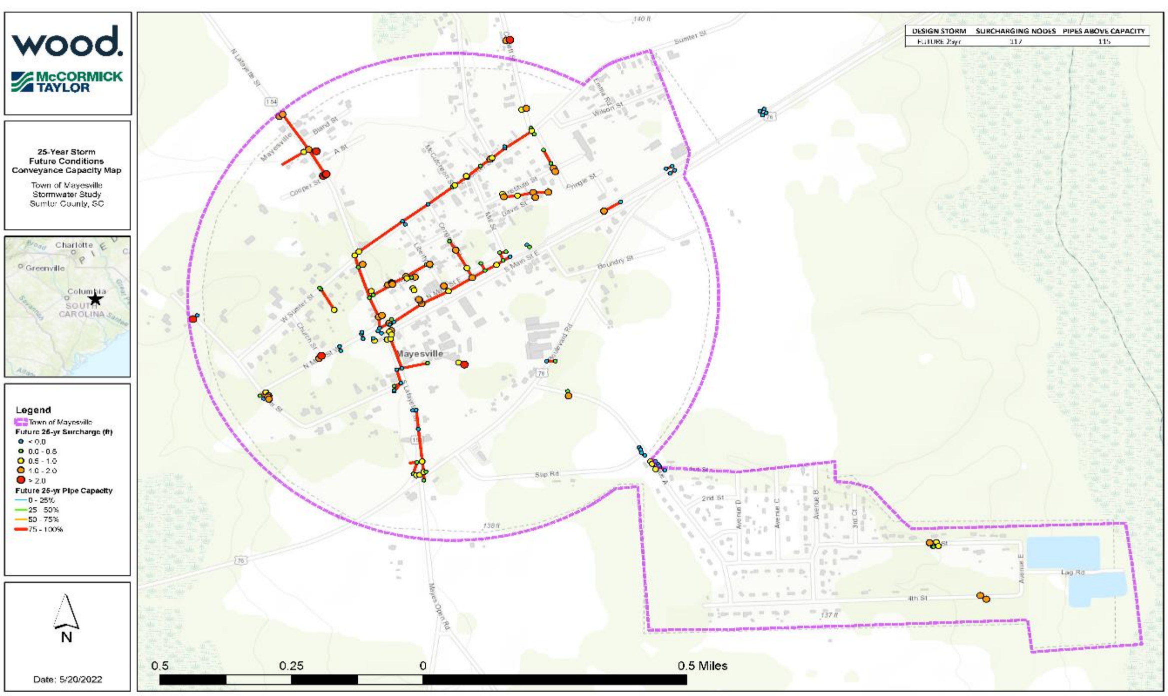


Figure 8: Mayesville 25-yr Existing system capacity with Future Precipitation

5.0 Mapping and Impact Assessment

5.1 Impact Analysis

While the 1D model results in the previous section highlighted the assets that were operating above capacity, the 2D model results depict the flooding depths and extent across the town for each of the design storm scenarios (all maps are included in Appendix A). Qualitatively, the maps show how the areas of inundation expand and become deeper with increasing storm size. The number of buildings vulnerable to flooding was used to quantify the extent of the flooding, with the caveat that any ponding under six inches was excluded as a flood condition as this depth of water is a result of utilizing the rain on grid hydrologic method. The depiction of 6 inches or less of flooding is a result of the rain falling over a particular portion of ground. The results from the PCSWMM model summarized in Table 11 indicate that for a 25-yr storm event, 33 buildings out of 397 total (8%) are vulnerable to flooding depths of 1 to 2 feet. However, identifying the buildings vulnerable to flooding is solely based on intersection of the flooded area with the building. It does not account for specific structure information (such as first floor elevation) which may determine whether there is an actual impact.

Table 11: Summary of Buildings Vulnerable to Flooding with Existing Drainage System and Current Precipitation

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	51	86	113	142	172
1 to 2	11	21	33	46	57
2 to 3	4	5	6	8	9
> 3	0	0	1	2	2

Appendix A contains map of current condition flood depths and buildings vulnerable to flooding.

Table 12: Summary of Buildings Vulnerable to Flooding with Existing Drainage System and Future Precipitation

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	65	106	149	174	201
1 to 2	15	28	46	58	75
2 to 3	4	5	8	9	10
> 3	0	0	2	2	3

Appendix B contains map showing future precipitation flood depths and buildings vulnerable to flooding.

6.0 Mitigation Strategy Considerations

6.1 General Mitigation Strategies

There are a number of techniques that can be employed to reduce or eliminate flood risks for infrastructure (roads, bridges, utilities) and for existing structures and future development (residential, commercial, industry). Strategies include a variety of structural measures that reduce the flood risk directly, as well as indirect actions that may reduce the severity of damage resulting from flooding, but not necessarily eliminate flooding itself. Table 13 summarizes typical flood mitigation strategies. These strategies, though, may not be appropriate to all landscapes and topography. Effective strategies are even further reduced when considering the type of flooding, such as riverine, coastal, or surface water (stormwater) flooding.

Table 13: Summary of Flood Mitigation Strategies

Mitigation Type	Typical Strategies	Riverine	Coastal	Surface Water (Stormwater)
Direct	Flood Barriers (levee, floodwall, portable barriers)	X	X	
	Hydraulic Diversion Systems (ditches, canals, pipes)	X		X
	Drainage System Improvements			X
	Stormwater (surface water)/Flood Detention BMPs	X		X
	Green Infrastructure			X
	Bridge or Culvert Improvements	X	X	
	Structure or Infrastructure Flood Proofing (dry, wet)	X	X	X
	Structure Elevation Modification	X	X	X
	Structure Reconstruction	X	X	X
	Structure Relocation or Demolition	X	X	X
Indirect	Flood Warning/Alert System	X	X	
	Buffers and Conservation Areas	X	X	
	Flood Insurance	X	X	X
	Enhanced Stormwater Management and Design Requirements	X		X
	Ordinance/Land Planning (Building Codes, Zoning)	X	X	X
	Education	X	X	X

6.1.1 Physical Mitigation Techniques

Flood Barriers

Flood barriers are located between infrastructure and/or structures and the source of flooding with the intent of protecting the assets by holding back floodwaters. Levees, floodwalls, earthen berms or the combination of the three are the most typical type of flood barrier implemented. A levee and earthen berm are similar in nature, however, a levee is a federally regulated feature, often by the United States Army Corps of Engineers, while an earthen embankment is an unregulated feature. Both are earthen embankments with sloped sides and armored with vegetation, rock, and/or concrete. Floodwalls are found in more urban settings where available land is limited. Floodwalls are constructed from concrete or brick, though in some cases can be constructed from other materials such as steel or composites. Floodwalls consist of vertical sides and require a minimal footprint. More recently, portable flood barriers have been gaining traction in the flood mitigation marketplace. These barriers come in several forms and functions ranging from modular sand filled containers to water filled tubes, which SCDOT employed during Hurricane Florence in 2018. The scale of these systems ranges from residential to larger commercial and institutional size systems. These types of systems have been utilized by departments of transportation in preserving means of egress through flood prone roadways.

While these features serve well to protect assets within their footprint, they can have secondary impacts that may cause more harm than good. These features can constrict the flow of water within riverine systems resulting in an increase of flow velocities, elimination of floodplains and their associated flood storage, and increase upstream and downstream flood elevations. When factored together, these types of mitigation techniques often result in negative impacts to properties upstream or downstream of the protected areas. These systems are also often constructed within riparian areas that can impact wetlands and other sensitive environmental features.

Flood barriers have secondary impacts as well, as they require wholesale modifications to the interior area drainage systems. Stormwater conveyance systems must be relocated, back flow preventors installed and often stormwater pump stations are needed to effectively drain the area. These systems also disconnect communities, can be aesthetically displeasing as they rise above the natural topography of the land, and in riverine or coastal settings can obstruct viewsheds. When these are factored together, flood barriers can be complex and costly, and require routine maintenance, storage space, labor to deploy and inspect.

Hydraulic Diversion Systems

Diversion systems are constructed large scale pipe systems, ditches, channels, or combination of all three that allow for an alternate route for flood waters which reduce or eliminate flooding within prone areas. In creating a diversion system, flood waters are diverted around vulnerable areas using these identified conveyance systems. To increase the effectiveness of these systems, they are often paired with wetlands, floodplains, or large storage/detention facilities that can store the excess water until the receiving riverine system recedes from flood stage. These systems also disconnect communities, can be aesthetically displeasing as they disrupt the natural topography of the land, and can become a habitat to nuisance animals and invasive species. When these are factored together, diversion systems can be complex and costly, and require routine maintenance and inspections.

Drainage System Improvements

Drainage systems are local neighborhood-scale conveyance systems comprised of ditches, stormdrain pipes and inlets, manmade channels, road culverts, etc. Drainage system improvements are mitigation measures not typically meant to address riverine or larger scale flooding, but more localized flooding that results from a substandard drainage conveyance system. Prior to commencing improvements to an area's drainage system, the existing drainage system is evaluated, and areas of constricted flow or lack of existing structural conveyance systems are identified. Improvement's entail adding or increasing stormdrain pipe sizes, adding additional inlets, enlarging or adding ditches and drainage channels, or enlarging or adding culverts. By addressing these features, roadway flooding is addressed as well as offsite areas that drain toward the roadway. As a result of this type of improvement, it is important to consider the effects of increasing the drainage effectiveness and capacity of an upper area of watershed to areas further downstream. Thus, with drainage system improvements it is important to consider an entire watershed until it reaches a sizeable waterbody or conveyance system.

Stormwater (Surface Water) / Flood Detention

Detention facilities consist of constructing areas to store flood flow from riverine areas or runoff discharges from drainage conveyance systems and direct runoff in developed areas. These types of systems temporarily capture, store, and then release water back into a conveyance system. These facilities can come in the form of excavated wetlands, detention basins (basins that remain dry unless in service), retention basins (basins that maintain a permanent wet pool when not in service), or underground storage vaults. The facility discharges through an engineered outlet control structure that reduces the peak flow of the conveyance system but does not typically reduce the overall volume of water moving through the conveyance system. In some cases, infiltration can be introduced which in return will reduce the volume of water as well. Detention facilities are typically placed upstream of or within the flood prone areas. Depending upon the location of the detention facility, they are often paired with hydraulic diversion systems. As these facilities can be constructed at varying scales and shapes, they often can be placed within established areas with less disturbance or impact. More recently, multi-use detention facilities have been constructed, during dry periods, these green spaces serve as recreational areas, while during wet weather, they manage flood flows.

Green Infrastructure

Green Infrastructure consists of micro-scale stormwater management practices installed on a block by block, or parcel by parcel basis. These practices can consist of bioretention systems, rain gardens, green roofs, pervious hardscapes, bioswales, exfiltration pipes, and dry wells. Green Infrastructure can be successful in managing micro localized flooding situations by addressing stormwater runoff at its source when paired with infiltration. If infiltration is not available, these facilities can be utilized to slow the conveyance of runoff into undersized drainage systems. It is important to note that green infrastructure does not have the capacity to address neighborhood or larger scale flooding events as it is typically designed to only store smaller storm events.

Bridge or Culvert Improvements

To alleviate flooding, bridges or culverts are replaced with larger structures increasing their conveyance capacity. By increasing the capacity, the restriction these structures place on a conveyance system is removed, thus diminishing the backwater effect. Backwater floods upstream properties and roadways as the water backs up. This also results in the bridge or culvert being overtopped as well potentially damaging the roadway. Care must be taken, though, when improving these structures, as larger flow amounts would be directed downstream thus creating flooding conditions in areas previously untouched. Further analysis is needed when these structures fall within FEMA regulated floodplains, as any change to these regulated waters requires FEMA approval and property owner buy in.

Structure or Infrastructure Flood Proofing

Flood proofing is the retrofitting of a structure or asset to withstand flooding. Unlike other mitigation techniques, this activity does not prevent or redirect flood flows, but hardens the asset to withstand the impacts associated with flooding. There are two types of flood proofing, Wet flood proofing and Dry flood proofing.

Wet flood proofing involves retrofitting an asset to allow floodwaters to enter enclosed areas in a way that minimizes damages to the structure or asset. Wet flood proofing is not used for living areas, areas housing electrical or mechanical equipment or critical assets that must remain dry entirely. In buildings, it can be successfully implemented to garages, utility structures, basements, or crawlspaces. For infrastructure type assets, various components could be retrofitted to be water resistant or constructed in a way to remain operation while submerged. It is important that in designing wet flood proofing that the water elevations within the structures raise and fall at the same rate as the exterior areas so as to reduce the effects of hydrostatic pressure.

Dry flood proofing results in the sealing of a structure or asset's exterior to prevent intrusion of water. This may include structural strengthening of a building's walls or foundation to resist the hydrostatic pressure that the flood waters will exhibit on the exterior surfaces. While this type of mitigation can be implemented on most structures, it is most successful on masonry buildings and structures with slab-on-grade construction. To achieve water resistant conditions, flood shields, water proofing coatings, impermeable sheeting, or other types of sealants are installed around the outer perimeter of the building. For infrastructure assets such as mechanical systems or electrical systems such as the ones found at water treatment plants, they can be placed in waterproof enclosures. It is important to note that Dry flood proofing is not allowed on residential buildings within a FEMA floodplain.

Structure Elevation Modification

In some instances, raising a structure or infrastructure asset above the flood elevation (Community Flood Protection Elevation) may be the best economical solution to mitigating flooding. There are several ways to raise the elevation of a structure including placement of fill or alternatively, piers or columns can be constructed to support the structure at its elevated position. Mechanical systems must also be raised above the flood elevation and utilities reconnected to the structure. While this approach protects living space or critical infrastructure, it will not prevent yards, parking lots or any other ground-level assets from flooding.

Structure Reconstruction

Reconstruction of a structure involves the demolition of a structure prone to repetitive flooding and the subsequent construction of a regulatory-compliant structure within the same property. In reconstructing the structure it either has to be located outside of the floodplain or elevated above the Flood Protection Elevation (FPE). The new building must meet all current building codes and regulations.

Structure Relocation or Demolition (Buyout)

There are several approaches to relocating or removal of repetitive flood loss structures. If the structure is suitable type, the property is acquired by the local government, and the structure is then relocated to a different property. The original property is then graded and stabilized allowing it to revert to a floodplain. If a new property is not available or the structure is not suitable for moving, after acquisition of the property, the structure is demolished and the site is stabilized so that it functions as a flood plain, wetland, or greenspace.

Typically, the local government entity retains ownership of the entire parcel and places the property into a conservation easement to prevent future redevelopment. In some instances, the government entity may only acquire the areas within the floodplain, allowing the original property owner to retain the portion of the property that is outside the floodplain.

Buyouts are challenging as flood prone areas have historical, sentimental, or other significance that generates strong opposition. Acquisition costs are often high in urban areas and further complicated by the lack of suitable relocation sites for property owners to move to. In rural areas, properties to relocate to near the original homesites can be limited which require people to move outside of their native community.

6.1.2 Indirect Measures

Indirect measures can be deployed independently or in conjunction with the direct measures discussed above. Indirect measures can address flooding in a more holistic way then the structural direct measures, and often at much less cost. Through implementing indirect measures, a community can become more resilient and adaptable to the changing environment.

Flood Warning/Alert Systems

With the advancement of technology, automated systems are now available to monitor weather forecasts and riverine water surface elevations real time. These flood warning systems can then pre-alert areas prior to flooding so that evacuations and precautions can occur before the flood event commences.

Riparian Buffers and Conservation Areas

Communities can develop riparian buffer requirements that limit or prohibit development or clearing of stream corridors thus preserving floodways and floodplains from alteration. These requirements also prevent structures or outbuildings from being built within flood prone areas. Communities can go even further by acquiring undeveloped flood-prone areas and placing them within conservation easements. These techniques also offer water quality improvements as well as aesthetic improvements as they result in the maintaining of green space in communities.

Flood Insurance

With or without flood mitigation measures, flood insurance is critical for property owners in flood prone areas. Available through the NFIP or private market, this insurance can help property owners rebuild after a flood. While not required outside of FEMA-regulated floodplains, flood insurance is required within FEMA floodplains for those with mortgages. Additionally, for a community to obtain FEMA grant funding, property owners must maintain flood insurance.

Enhanced Stormwater Management and Design Requirements

In providing enhanced stormwater management and design requirements, communities can put the onus of flood mitigation on properties undergoing development or redevelopment. These requirements may include enactment of management of larger storm events (100-year, 500-year) back to pre-development conditions or at least the design of drainage conveyance systems to safely convey larger storm events. Typically, street level drainage conveyance system must convey the 10 to 25-year event without overtopping or surcharging. In flood prone areas it may behoove the jurisdiction to enact larger design storm requirements so that street-level conveyance systems can convey the 50-year or even 100-year events. Going even further, jurisdictions can enact volume reduction stormwater management requirements instead of just peak rate management. Volume reduction requirements prohibit the generation of runoff volume of a parcel beyond the predeveloped runoff volume. These enhanced measures can be applied jurisdictional-wide or only in flood-prone areas identified as special flood hazard areas. When enacted, it can reduce the flood risk of areas and reduce the flood inundation levels directly.

Ordinance/Land Planning (Building Codes, Zoning)

On a much larger scale than discussed in the Enhanced Stormwater Management and Design Requirements and Riparian Buffer and Conservation sections above, jurisdictions can overhaul their entire land development protocols in a way that allows the community to live safely with flood-prone areas. This could mean more stringent building codes that take into consideration climate change or the potential for increasing flood elevations or zoning that limits development within current and future flood-prone areas.

Education

Public education is the cornerstone for the successful implementation of the above-discussed indirect mitigation measures as well as educating communities and the public on various flood prevention strategies. By educating the public on the economic damages and disruption of life that flooding can result in, communities will have more support to implement these indirect and direct mitigation measures. In educating the public, you allow them to understand the importance of heeding evacuation orders, not building within the floodplain, and the need for flood insurance. Also, education can be as simple as informing property owners of the importance of maintaining drainage conveyance systems within or around their property and reporting drainage issues to the local authorities for maintenance.

6.1.3 Typical Mitigation Factors

The effectiveness, cost, and overall applicability of each mitigation technique is dependent on criteria such as property use, site conditions, design factors, regulatory requirements, financial ability, flood frequency, etc. These factors should be considered while identifying the mitigation alternative(s) to pursue as identified in Table 14.

Table 14: Typical Mitigation Factors

	Typical Considerations
Type of Flooding	• Riverine • Coastal • Stormwater (Surface Water) Conveyance • Combination/Compound
Study Area Conditions	• Topography • Soils / Geology • Drainage characteristics • Existing infrastructure • Availability of undeveloped land or public right-of-way • Road ownership, elevations, classification
Study Area Building Characteristics	• Building Foundation Type • Building Size • Building Exterior Type • Utility connections
Study Area Use Characteristics	• Building use (residential, commercial, institutional, industrial) • Aesthetics • Neighborhood
Drainage/Flood Characteristics	• Severity/Frequency of flooding • Sources/Causes of flooding • Contributing drainage area
Regulatory Requirements	• Design requirements (e.g. SCDOT, County, Local) • Permit requirements (e.g. SCDHEC, USACE, FEMA) • Use requirements (e.g. zoning) • Special Designations (e.g. historic)

6.2 State and Local Mitigation Considerations

Mitigation alternatives must consider state, county, and local design standards, requirements, ordinances, and policies. Regarding mitigation scenarios that result in modifying structures, the Sumter County building code and the Town of Mayesville's flood ordinance must be followed. When considering improvements that involve roadways and other transportation elements, the SCDOT or County Public Works standards must be followed which include design standards for drainage conveyance systems, bridges, culverts, and any associated work within the roadway. In the case of Mayesville, the SCDOT drainage and roadway design requirements were followed, as the majority of the roads within the study area are owned or maintained by the state. Additionally, any proposed work within the SCDOT right-of-way would require an encroachment permit. During this process, the SCDOT will review work within their right-of-way to ensure it meets state requirements and does not negatively impact their assets.

Impacts to environmental resources must also be evaluated when considering mitigation alternatives. Impacts to wetlands and waters of the U.S. are often unavoidable when addressing flooding through implementation of direct mitigation alternatives. Impacts to these resources would require permits and approvals from the SCDHEC and the USACE. In some instances, if the impacts exceed the national permit guidelines, wetland and stream mitigation credits may be required.

In addition to state, county, and local considerations, impacts to utilities (electric, telecom, water, sewer, etc) must be evaluated as they can result in considerable cost increases and schedule delays.

6.3 Mitigation Options Considered for this Study

As discussed in the previous sections, flooding within the Town of Mayesville is a result of substandard or nonexistent stormwater conveyance systems. In general, the repetitive flooding was found to occur in the downtown core including N. Lafayette Street, Republic Street, Main Street, and the residential area between Main Street and Sumter Street. Isolated areas of flooding were found throughout the remaining areas of town. While flooding impacted both properties and roadways, it was found that the flooding was generally a result of the substandard drainage systems along the roadways and irregular lot grading resulting in low spots within the properties. Buildings within Mayesville area are largely residential and have a mix of slab-on- grade and crawl space foundations. The roadways have limited piped stormdrain conveyance systems and generally lack swales and ditches.

As detailed below in Table 15: Mitigation Measures Considered in the Town of Mayesville, based on the flood model results and review of the direct and indirect mitigation alternatives, Drainage System Improvements were identified and determined to be the most appropriate mitigation measure to address flooding in the Town of Mayesville.

The proposed design was constrained by the surrounding lowland topography to maintain positive flow from the Town to the shallow stream channels. Nonetheless, the Sensitivity Analysis in Section 8.6 shows the proposed design reduces the number of pipes surcharging and the number of flood vulnerable buildings in both current and future precipitation scenarios. Drainage system improvements safeguard for future flooding problems because future development must maintain peak runoff from pre- to post-development for 2- and 10-year storm events.

Table 15: Mitigation Measures Considered in the Town of Mayesville

Mitigation Measures Considered		Considerations
Indirect Measures	Flood Warning/Alert Systems	• Would not address flooding of properties nor roadways which result in obstructed traffic, • Type of flooding is not at a scale where loss of life is anticipated where advance warning is needed
	Riparian buffers and conservation areas	• There are no rivers or streams within the study area • Riverine flooding is not experienced in Mayesville • Excessive conservation areas would restrict much needed redevelopment and economic investment within the Town
	Flood Insurance	• The Town is not within a mapped FEMA Floodplain, thus flood insurance will be costly and unachievable for the LMI Community • Type of flooding typically not associated with FEMA regulated floodplains
	Enhanced Stormwater Management and Design requirements	• Would not address current flooding • Town currently does not have active redevelopment occurring, thus any effectiveness would be limited • Future development already must meet pre- to post-development quantity management for the 2- and 10-year storm event • Future development discharging into the SCDOT ROW already must provide pre-to post-development quantity management for the 25-year storm event • May hamper redevelopment and economic investment in the Town
	Ordinance / Land Planning (Building Codes, Zoning)	• Would not address current flooding • Town currently does not have active redevelopment occurring, thus any effectiveness would be limited • Future development already must meet pre- to post-development quantity management for the 2- and 10-year storm event • Future development discharging into the SCDOT ROW already must provide pre-to post-development quantity management for the 25-year storm event • May hamper redevelopment and economic investment into the Town

			• The Town has limited staffing and technical expertise to implement increased stormwater regulations above the state land development regulations.
		Public Education	• Public education is encouraged to use its social media and other sources of reaching the public to: • Engage residents and property owners about proper litter and debris disposal to reduce clogging and maintenance of drainage systems • Engage property owners about proper maintenance of private drainage conveyance systems • Engage property owners about benefits of onsite stormwater management such as rain barrels and limiting impervious areas • Encourage property owners to retrofit properties with stormwater management BMPs, however this is limited unless a stormwater utility is implemented that a fee credit or tax credit incentive could be applied
Direct Measures	Measures associated with riverine type of flooding	Flood barriers	• Flooding in Mayesville is associated with localized flooding, not riverine flooding. • Would require each property owner to purchase flood barrier for their property/structure
		Hydraulic diversion	• Flooding is a result of substandard street drainage, diversion of this sort of runoff/flow is not feasible
		Bridge or culvert improvements	• There are no bridges or need for bridges within the Study Area • Culvert improvements were included in the drainage system improvement alternatives, where required
		Structure or infrastructure flood proofing	• This approach would not mitigate for the roadway flooding that occurs • Beside roads, infrastructure present in the Study Area is not majorly impacted by flooding
		Structure elevation modifications	• This approach would not mitigate for the roadway flooding that occurs • 201 homes would need to be elevated or floodproofed based on future precipitation results, which would not be efficient
	Green Infrastructure (GI)		• Would only be effective for managing 2-year or less storm events • Due to the widespread and dispersed flooding, multiple GI would need to be installed, creating an exorbitant maintenance expense while not addressing flooding for larger storm events. • The Town does not have a maintenance department to maintain this sort of infrastructure • Town does not have budget to maintain this sort of infrastructure • Due to narrow ROW, private property would need to be acquired for installation of GI BMPs. Additionally, SCDOT does not typically allow for GI BMPS within their ROW.
	Detention facilities		• There is limited open space and minimal public-owned property for development/redevelopment in the Town. Dispersed flooding throughout the Town would require numerous detention basins, with very limited options for land. • Most public-owned land is SCDOT ROW which would not allow installation of BMPS within their ROW • Due to dispersed flooding, multiple detention basins would be required throughout the Town

			• To construct these basins, private property would be needed to be purchased, removing it from the tax base and further limiting the future growth and redevelopment of Mayesville.
	Structure Reconstruction		• Due to the dispersed and widespread flooding, structure reconstruction would not be effective
	Structure relocation or demolition		• At this time no structure, other than the Town-owned buildings along Main St. have been repetitively flooded.
	Drainage system improvements		• Would be the most appropriate alternative, as flooding in Study Area is a result of inadequate drainage conveyance systems • Addresses the dispersed flooding throughout the Study Area • Reduces private property flooding and roadway flooding • Can be installed in phases • Supports the Town's redevelopment and economic investment plans • Allows private property owners to redirect their runoff, that may result in flooding or ponding of water on their properties, into an adequately sized drainage system • The roads and stormwater infrastructure in the Town are DOT-owned, Count-owned or privately-owned. Therefore, the maintenance of all drainage improvements will be the responsibility of one of those entities.

Specific items related to the chosen mitigation approach while assessing the overall feasibility and effectiveness of the above techniques including flood damage reduction potential, constructability, cost-effectiveness, regulatory compliance, and neighborhood/social impact are discussed in further detail in the next section.

7.0 Mitigation Evaluations

Section 6 discussed the mitigation options and feasibility factors that are typically considered for flood mitigation projects. Through evaluating these varying options, in addition to public education as detailed in Table 15, one strategy: **drainage system improvements**, was identified as the most applicable/effective strategy based on the characteristics of the flooding within the Town of Mayesville. This section provides evaluations of this recommended mitigation alternative throughout the town. The drainage improvements consist of larger and more stormdrain pipe systems with accompanying inlets, new or larger roadside ditches, and enlarged existing drainage channels. The proposed drainage systems were sized to convey the 25-year storm event, which meets the SCDOT requirements. In modeling the mitigation drainage systems, current and future precipitation was considered. The alternatives discussed within this section can be implemented on a block-by-block basis starting at the outfall or scaled up (or down). to meet the available funding at any given time. The complete flood mitigation depicted would not be achieved until the entirety of the proposed system is in place. If constructed in phases, starting from the downstream and working upstream, mitigation of flooding would occur only within the completed areas. This section discusses the improved drainage conveyance systems grouped by outfall. It should be noted that the mitigation approaches presented in this section are based on LIDAR topography and limited field measurements. Detailed topographic survey should be obtained before commencing with any detailed design. The pipe sizes and inlet spacings are based on this limited information and should be considered conceptual. During the detailed design phase, a jurisdictional determination shall be completed to identify any environmental resources such as wetlands or waters of the United States that may be impacted by any proposed enlargement or enclosure of swales or ditches.

Two critical facilities have been identified in the Town of Mayesville: the fire station and the town hall. Modelling has showed that the fire station does not flood under current conditions for any of the rain events studied. However, modeling has showed that the town hall does flood during current conditions. Although the proposed drainage system improvements in 7.1 will significantly reduce the flooding at the town hall, it will not eliminate it. See Figure 35 for Flood Improvement Comparison Map – Current 25-Year Storm for the fire station and town hall.

Four locations of DOT traffic counts are available in or near the Town of Mayesville as shown in Figure 9a. The average traffic counts show 475 per day on N. Lafayette Street and 1,600 per day on US 76. The high traffic counts on N. Lafayette Street where there is significant flooding demonstrates the significant benefit to the proposed improvements in Drainage Area 7.1.

Figure 9a: SCDOT Traffic Counts in and near the Town of Mayesville

Station Id: 43-0267
Description: SC154 : City Limits - MAYESVILLE TO County Line - LEE
AADT: 475
Located in project area 7.1 N Main N Lafayette

Station Id: 43-0167
Description: US76 : S- 46 (BELL RD) TO County Line – LEE
AADT: 1,600
Located in project area 7.4 East Main Street

Station Id: 43-0459
Description: S-41 : US 76 (FLORENCE HWY) TO S- 57 (EASTERN SCHOOL RD)
AADT: 325
Located just south of project area (below South Lafayette St.)

Station Id: 43-0459
Description: S-41 : US 76 (FLORENCE HWY) TO S- 57 (EASTERN SCHOOL RD)
AADT: 25
Located just east of project area (Sumter Street on eastern side)

Multiple displays have been prepared to graphically depict the improvements in flood reduction the proposed mitigation techniques will create. As there is overlap of the various geographical locations discussed below, please refer to the maps that can be found in Section 8.0 Mapping. Table 16 shows the total remaining number of buildings vulnerable to flooding with the proposed drainage improvements with current precipitation, and Table 17 shows the total remaining number of buildings vulnerable to flooding with the proposed drainage improvements with future precipitation. Table 18 shows the number of buildings removed from being vulnerable to flooding with the proposed drainage improvements with current precipitation.

Table 16: Summary of Buildings Vulnerable to Flooding with Alternative Analysis Drainage System and Current Precipitation

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	25	42	48	53	64
1 to 2	5	11	11	13	16
2 to 3	1	4	4	4	4
> 3	0	0	0	0	0

Appendix A contains map of current condition with alternative analysis drainage system flood depths and buildings vulnerable to flooding.

Table 17: Summary of Buildings Vulnerable to Flooding with Alternative Analysis Drainage System and Future Precipitation

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	34	44	56	64	69
1 to 2	9	11	13	16	16
2 to 3	3	4	4	4	4
> 3	0	0	0	0	0

Appendix B contains map showing future precipitation with alternative analysis drainage system flood depths and buildings vulnerable to flooding.

Table 18: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis Drainage System and Current Precipitation

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	26	44	65	89	108
1 to 2	6	10	22	33	41
2 to 3	3	1	2	4	5
> 3	0	0	1	2	2

Table 19: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis Drainage System and Future Precipitation

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	31	62	93	110	132
1 to 2	6	17	33	42	59
2 to 3	1	1	4	5	6
> 3	0	0	2	2	3

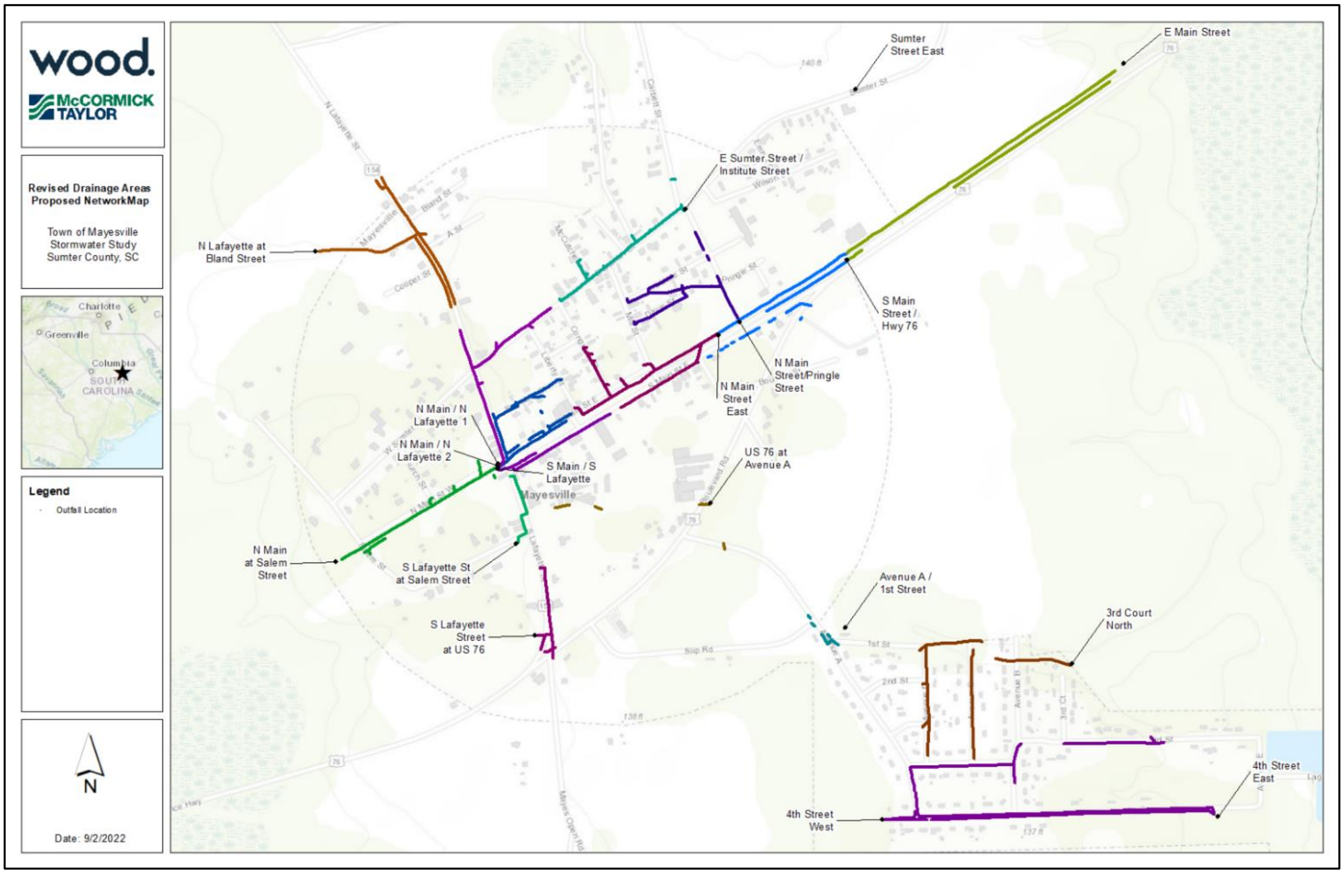


Figure 9b: Mayesville Mitigation Focus Areas

7.1 North Main St at North Lafayette St (1 & 2) / South Main St at South Lafayette

Currently this area of North Lafayette St., South Main St., Republic St., and East Sumter St. consists of a combination of roadside ditches, inlets, and pipes that collect runoff from the agricultural fields to the north of Sumter St. and the residential areas along these streets. This collected flow leaves the SCDOT ROW through a pipe that outfalls into a ditch that runs along the defunct railroad, eventually draining into the swamps adjacent to Long Branch. As discussed in the previous sections, the current drainage system is undersized and experiences flooding starting at the 2-year storm event.

To mitigate flooding in this area and reduce its frequency, this area was separated into two systems from the original Drainage Area 4: North Main/North Lafayette 1 which collects drainage from 17.9 acres from East Sumter St. and North Lafayette St. (DA-4a), and North Main/North Lafayette 2 which collects drainage from 10.3 acres from Republic St., North Lafayette St., and North Main St. Proposed pipe diameters range from 18” diameter circular pipe to 32”x49" elliptical pipe.

The undersized drainage conveyance system is improved with larger pipes on both sides of North Lafayette St., Sumter St., Republic St., and Main St., collecting the runoff that drains towards the roadway. These larger pipes combine into a double barrel pipe system and a multiple outfall discharge point into the railroad ditch. The railroad ditch is then enlarged to convey the 25-year storm event and provide positive conveyance into the Long Branch Swamp. Overall, there is a significant reduction in roadway and property flooding in this area as a result of the improvements. The general flatness of this area and shallow receiving ditches created a challenging scenario in sizing an adequate drainage system, however the proposed system will convey the 25-year storm event.

- Of the 31 pipes in the N Main/N Lafayette 1 network, 12 are below 94% capacity and 19 are above 94%

capacity; however, the time that pipes are capacity limited ranges from only 0.01 to 0.55 hours.

- Of the 44 pipes in the N Main/N Lafayette 2 network, all are above 94% capacity; however, all but two of the pipes are limited for 0.01 hours, and the remaining two are limited for only 0.25 hours and 0.77 hours respectively.
- Of the 15 pipes in the South Main/South Lafayette network, 6 are below 94% capacity and 9 are above 94% capacity; however, the time that pipes are capacity limited ranges from only 0.01 to 0.2 hours.

The remaining flooding within the properties in this area is a result of irregular land grading within the lots. At the property owners' expense, these lots could be regraded to reduce or eliminate the flooding currently depicted.

The proposed system may be constructed in a phased approach, with the initial phase focusing on enlarging the railroad ditch and installation of drainage pipes along North Lafayette St. and along Main St. The second phase would focus on drainage improvements along the side streets including Sumter St. and Republic St.

Table 20: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in North Main St at North Lafayette St (1 & 2) / South Main St at South Lafayette Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	5	4	6	4	6
1 to 2	0	2	4	5	5
2 to 3	1	0	1	1	1
> 3	0	0	0	0	0

7.2 North Lafayette Street at Bland Street

Currently this area of North Lafayette St. consists of a combination of roadside ditches, inlets, and pipes that collect runoff from the agricultural fields to the north and east of North Lafayette St. This collected flow leaves the SCDOT ROW through a small pipe out falling into an agricultural ditch that eventual drains to swamps adjacent to Long Branch. As discussed in the previous sections, the current drainage system is undersized and experiences flooding starting at the 2-year storm event.

To mitigate flooding in this area and reduce its frequency, the undersized drainage conveyance system is improved with larger pipes on both sides of North Lafayette Street collecting the agricultural runoff from 105.2 acres (DA-7) that drains towards the roadway. These larger pipes combine into a double barrel pipe system as it leaves the SCDOT ROW and traverses through a residential property. Once near the agricultural fields, the pipe system terminates into an existing agricultural ditch that will be re-graded to a larger size and to provide positive conveyance through the fields into the Long Branch Swamp. Overall, there is a significant reduction in roadway and property flooding in this area as a result of the improvements. The general flatness of this area and shallow receiving ditches created a challenging scenario in sizing an adequate drainage system along North Lafayette St. Given these constraints, the current proposed model does reflect some shoulder flooding during the 25-year event even with larger pipes installed. All of the 31 proposed pipes in this network are above 94% capacity; however, the time that pipes are capacity limited ranges from only 0.01 (77% of the pipes) to 1.07 hours.

The proposed drainage system would need to be constructed in one phase. This condition will be further evaluated and updated during the next phase of this study. As part of the next phase of the study/design, we recommend including surveyed cross sections of the outfall ditch as the LiDAR generated contours may not have depicted the precise geometry of this channel. As this is a preliminary study, detailed topographic survey will be required during the design phase, which may result in the ability to utilize shallower ditches.

Table 21: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in North Lafayette Street at Bland Street Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	1	4	6	8	7
1 to 2	1	1	1	1	1
2 to 3	0	1	1	1	1
> 3	0	0	0	0	0

7.3 East Sumter at Institute Street

This area of East Sumter St. between Congress St. and Institute St. consists of a combination of roadside ditches, inlets, and pipes that collect runoff from 18.6 acres (DA-8b) and conveys it to an existing ditch along the west side of Institute St. that ultimately discharges along North Main St.

To mitigate flooding in this area and reduce its frequency, the existing drainage system is replaced with a larger diameter pipe system running along East Sumter Street with pipes ranging in size from 18" diameter circular pipe to 32"x49" elliptical pipe. All of the 20 proposed pipes in this network are above 94% capacity; however, only one pipe has limited capacity for more than 0.01 hours (0.66 hours). Overall, there is a significant reduction in roadway and property flooding in this area as a result of the improvements. The general flatness of this area and shallow receiving ditches created a challenging scenario in sizing an adequate drainage system, however the proposed system will convey the 25-year storm event. The remaining flooding within the properties is a result of irregular land grading within these lots. At the property owners' expense, these lots could be regraded to reduce or eliminate the flooding currently depicted.

The proposed drainage system would need to be constructed in one phase and should only be considered once the downstream drainage systems at Main Street / Highway 76 and North Main Street East (discussed in section 7.4) are completed as this system will drain into these systems.

Table 22: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in East Sumter at Institute Street Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	2	5	4	5	4
1 to 2	0	0	3	3	0
2 to 3	0	0	0	0	0
> 3	0	0	0	0	0

7.4 South Main St at US 76 / East Main St / North Main St E / N Main St at Pringle Street

This very large area (DA-12) consisting of South Main St, Liberty St, Institute St, Davis St, and East Sumter St consists of a combination of roadside ditches, inlets, and pipes that collect runoff from the agricultural fields to the north of Sumter St and the residential areas along these streets. This collected flow enters a large drainage channel that runs along US 76 to the east out of the town limits, eventually draining into the swamps adjacent to Black River. As discussed in the previous sections, the current drainage system is undersized and experiences flooding starting at the 2-year storm event.

To mitigate flooding in this area and reduce its frequency, four separate drainage networks were proposed:

- DA-12a (22.0 acres) conveyed by the North Main Street East network
- DA-12b (48.6 acres) conveyed by the North Main Street / Pringle Street network
- DA-12c (29.6 acres) conveyed by the South Main Street / Hwy 76 network
- DA-12d (48.9 acres) conveyed by the East Main Street network

The undersized drainage conveyance system is improved with larger pipes along most of the streets within this basin collecting the runoff that drains towards the roadway. These larger pipes combine into a double barrel pipe system and outfalls into the channel near Pringle St along North Main St and ultimately US 76. The existing channel from Mill St to near Pringle St along North Main St will be enclosed with a pipe system to allow for future Town economic growth projects in this area. To improve the conveyance of the entire system, the channel along Pringle St and US 76 is enlarged to convey the 25-year storm event and provide positive conveyance out of the town limits. Overall there is a significant reduction in roadway and property flooding in this area as a result of the improvements. The general flatness of this area and shallow receiving ditches created a challenging scenario in sizing an adequate drainage system, however the proposed system will generally convey the 25-year storm event.

- North Main Street East: 23 of 40 pipes (58%) above capacity, ranging from 0.01 to 0.36 hours of limitation.
- North Main Street / Pringle Street: all 33 pipes are above capacity, with the majority (83%) with less than 0.3 hours of limitation, and the remaining 3 ranging from 1.43 to 3.35 hours of limitation.
- South Main Street / US 76: 10 of 14 pipes (71%) above capacity, but all pipes limited for 0.0 – 0.01 hours.
- East Main Street: both of the proposed pipes are below 94% capacity, with no limited hours.

The remaining flooding within the properties is a result of irregular land grading within these lots. At the property owners' expense, these lots could be regraded to reduce or eliminate the flooding currently depicted.

This system can be constructed in phases, with the initial phase focused along North Main Street east to Highway 76. Subsequent phases would include the proposed improvements along Institute Street and Pringle Street, followed by Liberty St and South Main Street. The phases should be sequences so as they are constructed from downstream working upstream.

Table 23: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in South Main St at US 76 / East Main St / North Main St E / N Main St at Pringle Street Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	10	15	20	30	40
1 to 2	3	3	8	17	18
2 to 3	0	0	0	1	2
> 3	0	0	0	0	0

7.5 South Lafayette Street at Salem Street

Currently this area of South Lafayette St consists of roadside ditches, inlets, and pipes that collect runoff from 2.6 acres (DA-15a) of residential, commercial and agricultural fields to the south and east of South Lafayette St. This collected flow leaves the SCDOT ROW through a small pipe out falling into an agricultural ditch that eventual drains to swamps adjacent to Long Branch. As discussed in the previous sections, the current drainage system is undersized and experiences flooding starting at the 2-year storm event.

To mitigate flooding in this area and reduce its frequency, the undersized drainage conveyance system is improved with larger pipes along South Lafayette Street collecting the runoff that drains towards the roadway. These larger pipes combine into a pipe system as it leaves the SCDOT ROW and traverses through a residential property. Once near the agricultural fields, the pipe system terminates into an existing agricultural ditch that will be regraded to a larger size and to provide positive conveyance through the fields into the Long Branch Swamp. All ten of the proposed pipes are below capacity and have no flow limitations. Overall there is a significant reduction in roadway and property flooding in this area as a result of the improvements. The general flatness of this area and shallow receiving ditches created a challenging scenario in sizing an adequate drainage system along South Lafayette Street. This suggests that this pipe system performs well in the model and can be refined in final design. The improvements included in this section should be constructed at the same time.

Table 24: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in South Lafayette Street at Salem Street Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	0	1	3	4	4
1 to 2	1	1	1	1	1
2 to 3	0	0	0	0	0
> 3	0	0	0	0	0

7.6 South Lafayette Street at US 76

Currently this area of South Lafayette St consists of 24. 7 acres (DA-6b) of roadside ditches, inlets, and pipes that collect runoff from the residential, commercial and agricultural fields to the south and east of South Lafayette St. This collected flow leaves the SCDOT ROW through a small pipe out falling into an agricultural ditch that eventual drains to swamps adjacent to Long Branch. As discussed in the previous sections, the current drainage system is undersized and experiences flooding starting at the 2-year storm event.

To mitigate flooding in this area and reduce its frequency, the undersized drainage conveyance system is improved with larger pipes along South Lafayette Street collecting the runoff that drains towards the roadway. These larger pipes combine into a pipe system as it leaves the SCDOT ROW and traverses through a residential property. Once near the agricultural fields, the pipe system terminates into an existing agricultural ditch that will be regraded to a larger size and to provide positive conveyance through the fields into the Long Branch Swamp. Overall there is a significant reduction in roadway and property flooding in this area as a result of the improvements. For the 15 proposed pipes in this section, 8 are under 94% capacity for the 25-year storm under current precipitation conditions. The duration of the capacity limitation for the remaining pipes is 0.01 hrs for 5 pipes, 0.52 hrs, and 2.42 hrs. The general flatness of this area and shallow receiving ditches created a challenging scenario in sizing an adequate drainage system along South Lafayette Street. Given these constraints, the current proposed model does reflect shoulder flooding during the 25-year event even with larger pipes installed. For the 10 proposed pipes in this section, pipe capacity ranges from 47 to 95% for the 25-year storm under current precipitation conditions. The improvements included in this section should be constructed at the same time.

Table 25: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in South Lafayette Street at US 76 Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	0	1	1	1	0
1 to 2	0	0	0	0	0
2 to 3	0	0	0	0	0
> 3	0	0	0	0	0

7.7 North Main Street at Salem Street West

As depicted in the existing conditions analysis, West Sumter St west of Church St and Salem St from North Main St to its northern terminus does not experience any flooding during the 25-year storm event. As the existing conveyance systems adequately convey the design storm, no improvements have been proposed to the residential area. However, we do propose including improvements to the existing ditch network and enlarging the culverts crossing Main Street and Salem Street in order to remove impediments to flow from upstream DA-1, DA-4a, DA-4b and DA-13 (88.5 acres), discussed in Section 7.1, as it is conveyed by the system to discharge into Little Long Branch. Of the nine proposed pipes, only three are above capacity; however, they are limited for only 0.01 hours in the model.

Table 26: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in North Main Street at Salem Street West Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	1	1	4	7	9
1 to 2	0	0	0	0	1
2 to 3	0	0	0	0	0
> 3	0	0	0	0	0

7.8 US 76 at Avenue A

A culvert under US 76 collects runoff from 49.3 acres (DA-15b) of residential, commercial and agricultural fields between US 76, Main St, and South Lafayette St. This collected flow crosses under US 76 through a culvert out falling into an agricultural ditch that eventual drains to swamps adjacent to Long Branch. As discussed in the previous sections, the culvert under US 76 is undersized and experiences flooding starting at the 2-year storm event.

To mitigate flooding in this area and reduce its frequency, the undersized culvert is replaced with two 24x38" pipes. The larger culvert will terminate into the existing agricultural ditch. Although the model indicates that all four proposed pipe sections in this network are above 94% capacity, the actual time limitation is 0.01hrs. This improvement may be constructed separately or compiled into one of the other projects.

Table 27: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in US 76 at Avenue A Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	4	3	7	11	16
1 to 2	1	1	3	3	7
2 to 3	2	0	0	1	1
> 3	0	0	1	2	2

7.9 Avenue A at 1st Street

A culvert under Avenue A collects runoff from the residential, commercial and agricultural fields between US 76, Avenue A and Slip Rd. This collected flow crosses under Avenue A through a culvert that discharges into an agricultural ditch that eventual drains to swamps adjacent to Long Branch. As discussed in the previous sections, the culvert under Avenue A is undersized and experiences flooding starting at the 10-year storm event.

To mitigate flooding in this area and reduce its frequency, the undersized culvert is replaced with a larger a double barrel 29"x45"culvert that terminates into the existing agricultural ditch. The upstream and downstream ditch will be regraded to improve conveyance capacity in the area of the culvert. Of the 6 proposed pipes, all but one of the smaller driveway crossings are below 94% capacity (and that pipe has 0.01 of flow limitation in the model).

Table 28: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in Avenue A at 1st Street Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	0	0	0	0	0
1 to 2	0	0	0	0	0
2 to 3	0	0	0	0	0
> 3	0	0	0	0	0

7.10 Southeastern Neighborhood (South of US 76) – 4th Street West, 4th Street East and 3rd Court North

Currently this neighborhood does not have any drainage conveyance systems except for a set of culverts near the Slip Road and Avenue A intersection that conveys a drainage channel to a wooded area behind the neighborhood. Due to the lack of convenance systems along these roadways, stormwater collects and pools until it infiltrates into the ground. The lack of flooding in this area is a direct result of the sandy soil and large yards that can collect and infiltrate the runoff. As discussed in the previous sections, the current drainage system is undersized and experiences flooding starting at the 2-year storm event.

To mitigate flooding in this area and reduce its frequency, an improved drainage conveyance system is recommended along many of the streets within this neighborhood. The proposed system consists of stormdrain pipes, roadside ditches and cross culverts. Specifically shallow ditches will convey roadway runoff that is currently captured in sumps and low spots along the roadway. This swale system will outfall into existing drainage courses and stream channels within the neighborhood. Two existing cross culverts, along 3rd St and 4th street are enlarged to meet the 25-year design storm. Nine of 11 pipes on 3rd court are above 94% capacity (with flow limitations of 0.01 to 1.08 hours). None of the four pipe sections on 4th street are above capacity. Due to the type of improvements proposed, it is recommended that this project be completed in a single phase.

Table 29: Summary of Buildings Removed from Being Vulnerable to Flooding with Alternative Analysis and Current Precipitation in Southeastern Neighborhood (South of US 76) – 4th Street West, 4th Street East and 3rd Court North Drainage Area

Depth (ft)	Building Count				
	2-yr	10-yr	25-yr	50-yr	100-yr
0.5 to 1	1	6	7	13	17
1 to 2	0	0	0	0	3
2 to 3	0	0	0	0	0
> 3	0	0	0	0	0

8.0 Mitigation Evaluations – Mapping and Displays

8.1 Existing Condition Drainage system and Proposed Condition Drainage System

The town of Mayesville has a limited drainage system under existing conditions. Based upon research of SCDOT archives and field verification, the Town has approximately 127 individual pipes, with a total length of about 13,072 feet, or 2.5 miles in current conditions.

Table 30: Existing Pipe Infrastructure

Shape	Size (in)	Count	Length (ft)
Circular	12	3	77
Circular	15	39	2,973
Circular	18	52	6,554
Circular	21	1	50
Circular	24	26	3,071
Circular	30	2	72
Circular	36	3	189
Circular	48	1	87
TOTAL:		127	13,072

In developing the mitigation alternatives, a significant increase in drainage pipes was needed to meet the project's design requirements and to limit the need for additional right of way that would be needed if ditches were to be constructed in many areas. Due to the flat topography of Mayesville, in many instances horizontal elliptical pipes are required as these pipes have the ability to convey a large volume of water while utilizing less vertical space then the equivalent circular pipe. By using elliptical pipes, existing points of outfall into open channels were able to be maintained. In some instances, double barrel pipes were required to meet the conveyance requirements (two elliptical or circular pipes side by side), these locations are denoted on the following maps as well. For this study, reinforced concrete pipes were recommended as the majority of pipes are to be located within the SCDOT right of way and would be within a roadway or driveway. In areas outside of the SCDOT right of way, and under open space, given adequate cover, plastic pipes may be utilized. The proposed mitigation alternatives result in 7,714 LF (1.5 miles) of circular pipe and 13,973 LF (2.6 miles) of horizontal elliptical pipe.

In addition to the addition of numerous pipes, new drainage inlets will be required to be constructed along the roadway. These inlets will capture the surface flow and convey runoff into the pipe system. For this study, inlets were located within sumps and spaced throughout the pipe system averaging every 100 linear foot. During the detailed design phase, inlet spacing computations should be performed to ensure capture efficiency and spread requirements are met. These computations require detailed topographic survey, thus were not completed as part of this study.

Table 31: Proposed Pipe Infrastructure

Shape	Size (in)	Length (ft)
Circular Pipe	15	1,608
	18	4,002
	21	87
	24	934
	30	1,099
	36	162
	42	112
Elliptical Pipe	14x23	2,896
	19x30	4,774
	22x34	1,289
	24x38	1,564
	27x42	3,114
	29x45	1,635
	32x49	1,143
TOTAL		24,421

In the Existing Condition, the Team relied on using the topography from LiDAR to identify the locations of existing channels and ditches. In the proposed condition, 1D channels were created in areas where existing channels were unable to adequately convey flow (either due to size or slope constraints). The total amount of proposed improved ditches is 12,572 LF (2.4 miles). Note, the improved ditches are located in places where the LiDAR indicates existing low-lying linear areas that convey water.

Table 32: Proposed Channel Improvements

Shape	Width[1] (ft)	Length (ft)
Trapezoidal	2	250
	3	99
	4	2,261
	6	2,350
	8	4,807
	10	1,194
	12	1,483
Triangular	2	7,156
	8	197
TOTAL		19,797

[1]For trapezoidal channels, the width is the bottom dimension; for triangular channels, the width is the top dimension

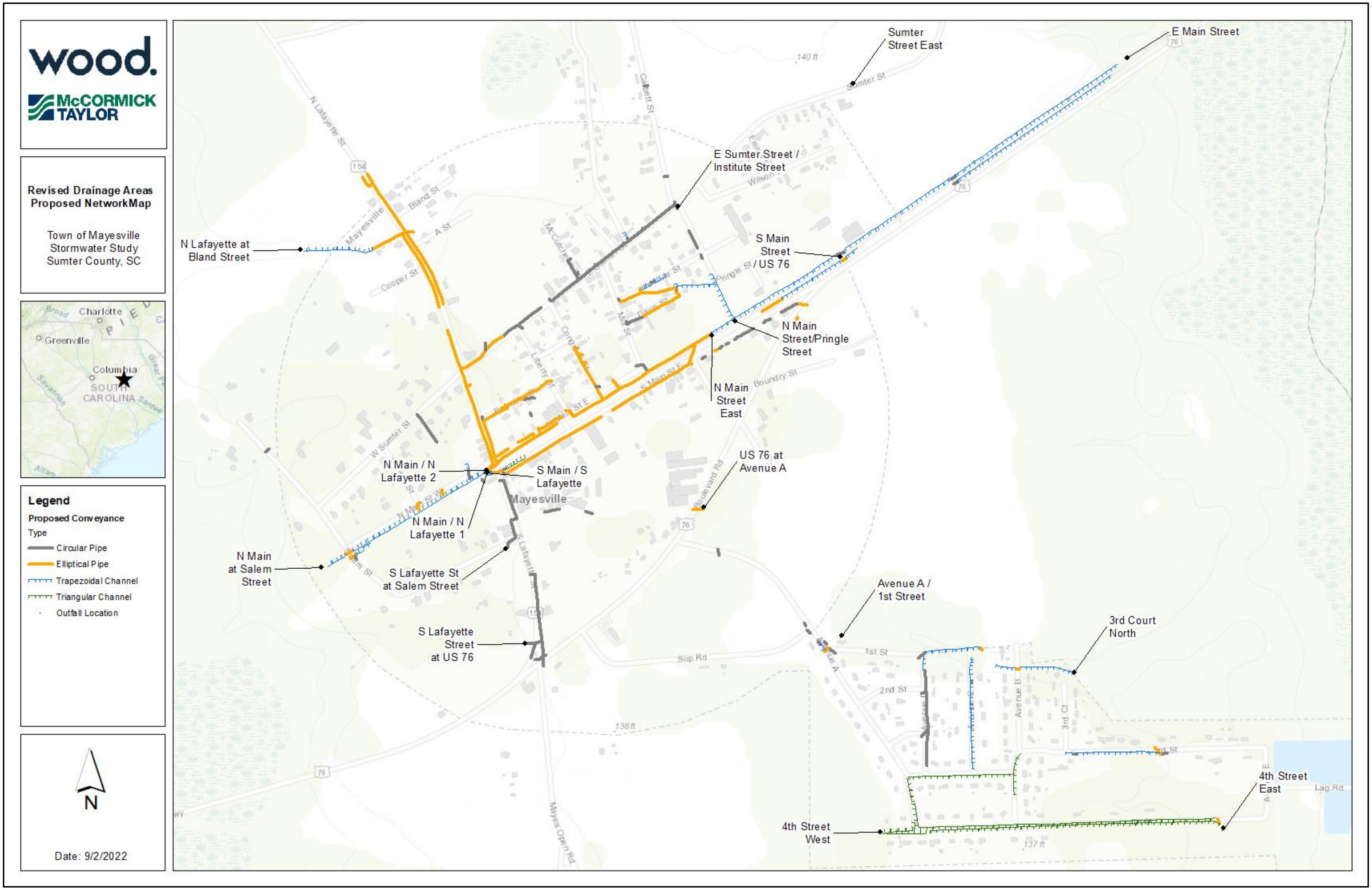


Figure 10: Proposed Drainage Network Conduit Type Map

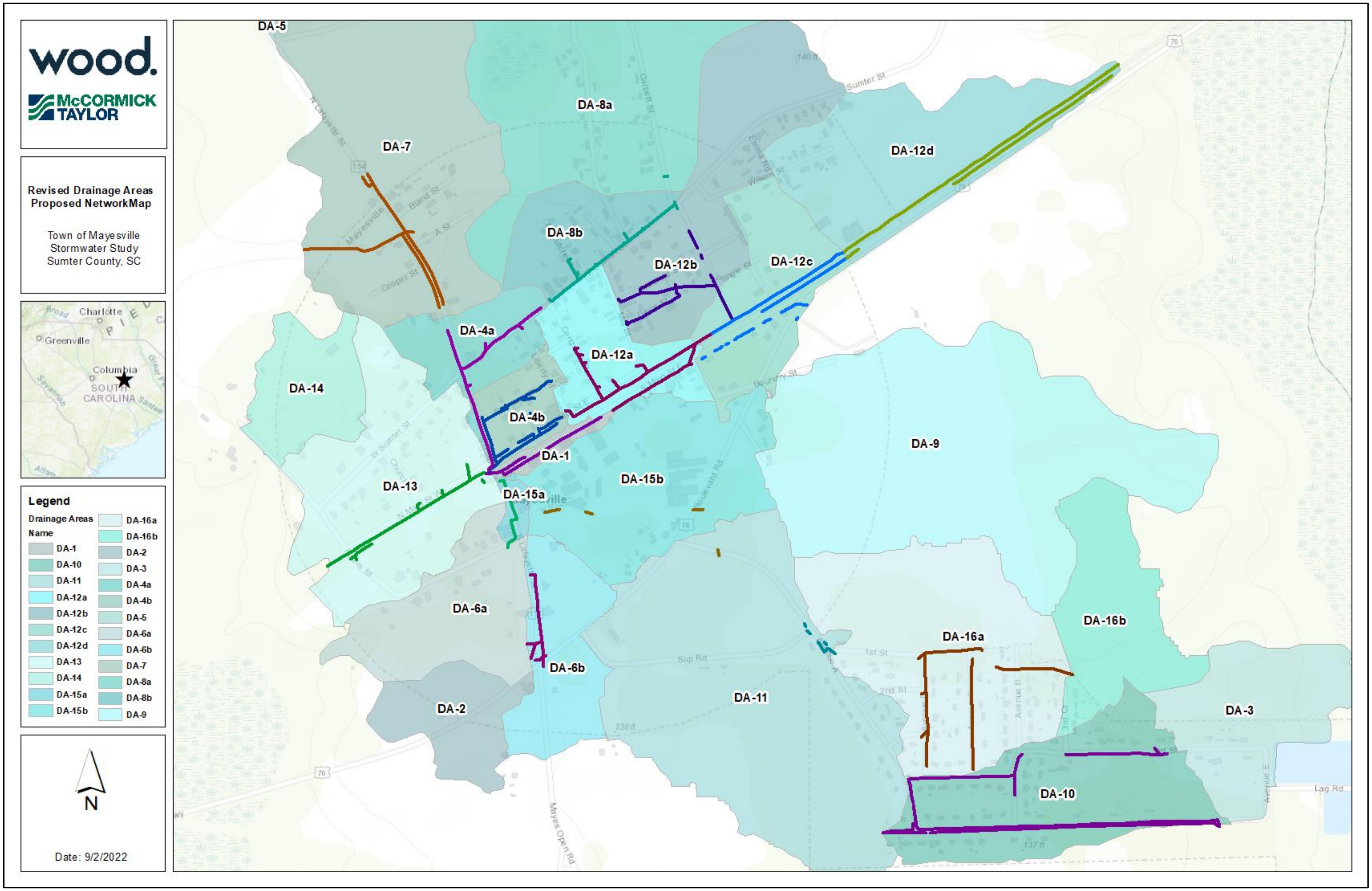
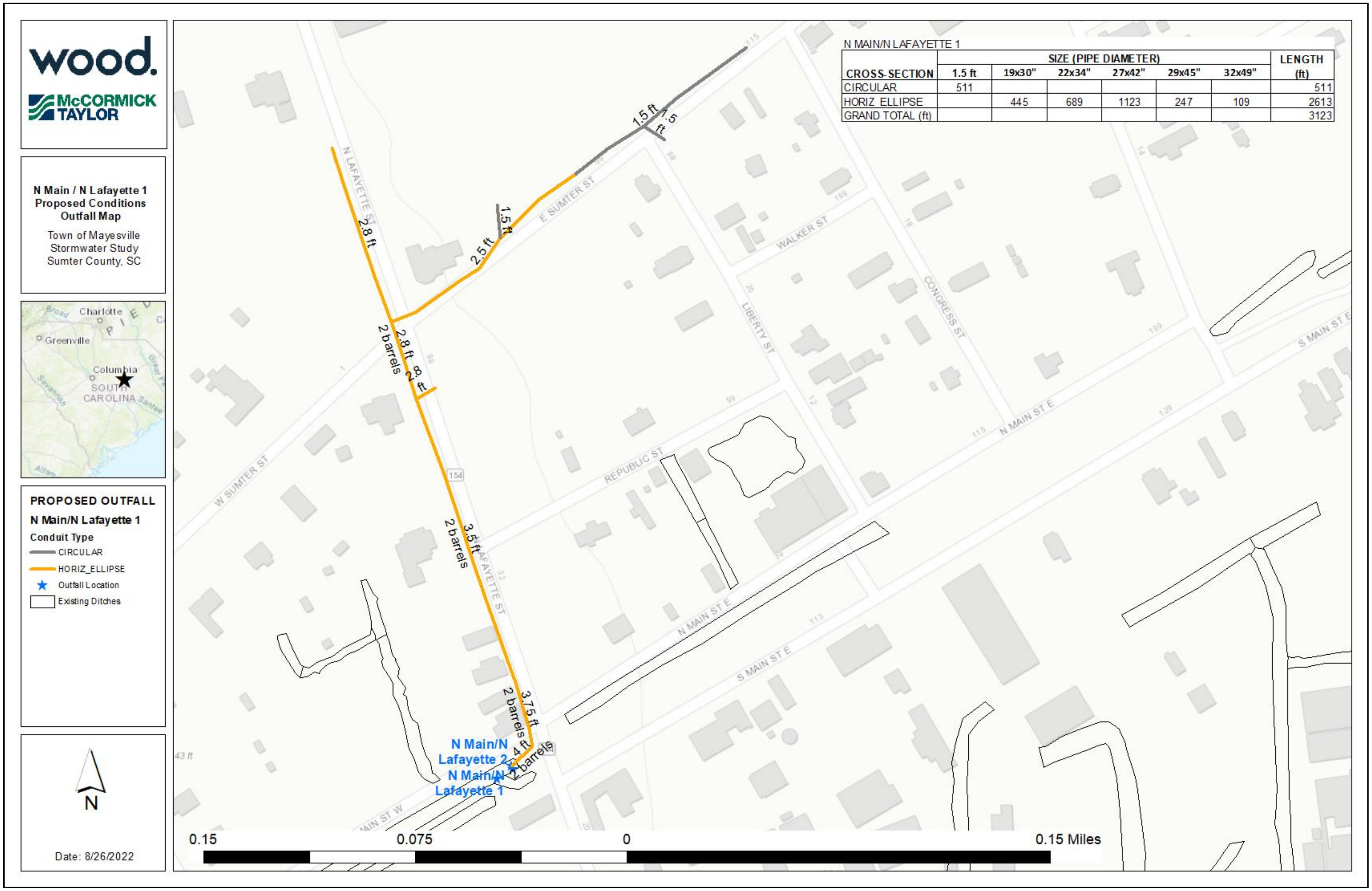


Figure 11: Proposed Network Revised Drainage Areas



CROSS-SECTION	SIZE (PIPE DIAMETER) 1.5 ft	19x30"	22x34"	27x42"	29x45"	32x49"	LENGTH (ft)
CIRCULAR	511						511
HORIZ ELLIPSE		445	689	1123	247	109	2613
GRAND TOTAL (ft)							3123

Figure 12: Proposed Drainage Network Conduit Type Map: North Main Street/North Lafayette 1 network

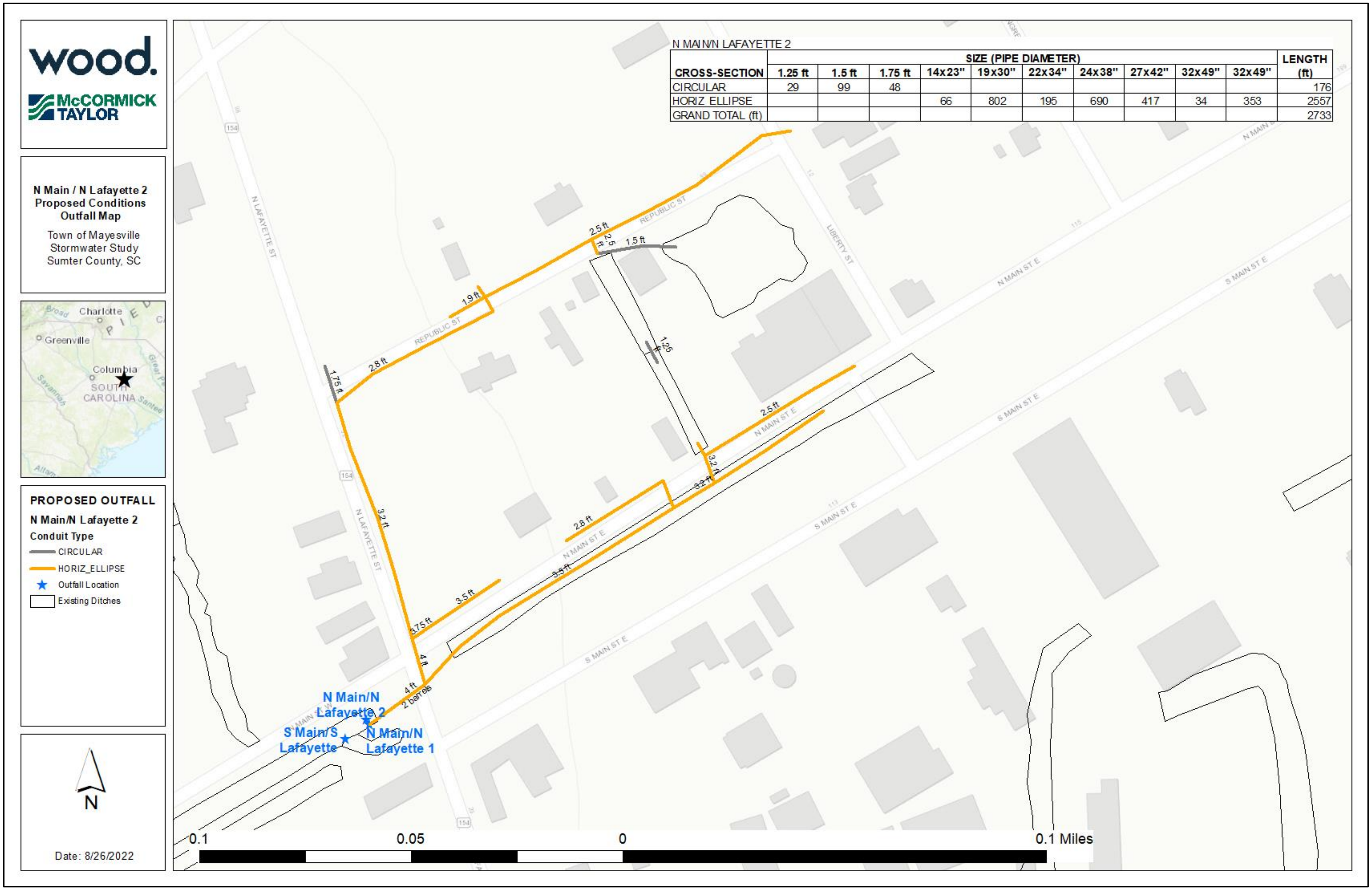


Figure 13: Proposed Drainage Network Conduit Type Map: North Main Street/North Lafayette 2 network

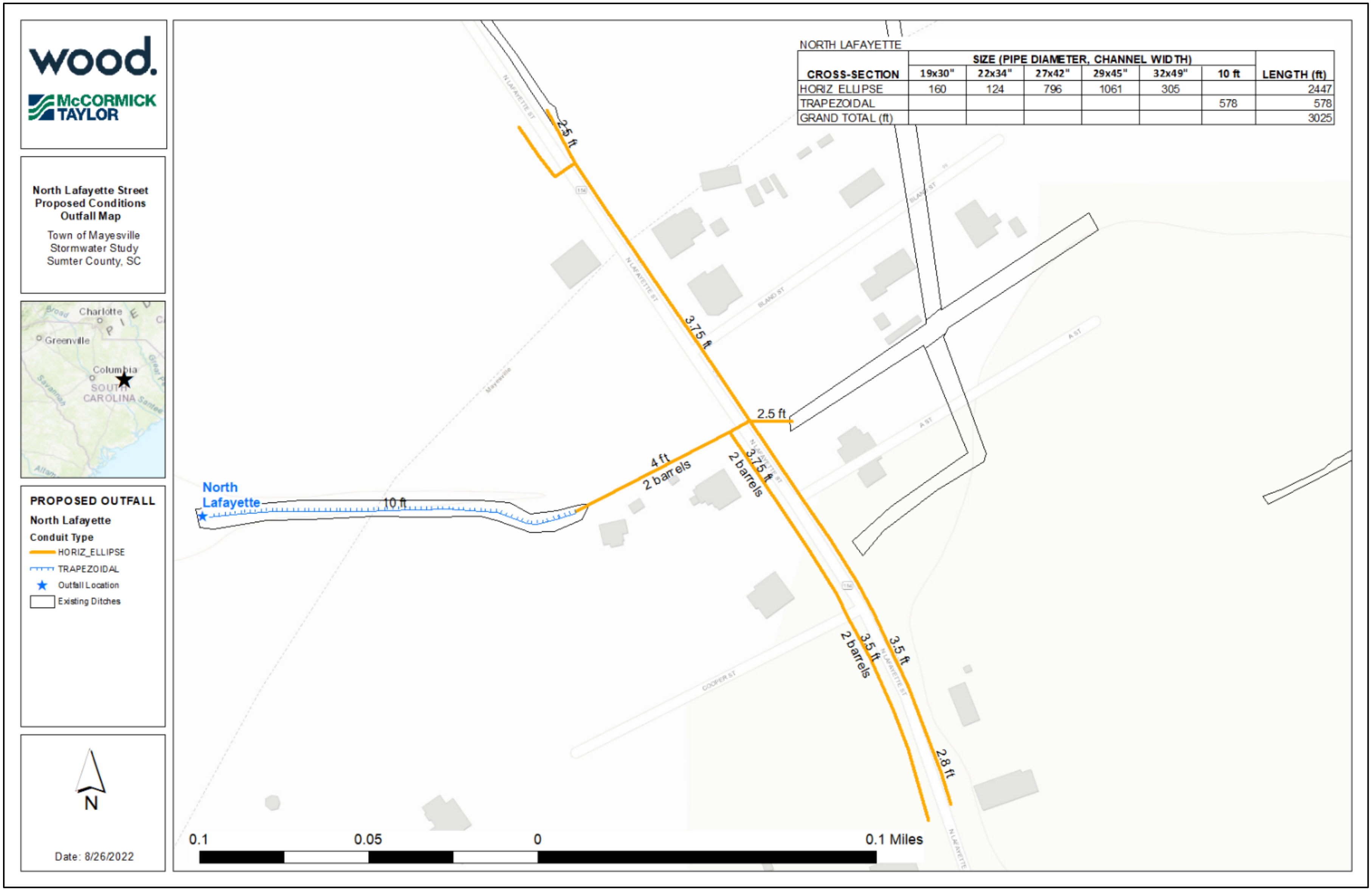
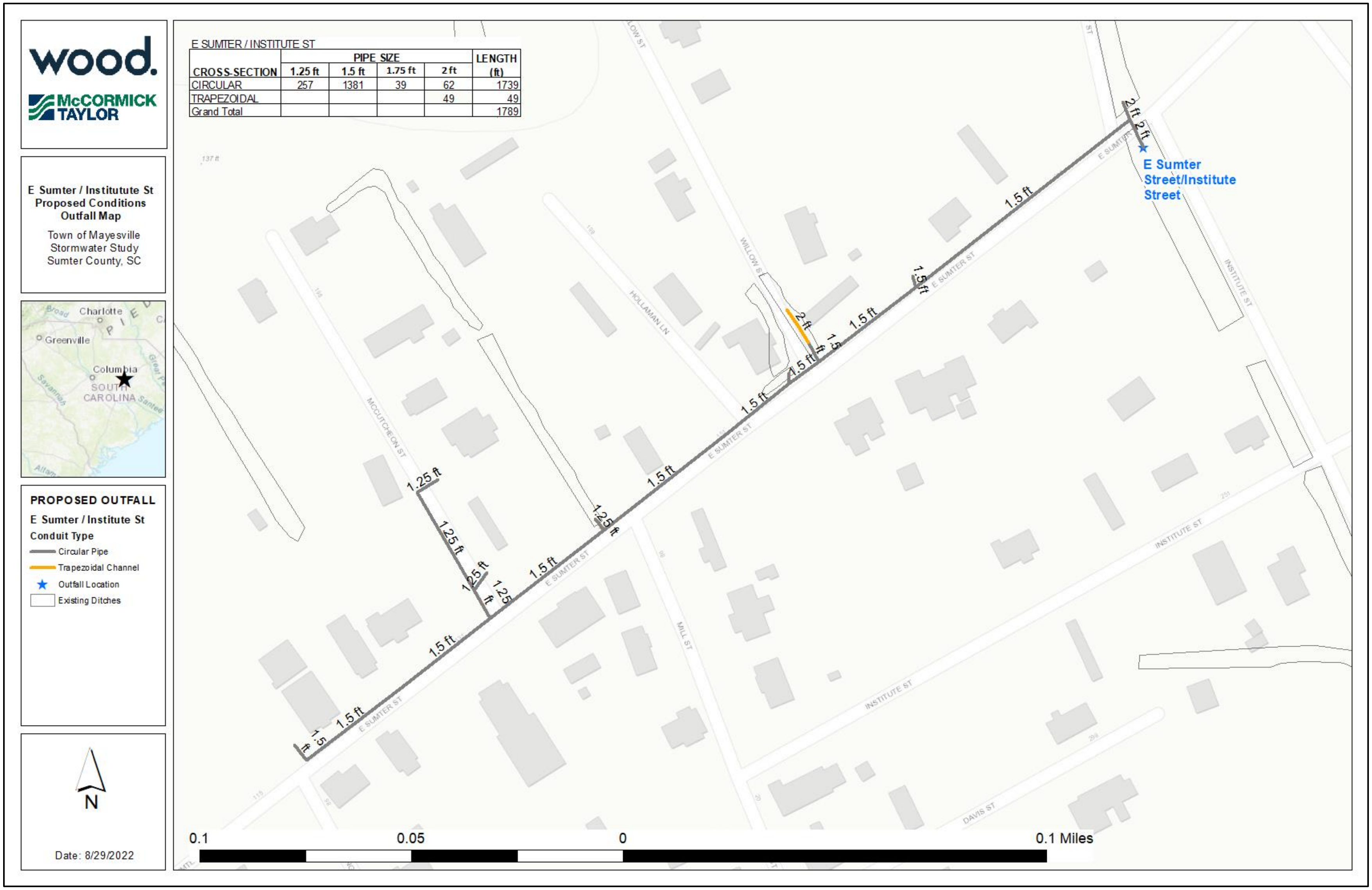


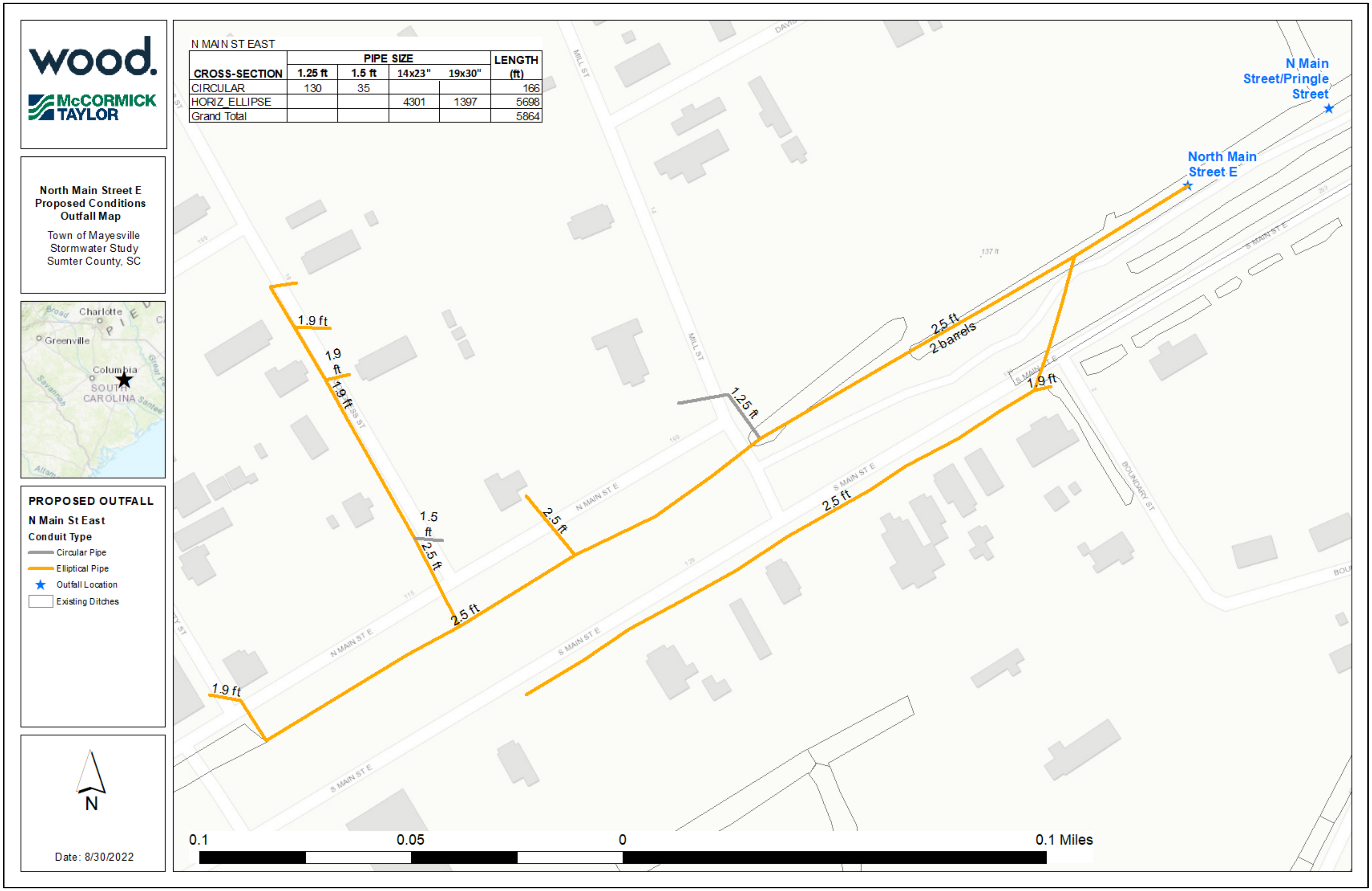
Figure 14: North Lafayette St. at Bland Street network



E SUMTER / INSTITUTE ST

CROSS-SECTION	PIPE SIZE 1.25 ft	1.5 ft	1.75 ft	2 ft	LENGTH (ft)
CIRCULAR	257	1381	39	62	1739
TRAPEZOIDAL				49	49
Grand Total					1789

Figure 15: Proposed Drainage Network Conduit Type Map: East Sumter St. at Institute St. network



CROSS-SECTION	PIPE SIZE 1.25 ft	1.5 ft	14x23"	19x30"	LENGTH (ft)
CIRCULAR	130	35			166
HORIZ_ELLIPSE			4301	1397	5698
Grand Total					5864

Figure 16: North Main Street East network

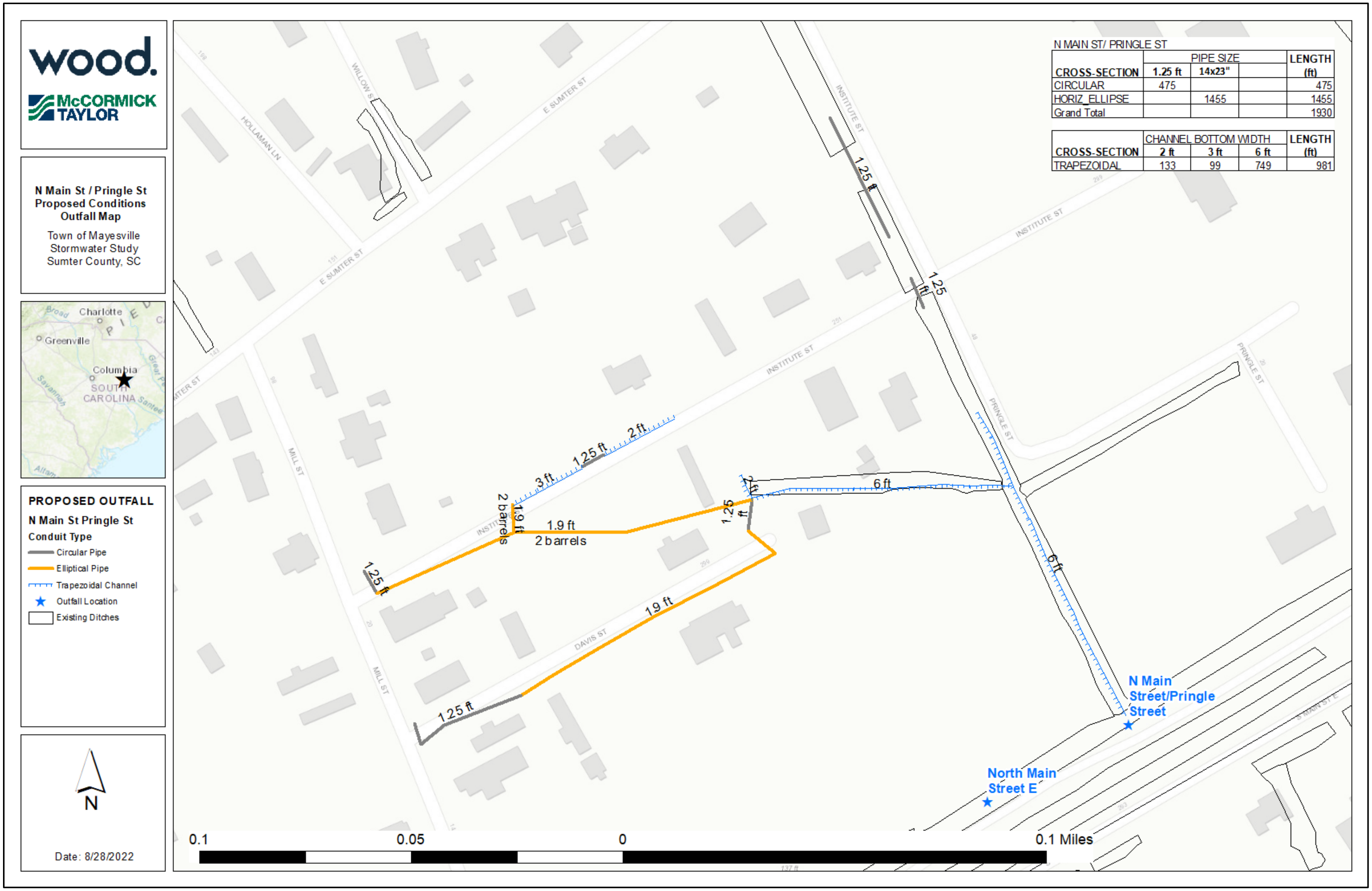
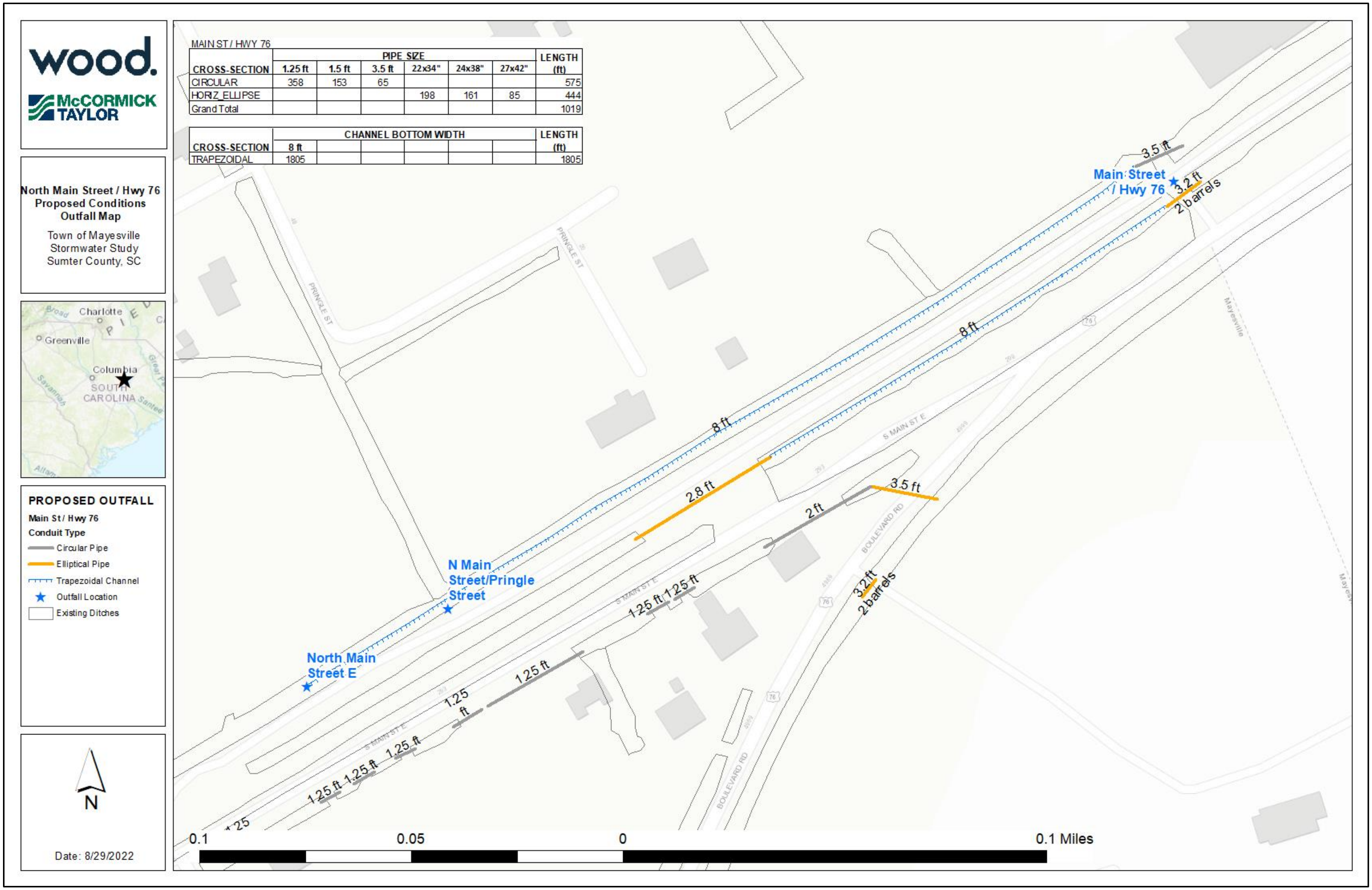


Figure 17: Proposed Drainage Network Conduit Type Map: North Main Street / Pringle Street network

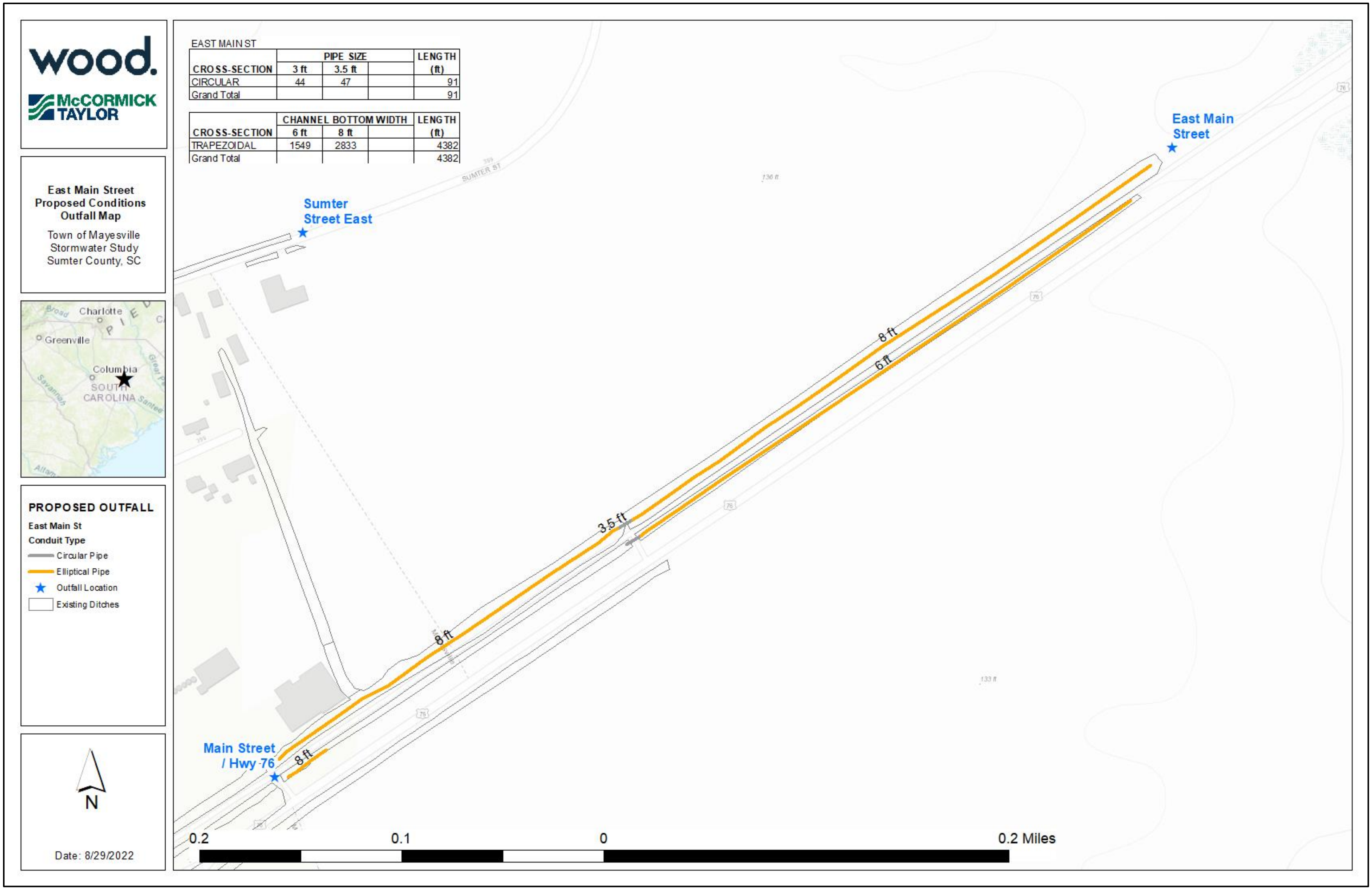


MAIN ST / HWY 76

CROSS-SECTION	PIPE SIZE 1.25 ft	1.5 ft	3.5 ft	22x34"	24x38"	27x42"	LENGTH (ft)
CIRCULAR	358	153	65				575
HORIZ_ELLIPSE				198	161	85	444
Grand Total							1019

CROSS-SECTION	CHANNEL BOTTOM WIDTH 8 ft						LENGTH (ft)
TRAPEZOIDAL	1805						1805

Figure 18: Proposed Drainage Network Conduit Type Map: Main Street / Hwy 76 network



EAST MAIN ST

CROSS-SECTION	PIPE SIZE 3 ft	3.5 ft		LENGTH (ft)
CIRCULAR	44	47		91
Grand Total				91

CROSS-SECTION	CHANNEL BOTTOM WIDTH 6 ft	8 ft		LENGTH (ft)
TRAPEZOIDAL	1549	2833		4382
Grand Total				4382

Figure 19: Proposed Drainage Network Conduit Type Map: East Main Street network

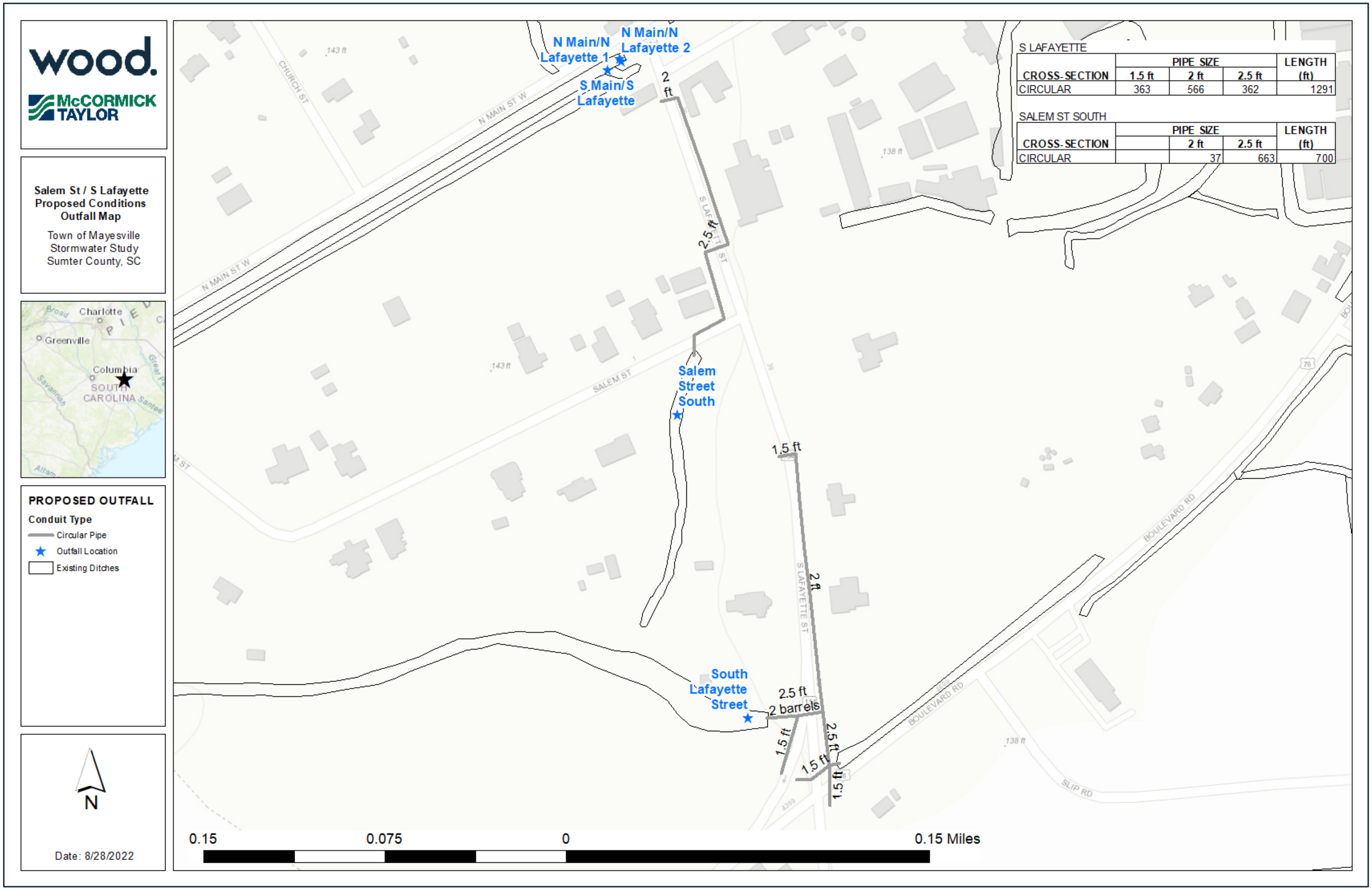
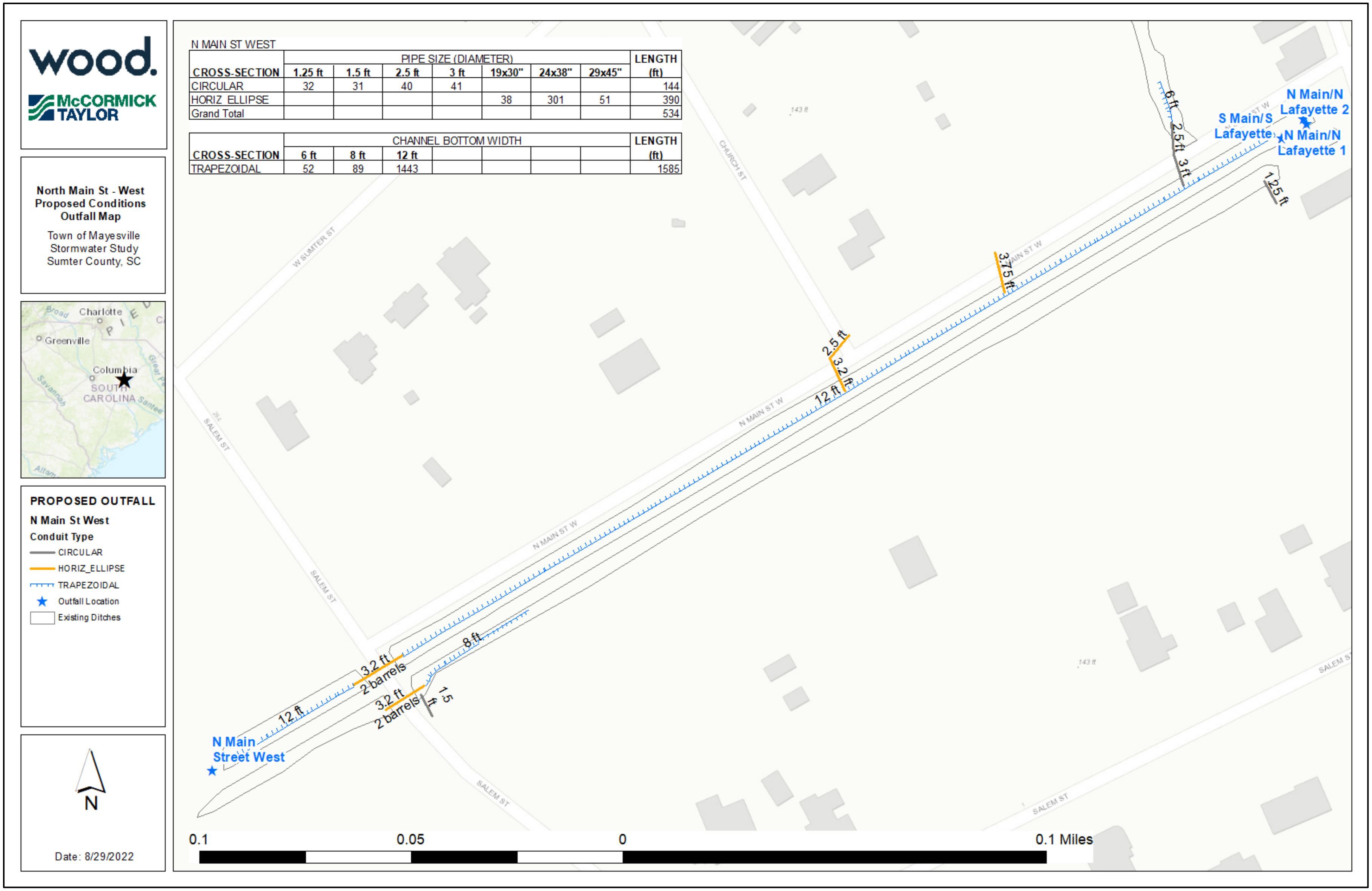


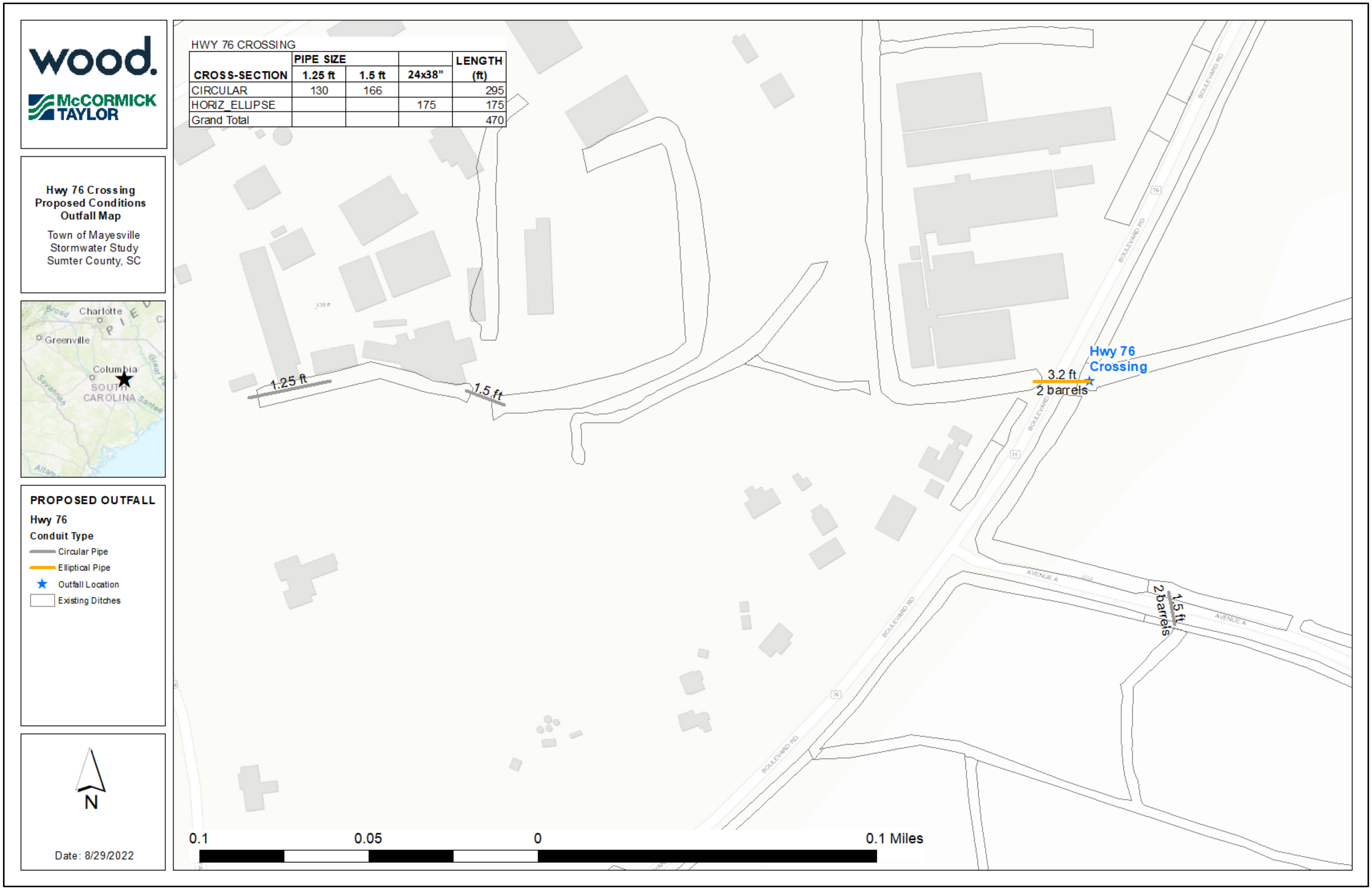
Figure 20: Proposed Drainage Network Conduit Type Map: South Lafayette and Salem Street networks



CROSS-SECTION	PIPE SIZE (DIAMETER) 1.25 ft	1.5 ft	2.5 ft	3 ft	19x30"	24x38"	29x45"	LENGTH (ft)
CIRCULAR	32	31	40	41				144
HORIZ_ELLIPSE					38	301	51	390
Grand Total								534

CROSS-SECTION	CHANNEL BOTTOM WIDTH 6 ft	8 ft	12 ft	LENGTH (ft)
TRAPEZOIDAL	52	89	1443	1585

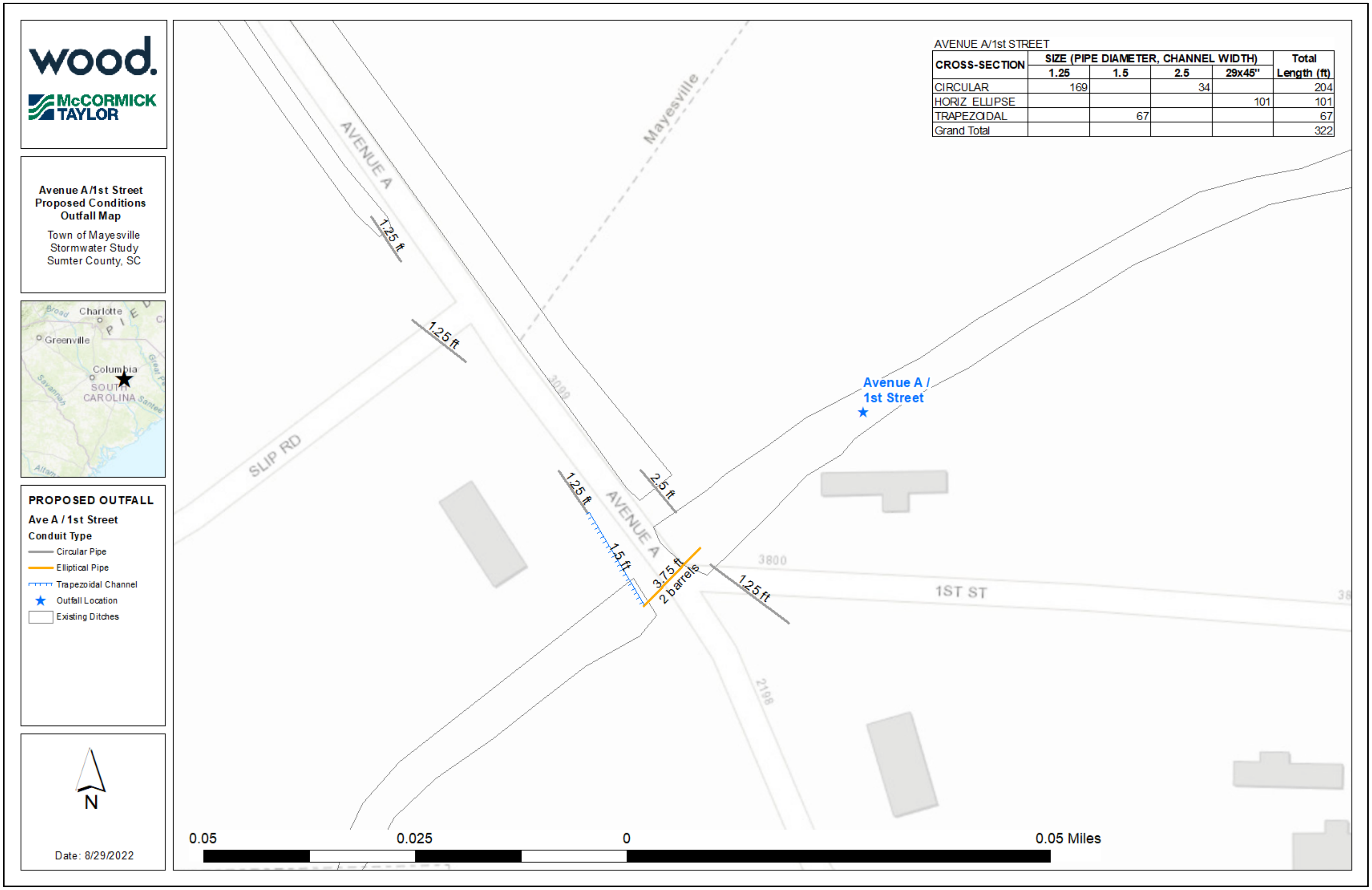
Figure 21: Proposed Drainage Network Conduit Type Map: N Main Street at Salem Street West network



HWY 76 CROSSING

CROSS-SECTION	PIPE SIZE 1.25 ft	1.5 ft	24x38"	LENGTH (ft)
CIRCULAR	130	166		295
HORIZ_ELLIPSE			175	175
Grand Total				470

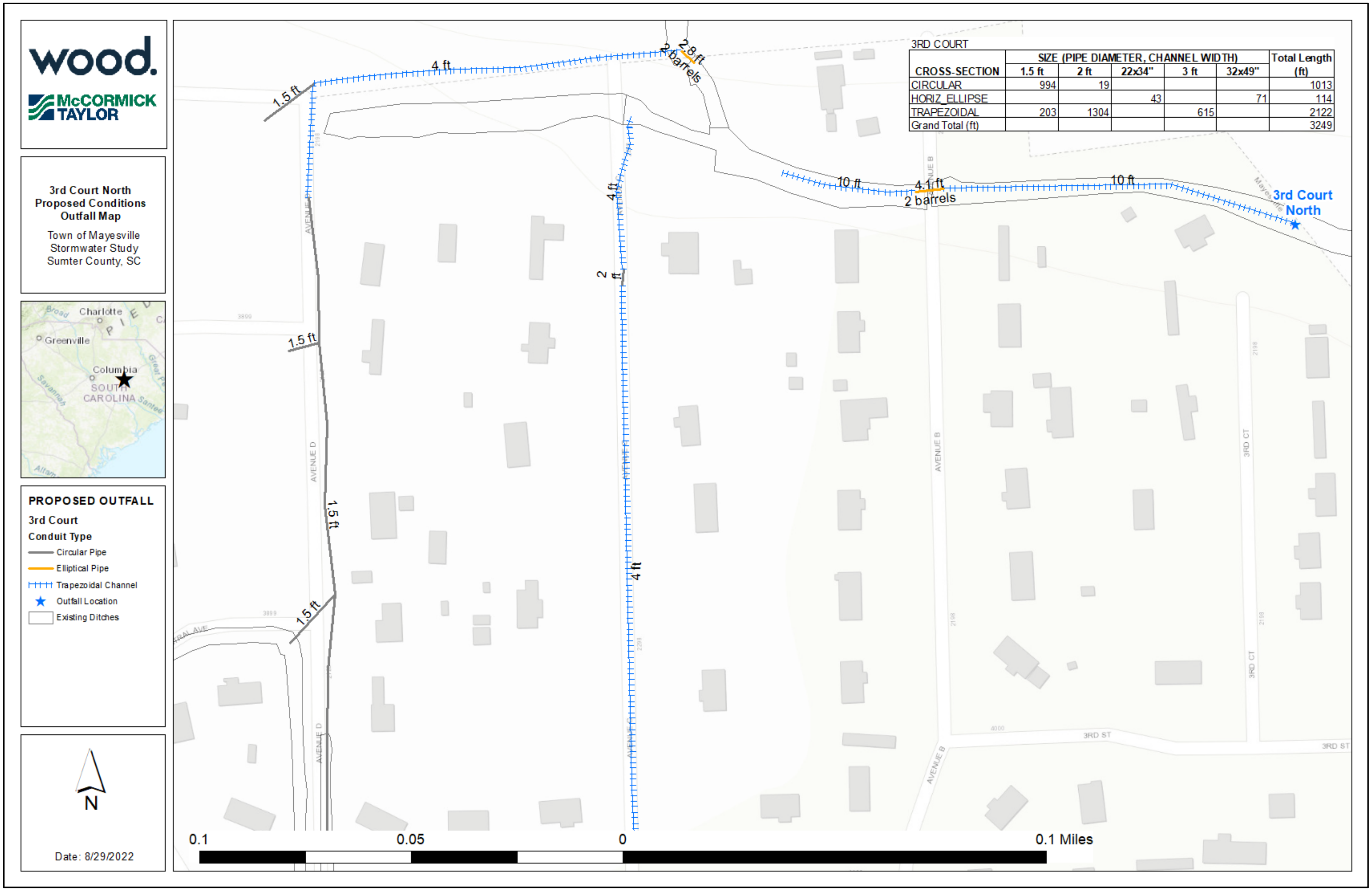
Figure 22: US 76 at Avenue A network



AVENUE A/1st STREET

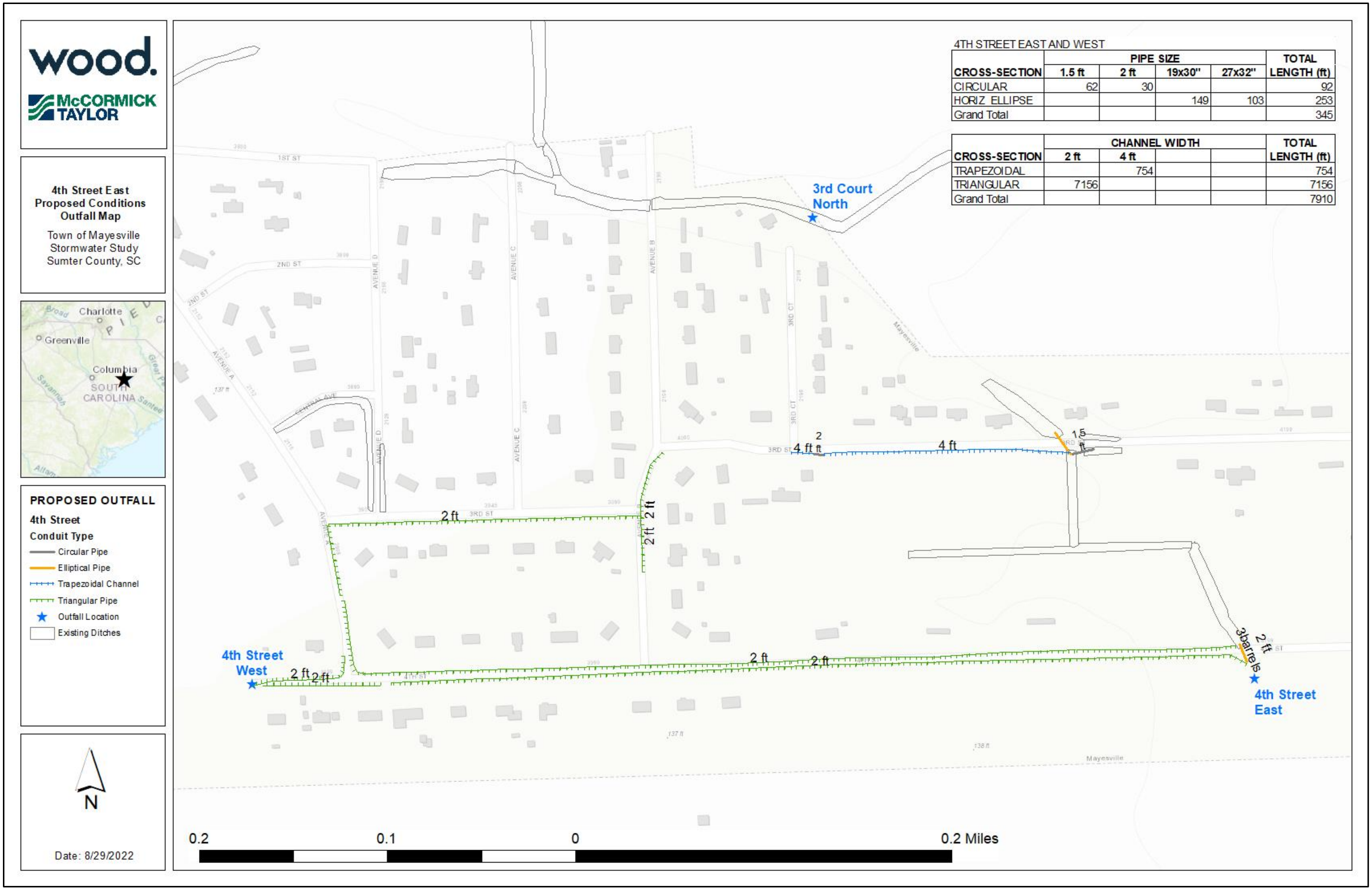
CROSS-SECTION	SIZE (PIPE DIAMETER, CHANNEL WIDTH)				Total Length (ft)
	1.25	1.5	2.5	29x45"	
CIRCULAR	169		34		204
HORIZ_ELLIPSE				101	101
TRAPEZOIDAL		67			67
Grand Total					322

Figure 23: Proposed Drainage Network Conduit Type Map: Avenue A at 1st Avenue network



CROSS-SECTION	SIZE (PIPE DIAMETER, CHANNEL WIDTH) 1.5 ft	2 ft	22x34"	3 ft	32x49"	Total Length (ft)
CIRCULAR	994	19				1013
HORIZ_ELLIPSE			43		71	114
TRAPEZOIDAL	203	1304		615		2122
Grand Total (ft)						3249

Figure 24: Proposed Drainage Network Conduit Type Map: Southeastern Neighborhood: 3rd Court network



CROSS-SECTION	PIPE SIZE 1.5 ft	2 ft	19x30"	27x32"	TOTAL LENGTH (ft)
CIRCULAR	62	30			92
HORIZ ELLIPSE			149	103	253
Grand Total					345

CROSS-SECTION	CHANNEL WIDTH 2 ft	4 ft			TOTAL LENGTH (ft)
TRAPEZOIDAL		754			754
TRIANGULAR	7156				7156
Grand Total					7910

Figure 25: Proposed Drainage Network Conduit Type Map: Southeastern Neighborhood: 4th Avenue network

8.2 Proposed Improvements Conveyance Capacity and Surcharge

In the existing condition, we modelled 170 junctions and 127 pipes. In proposed condition, in order to add additional inlets to provide opportunities to capture stormwater runoff, the model included 338 junctions and 284 pipes. The capacity and surcharge analysis did not include ditches (or the junctions associated with them). As with existing conditions, in the proposed condition, our goal was to keep the junction surcharge less than 0.5 ft and the pipe capacity to 94% or less.

For a preliminary design, we have shown that it is possible to provide measurable improvement to the drainage system. However, a future more detailed study (with surveys of channels, utilities, etc.) will maximize the effectiveness of these proposed improvements.

Table 33: Proposed Pipes, Current Precipitation Capacity Summary

Design Storm Scenario	Junctions Surcharging >0 ft		Junctions Surcharging >0.5 ft		Pipes Exceeding Capacity (94%)	
	Number	Percent	Number	Percent	Number	Percent
Current 2yr	62	18%	14	4%	84	30%
Current 10yr	117	35%	39	12%	172	61%
Current 25yr	150	44%	65	19%	201	71%
Current 50yr	177	52%	76	22%	225	80%
Current 100yr	188	56%	100	30%	237	84%
# Items	338		338		284	

As expected in future precipitation conditions, the number of junctions surcharging and pipes above capacity increases in response to the larger rainfall amounts.

Table 34: Proposed Pipes, Future Precipitation Capacity Summary

Design Storm Scenario	Junctions Surcharging >0 ft		Junctions Surcharging >0.5 ft		Pipes Exceeding Capacity (94%)	
	Number	Percent	Number	Percent	Number	Percent
Future 2yr	96	28%	32	9%	138	49%
Future 10yr	156	46%	62	18%	195	69%
Future 25yr	171	51%	78	23%	228	81%
Future 50yr	177	52%	97	29%	237	84%
Future 100yr	185	55%	105	31%	243	86%
# Items	338		338		284	

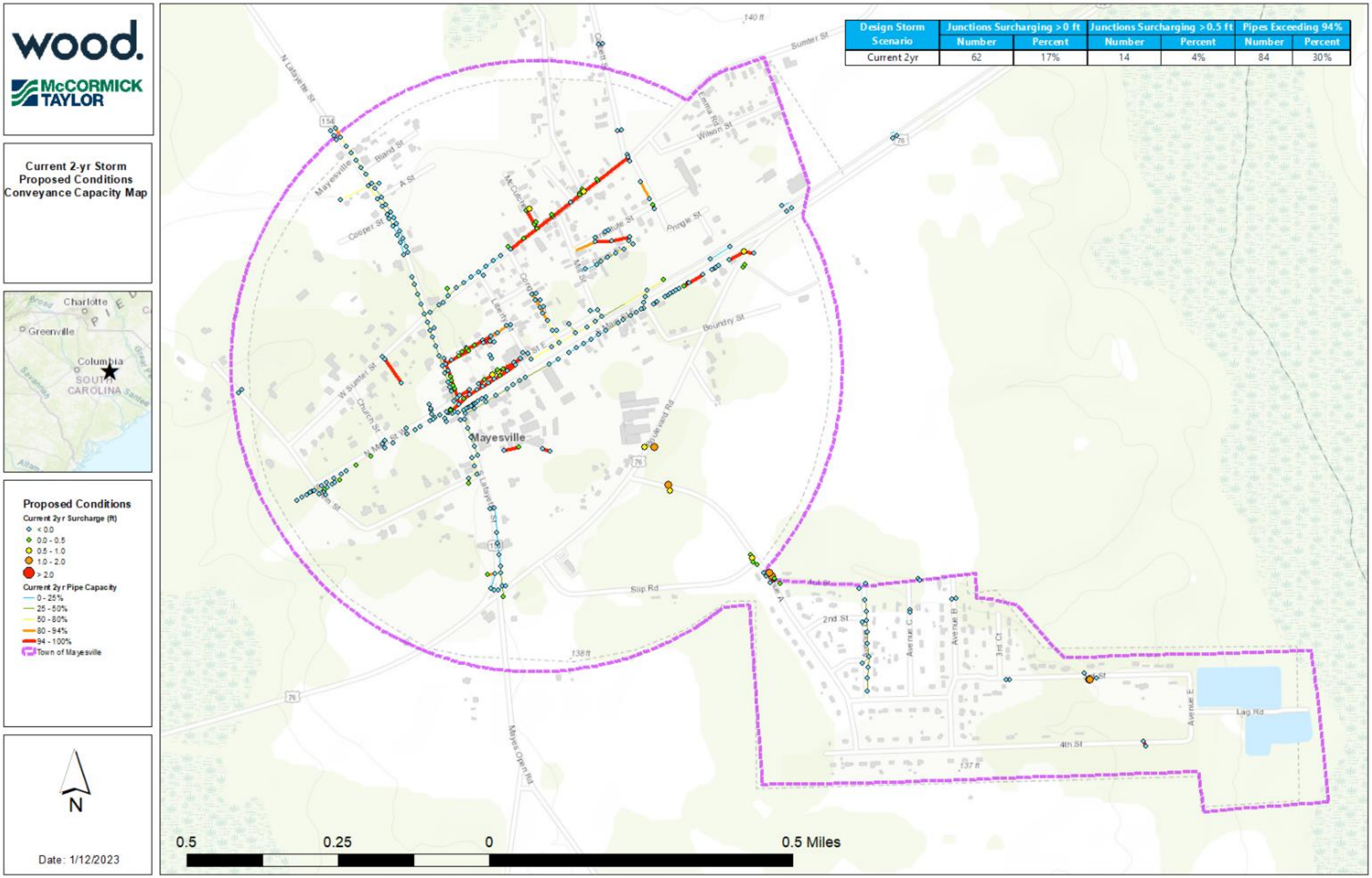


Figure 26: Conveyance Capacity Map: Proposed Condition Current 2-Year Storm

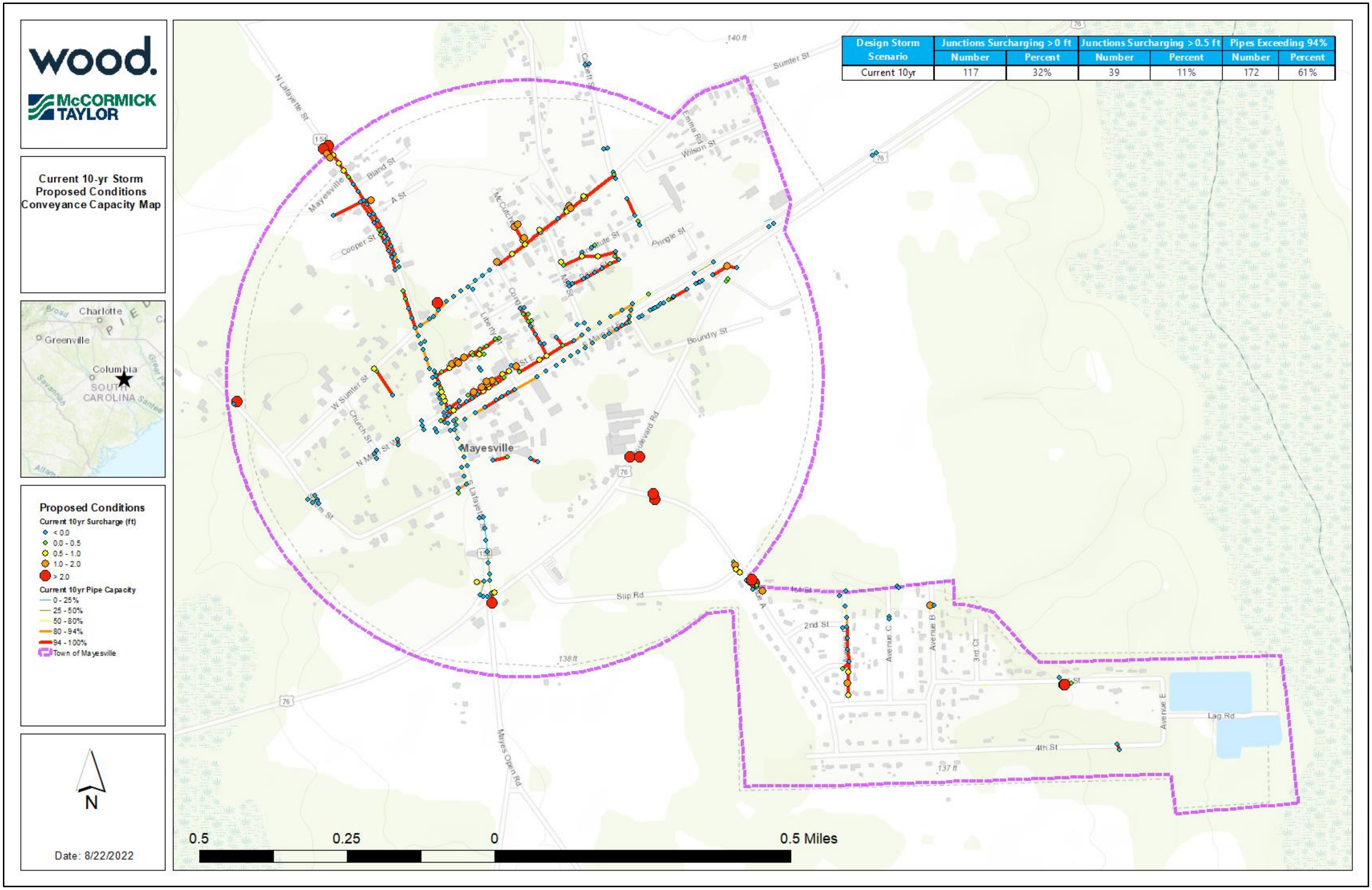
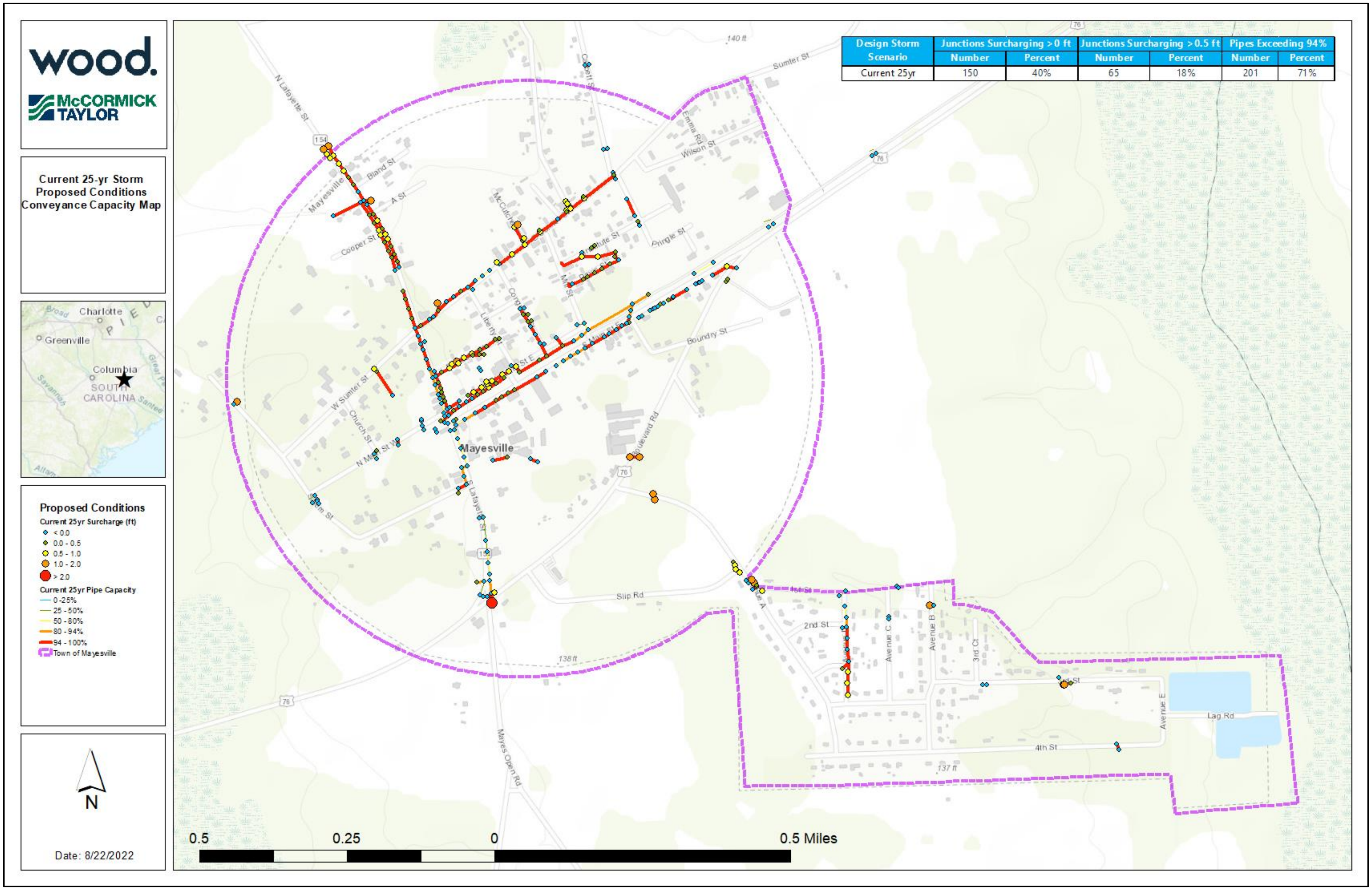


Figure 27: Proposed Condition Conveyance Capacity Map: Current 10-Year Storm



Design Storm Scenario	Junctions Surcharging >0 ft		Junctions Surcharging >0.5 ft		Pipes Exceeding 94%	
	Number	Percent	Number	Percent	Number	Percent
Current 25yr	150	40%	65	18%	201	71%

Figure 28: Proposed Condition Conveyance Capacity Map: Current 25-Year Storm

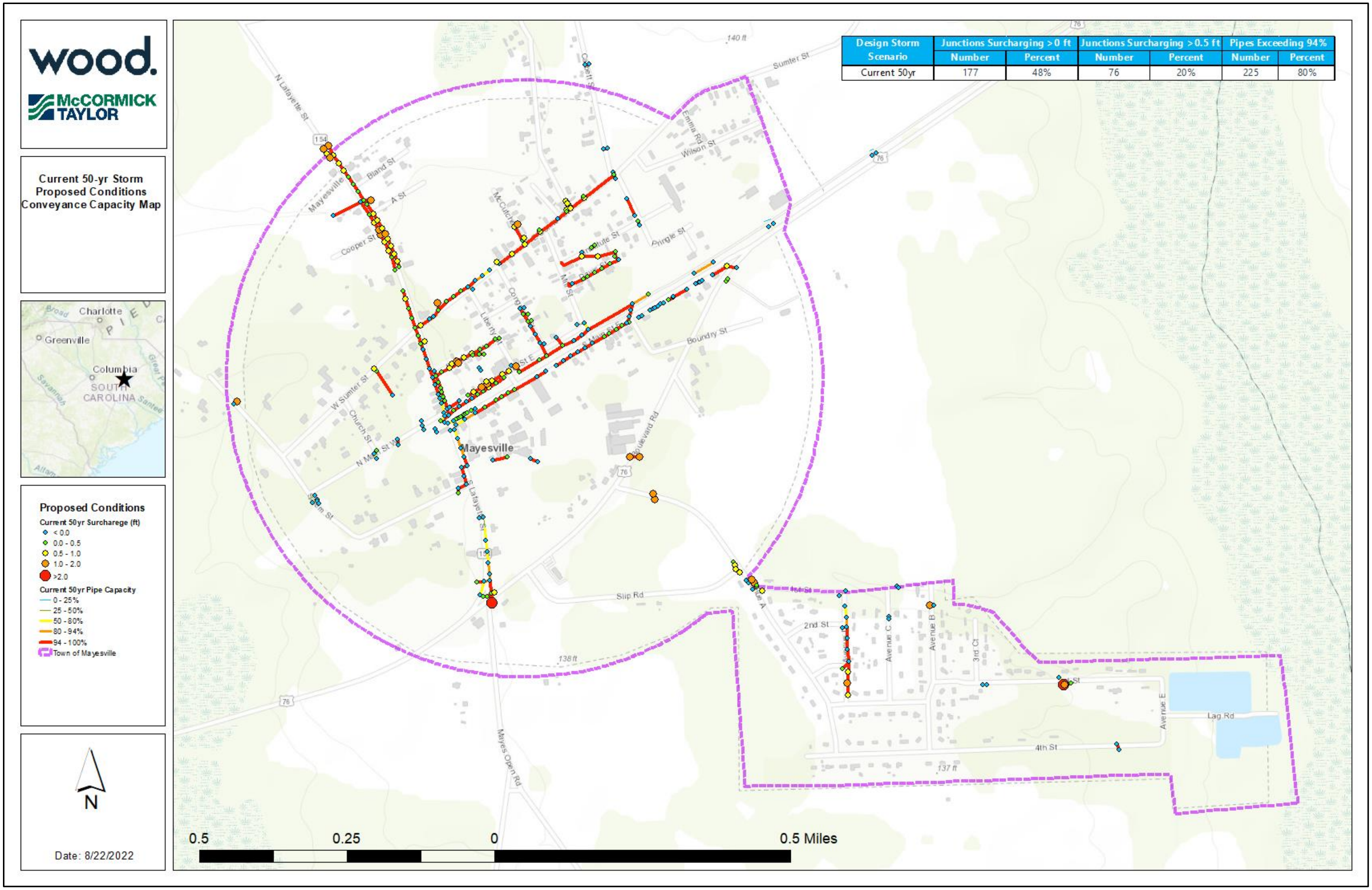


Figure 29: Proposed Condition Conveyance Capacity Map: Current 25-Year Storm

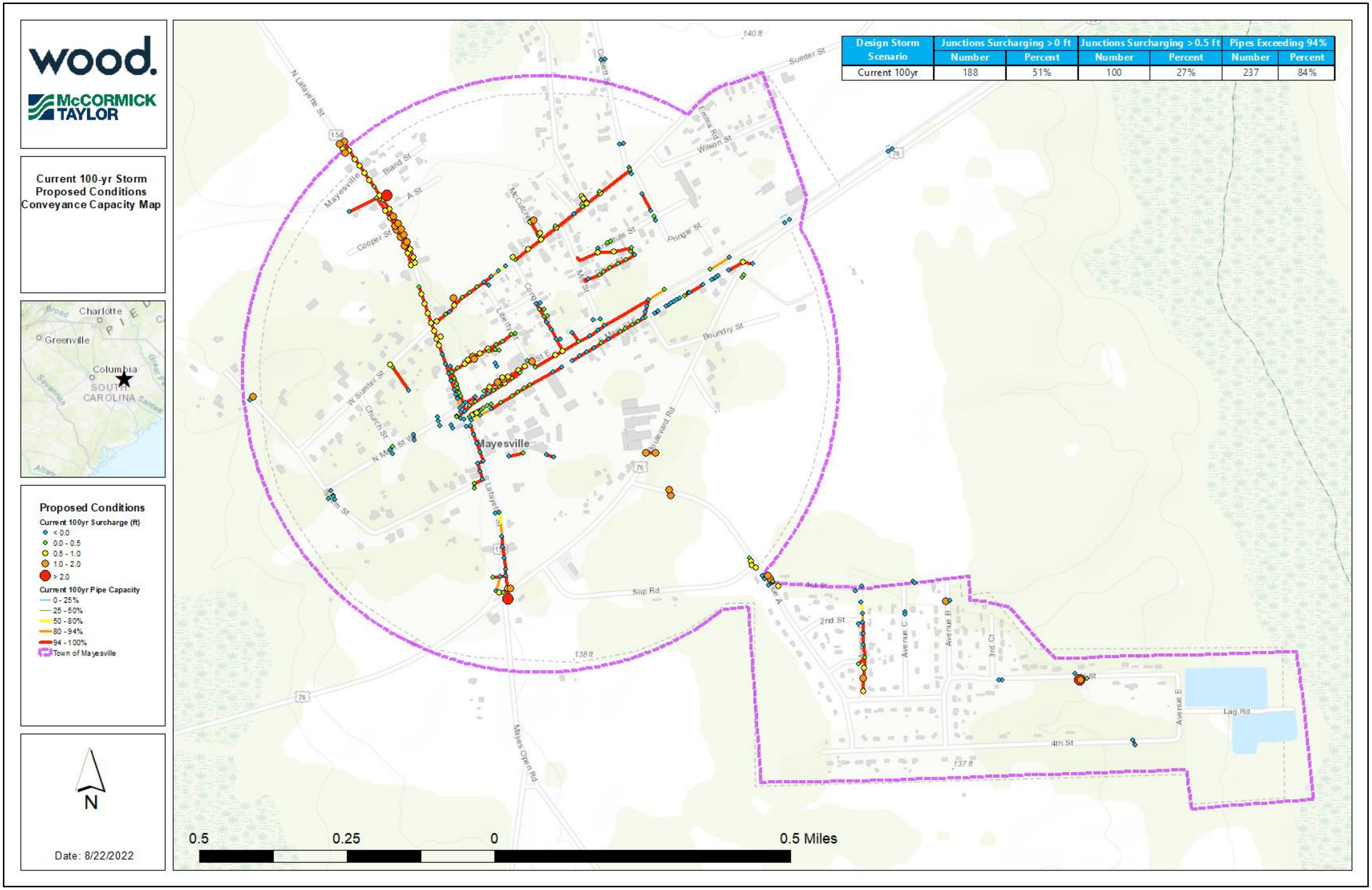
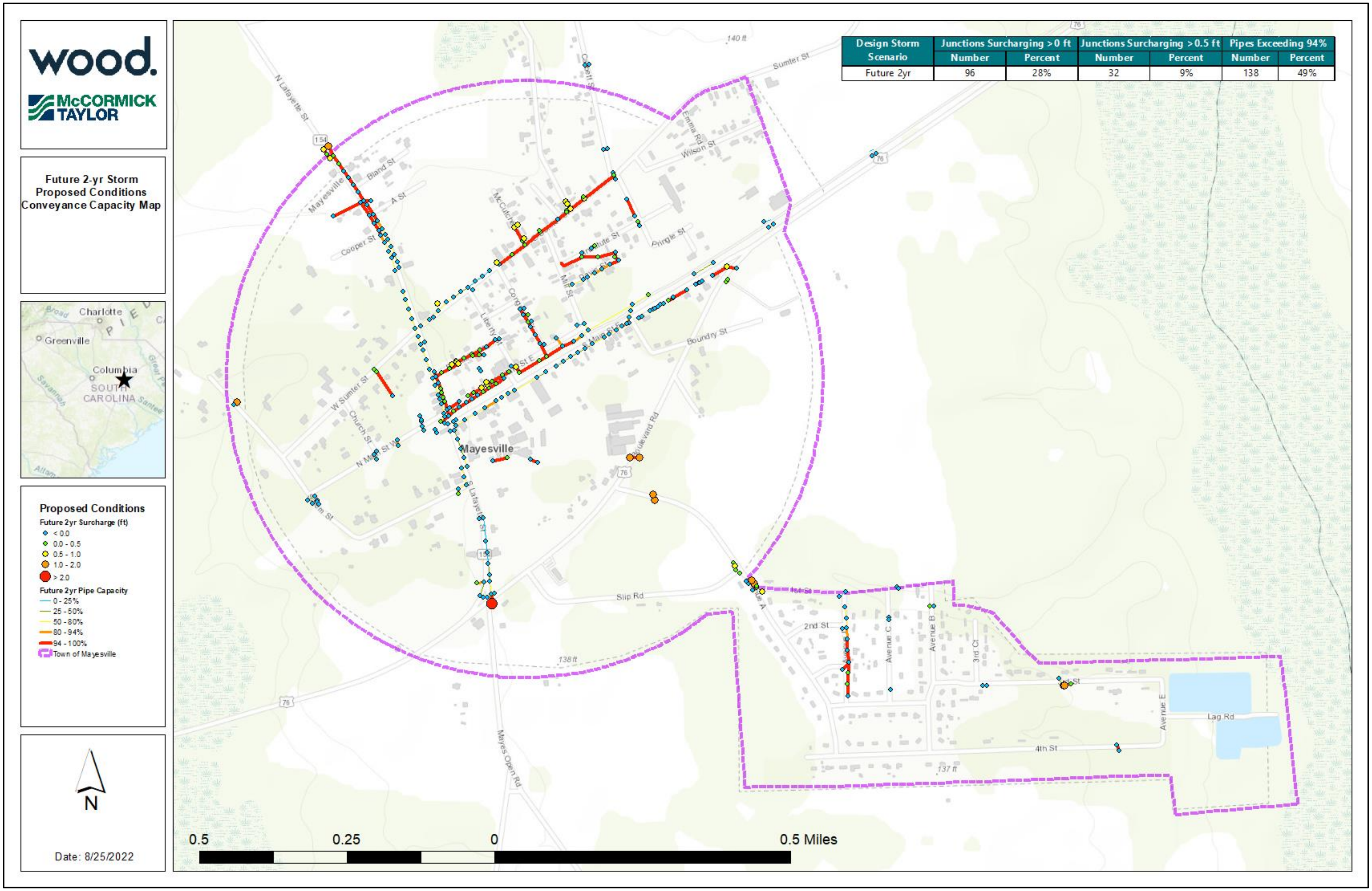


Figure 30: Proposed Condition Conveyance Capacity Map: Current 100-Year Storm



Design Storm Scenario	Junctions Surcharging >0 ft		Junctions Surcharging >0.5 ft		Pipes Exceeding 94%	
	Number	Percent	Number	Percent	Number	Percent
Future 2yr	96	28%	32	9%	138	49%

Figure 31: Proposed Condition Conveyance Capacity Map: Future 2-Year Storm

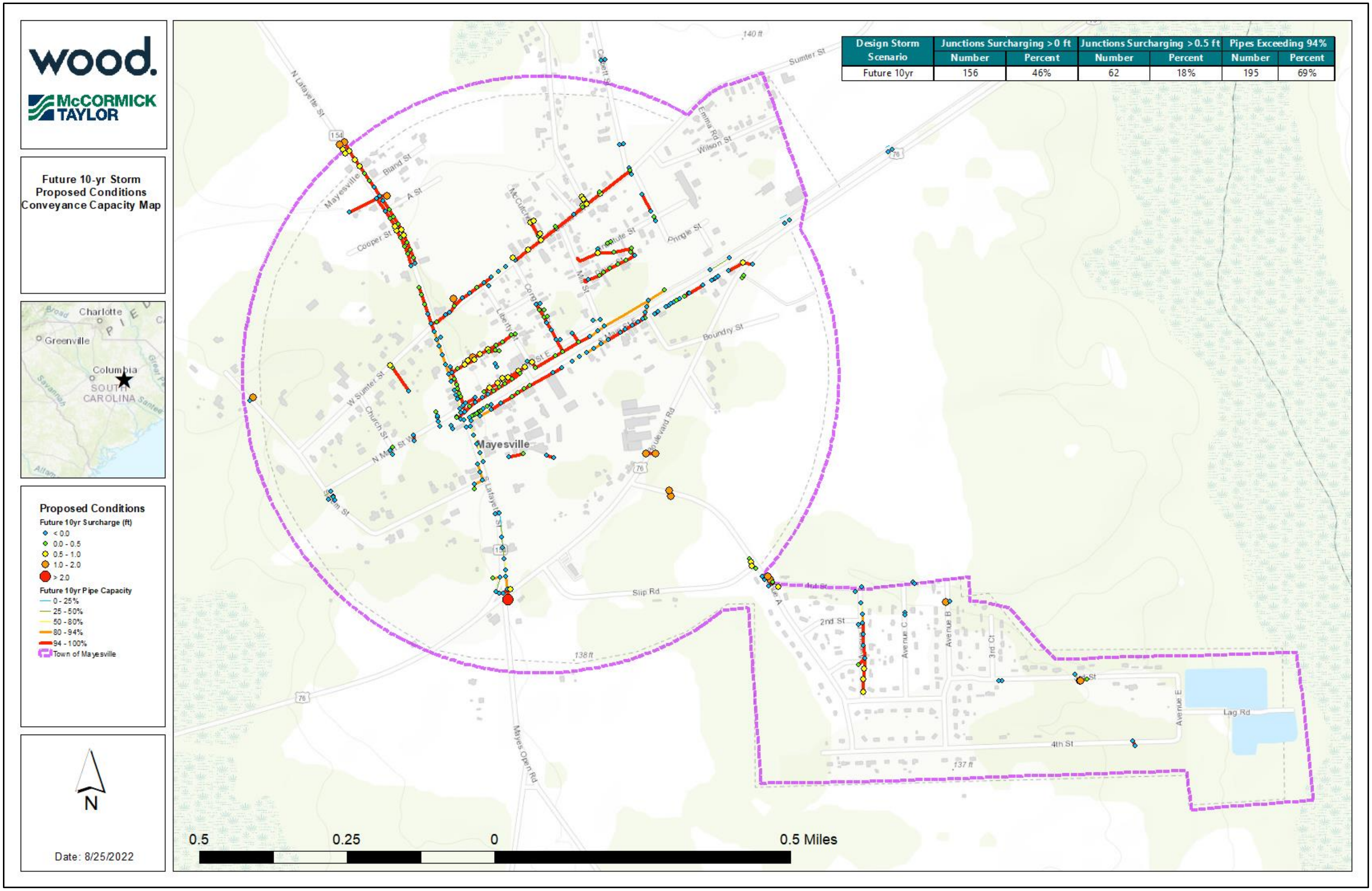
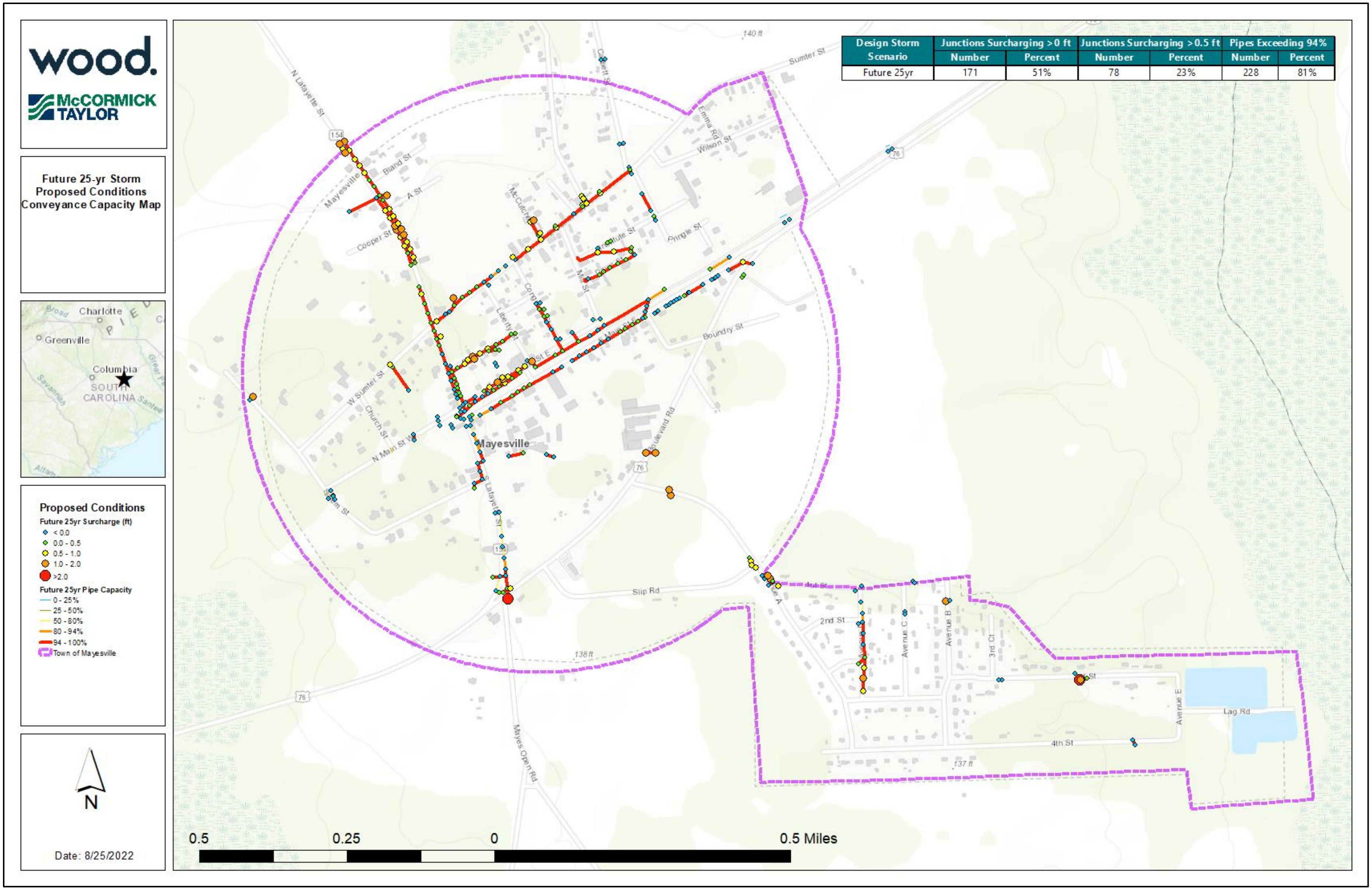
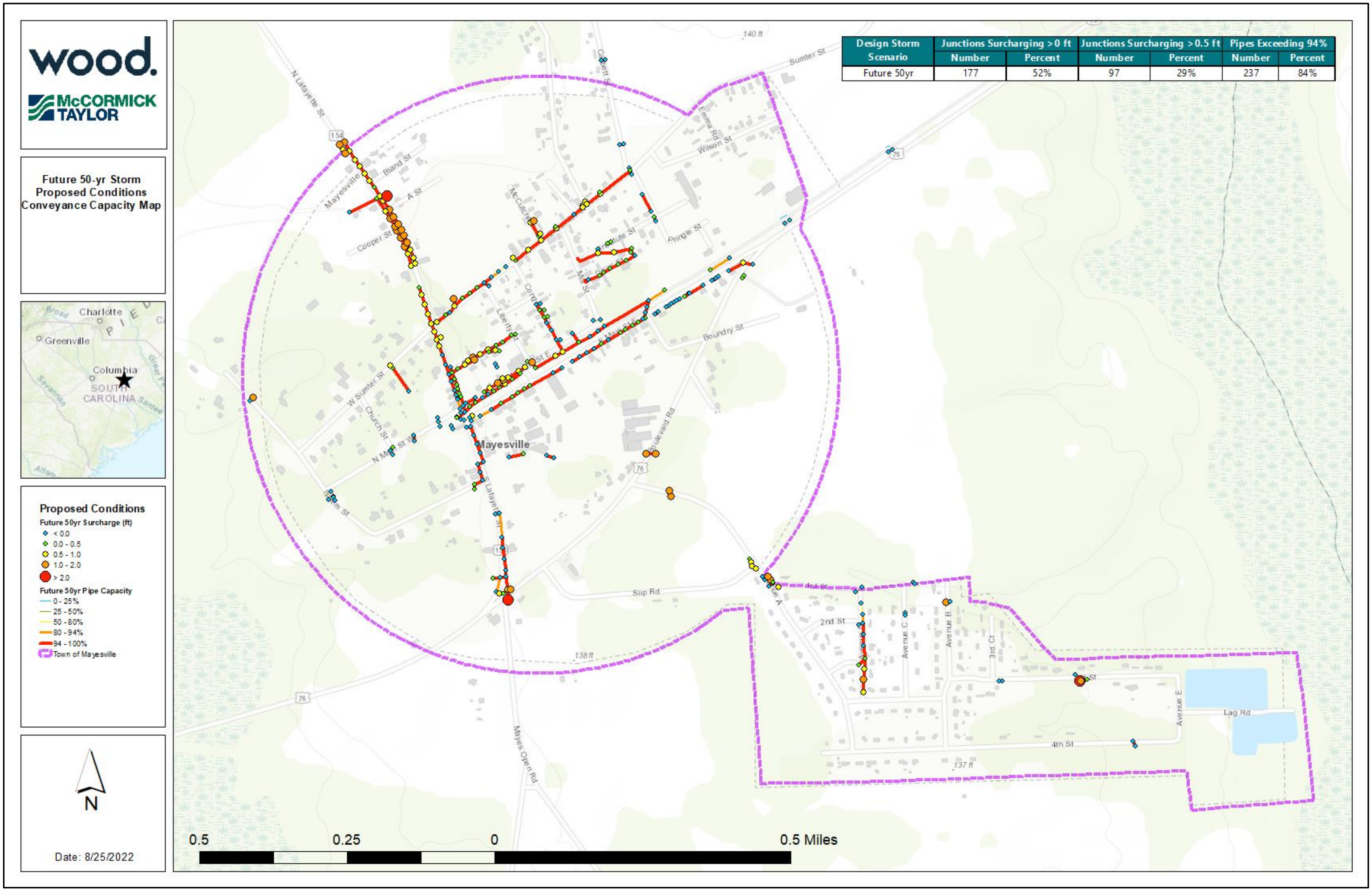


Figure 32: Proposed Condition Conveyance Capacity Map: Future 10-Year Storm



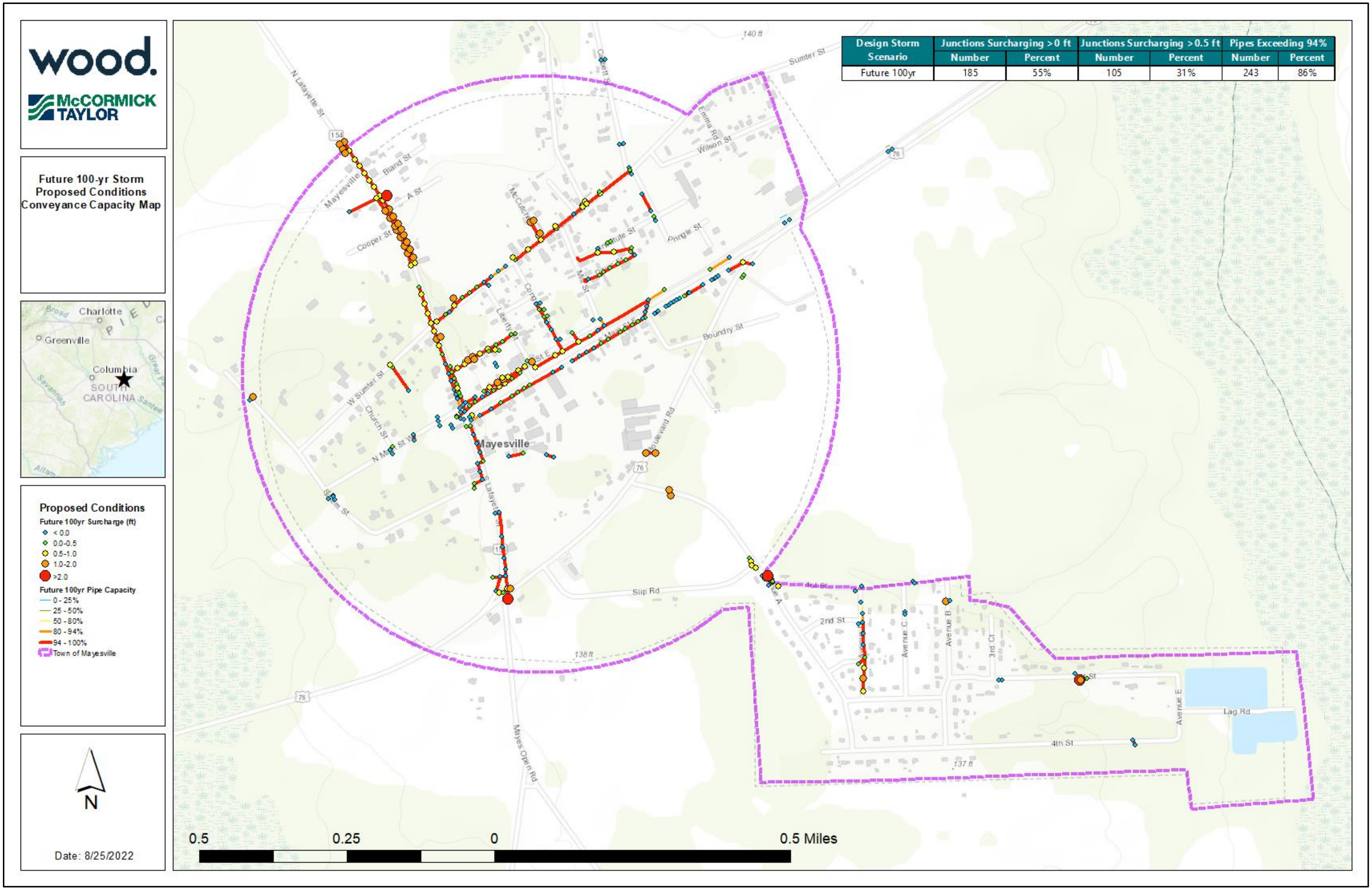
Design Storm Scenario	Junctions Surcharging >0 ft		Junctions Surcharging >0.5 ft		Pipes Exceeding 94%	
	Number	Percent	Number	Percent	Number	Percent
Future 25yr	171	51%	78	23%	228	81%

Figure 33: Proposed Condition Conveyance Capacity Map: Future 25-Year Storm



Design Storm Scenario	Junctions Surcharging >0 ft		Junctions Surcharging >0.5 ft		Pipes Exceeding 94%	
	Number	Percent	Number	Percent	Number	Percent
Future 50yr	177	52%	97	29%	237	84%

Figure 34: Proposed Condition Conveyance Capacity Map: Future 50-Year Storm



Design Storm Scenario	Junctions Surcharging >0 ft		Junctions Surcharging >0.5 ft		Pipes Exceeding 94%	
	Number	Percent	Number	Percent	Number	Percent
Future 100yr	185	55%	105	31%	243	86%

Figure 35: Proposed Condition Conveyance Capacity Map: Future 100-Year Storm

8.3 Existing Conditions and Proposed Conditions (Current Precipitation)

These side-by-side comparison maps show how the same rain event (the current 2, 10, 25, 50, and 100-year events) results in less flooding under the proposed condition. Note that cells where channels are based on LiDAR, that the depth of water is greater than 0.5 ft – this is to be expected, but there is not an easy way to parse out those water depths from the results.

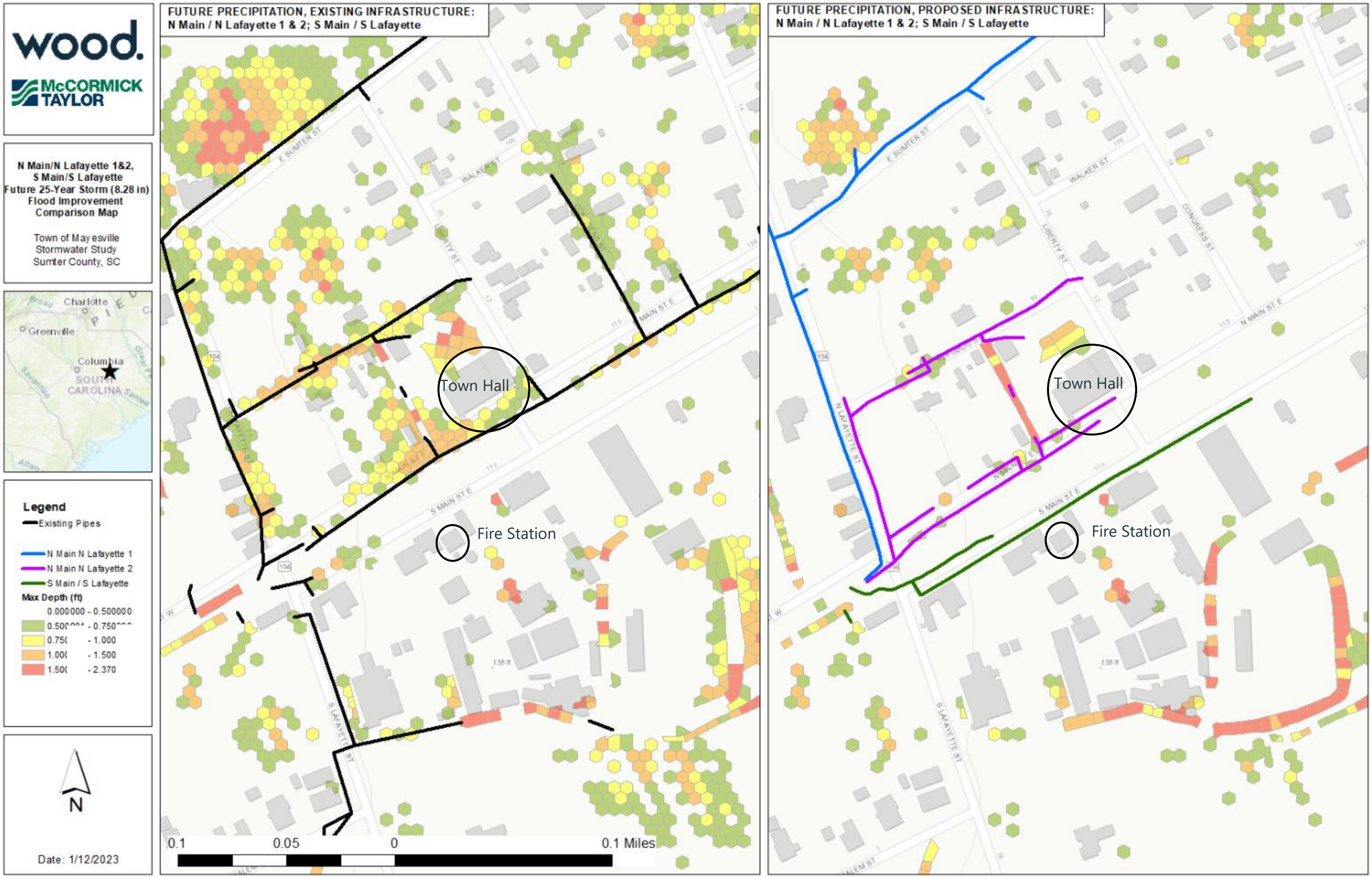


Figure 36: Flood Improvement Comparison Map – Current 25-Year Storm: North Main/North Lafayette 1, 2 & 3

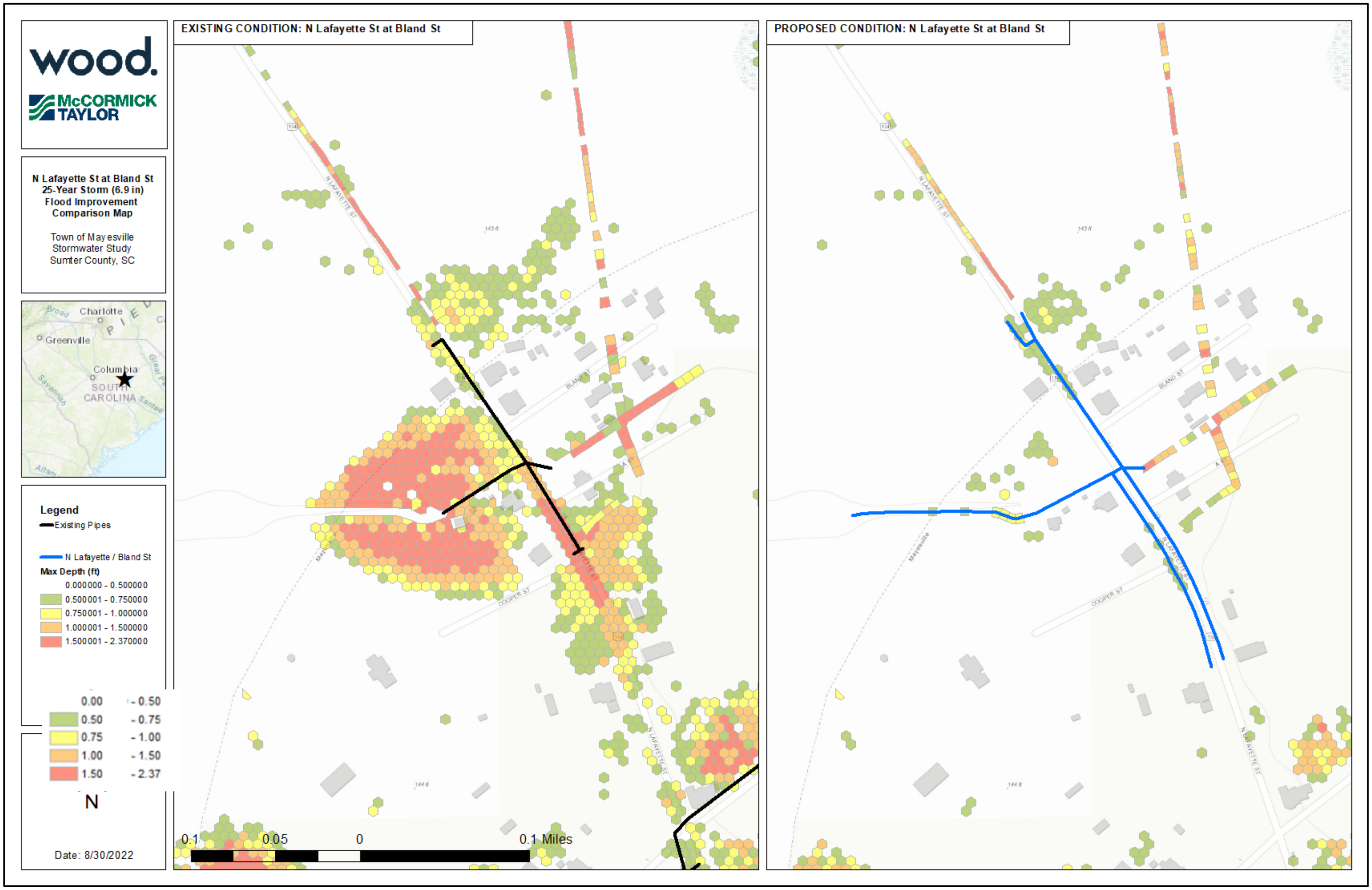


Figure 37: Flood Improvement Comparison Map – Current 25-Year Storm: North Lafayette at Bland St.

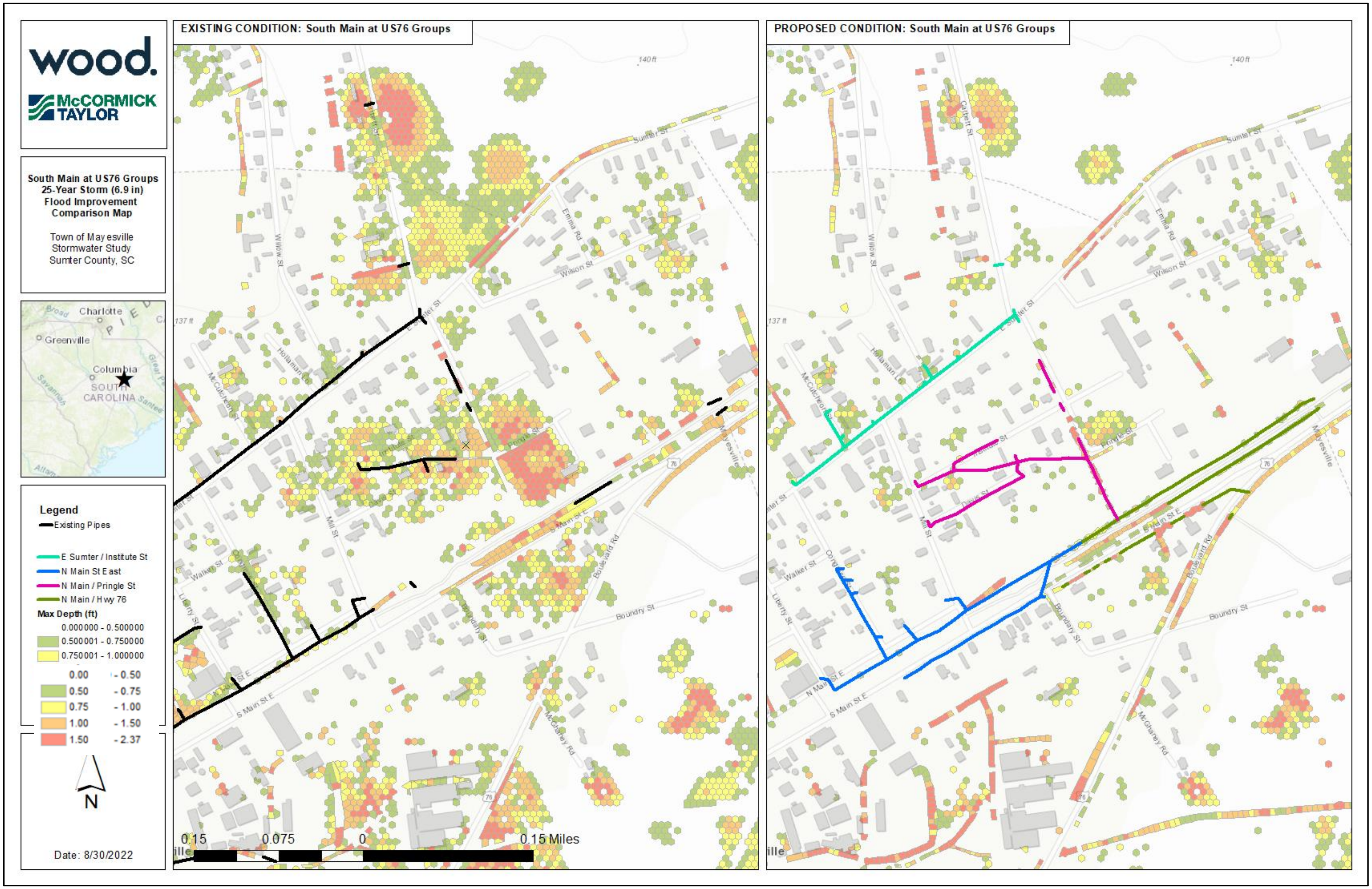


Figure 38: Flood Improvement Comparison Map – Current 25-Year Storm: South Main at US 76 Groups

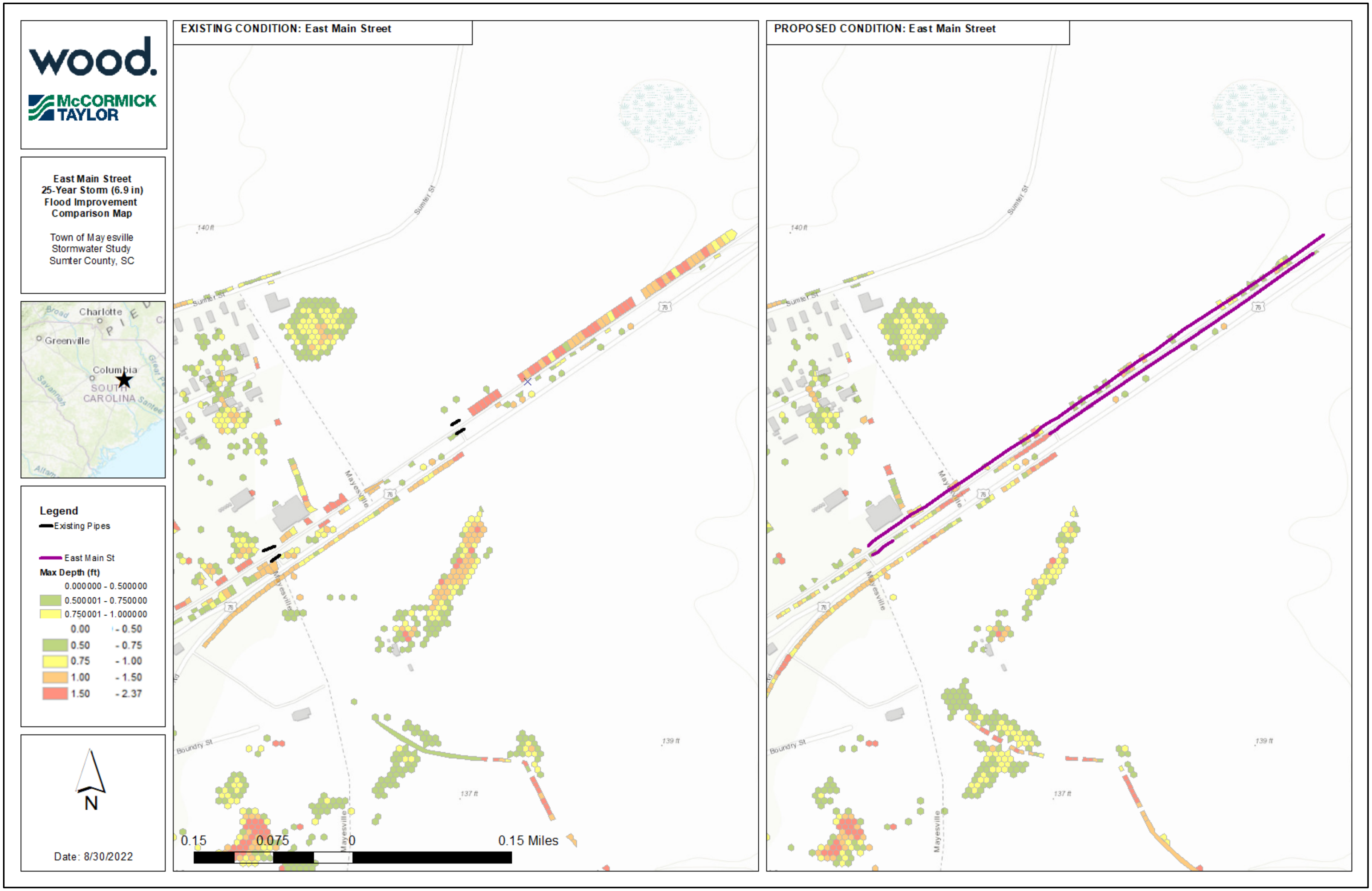


Figure 39: Flood Improvement Comparison Map – Current 25-Year Storm: East Main St.

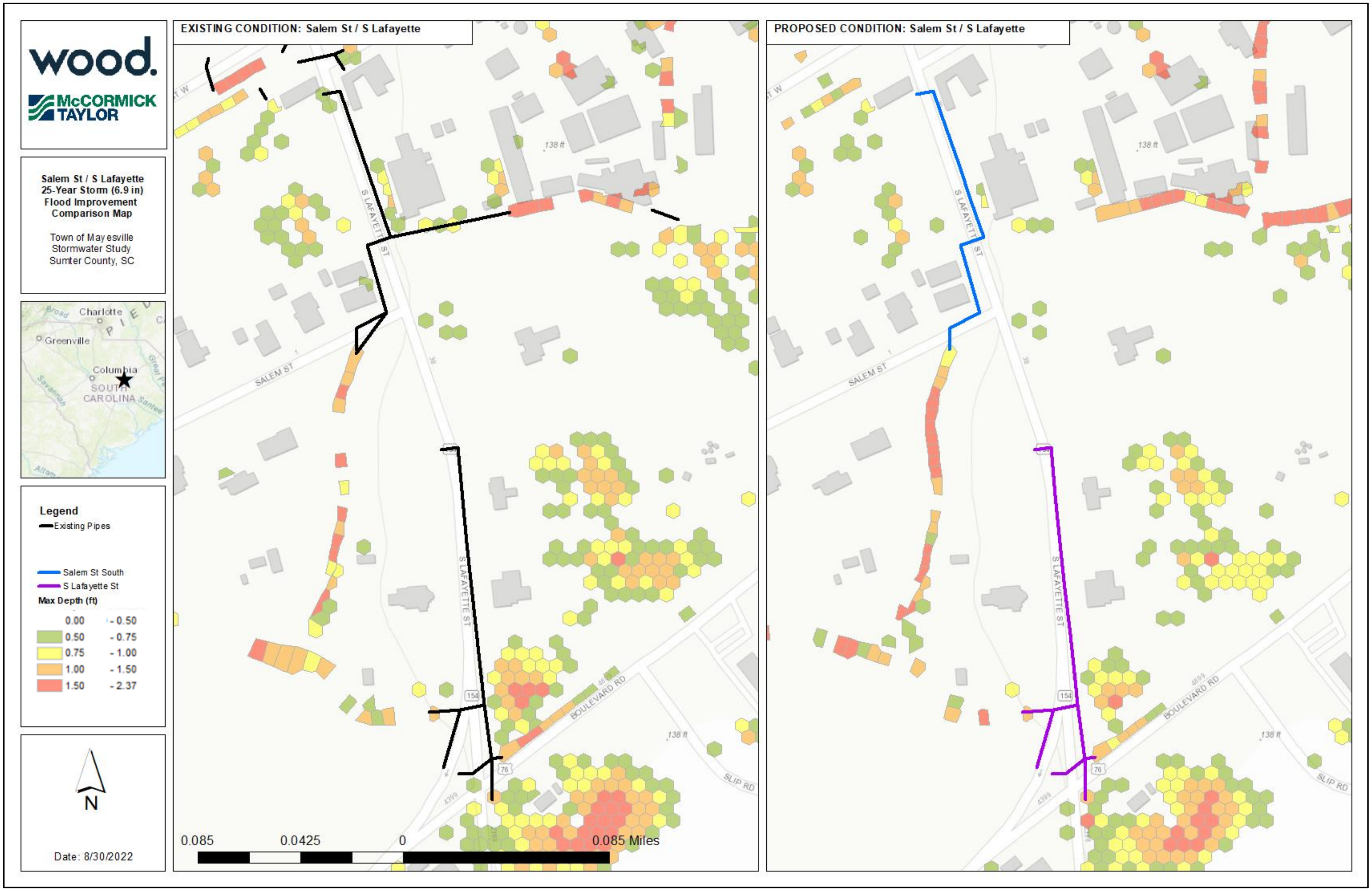


Figure 40: Flood Improvement Comparison Map – Current 25-Year Storm: Salem St / S. Lafayette Street

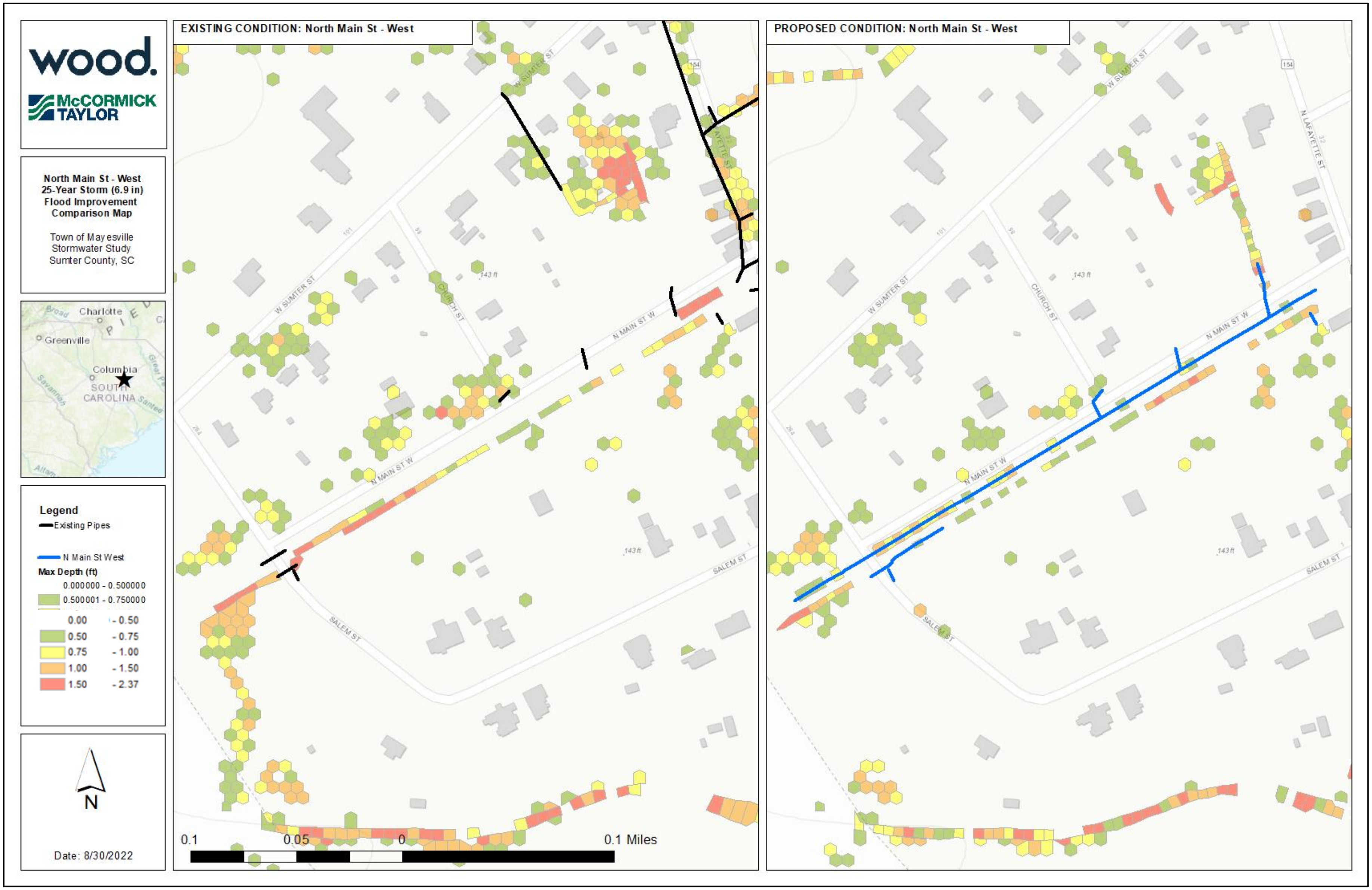


Figure 41: Flood Improvement Comparison Map – Current 25-Year Storm: North Main St. – West

Figure 42: Flood Improvement Comparison Map – Current 25-Year Storm: Hwy 76 Crossing

Figure 43: Flood Improvement Comparison Map – Current 25-Year Storm: Avenue A at 1st Avenue

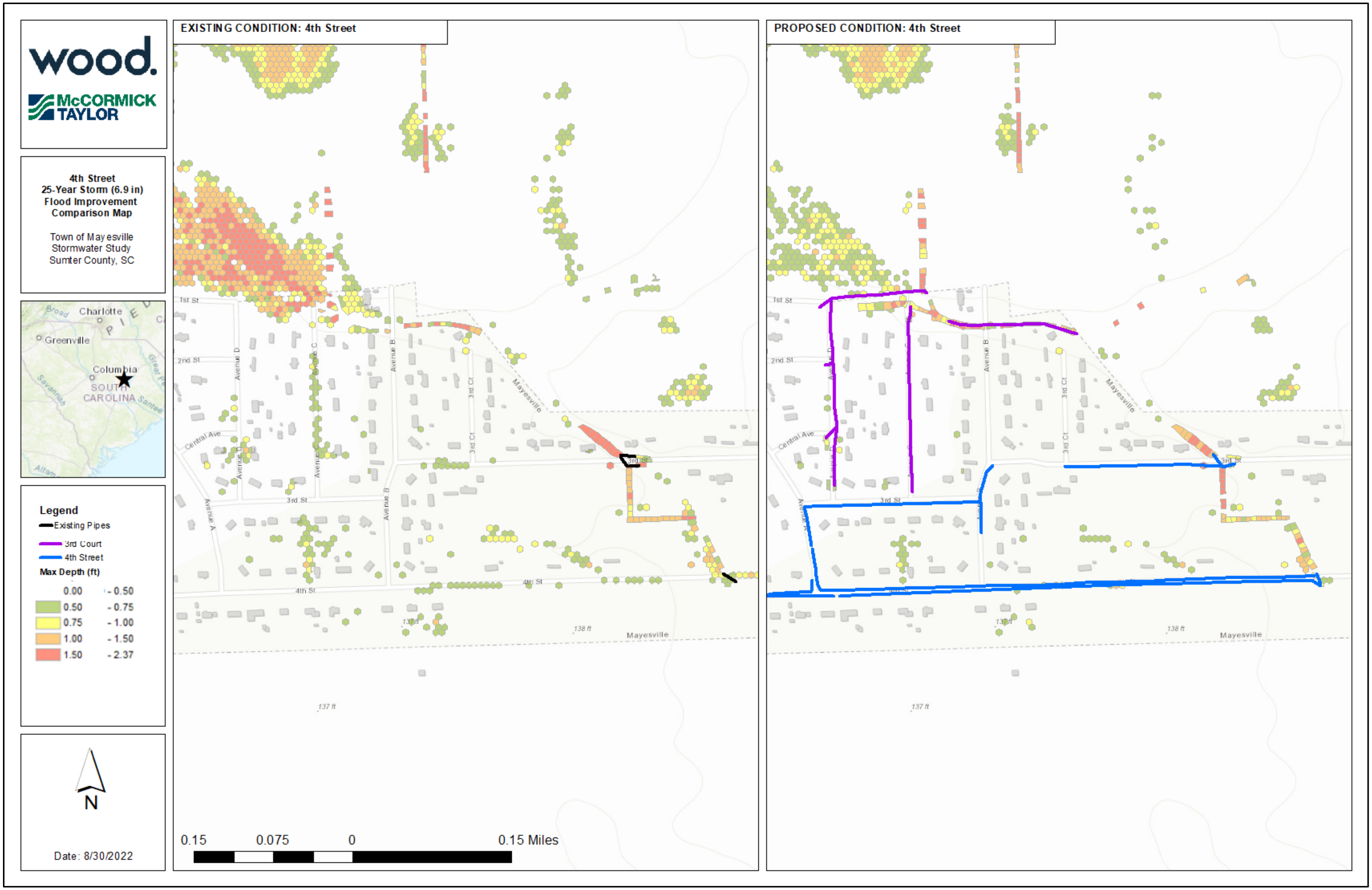


Figure 44: Flood Improvement Comparison Map – Current 25-Year Storm: 4th Street

8.4 Existing Conditions and Proposed Conditions (Future Precipitation)

The following figures show the types of existing and proposed infrastructure at nine different locations throughout the Town of Mayesville. This shows how the proposed conditions (infrastructure improvements) have reduced the area and depth of flooding in the Town. Table 20 summarizes how the total area with maximum water depths greater than 0.5 ft increases with return interval and potential climate change; the 25-year design storm results are highlighted in blue. Note that the entire project area in the PCSWMM model extends outside of the actual Town border. However, with the proposed improvements located only within the Town's boundary, both the current and future precipitation show less area flooded than in the existing condition. For the 25-year storm event, the proposed infrastructure removes 95 acres (39%) from flooding with current precipitation, and 115 acres (40%) with future precipitation estimates. Section 8.5 will summarize the buildings vulnerable to flooding in each scenario.

Table 35: Area (acres) with Water Depth Greater than 0.5 ft

Return Interval	Existing Conditions, Current Precip	Existing Conditions, Future Precip	Proposed Conditions, Current Precip	Proposed Conditions, Future Precip
2-yr	116	148	87	102
10-yr	191	231	124	146
25-yr	243	287	148	172
50-yr	285	336	173	199
100-yr	329	385	196	227

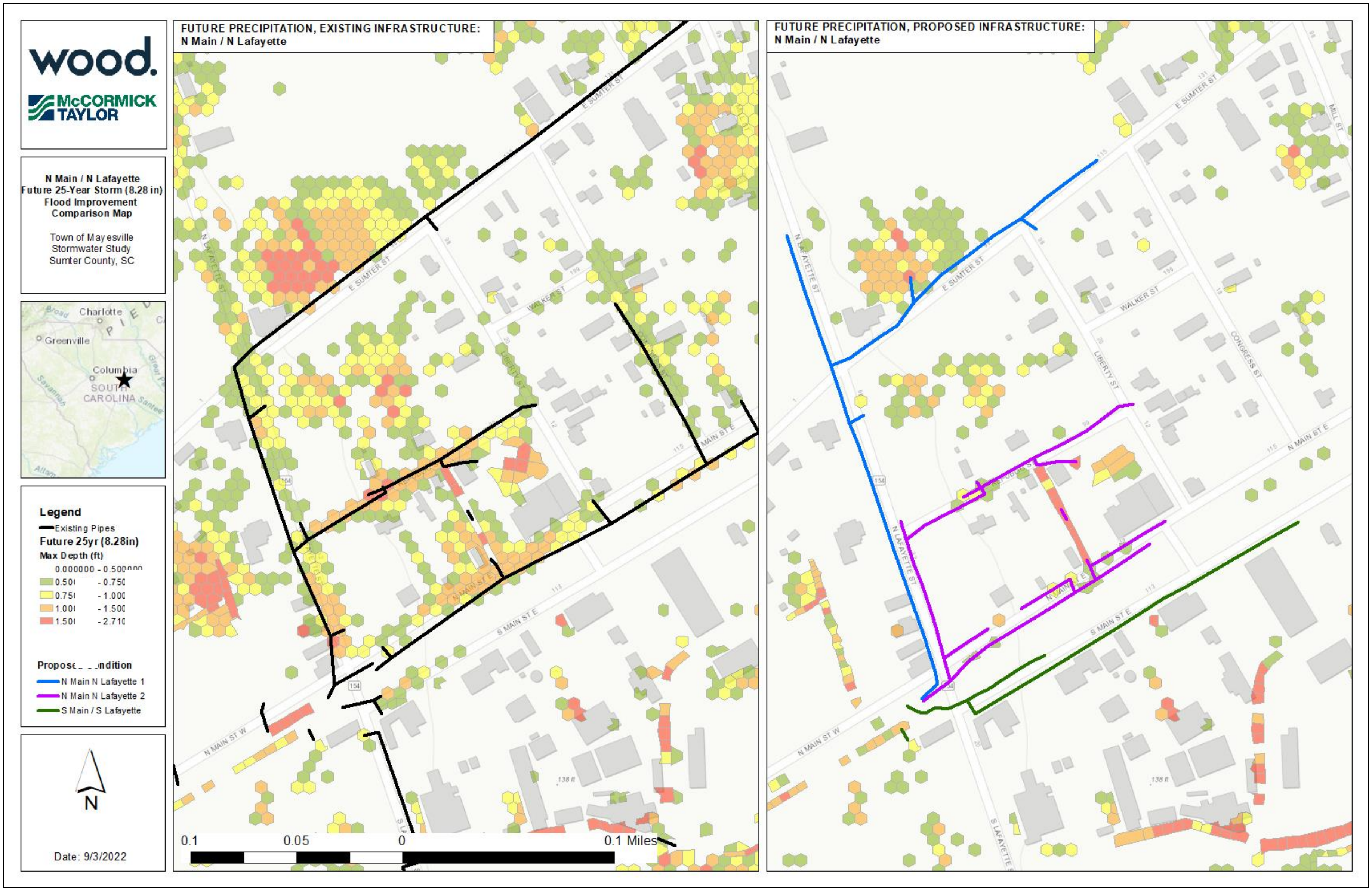


Figure 45: Flood Improvement Comparison Map – Future 25-Year Storm: North Main/North Lafayette 1, 2 & 3

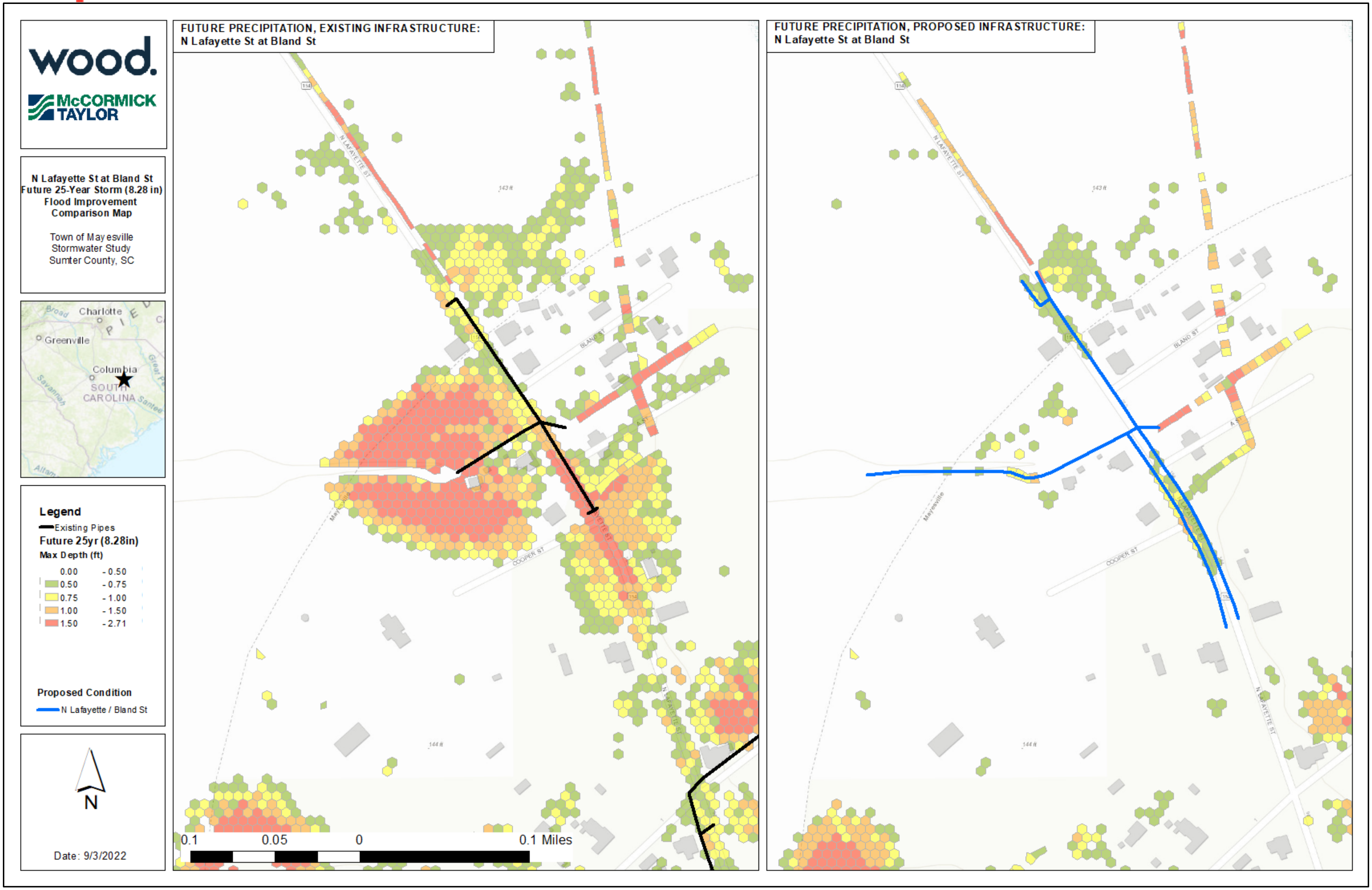


Figure 46: Flood Improvement Comparison Map – Future 25-Year Storm: North Lafayette at Bland St.

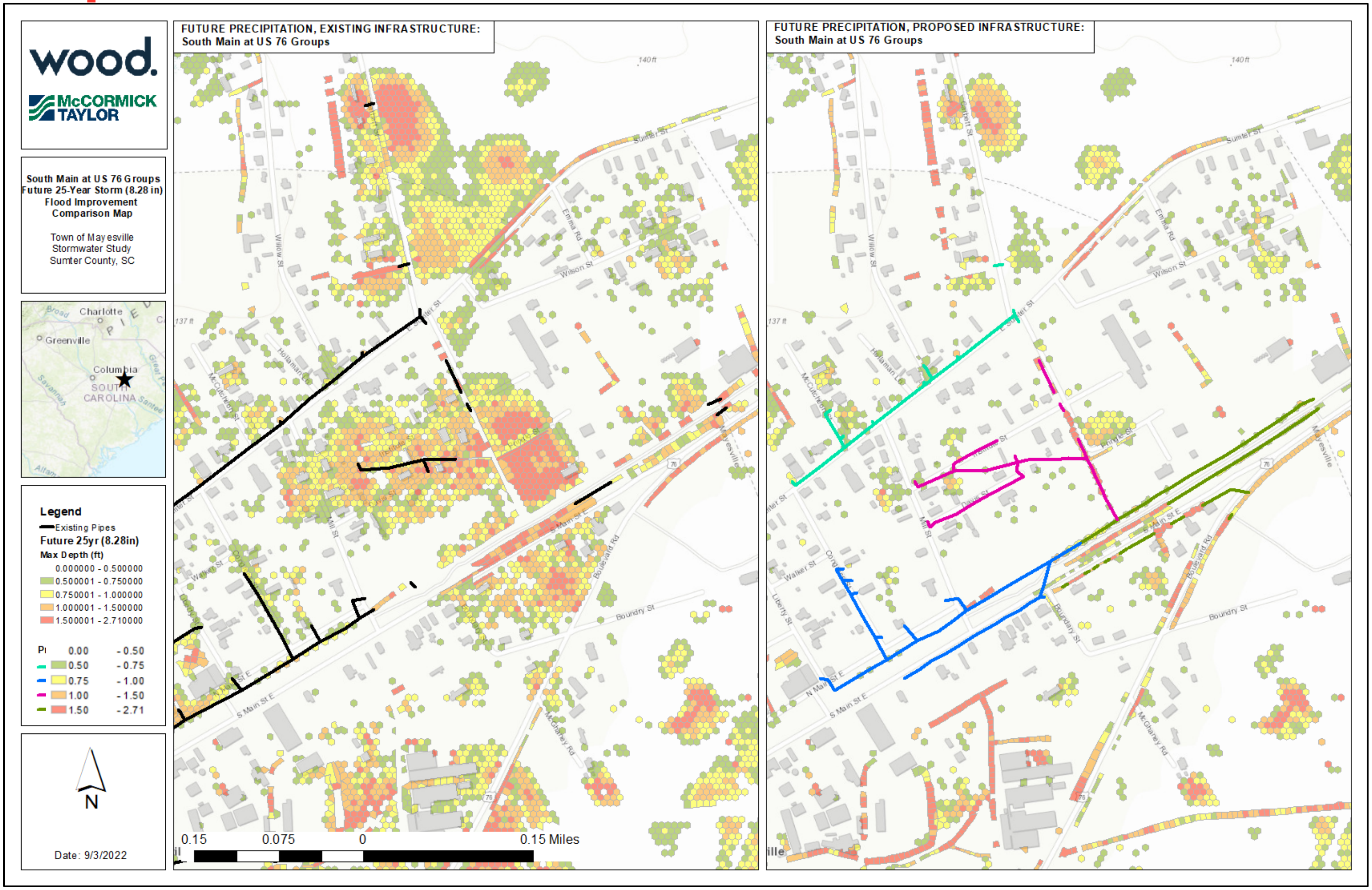


Figure 47: Flood Improvement Comparison Map – Future 25-Year Storm: South Main at US 76 Groups

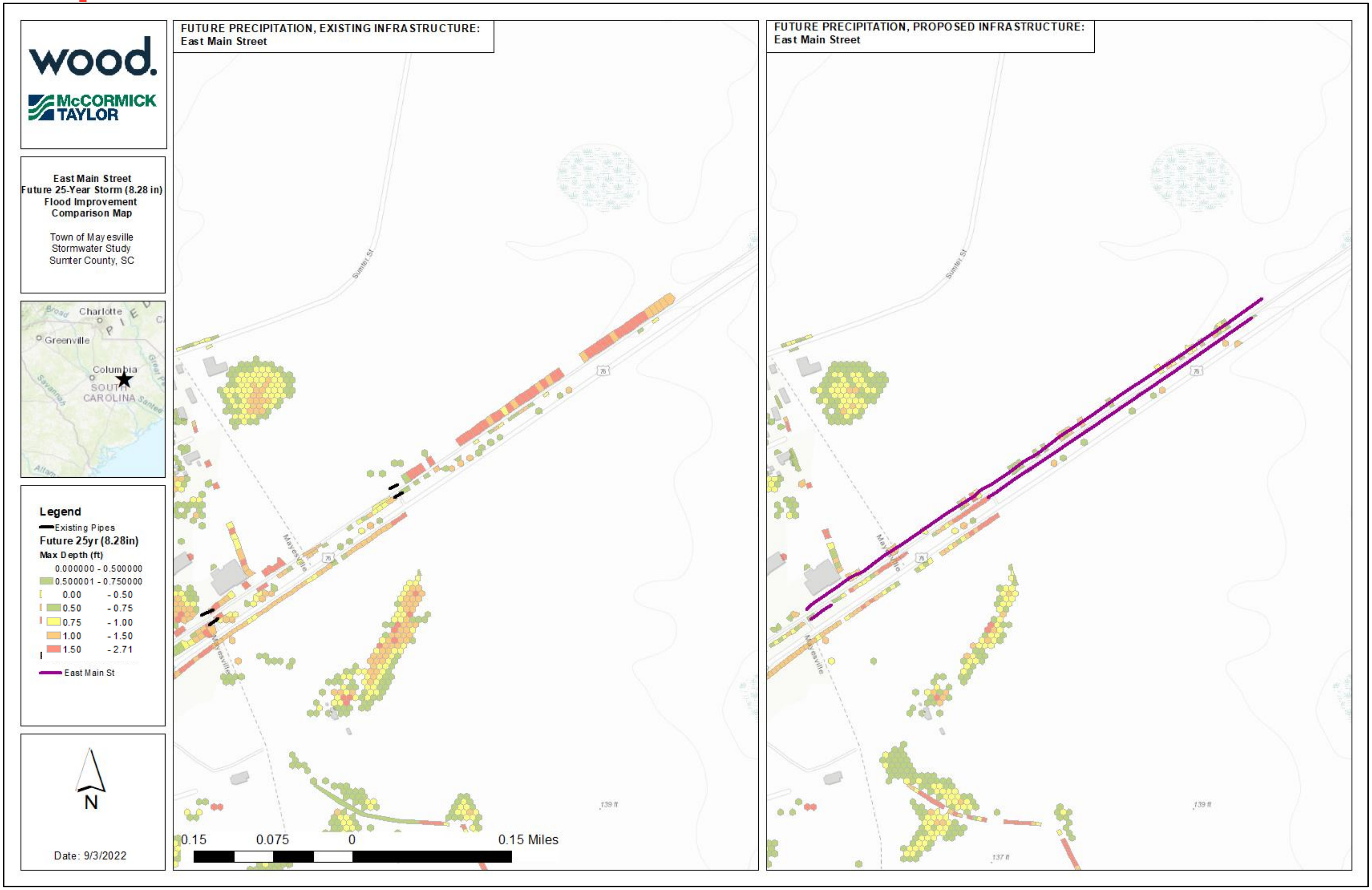


Figure 48: Flood Improvement Comparison Map – Future 25-Year Storm: East Main Street

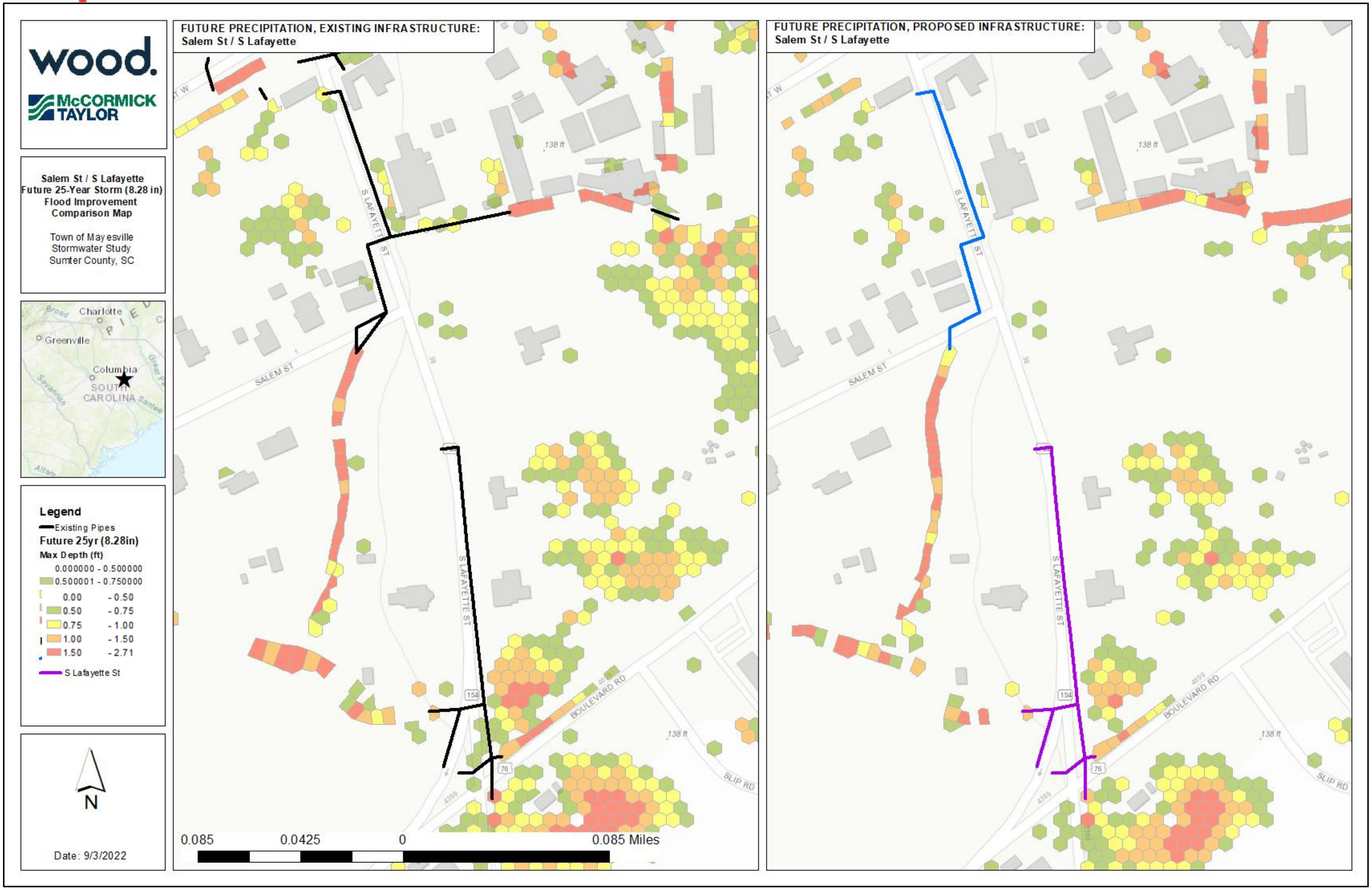


Figure 49: Flood Improvement Comparison Map – Future 25-Year Storm: South Lafayette and Salem Street

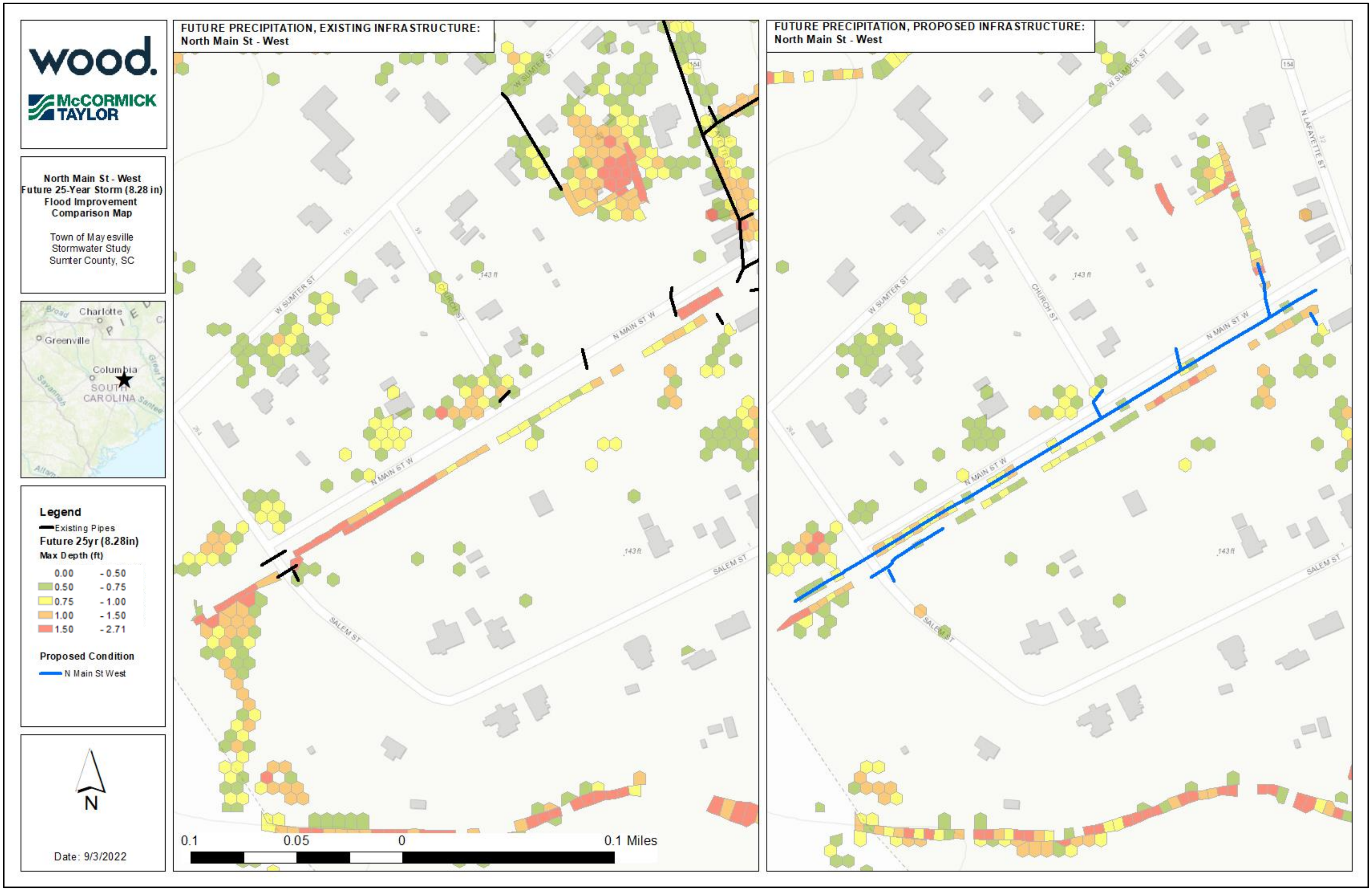


Figure 50: Flood Improvement Comparison Map – Future 25-Year Storm: North Main Street at Salem Street West

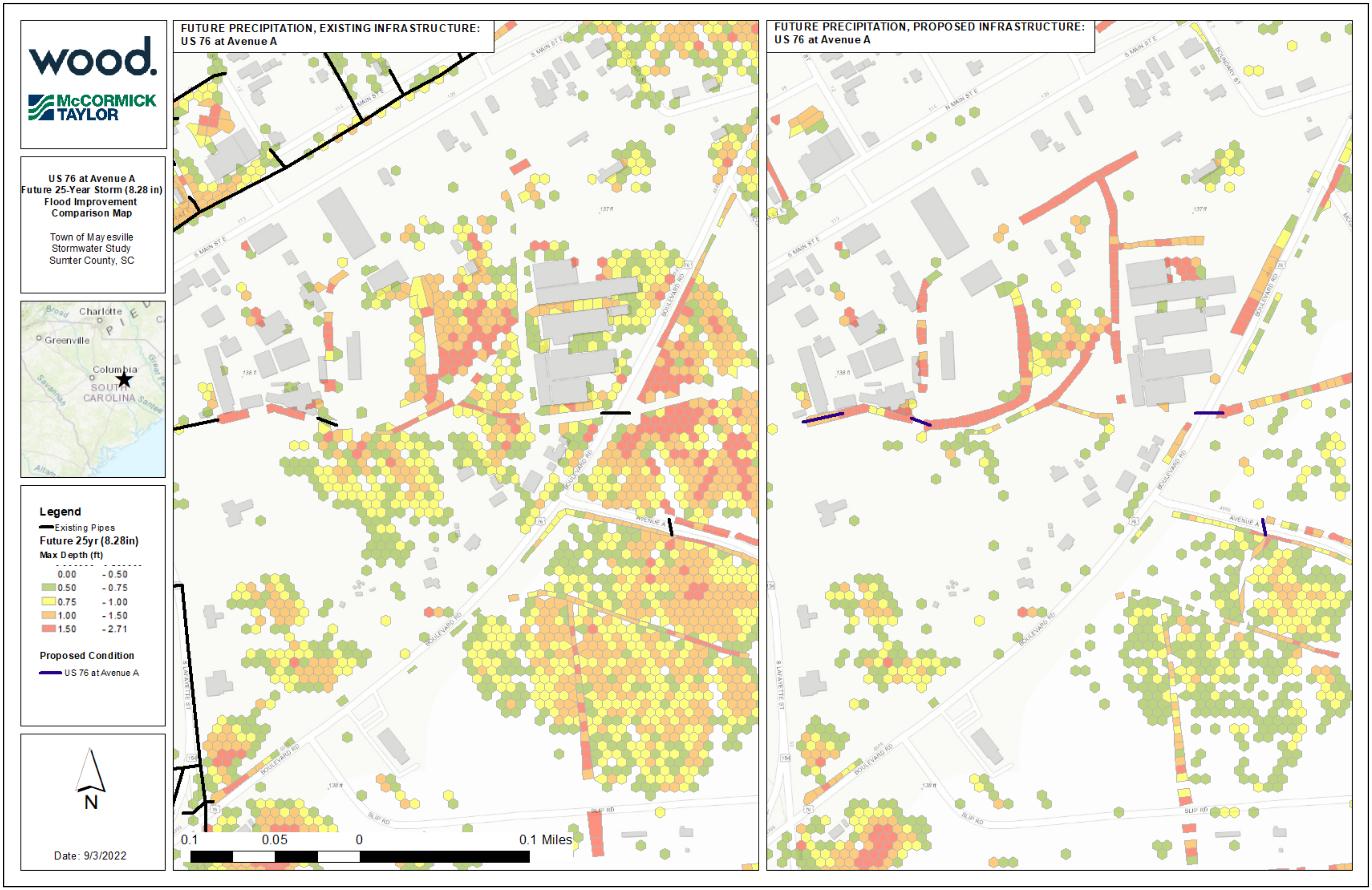


Figure 51: Flood Improvement Comparison Map – Future 25-Year Storm: US 76 at Avenue A

Figure 52: Flood Improvement Comparison Map – Future 25-Year Storm: Avenue A at 1st Avenue

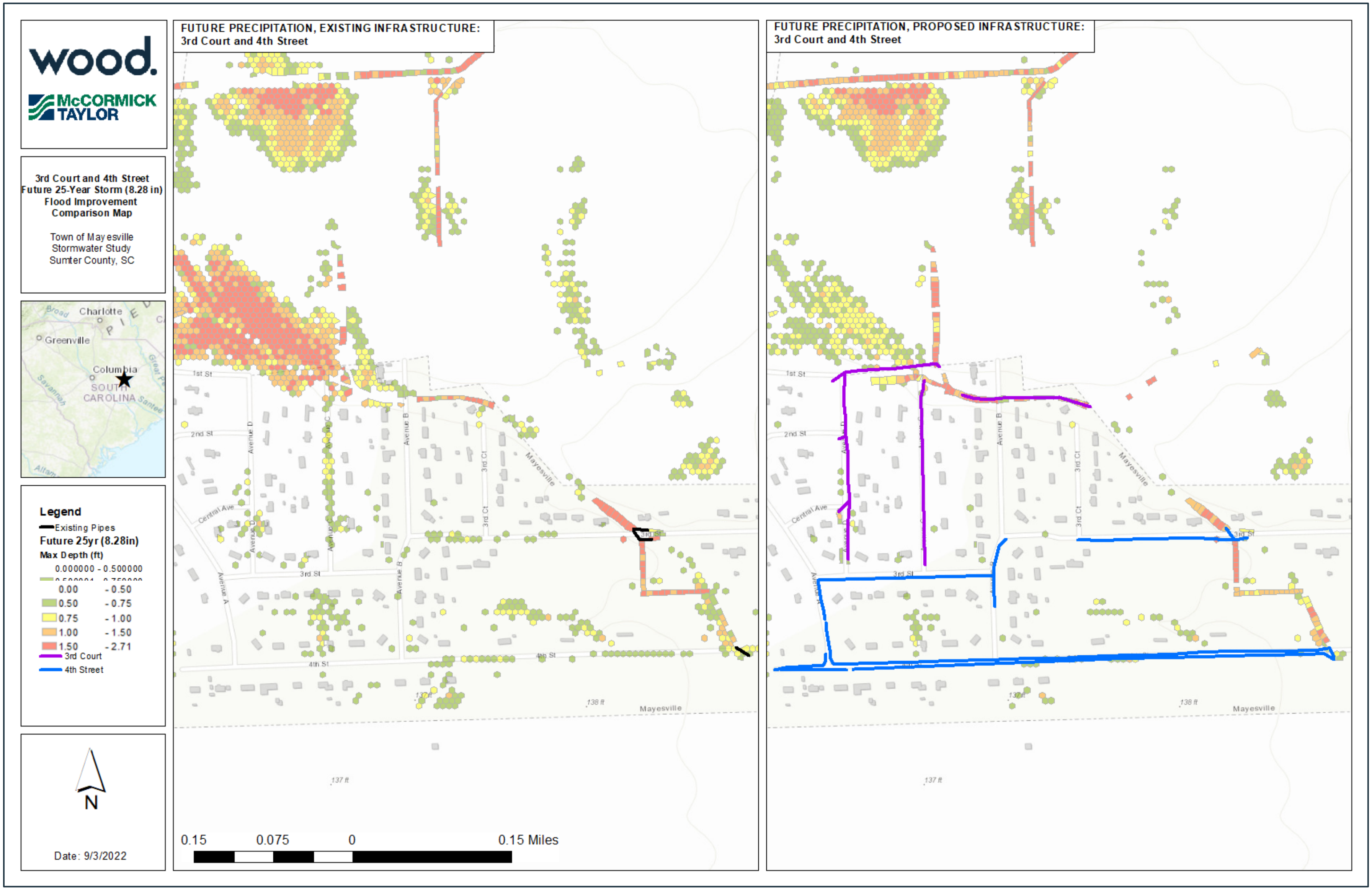


Figure 53: Flood Improvement Comparison Map – Future 25-Year Storm: Southeastern Neighborhood (3rd Court 4th Avenue)

8.5 Maximum Flood Depth Maps with Building Impacts

The following figures show the buildings removed from being vulnerable to flooding (and those which would remain vulnerable to flooding) under proposed conditions (infrastructure improvements) with current precipitation for each storm event (2-, 10-, 25-, 50- and 100-year storm events). Each figure includes a table with the number of buildings vulnerable to flooding under existing conditions and under proposed conditions. Table 16 and Table 17 in Section 7 summarize the number of buildings vulnerable to flooding throughout the town and Table 18 and Table 19 in Section 7 summarizes the number of buildings removed from vulnerable to flooding throughout the town. The detailed data for each structure and estimated depth of flooding at each storm event is included in Appendix H.

8.6 Sensitivity Analysis

In the PCSWMM model, we evaluated five different design storms for both the existing and future precipitation conditions. We conducted a sensitivity analysis for the system's response (measured as pipes above capacity and number of flood-vulnerable buildings) to stormwater from ten different scenarios. In this PCSWMM model, all variables contributing to stormwater runoff (such as curve number, roughness coefficient, and rainfall hyetograph shape) were kept constant and the only variables that changed were the precipitation input and the drainage network (existing vs. proposed pipe and channel size and locations).

The tables and figures below quantify the improvement of the Mayesville system with all proposed infrastructure; the light blue highlighted values indicate performance from design storms up to the 25-year current precipitation, which was the design storm stipulated by SCDOT drainage requirements. Existing conditions are represented as circles and proposed conditions are depicted as squares. Trendlines were added in Excel to differentiate the model response to precipitation in the proposed and existing condition; the trendlines were linear regressions that were set with an intercept of 0.

Table 36 and Figures Figure 54 and Figure 55 summarize the percentage of pipes exceeding capacity. In general, as the amount of precipitation increases, the percentage of pipes exceeding capacity increases in both the existing (circle data points in figure) and proposed (square data points in figure) conditions. However, the existing infrastructure is more limited by increases in precipitation. For every precipitation input, the corresponding percentage of pipes exceeding capacity is greater in the existing condition than the proposed. The rate of pipes exceeding capacity per inch of precipitation (or the slope of the trend line as found by linear regression in Figure 55) is about equal for the existing and proposed conditions.

About 70 percent of existing pipes exceed capacity with the smallest storm (2-yr existing precipitation of 3.6 inches) to almost 100% of existing pipes exceeding capacity with the largest future precipitation (100-yr precipitation of 11.4 inches). Comparatively, the proposed condition exceedance ranges from 30% to 86% for the smallest and largest design storms, respectively. By implementing the proposed infrastructure changes, pipe capacity improves which results in 17-40% reduction of pressurized pipes for the targeted design storms (2, 10, and 25yr).

Table 36: Area (acres) with Water Depth Greater than 0.5 ft

Design Storm	Precipitation	Existing Condition	Proposed Condition	Improvement
EX2yr	3.6	69%	30%	40%
EX10yr	5.5	80%	61%	19%
EX25yr	6.9	88%	71%	17%
EX50yr	8.1	91%	79%	11%
EX100yr	9.5	93%	83%	9%
FU2yr	4.32	76%	49%	27%
FU10yr	6.6	86%	69%	17%
FU25Yr	8.28	91%	80%	10%
FU50yr	9.72	94%	83%	10%
FU100yr	11.4	96%	86%	10%

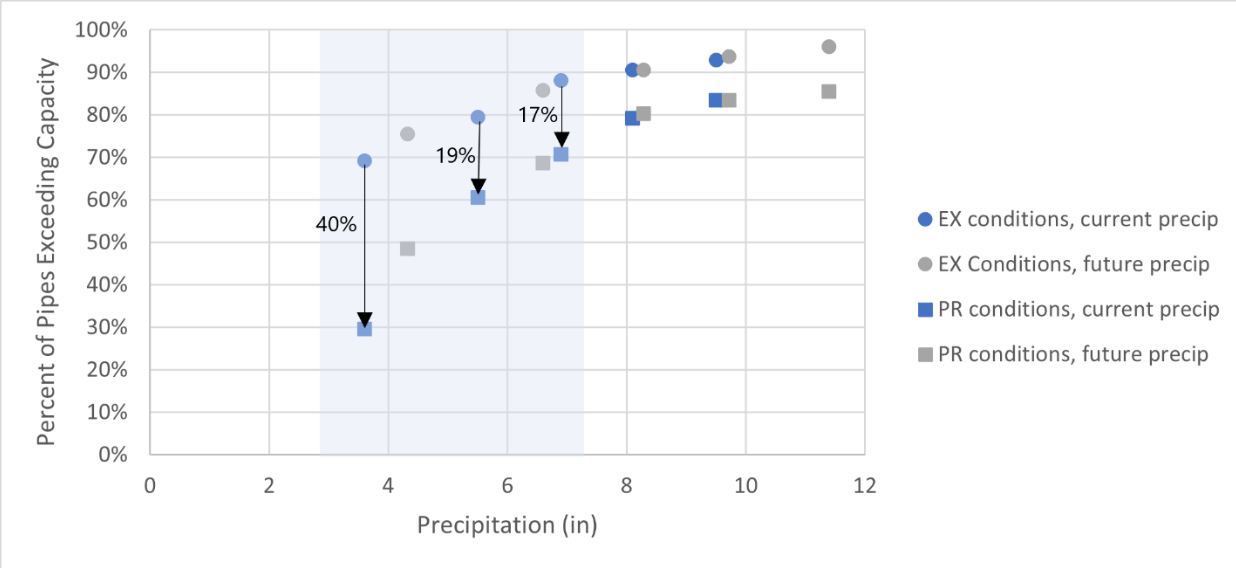


Figure 54: Mayesville Drainage Pipe Capacity Improvement

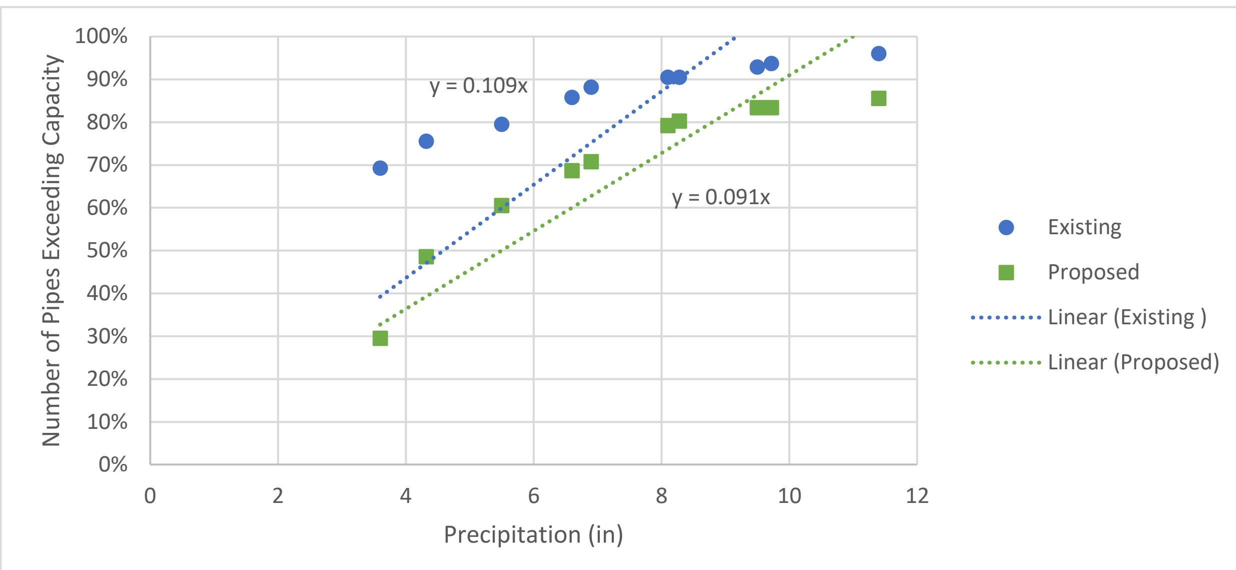


Figure 55: Mayesville Drainage Pipe Capacity Sensitivity Analysis

Table 37 and Figure 56 and Figure 57 summarize the number of buildings that were vulnerable to flooding in the modeling scenarios. The proposed infrastructure improvements remove between 50 and 60% of the flood vulnerable buildings from impacts in the model. Compared to the pipes exceeding capacity, the number of buildings vulnerable to flooding is more sensitive in the existing condition than in the proposed. The slope of the trendline in Figure Y2 is much steeper in the existing condition, indicating that every inch of precipitation in the model shows more buildings in danger of flood impacts. The benefit of the proposed infrastructure changes is that the system is less sensitive to increasing precipitation.

Table 37: Summary of Flood Vulnerable Buildings

Design Storm	Precipitation	Existing Condition	Proposed Condition	Improvement
EX2yr	3.6	73	44	40%
EX10yr	5.5	116	57	51%
EX25yr	6.9	158	63	60%
EX50yr	8.1	206	70	66%
EX100yr	9.5	248	85	66%
FU2yr	4.32	84	46	45%
FU10yr	6.6	139	59	58%
FU25Yr	8.28	205	73	64%
FU50yr	9.72	243	84	65%
FU100yr	11.4	289	89	69%

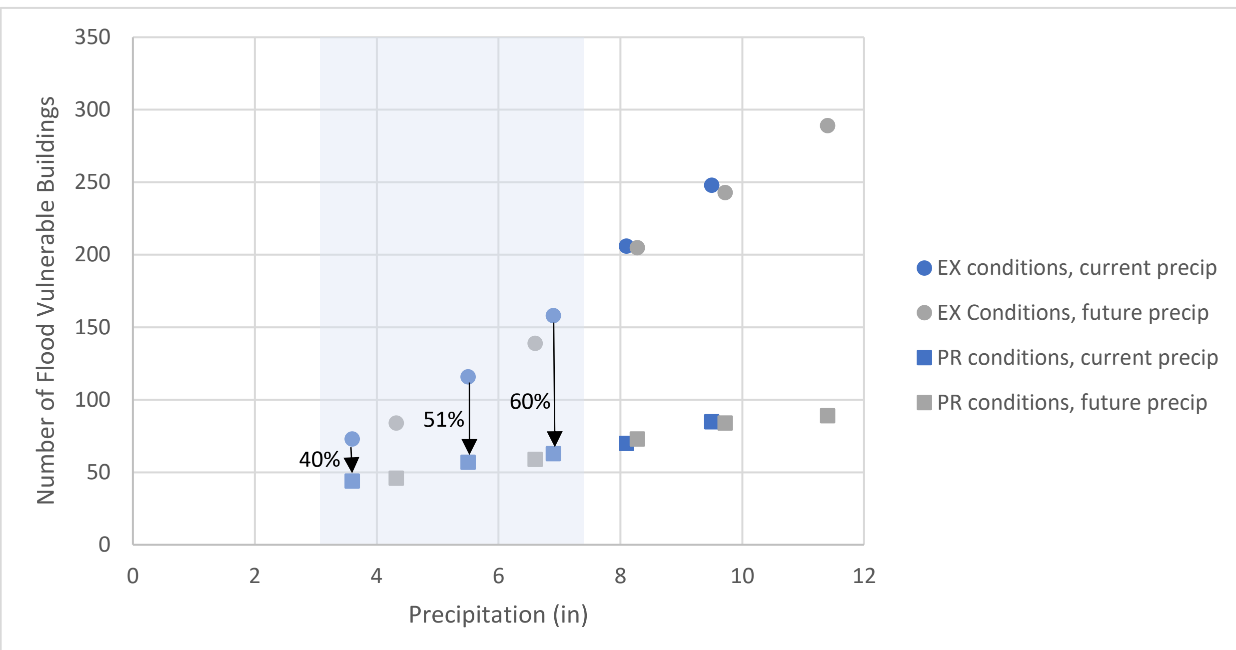


Figure 56: Mayesville Flood Vulnerable Buildings Comparison

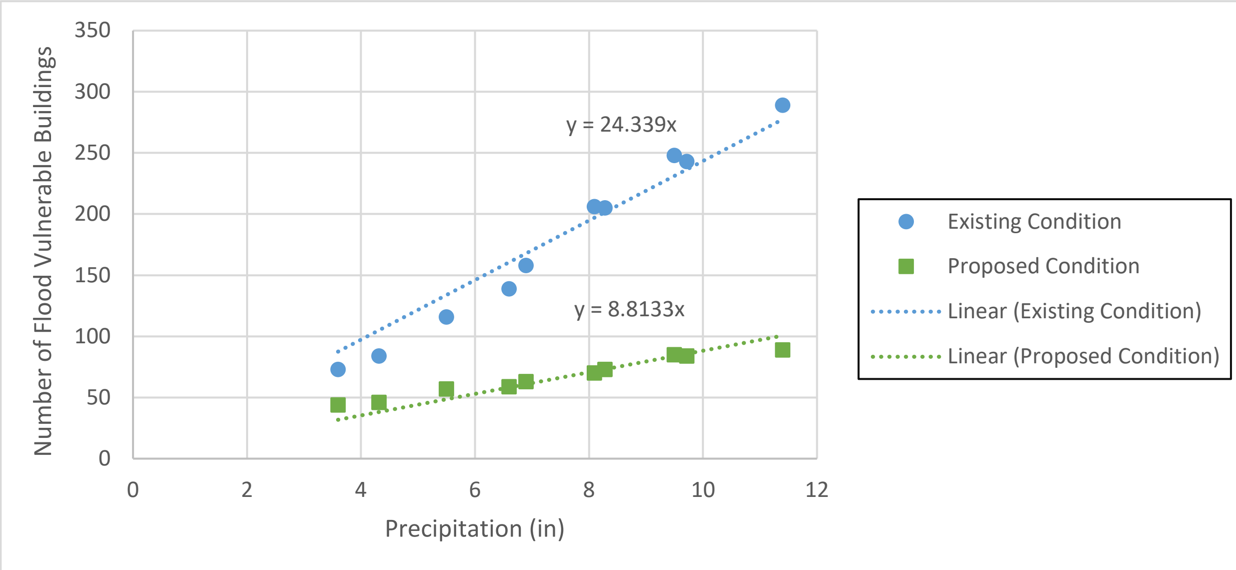
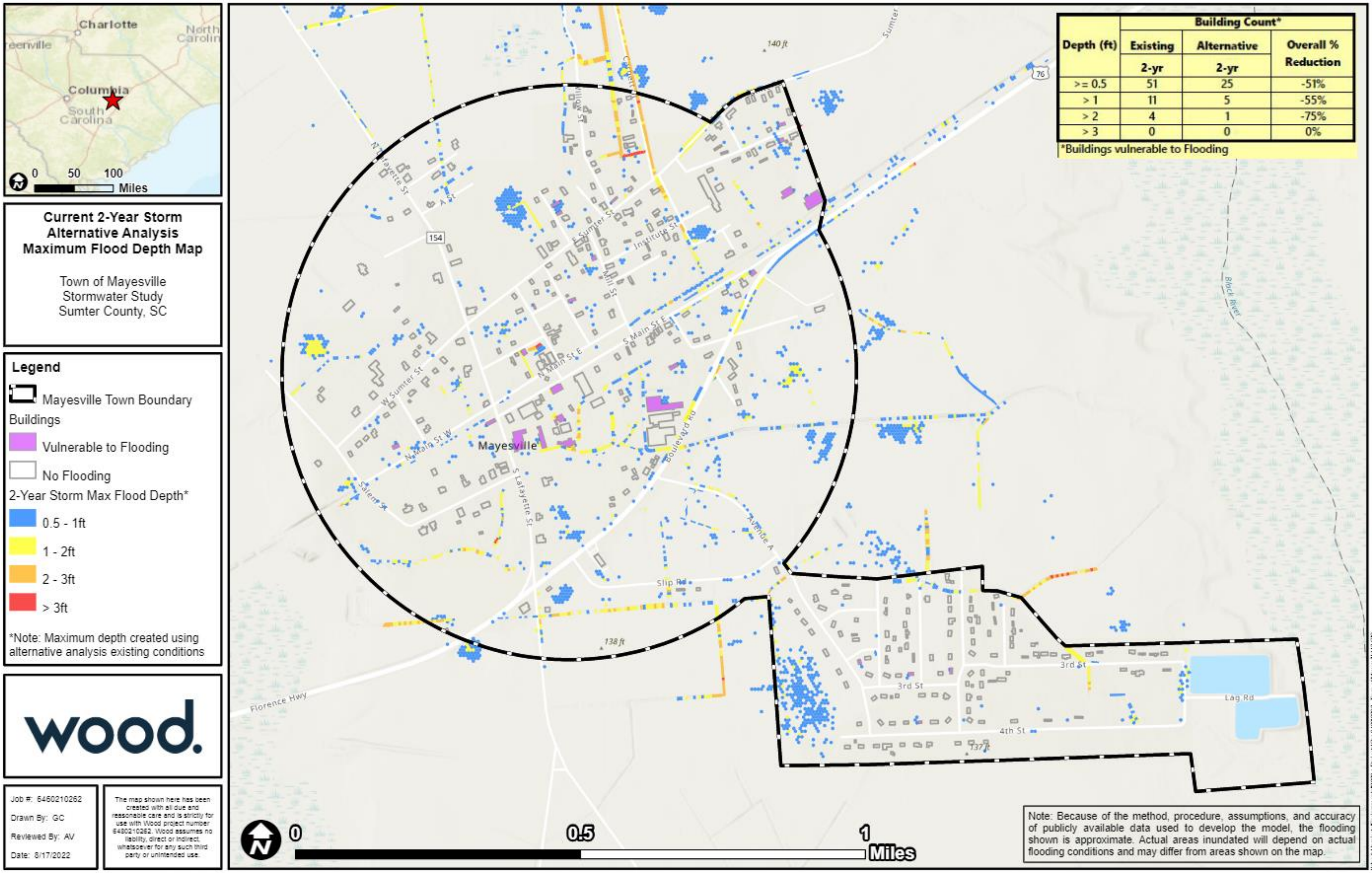


Figure 57: Mayesville Flood Vulnerable Buildings Sensitivity Analysis



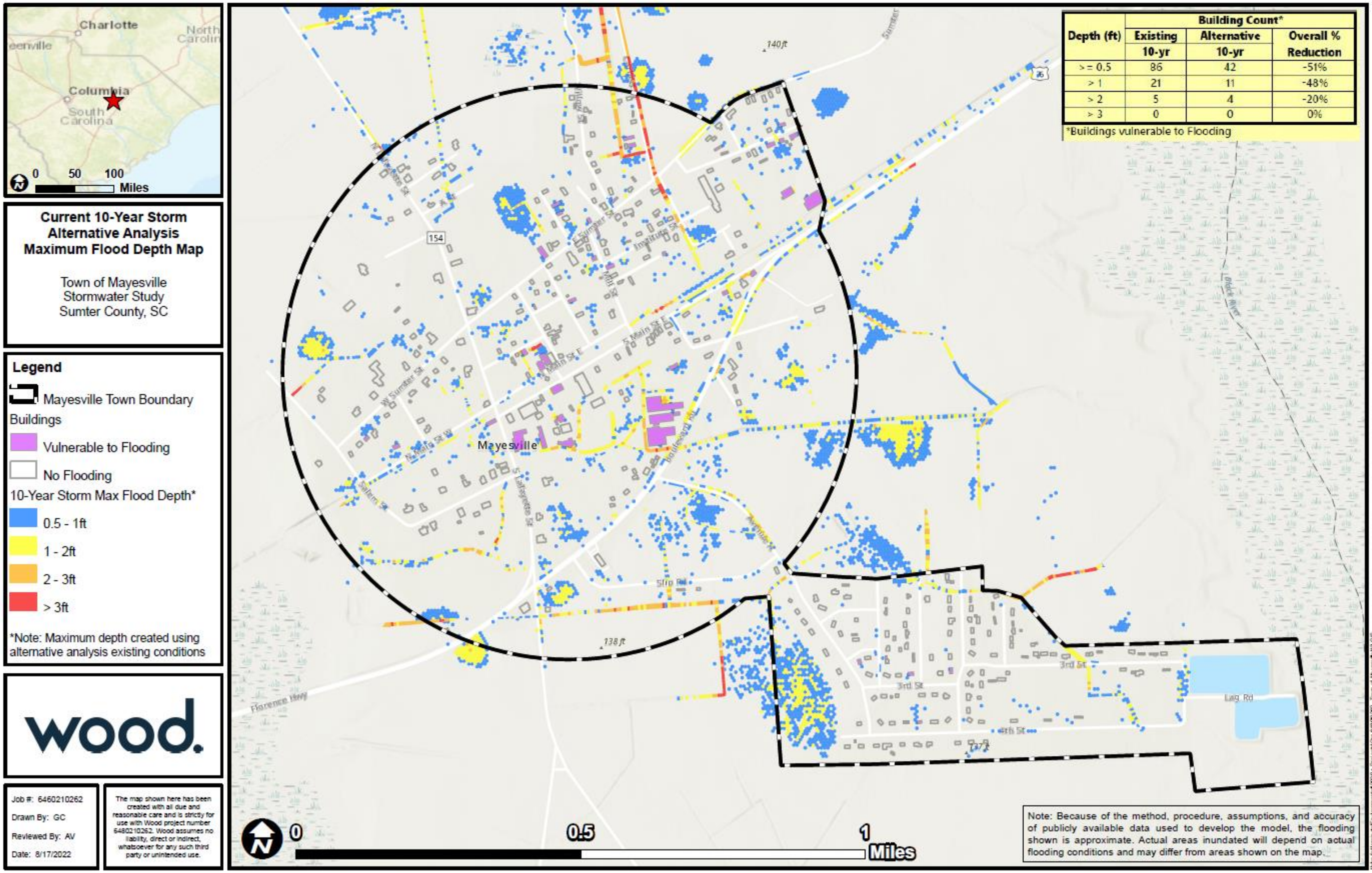
Depth (ft)	Building Count* Existing 2-yr	Building Count* Alternative 2-yr	Overall % Reduction
>= 0.5	51	25	-51%
> 1	11	5	-55%
> 2	4	1	-75%
> 3	0	0	0%

*Buildings vulnerable to Flooding

Figure 58: Maximum Flood Depth Map – Alternative Analysis – Current Precipitation – 2-Year Storm Event

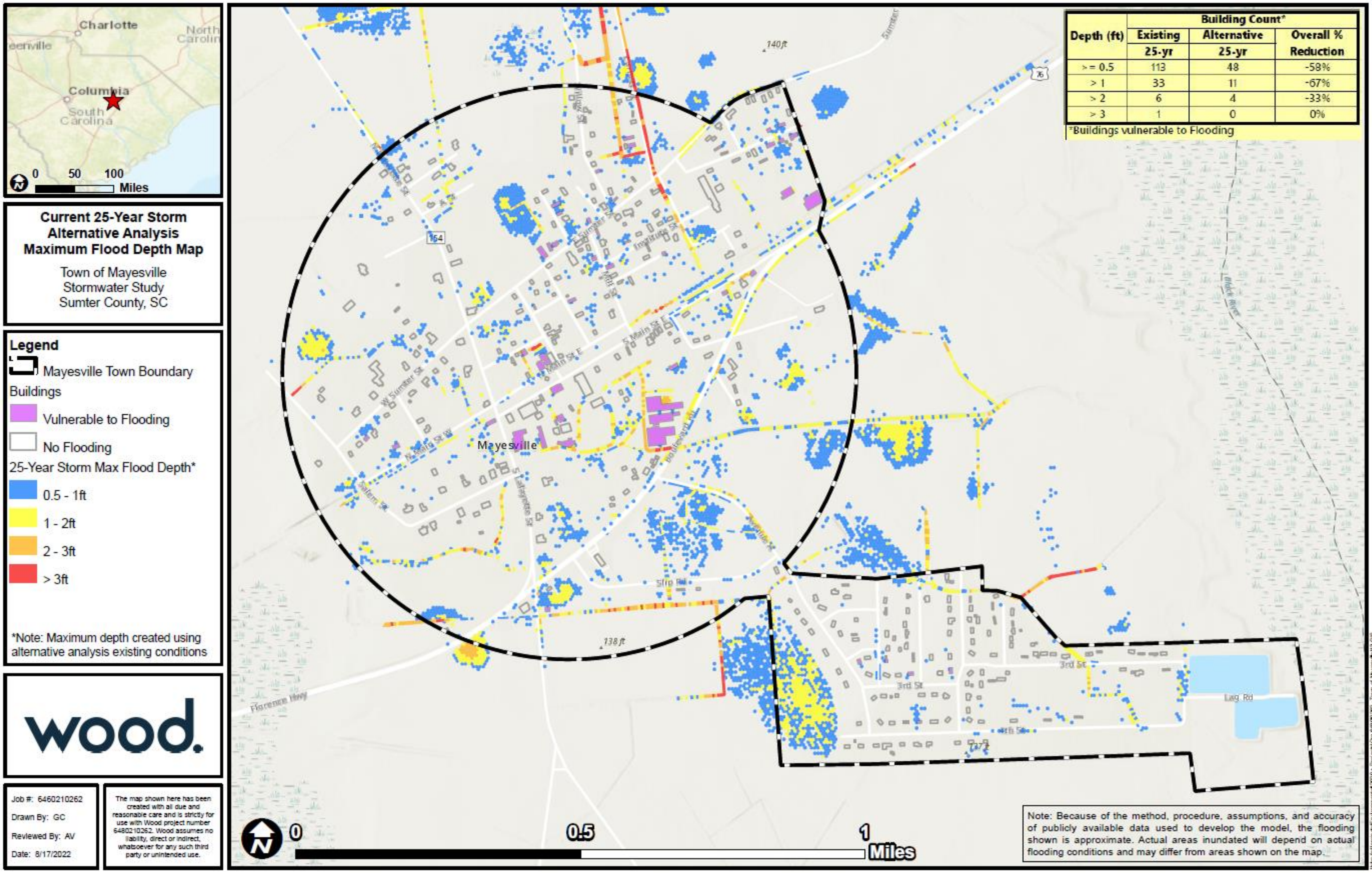
WSP

McCORMICK TAYLOR



Depth (ft)	Building Count* Existing 10-yr	Alternative 10-yr	Overall % Reduction
>= 0.5	86	42	-51%
> 1	21	11	-48%
> 2	5	4	-20%
> 3	0	0	0%

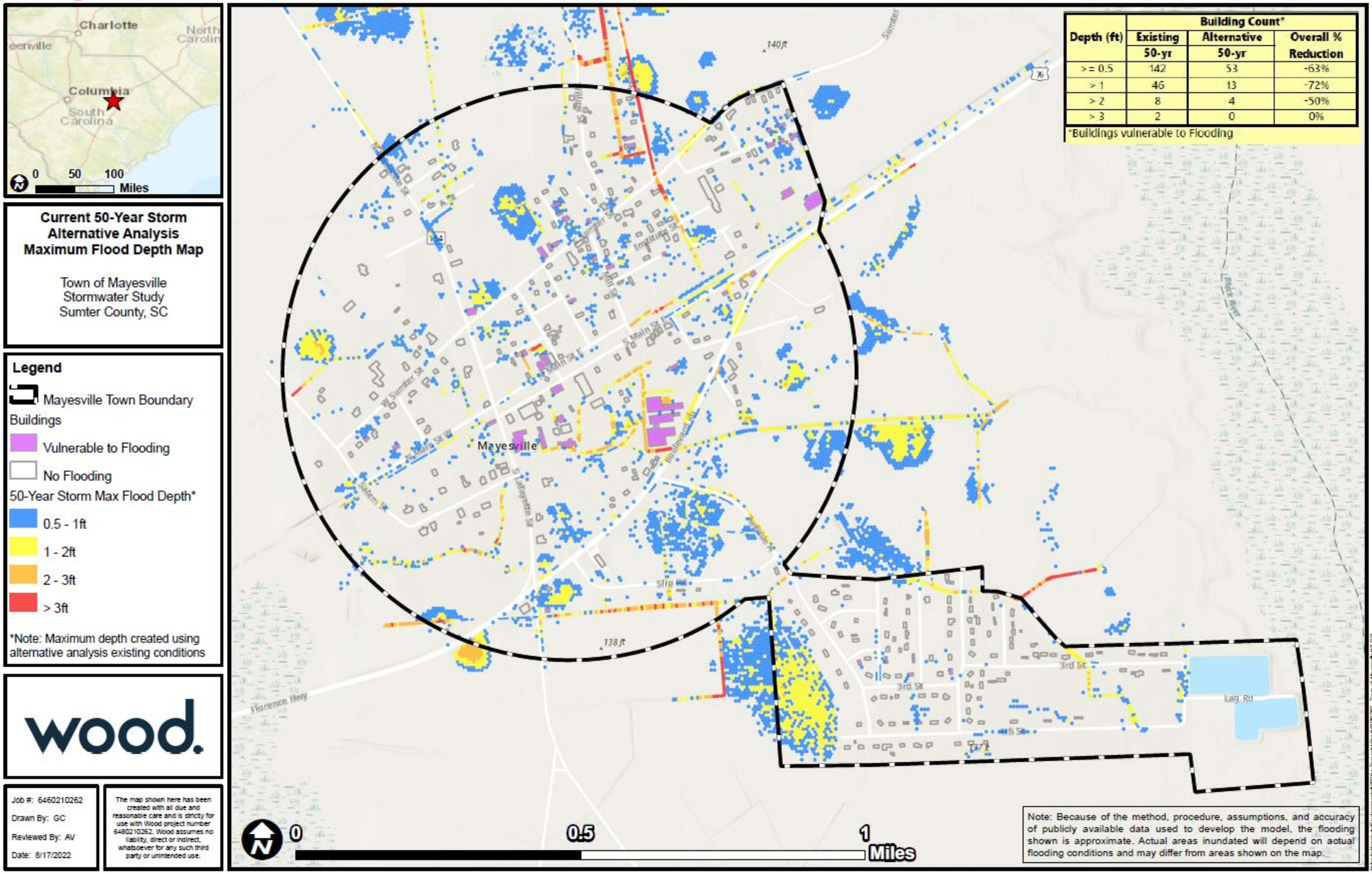
Figure 59: Maximum Flood Depth Map – Alternative Analysis – Current Precipitation – 10-Year Storm Event



Depth (ft)	Building Count*		
	Existing 25-yr	Alternative 25-yr	Overall % Reduction
>= 0.5	113	48	-58%
> 1	33	11	-67%
> 2	6	4	-33%
> 3	1	0	0%

*Buildings vulnerable to Flooding

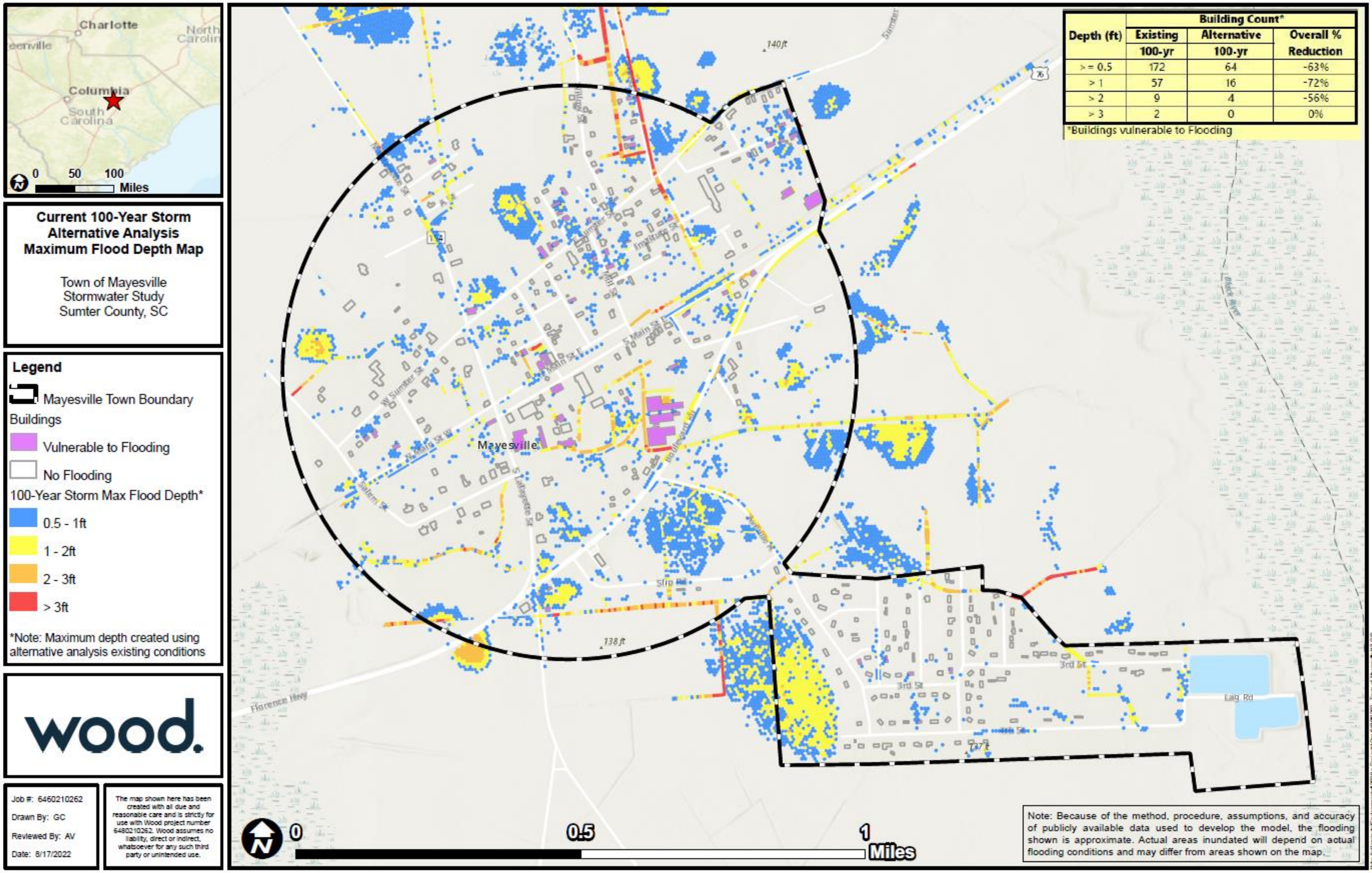
Figure 60: Maximum Flood Depth Map – Alternative Analysis – Current Precipitation – 25-Year Storm Event



Depth (ft)	Building Count*		
	Existing 50-yr	Alternative 50-yr	Overall % Reduction
>= 0.5	142	53	-63%
> 1	46	13	-72%
> 2	8	4	-50%
> 3	2	0	0%

*Buildings vulnerable to Flooding

Figure 61: Maximum Flood Depth Map – Alternative Analysis – Current Precipitation – 50-Year Storm Event



Depth (ft)	Building Count*		
	Existing 100-yr	Alternative 100-yr	Overall % Reduction
>= 0.5	172	64	-63%
> 1	57	16	-72%
> 2	9	4	-56%
> 3	2	0	0%

*Buildings vulnerable to Flooding

Figure 62: Maximum Flood Depth Map – Alternative Analysis – Current Precipitation – 100-Year Storm Event

Project Recommendations

The following sections detail the criteria used to prioritize the project recommendations shown in Figure 62.

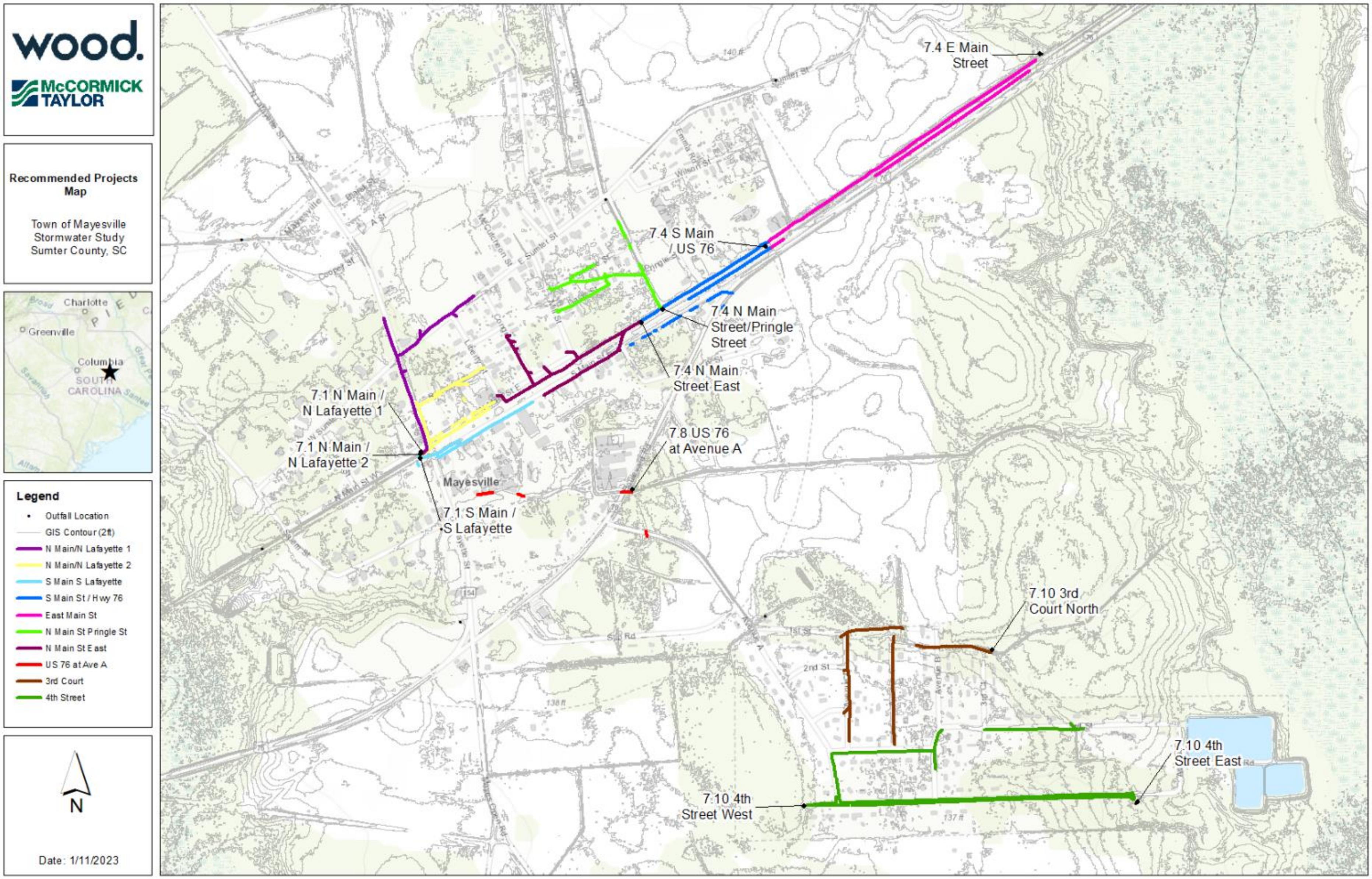


Figure 63: Recommended Projects

8.7 Project Cost Estimates

Table 38 shows the total estimated construction costs and annual maintenance costs for each drainage area detailed in Section 7., with the four prioritized projects highlighted: Drainage Areas 7.1, 7.4, 7.8 and 7.10.

Table 38: Drainage Improvement Construction and Annual Maintenance Costs by Drainage Area

Drainage Area	Construction Cost	Annual Maintenance Cost
7.1	**$ 9,600,000**	**$23,000**
7.2	$ 4,300,000	$11,000
7.3	$ 2,200,000	$6,000
7.4	**$ 6,800,000**	**$21,000**
7.5	$ 1,100,000	$3,000
7.6	$ 1,600,000	$4,000
7.7	$ 1,700,000	$1,000
7.8	**$ 500,000**	**$1,000**
7.9	$ 400,000	$500
7.10	**$ 2,000,000**	**$5,000**
TOTAL	**$ 30,200,000**	**$75,500**

See Section 9.3 for the ranking/prioritization system. The total cost of the four prioritized drainage improvement projects (bolded in Table 38 would be approximately $18,900,000 with an annual maintenance cost of approximately $50,000. It should be noted that projects within areas 7.1, 7.4 and 7.10 can be subdivided and constructed in smaller sections starting with the downstream limits and working upstream. For areas 7,1 and 7,4, the initial focus should be on the Main Street corridor, followed by the adjacent side streets. For 7.10, the work should start at the culvert crossings and work upstream along each roadway.

8.8 Benefit Cost Analysis

Based on the below assumptions and methods using the FEMA BCA Version 6.0.0 tool , the following Benefit Cost Analysis (BCA) was prepared by WSP staff in support of a potential stormwater infrastructure improvements for Mayesville, South Carolina. The costs used in the BCA were estimated by McCormick Taylor and are shown in Table 38. The BCA Reports are included in Appendix I. Note that using the 7% Discount Rate, only Drainage Area/Project Area 7.8 is greater than a 1. However, using the 3% Discount Rate (which is using for FY 22 BRIC and Flood Mitigation Assistance (FMA) grants), Drainage Areas/Project Areas 7.4 and 7.8 are above 1, and 7.10 is extremely close to a 1 (0.98).

Table 39: Benefit Cost Analysis by Drainage Area

Drainage Area	BCA using 7% Discount Rate	BCA using 3% Discount Rate (For FY22 BRIC and FMA only)	Comment
7.1	0.23	0.39	None
7.4	0.85	1.43	None
7.8	22.11	39.78	The high BCA is a result of all damages up through the 100-year flood being mitigated by the proposed project.
7.10	0.59	0.98	None

BCA Methodology

The FEMA BCA Version 6.0.0 tool was used as a standard method to calculate Benefit Cost Ratios (BCR). Since the proposed project is related to stormwater drainage, WSP used a spreadsheet tool originally developed by FEMA Region VIII to allow multiple properties to be assessed that resulted in pre-and post-project summary information that could be inserted into the FEMA BCA tool.

Professional expected damages before and after mitigation were assessed for four different project areas identified as Drainage Areas 7.1, 7.4, 7.8 and 7.10, based on depth of flooding data by structure estimated by WSP staff.

Based on the rain-on-grid method, which models rain falling everywhere, only properties with 0.5 foot of flood depth or greater were to be used in the analysis. Provisions in the FEMA spreadsheet calculator had to be made for properties that were under 0.5ft flooding, by assigning a value of -4.0 foot flooding for the 10 or 25 year and -2.0 foot flooding for 50 or 100yr flooding intervals. This was done to bypass losses that would be calculated by the Depth Damage Curves, in some instances at 0-foot flooding. This methodology was used in the Existing and Proposed Condition calculations for each drainage areas

The summary results of the calculations from the Exiting Conditions (EC) and Proposed Conditions (PC) spreadsheets were entered into the Professional Damages Before and After Damages Mitigation calculator in the FEMA BCA tool, one for each of the four drainage areas. Summary reports were developed that captured the results for each BCA.

Additional Benefits – Social.

Also considered in the analysis are social benefits from workers not being able to go to work due to the flood. This assumes 1 worker per residence, and was based on the structure count for the 25-year event. This then was then entered into the BCA the Additional Benefits – Social section.

Benefits Not Assessed: No Ecosystem service benefits were accounted for or applicable based on our understanding of the project. Costs for emergency responders to close roads and evacuate the area were not assessed in the BCA.

8.9 Ranking System

The following ranking system was developed to help prioritize the drainage projects.

Table 40: Project Ranking System

Ranking Criteria ⬇					
Drainage Area ➡	**7.1**	**7.4**	**7.8**	**7.10**	**Explanation**
Benefit-Cost Ratio (BCR) using 7% Discount Rate	2.3 (0.23)	8.5 (0.85)	10 (22.11)	5.9 (0.59)	BCA score multiplied by 10 (max score of 10)
Number of Buildings Removed from Flooding (25-Yr, current precipitation)	4 (6 buildings)	10 (20 buildings)	4 (7 buildings)	4 (7 buildings)	0-5 buildings = 2 6-10 buildings = 4 11-15 buildings = 6 16-20 buildings = 8 >20 buildings = 10
Linear feet of Road removed from Flooding	10	7	5	5	
Permitting Level of Effort	4	4	8	10	0 = significant impact to resources, not permittable, 10 = no impacts to resources, minimal permitting
ROW Needed to be Purchased from Landowners	7	5	10	10	0 = project does not have support, requires complex property acquisition and is disruptive 10 = project has community support and can be done in a non-disruptive manner
Utility Impacts	4	5	8	8	0 = project has major impact to utilities

Ranking Criteria ↓ Drainage Area →	7.1	7.4	7.8	7.10	Explanation
					10 = project does not require utility relocation
Is the Project subdividable into several phases	10	10	0	10	0 = project must be constructed in its entirety 10 = project can be subdivided into smaller projects to accommodate available budget
Annual Maintenance Requirements	7	7	10	10	0 = Project decreases the maintainability of the infrastructure and does not significantly increase the capacity of the structures 10 = Project significantly increases the capacity of the infrastructure and will decrease the overall maintenance needed
Supports Economic Redevelopment	10	7	7	5	0 = Project does not have support, will not support economic growth 10 = Project has community support and will support re-development of Mayesville
LMI	10	0	0	10	0 = <50 10 = >50
TOTAL SCORE	**68.3**	**64.5**	**62**	**77.9**	
Cost of Project	$9.6M	$6.8M	$0.5M	$2.0M	

Although the project in drainage area 7.8 has the lowest score in the prioritization, it is the only drainage area which has a BCR of greater than 1.0, which is often required for grant proposals.

However, the projects may be installed in phases, typically starting at an outfall. Therefore, the costs of each Drainage Area have been broken down in phases, with order of installation provided:

Table 41: Drainage Improvement Construction and Annual Maintenance Costs by Drainage Area By Phase

Drainage Area			Construction Cost	Annual Maintenance Cost	Order of Phase Installation
7.1	**N. MAIN ST AT N. LAFAYETTE / S. MAIN ST AT S. LAFAYETTE**		**$ 5,800,000**	**$23,000**	
	7.1.1	N. MAIN ST/N. LAFAYETTE 1	$ 2,200,000	$11,500	1*
	7.1.2	N. MAIN ST/N. LAFAYETTE 2	$ 2,600,000	$7,500	1*
	7.1.3	S. MAIN ST/S. LAFAYETTE	$ 1,000,000	$4,000	1*
7.2	N. LAFAYETTE ST AT BLAND ST		$ 3,400,000	$11,000	
7.3	E. SUMTER AT INSTITUTE ST		$ 1,200,000	$6,000	
7.4	**S. MAIN AT US 76/E. MAIN/N. MAIN/N. MAIN AT PRINGLE ST**		**$ 5,200,000**	**$21,000**	
	7.4.1	N. MAIN ST AT PRINGLE ST	$ 1,200,000	$5,400	3*
	7.4.2	E. MAIN ST	$ 500,000	$500	1
	7.4.3	S. MAIN ST AT US 76	$ 1,000,000	$2,600	2
	7.4.4	N. MAIN ST	$ 2,500,000	$12,500	3*
7.5	S. LAFAYETTE ST AT SALEM ST		$ 700,000	$3,000	
7.6	S. LAFAYETTE ST AT US 76		$ 900,000	$4,000	

Drainage Area		Construction Cost	Annual Maintenance Cost	Order of Phase Installation
7.7	N. MAIN ST AT SALEM ST WEST	$ 700,000	$1,000	
7.8	**US 76 AT AVENUE A**	**$ 400,000**	**$1,000**	
7.9	AVENUE A AT 1ST ST	$ 300,000	$500	
7.10	**SOUTH EASTERN NEIGHBORHOOD**	**$ 1,700,000**	**$5,000**	
TOTAL		**$ 20,300,000**	**$75,500**	

*Order of Phase Installation is Interchangeable

8.10 Buyouts or Elevations

In addition to the stormwater improvements identified herein, there are also options to elevate buildings or conduct buyouts of buildings. These options do not address street flooding but may provide a lower cost alternative for protecting buildings. These options would require a property owner to voluntarily agree to a buyout or elevation.

Using generalized budget values from FEMA, for planning purposes the typical elevation cost estimate would be between $175,000 and $210,000 for design and elevation of the building. Elevation will increase the elevation of the living space of the building but also requires the occupants to be relocated temporarily while the structure is elevation. For buyouts, the purchase price is based on an appraisal of the property. Once the property is purchased it can be demolished removing any flooding threat. Disadvantages of purchasing and demolishing the building includes maintenance of new open space and loss of tax revenue. Additionally, it is often difficult for the homeowner to find comparable housing within a reasonable distance of the building.

8.11 Risk Assessment

If implemented, this project will remove 65 houses from being vulnerable to flooding during the design storm (25-year) during current precipitation, but 48 houses would still flood during 25-year storm events.

8.12 "What If" Scenarios

The analysis described herein included "What If" scenarios as described in the following.

Future Increases in Precipitation

As noted in Section 3.1, in order to account for the effect of climate change, future precipitation was determined using the top range of the SCDHEC rainfall-duration-frequency (IDF) curves, per direction from SCOR, and then adjusted to include a future climate factor of a 20% increase in total rainfall, as referenced in Wood's Folly Beach Drainage Study. Table 17 and Table 19 show slight increases in the number of buildings vulnerable to flooding due to increased future precipitation, despite the project's proposed improvements.

Climate science in an inexact science and future precipitation may be greater to or less than the values used for this study. If the future 20% increase in precipitation is not realized, the Town will likely avoid increases in flooding damage at the level shown in Table 19 (post improvements with future condition precipitation). If future precipitation increases more the 20% increase included in this study, the Town will likely see damages that exceed the estimates shown herein.

Storm Events Larger than the Project Design Storm

The analysis included in this study used the 25-year, 24-hour precipitation event for designing the proposed improvements. The current estimate for this event is 6.9 inches of rainfall in 24 hours and the estimate future amount is 8.28 inches. For any precipitation event that has rainfall totals that exceed 6.9 inches or have similar precipitation totals that occur more rapidly than 24 hours, flooding will likely occur even following the proposed improvements. Large storm events, like tropical storms, often have rainfall totals exceeding 10 inches which exceeds the capacity of the proposed improvements.

9.0 Low-to-Moderate Income Assessment

The number of buildings removed from being vulnerable to flooding by implementation of the proposed projects during the 25-year storm event and the estimated Low-to Moderate Income (LMI) in each drainage area (project area) are shown in Table 42. Note that Drainage Areas/Project Areas 7.1 and 7.10 have an estimated LMI above 51%.

Table 42: Number of Buildings Removed from Vulnerable to Flooding by Drainage Area and %LMI

Drainage Area/Project Area	Number of Buildings Removed from Flooding in 25-year Storm Event	Estimated % LMI*
7.1	6	**57.2**
7.4	20	39.7
7.8	7	28.7
7.10	7	**75.8**
Total	0	

*LMI in the Town of Mayesville is 42.2%. The LMI of each drainage/project area was estimated based on structure value in entire town vs. structure value in drainage/project area.

By completing these specific projects, roadway flooding will be reduced or eliminated, thus allowing for residents to access their homes, but also allow them to travel to places of employment, medical or health centers, shopping areas and religious engagements. The current roadway flooding within this area can result in travel delays to the motoring public which then can result in financial and income related impacts to these people. Referring to SCDOT average daily traffic counts, North Lafayette St averaged 475 daily trips, which is approximately 85% of Mayesville population. Repetitive street flooding will also shorten the lifespan of asphalt roadways which results in increased roadway maintenance costs, more frequent repaving or patching efforts and increased wear and tear on vehicles due to potholes and worn roadway surfaces.

Specific to downtown area:

Additionally, reoccurring flooding along Mayesville's Main Street hampers the town's economic redevelopment as the current flooding impacts areas that could be redeveloped into businesses or commercial spaces. The flooding currently affects most of the empty storefronts and the associated potential businesses' street side parking. This project would eliminate or substantially reduce flooding in these areas, which removes this hinderance which makes these parcels useable and potentially more attractive to investors. A secondary effect of implementing these projects is that due to the installation of curb inlets and stormdrain pipes, replacement sidewalk and curb and gutter will be required to be installed which results in an aesthetic improvement similar to a streetscape project.

For the Residential areas:

Through installation of improved roadside drainage along these residential streets, property owners will have a reduction or elimination of ponding within their properties. This improvement provides aesthetical improvements to these homes as it will allow property owners to better maintain their yards or re-invest into improving their homes. These projects will also have the secondary affect of resurfacing these streets, leaving them in a new condition and notion of better visual aesthetics to the community. Through this improvement property values may improve and add greater tax base to the Town or incentivize new residents to move to Mayesville.

APPENDICES

APPENDIX A:

Existing Conditions Mapped Modeling Results

wood.

McCORMICK TAYLOR

2-Year Storm
Existing Conditions
Conveyance Capacity Map

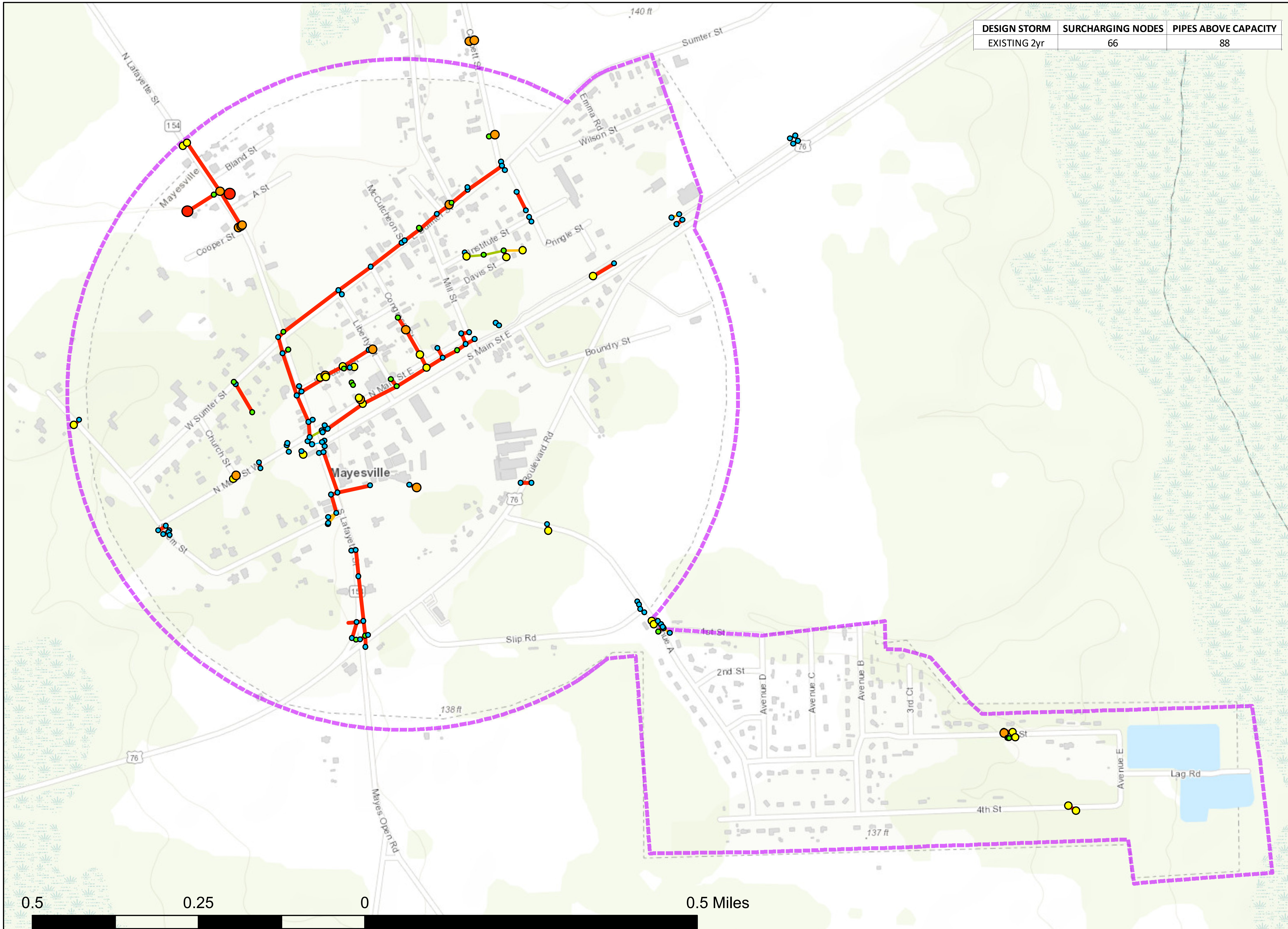
Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

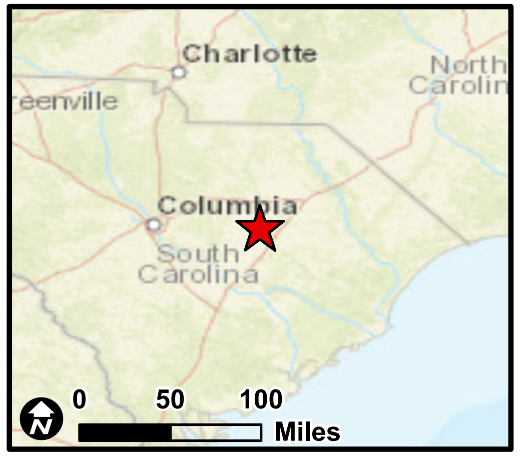
- Town of Mayesville
- 2-yr Surcharge (ft)
  - < 0.0
  - 0.0 - 0.5
  - 0.5 - 1.0
  - 1.0 - 2.0
  - > 2.0
- 2-yr Pipe Capacity
  - 0 - 25%
  - 25 - 50%
  - 50 - 75%
  - 75 - 100%

N

Date: 5/20/2022



DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
EXISTING 2yr	66	88



2-Year Storm
Existing Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

2-Year Storm Max Flood Depth*

0.5 - 1ft

1 - 2ft

2 - 3ft

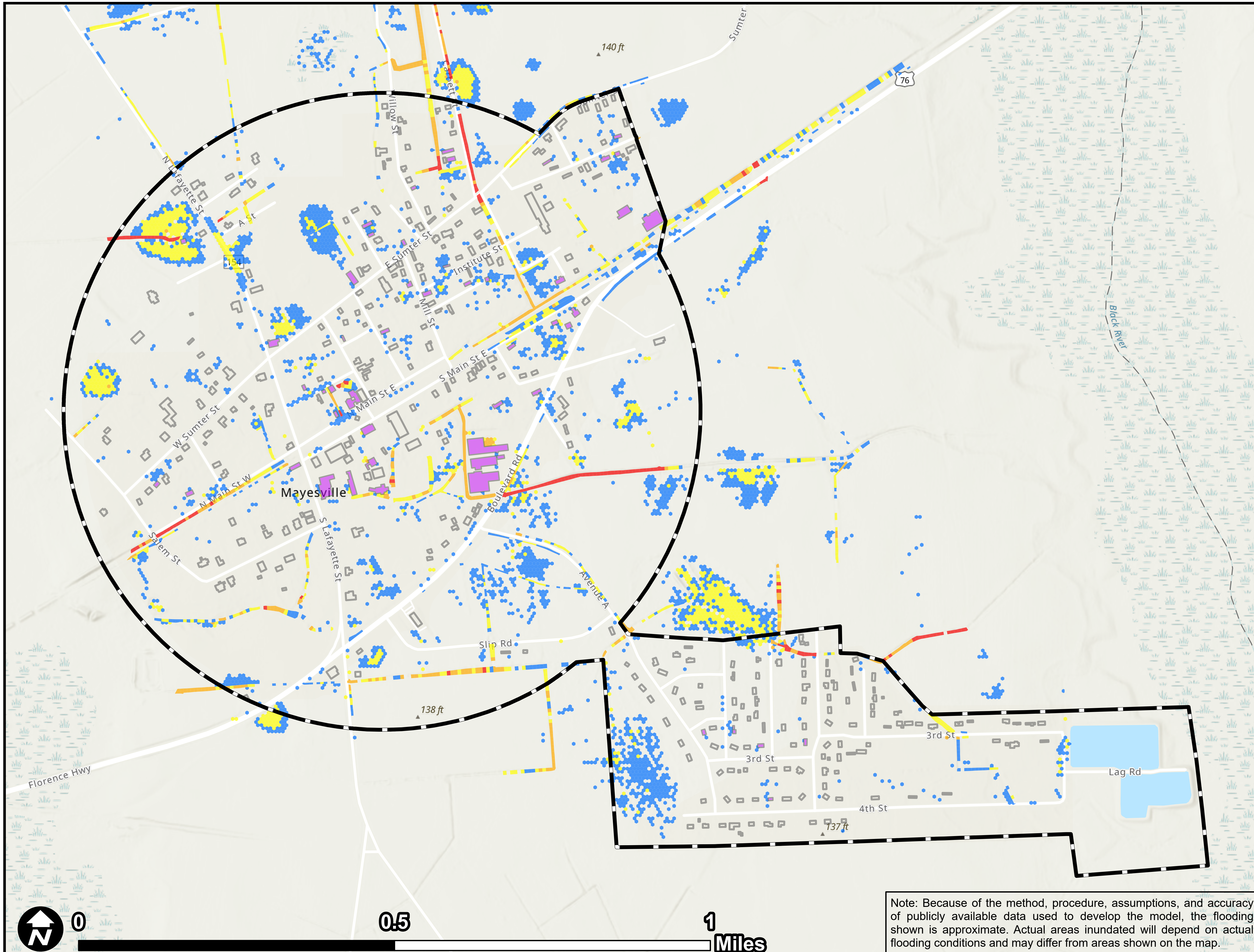
> 3ft

*Note: Maximum depth created using existing conditions model

wood.

Job #: 6460210262
Drawn By: GC
Reviewed By: AV
Date: 5/20/2022

The map shown here has been created with all due and reasonable care and is strictly for use with Wood project number 6480210262. Wood assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.



10-Year Storm
Existing Conditions
Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

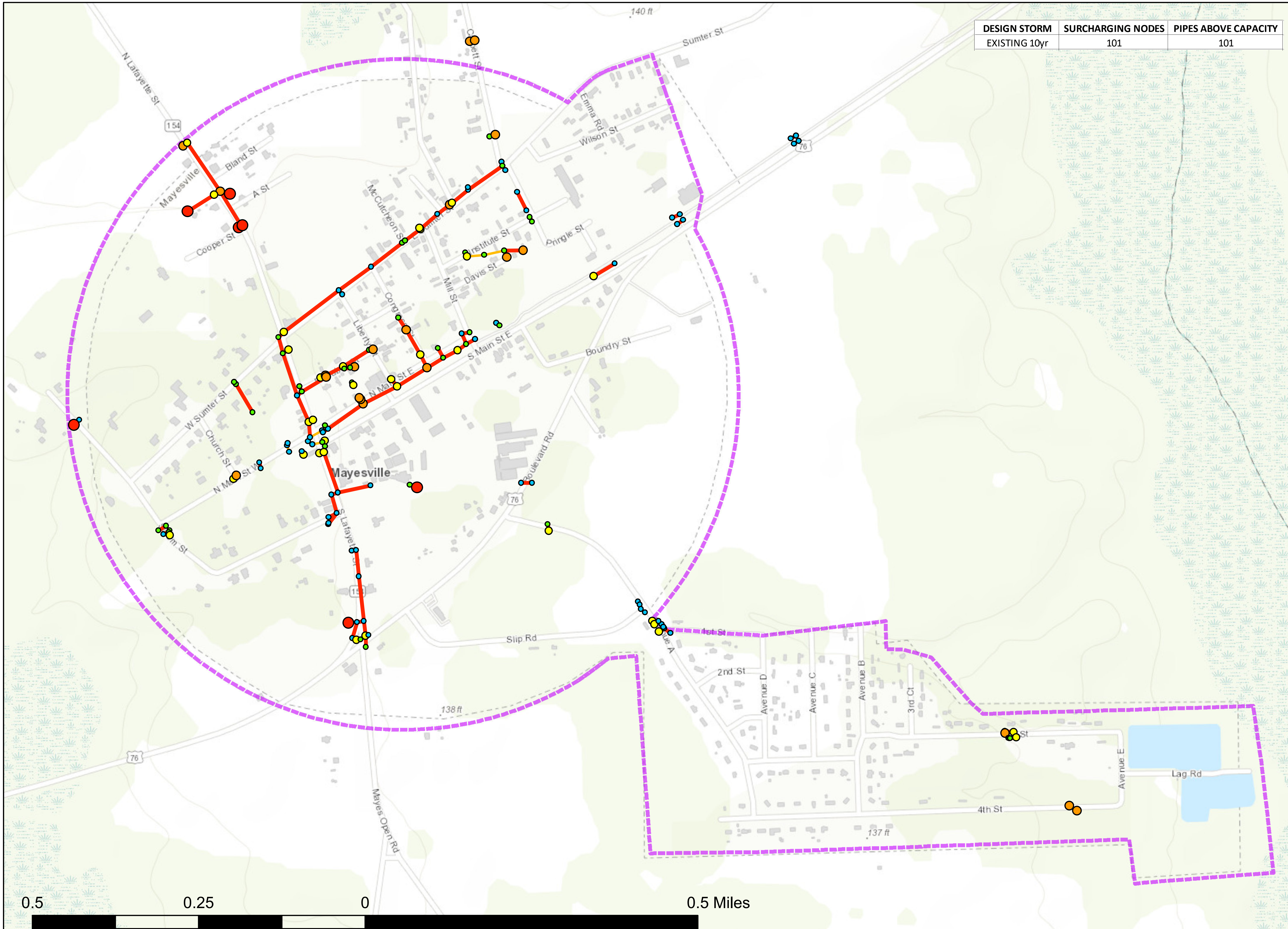
Legend

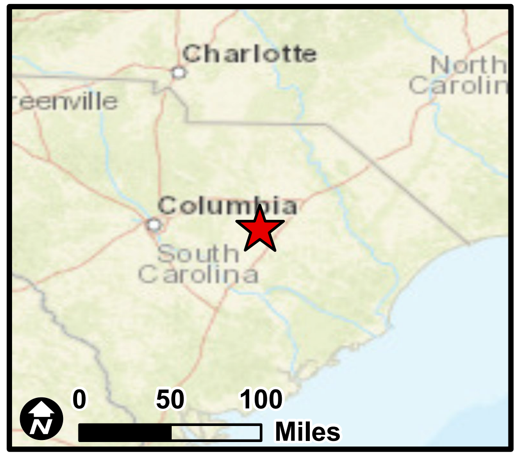
- Town of Mayesville
- 10-yr Surcharge (ft)
  - < 0.0
  - 0.0 - 0.5
  - 0.5 - 1.0
  - 1.0 - 2.0
  - > 2.0
- 10-yr Pipe Capacity
  - 0-25%
  - 25-50%
  - 50-75%
  - 75-100%

N

Date: 5/20/2022

DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
EXISTING 10yr	101	101





10-Year Storm
Existing Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

10-Year Storm Max Flood Depth*

0.5 - 1ft

1 - 2ft

2 - 3ft

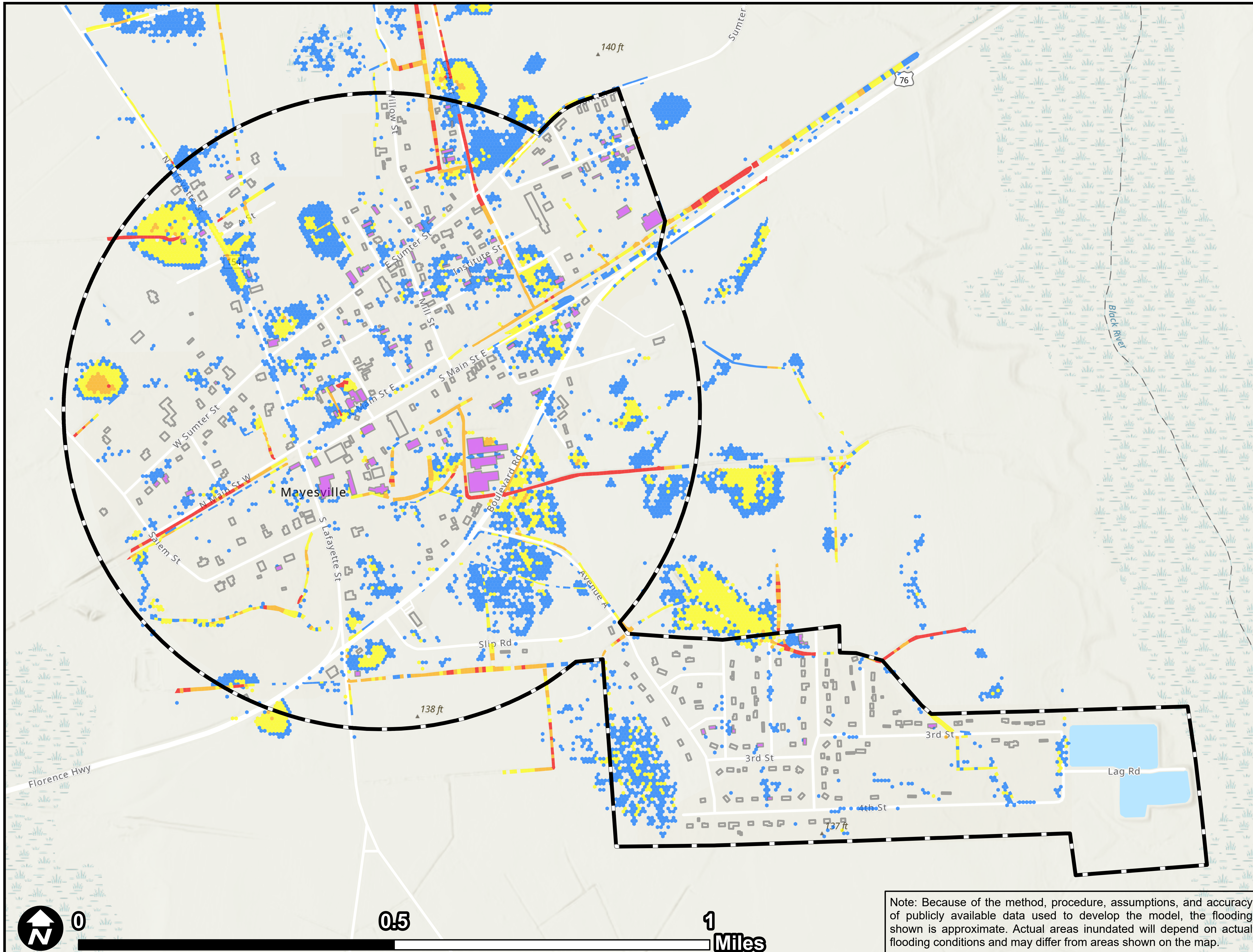
> 3ft

*Note: Maximum depth created using existing conditions model

wood.

Job #: 6460210262
Drawn By: GC
Reviewed By: AV
Date: 5/20/2022

The map shown here has been created with all due and reasonable care and is strictly for use with Wood project number 6480210262. Wood assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.



Note: Because of the method, procedure, assumptions, and accuracy of publicly available data used to develop the model, the flooding shown is approximate. Actual areas inundated will depend on actual flooding conditions and may differ from areas shown on the map.

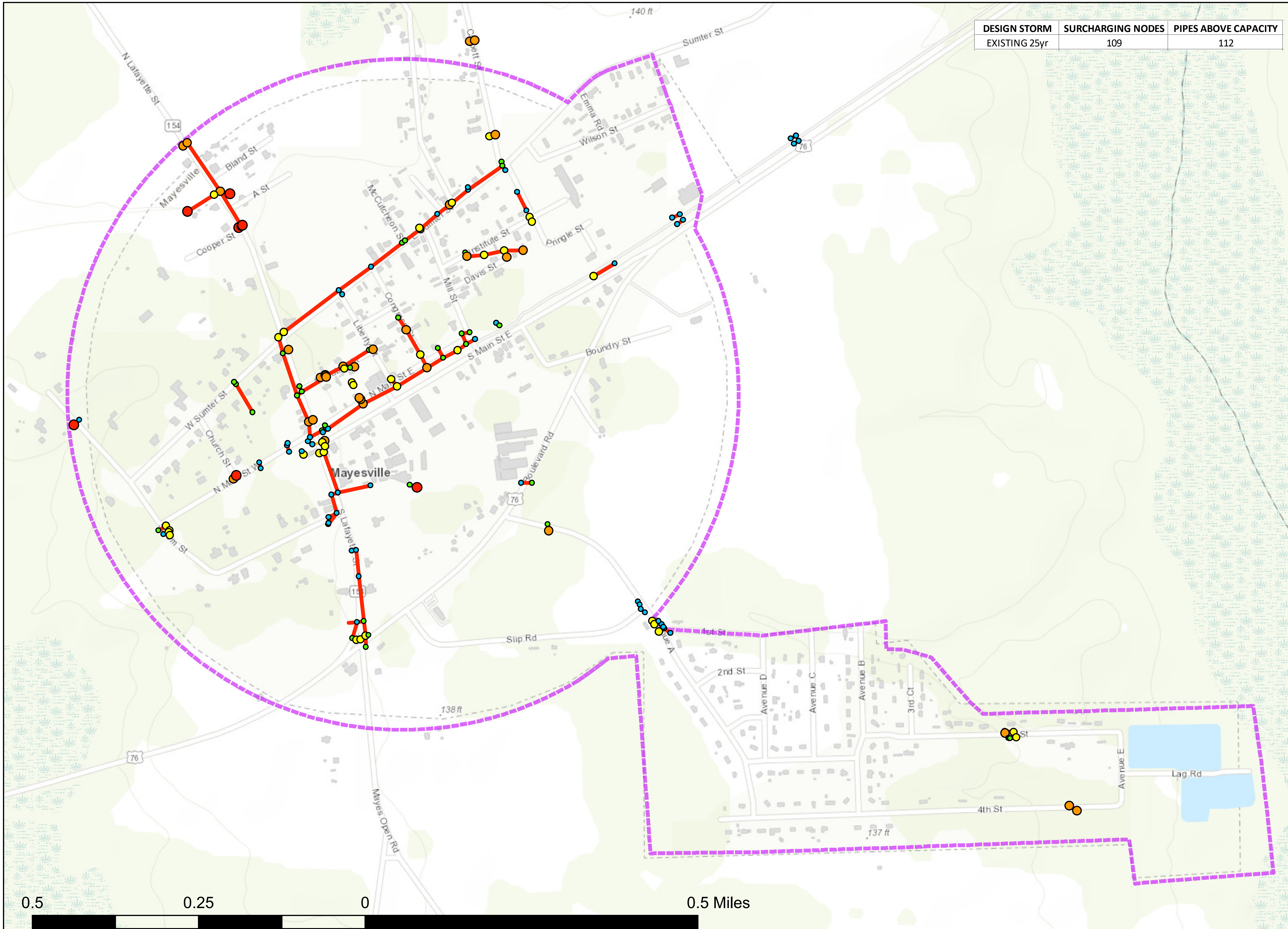
wood.

McCORMICK TAYLOR

25-Year Storm Existing Conditions Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
EXISTING 25yr	109	112



Legend

- Town of Mayesville

25-yr Surcharge (ft)

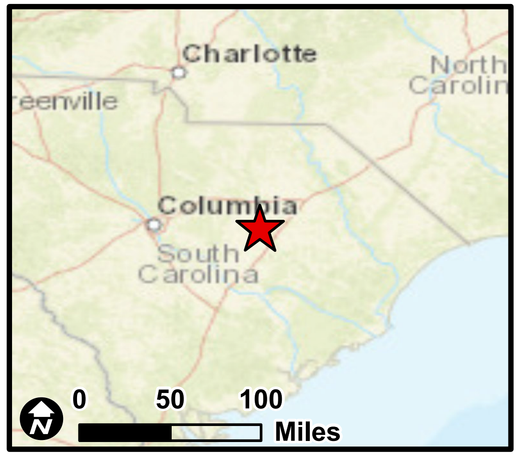
- < 0.0
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

25-yr Pipe Capacity

- 0 - 25%
- 25 - 50%
- 50 - 75%
- 75 - 100%

N

Date: 5/20/2022



25-Year Storm
Existing Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

25-Year Storm Max Flood Depth*

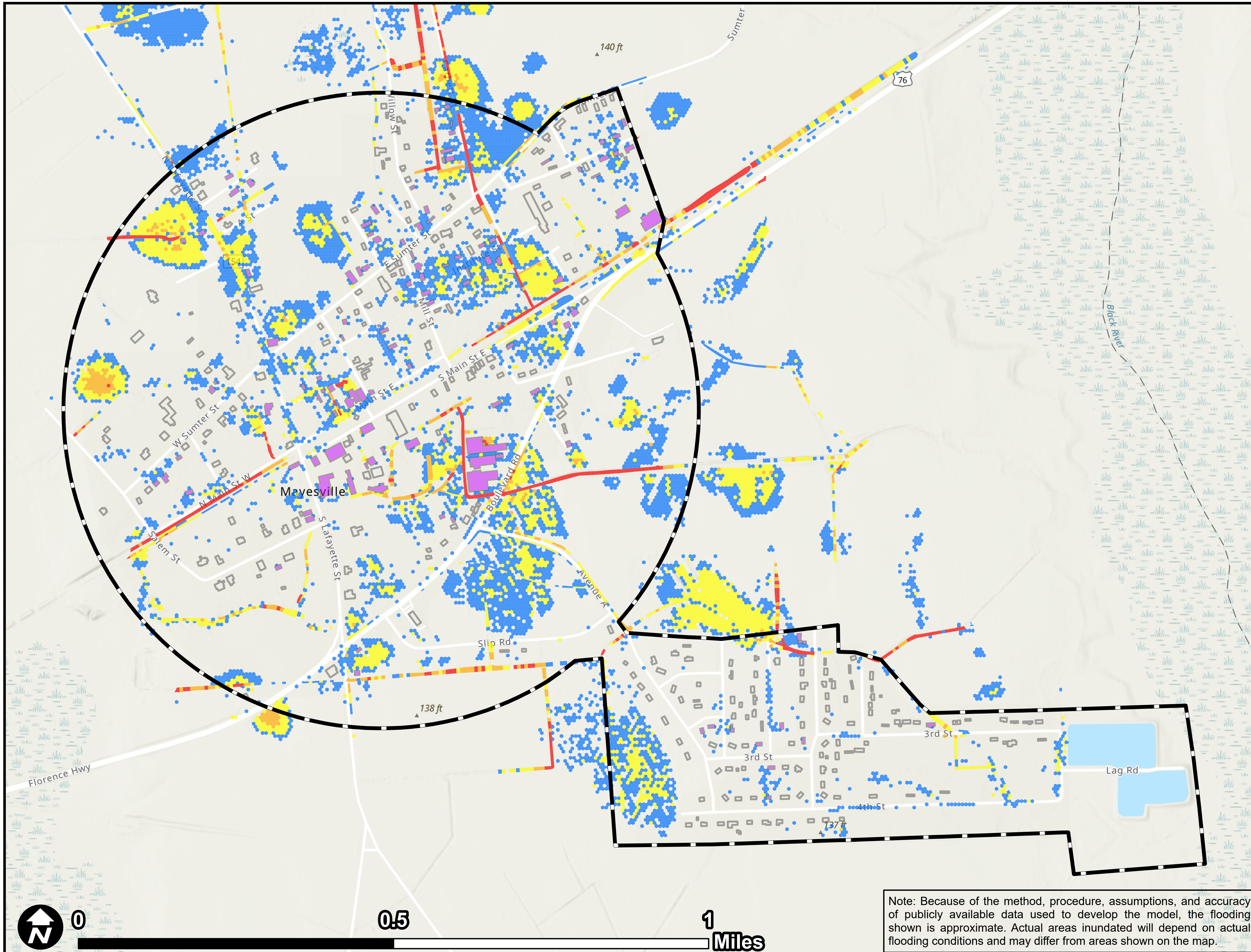
0.5 - 1ft

1 - 2ft

2 - 3ft

> 3ft

*Note: Maximum depth created using existing conditions model



Job #: 6460210262

Drawn By: GC

Reviewed By: AV

Date: 5/20/2022

The map shown here has been created with all due and reasonable care and is strictly for use with Wood project number 6480210262. Wood assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.

wood.

McCORMICK TAYLOR

50-Year Storm
Existing Conditions
Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

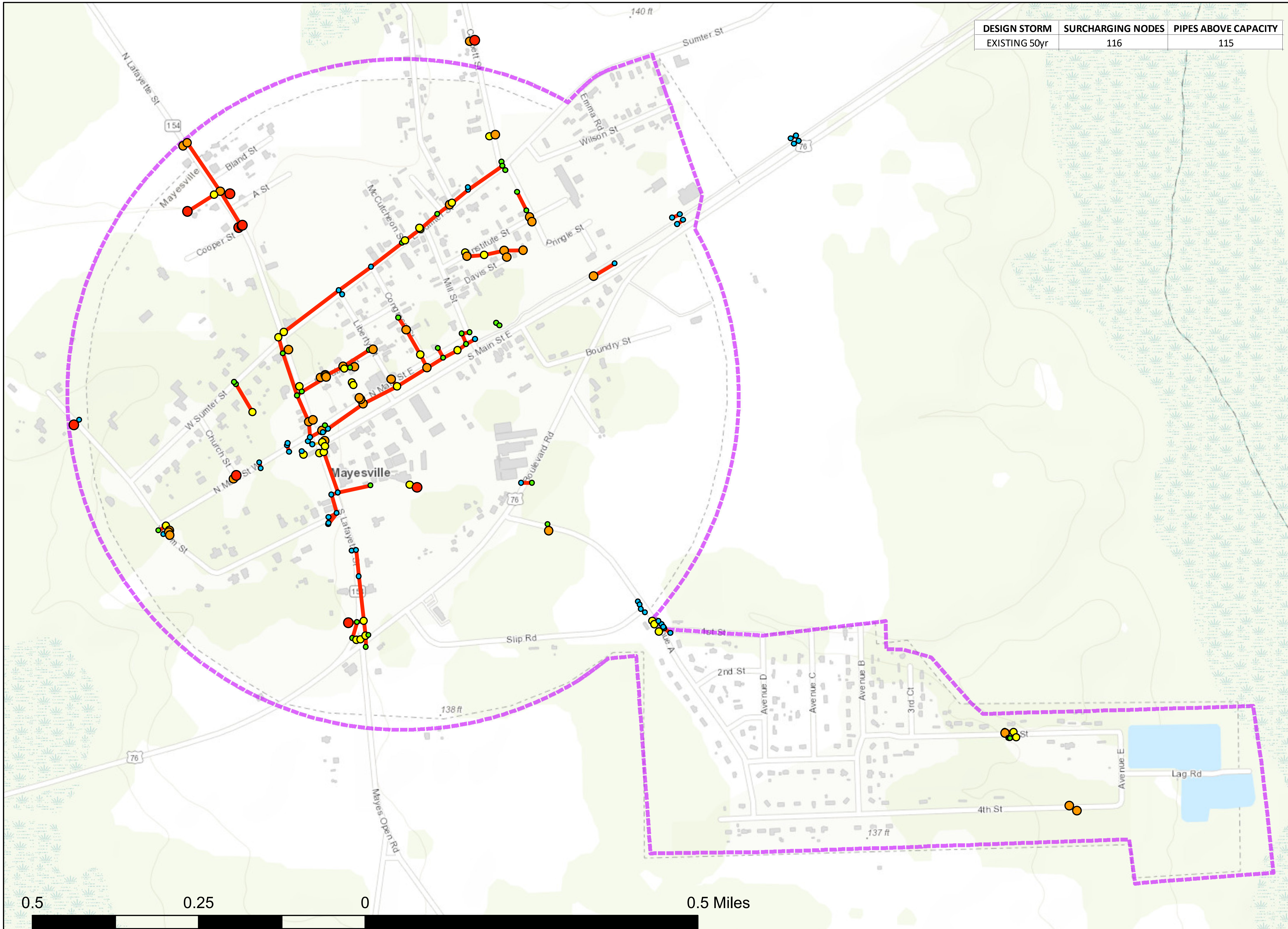
Legend

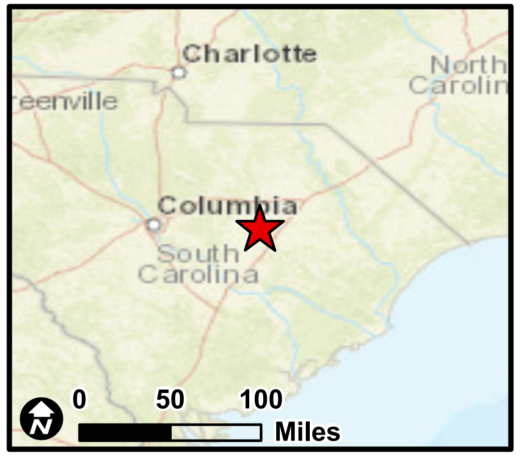
- Town of Mayesville
- 50-yr Surcharge (ft)
  - < 0.0
  - 0.0 - 0.5
  - 0.5 - 1.0
  - 1.0 - 2.0
  - > 2.0
- 50-yr Pipe Capacity
  - 0 - 25%
  - 25 - 50%
  - 50 - 75%
  - 75 - 100%

N

Date: 5/20/2022

DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
EXISTING 50yr	116	115





50-Year Storm
Existing Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

50-Year Storm Max Flood Depth*

0.5 - 1ft

1 - 2ft

2 - 3ft

> 3ft

*Note: Maximum depth created using existing conditions model

wood.

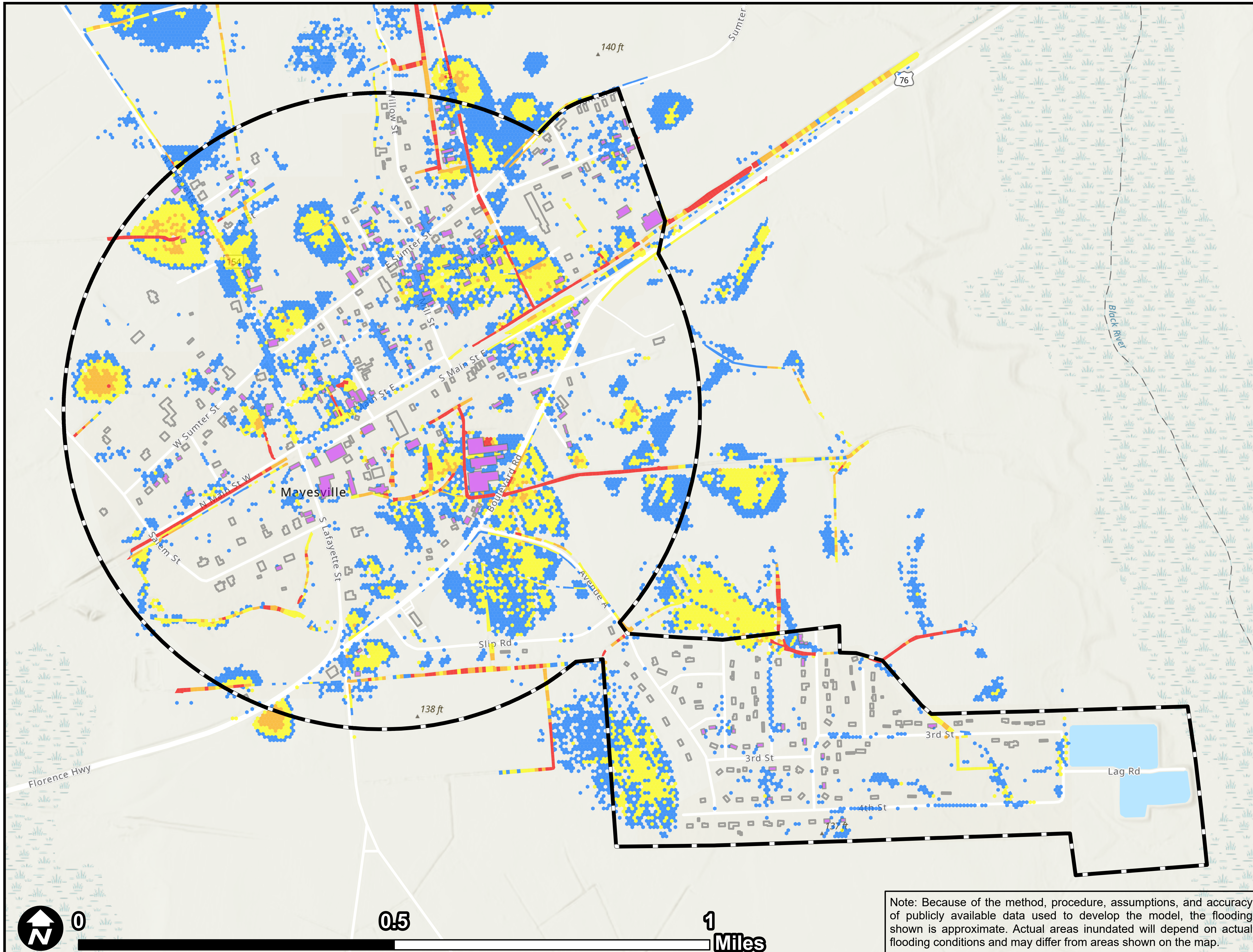
Job #: 6460210262

Drawn By: GC

Reviewed By: AV

Date: 5/20/2022

The map shown here has been created with all due and reasonable care and is strictly for use with Wood project number 6480210262. Wood assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.



Note: Because of the method, procedure, assumptions, and accuracy of publicly available data used to develop the model, the flooding shown is approximate. Actual areas inundated will depend on actual flooding conditions and may differ from areas shown on the map.

100-Year Storm Existing Conditions Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

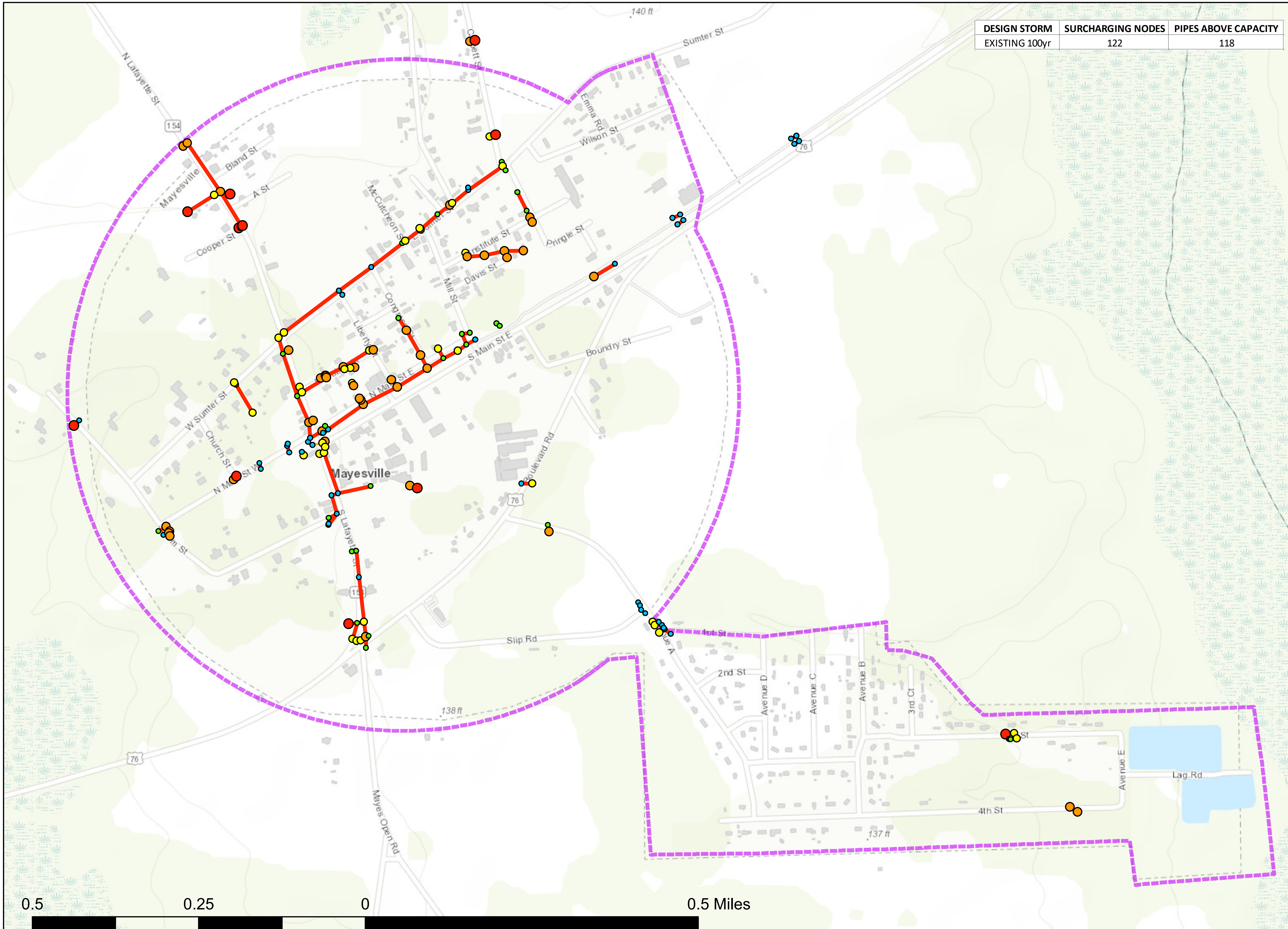
Legend

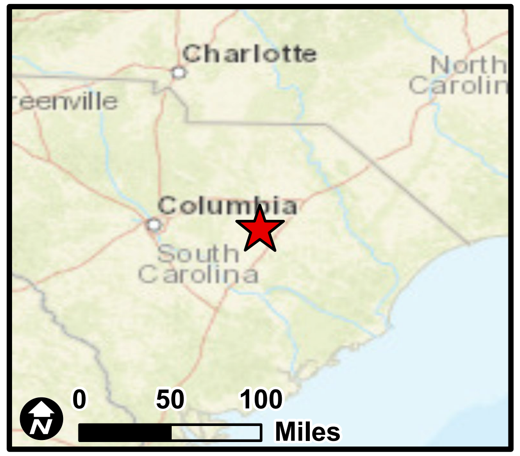
- Town of Mayesville
- 100-yr Surcharge (ft)
  - < 0.0
  - 0.0 - 0.5
  - 0.5 - 1.0
  - 1.0 - 2.0
  - > 2.0
- 100-yr Pipe Capacity
  - 0 - 25%
  - 25 - 50%
  - 50 - 75%
  - 75 - 100%

N

Date: 5/20/2022

DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
EXISTING 100yr	122	118





100-Year Storm
Existing Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

100-Year Storm Max Flood Depth*

0.5 - 1ft

1 - 2ft

2 - 3ft

> 3ft

*Note: Maximum depth created using existing conditions model

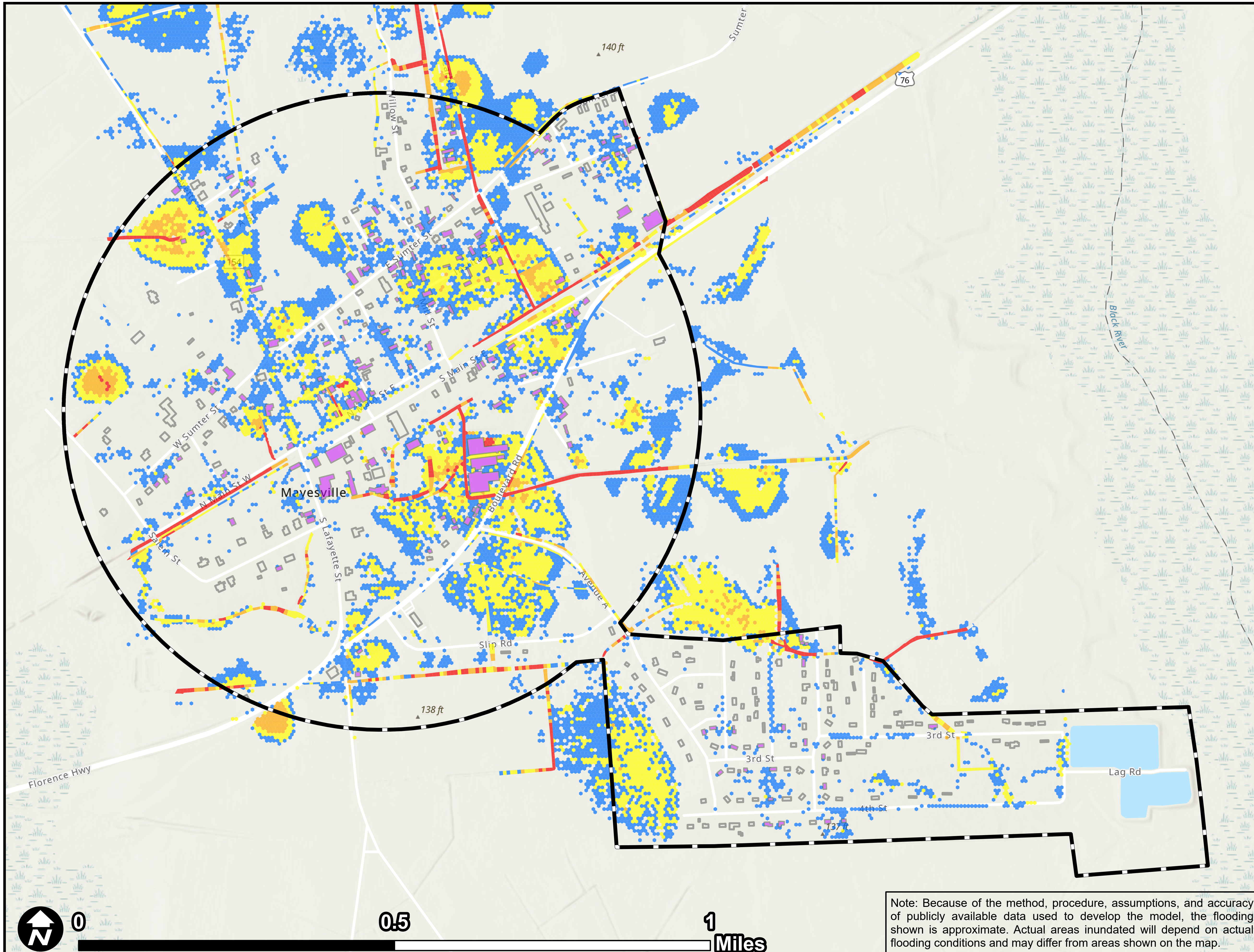
wood.

Job #: 6460210262

Drawn By: GC

Reviewed By: AV

Date: 5/20/2022



Note: Because of the method, procedure, assumptions, and accuracy of publicly available data used to develop the model, the flooding shown is approximate. Actual areas inundated will depend on actual flooding conditions and may differ from areas shown on the map.

\\cba-fs1\projects\Environmental\2020 + Projects\Org 6480\0262 - Town of Mayesville\13 GIS

APPENDIX B:

Future Conditions Mapped Modeling Results

wood.

McCORMICK TAYLOR

2-Year Storm
Future Conditions
Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Town of Mayesville

Future 2-yr Surcharge (ft)

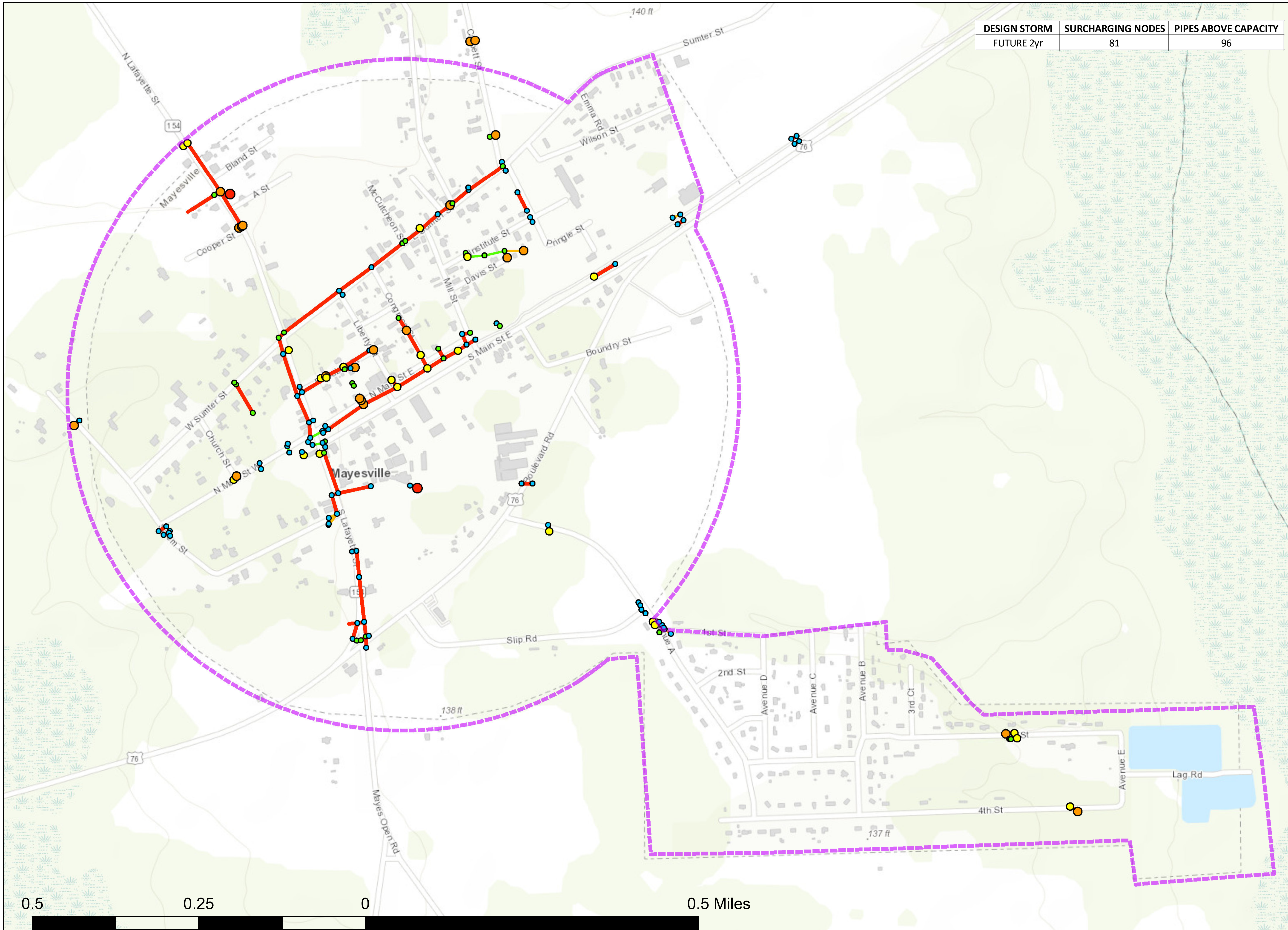
- < 0.0
- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

Future 2-yr Pipe Capacity

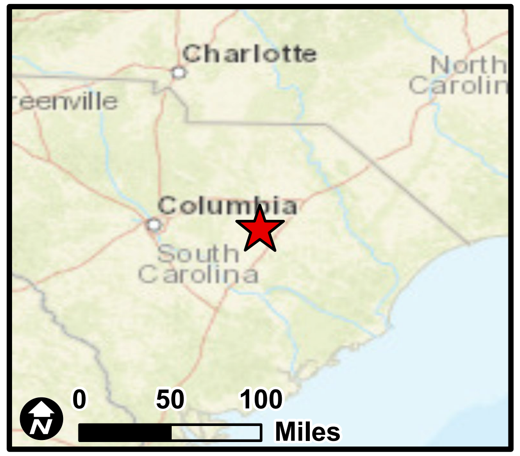
- 0 - 25%
- 25 - 50%
- 50 - 75%
- 75 - 100%

N

Date: 5/20/2022



DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
FUTURE 2yr	81	96



2-Year Storm Future Conditions Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

- Vulnerable to Flooding
- No Flooding

2-Year Storm Max Flood Depth*

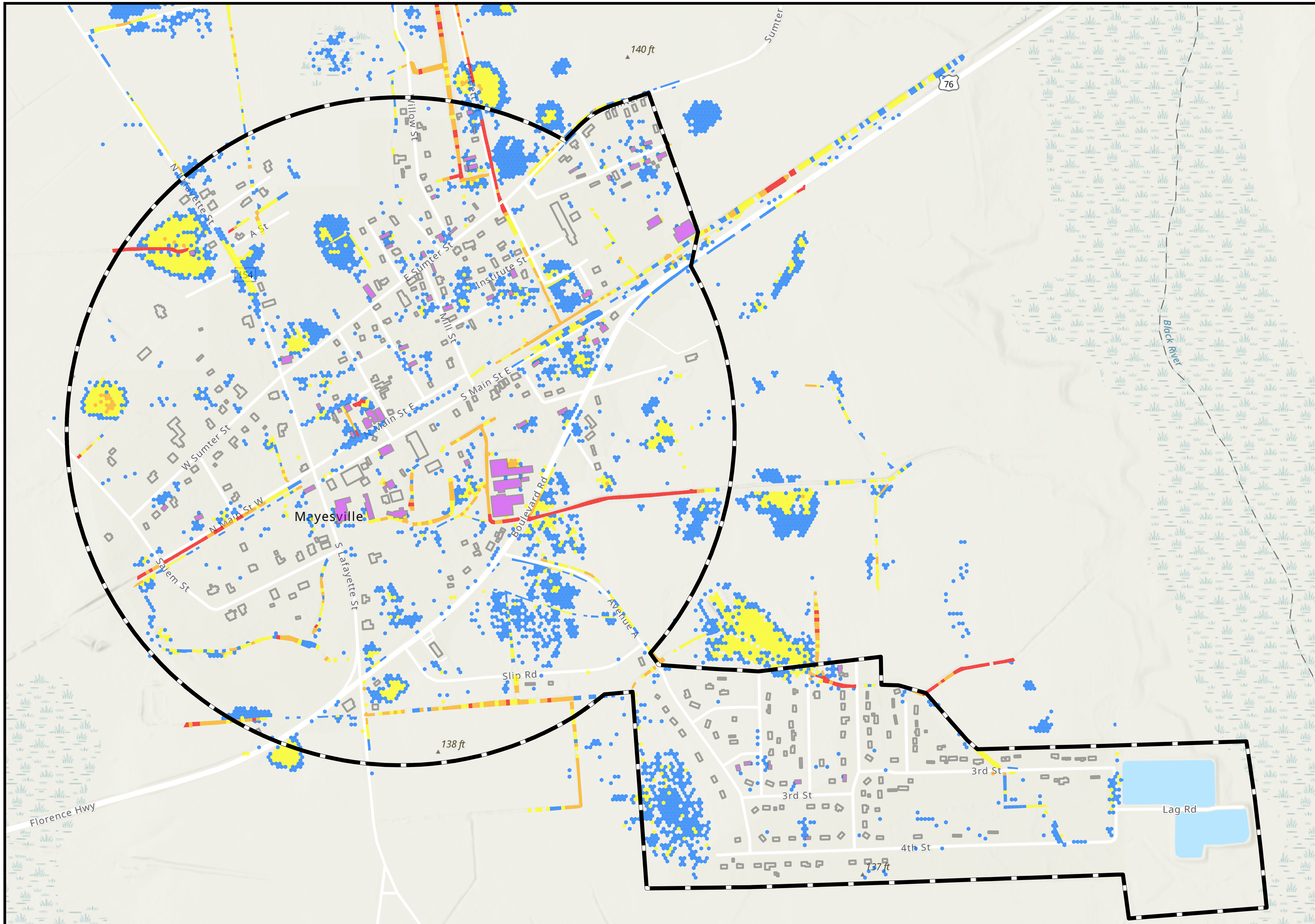
- 0.5 - 1ft
- 1 - 2ft
- 2 - 3ft
- > 3ft

*Note: Maximum depth created using future conditions model

wood.

Job #: 6460210262
Drawn By: GC
Reviewed By: AV
Date: 5/20/2022

The map shown here has been created with all due and reasonable care and is strictly for use with Wood project number 6480210262. Wood assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.



Note: Because of the method, procedure, assumptions, and accuracy of publicly available data used to develop the model, the flooding shown is approximate. Actual areas inundated will depend on actual flooding conditions and may differ from areas shown on the map.

wood.

McCORMICK TAYLOR

10-Year Storm
Future Conditions
Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Town of Mayesville

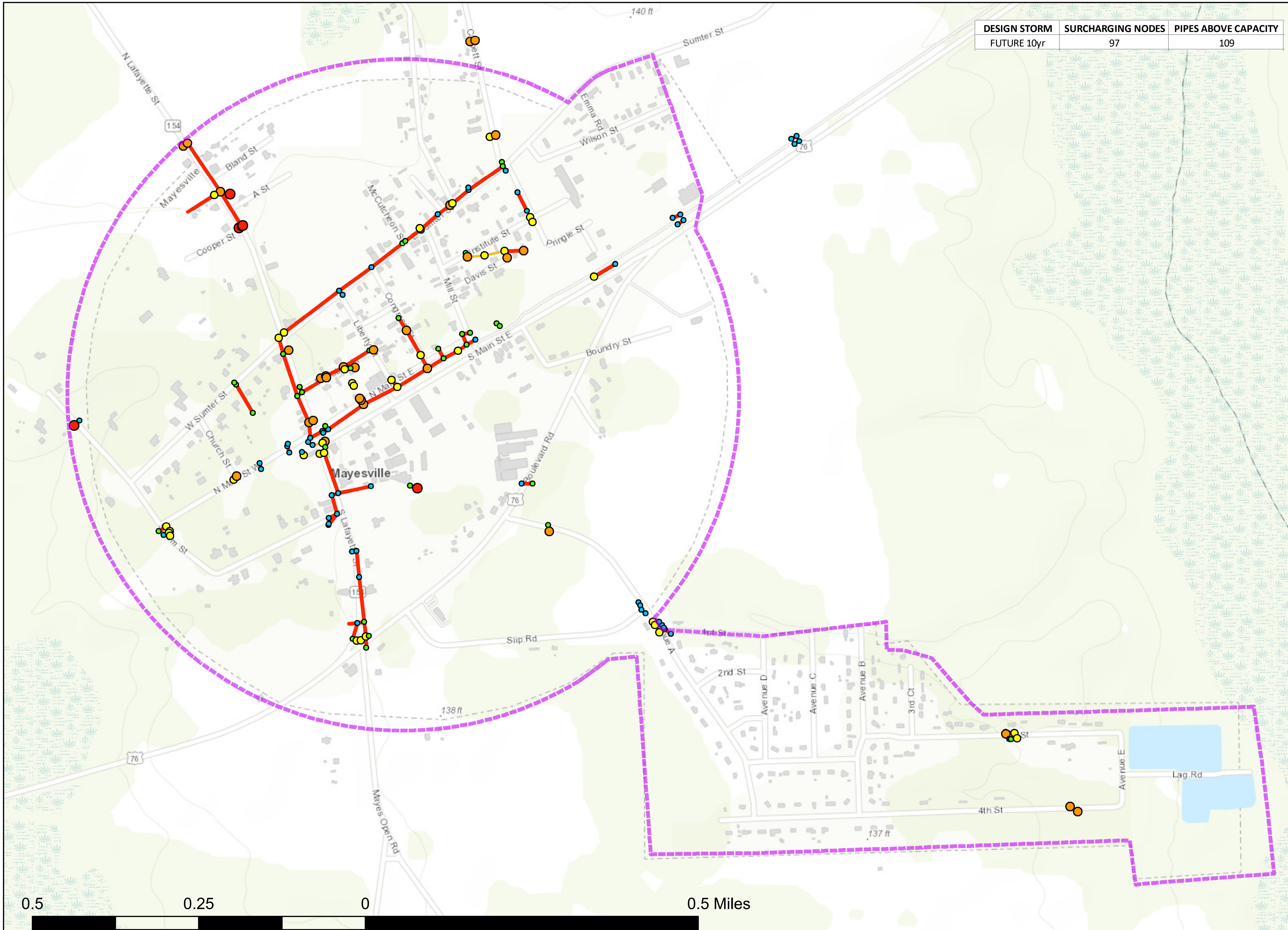
Future 10-yr Surcharge (ft)
- < 0.0
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

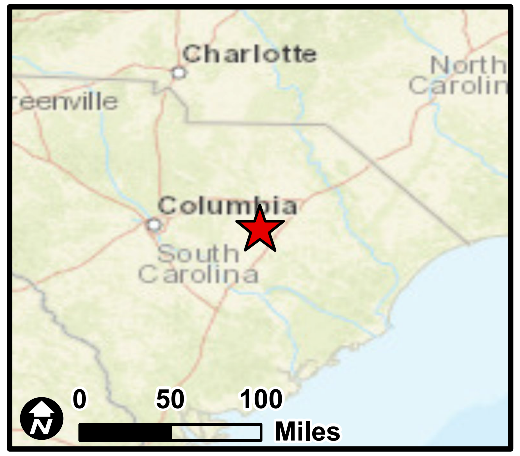
Future 10-yr Pipe Capacity
- 0 - 25%
- 25 - 50%
- 50 - 75%
- 75 - 100%

N

Date: 5/20/2022

DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
FUTURE 10yr	97	109





10-Year Storm
Future Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

10-Year Storm Max Flood Depth*

0.5 - 1ft

1 - 2ft

2 - 3ft

> 3ft

*Note: Maximum depth created using future conditions model

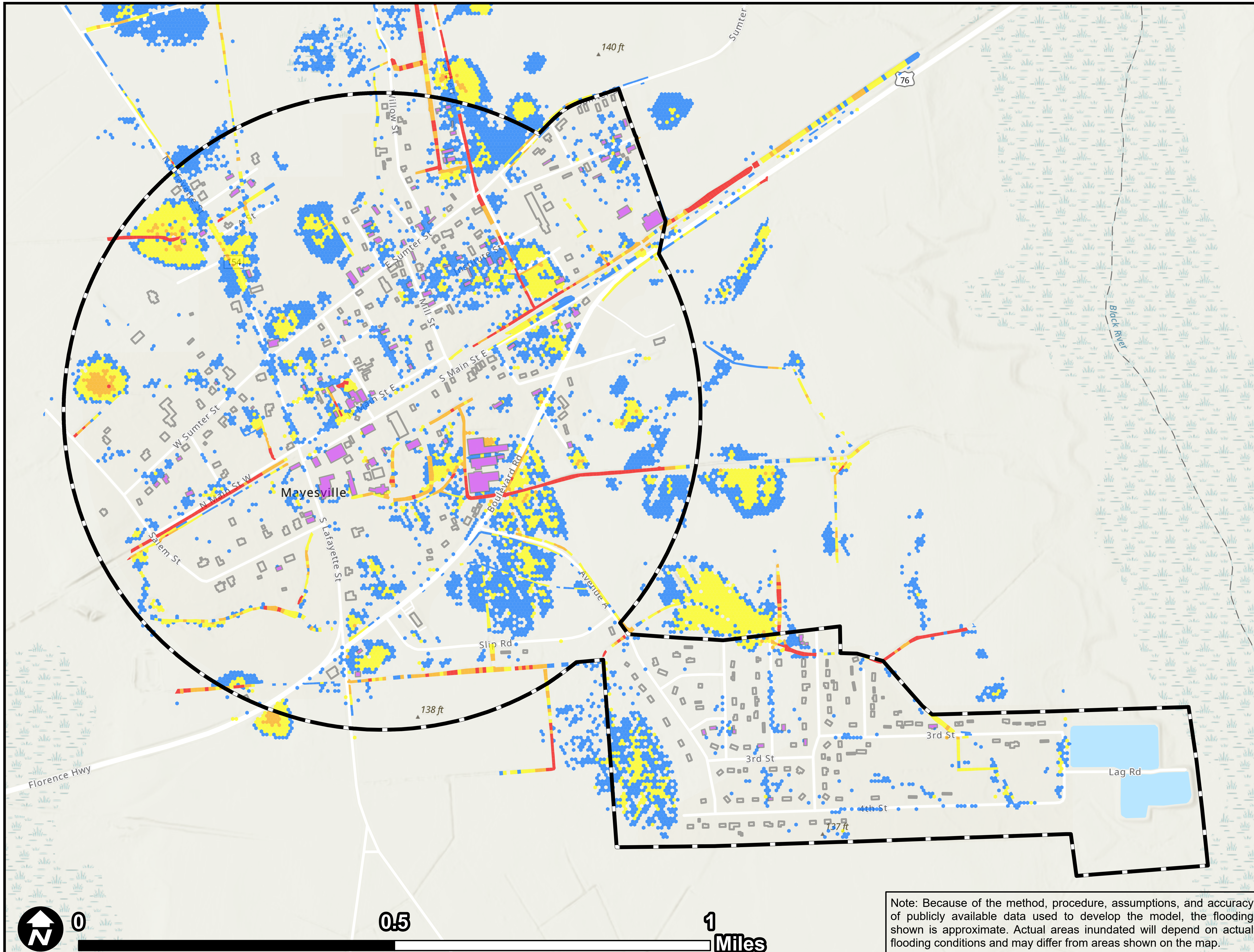
wood.

Job #: 6460210262

Drawn By: GC

Reviewed By: AV

Date: 5/20/2022



Note: Because of the method, procedure, assumptions, and accuracy of publicly available data used to develop the model, the flooding shown is approximate. Actual areas inundated will depend on actual flooding conditions and may differ from areas shown on the map.

wood.

McCORMICK TAYLOR

25-Year Storm
Future Conditions
Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Town of Mayesville

Future 25-yr Surcharge (ft)

- < 0.0
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

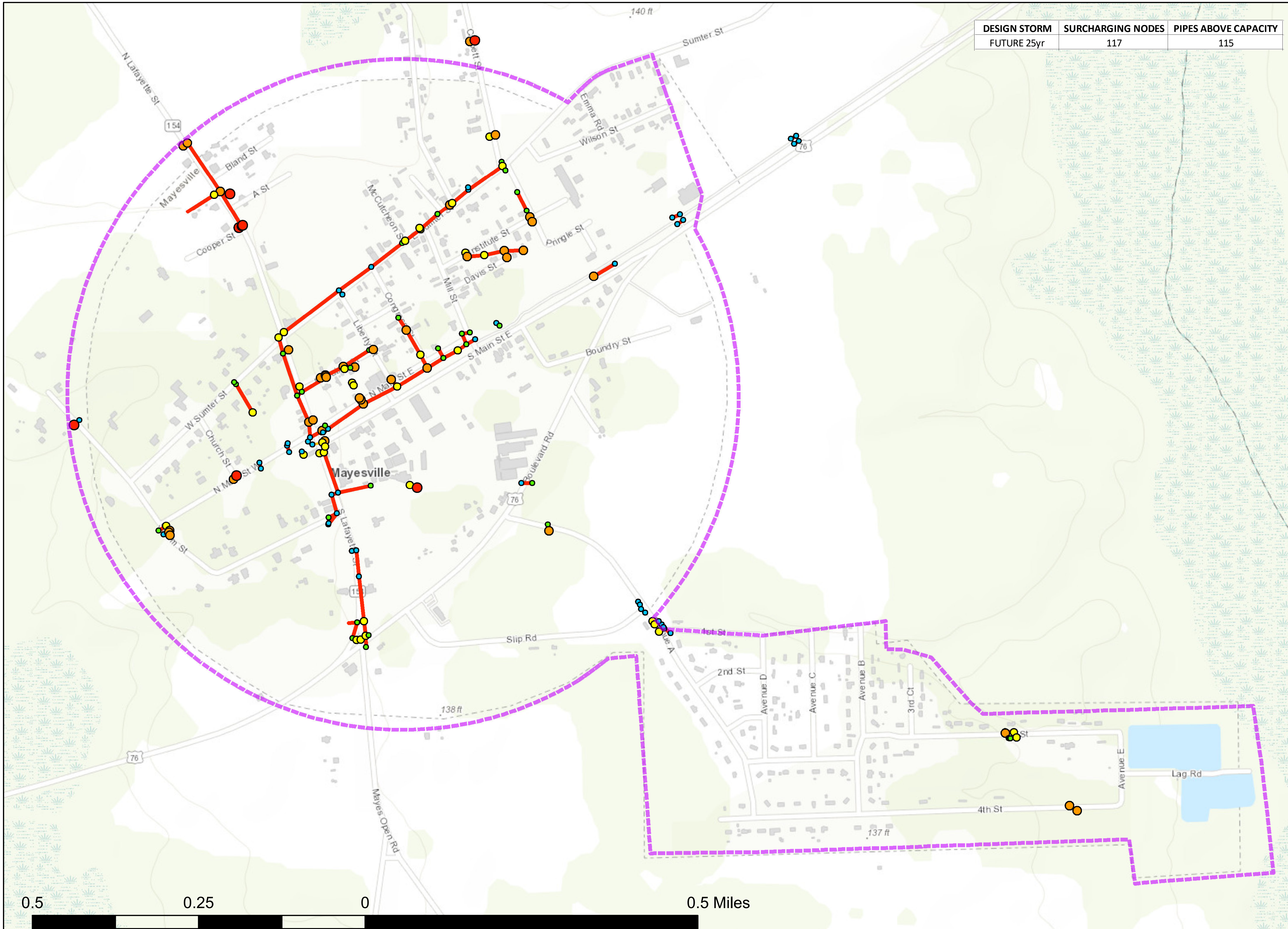
Future 25-yr Pipe Capacity

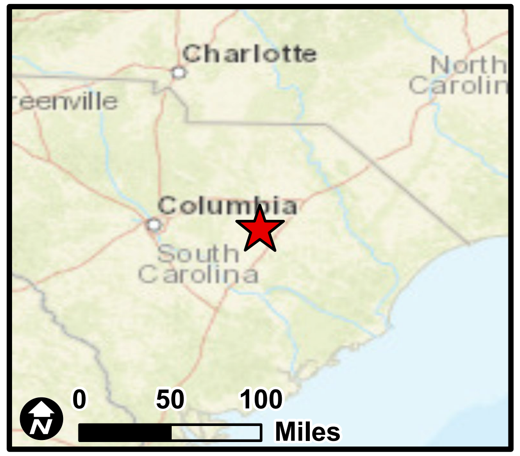
- 0 - 25%
- 25 - 50%
- 50 - 75%
- 75 - 100%

N

Date: 5/20/2022

DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
FUTURE 25yr	117	115





25-Year Storm
Future Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

25-Year Storm Max Flood Depth*

0.5 - 1ft

1 - 2ft

2 - 3ft

> 3ft

*Note: Maximum depth created using future conditions model

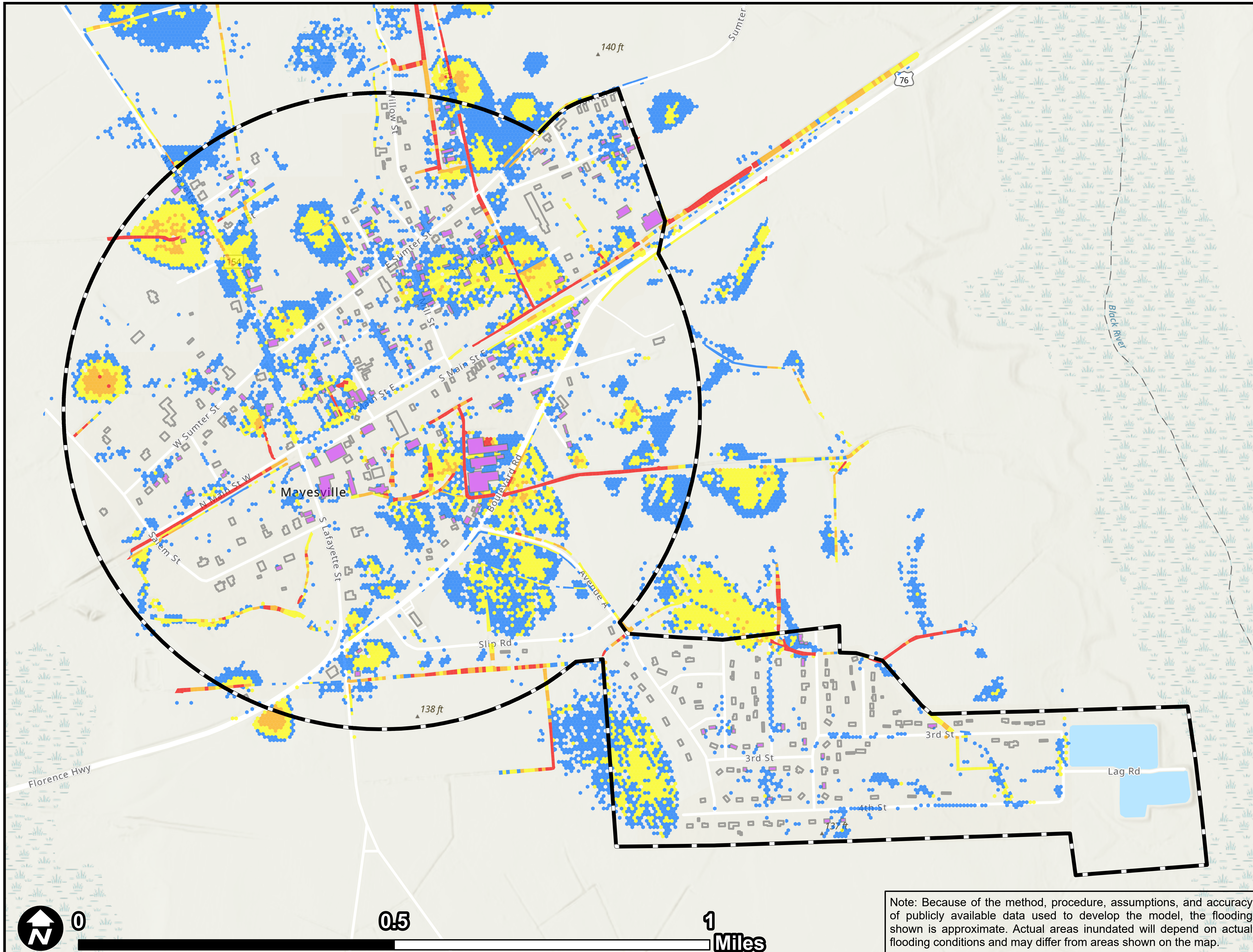
wood.

Job #: 6460210262

Drawn By: GC

Reviewed By: AV

Date: 5/23/2022



Note: Because of the method, procedure, assumptions, and accuracy of publicly available data used to develop the model, the flooding shown is approximate. Actual areas inundated will depend on actual flooding conditions and may differ from areas shown on the map.

\\cba-fs1\projects\Environmental\2020 + Projects\Org 64800262 - Town of Mayesville\13 GIS

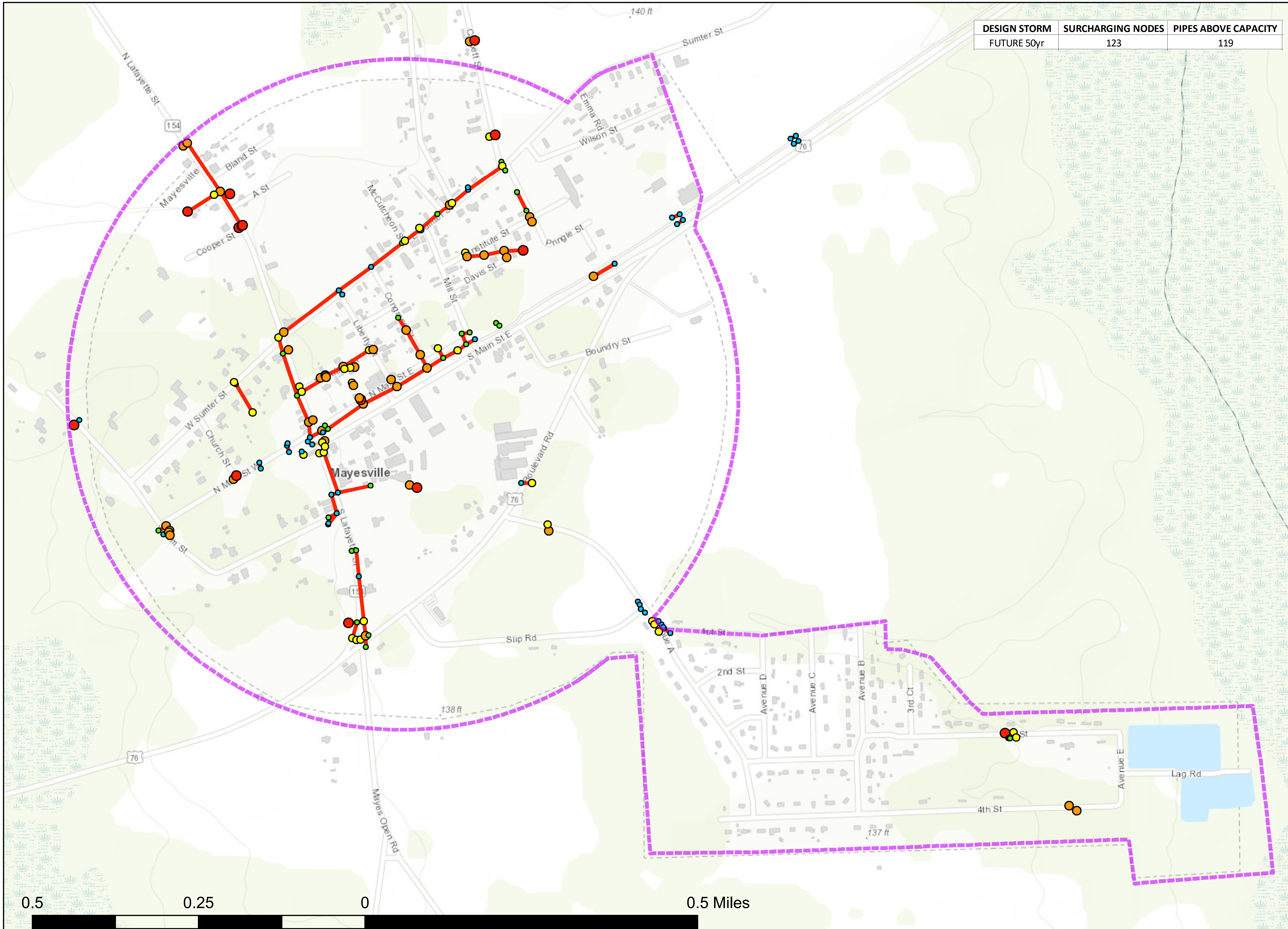
wood.

McCORMICK TAYLOR

50-Year Storm
Future Conditions
Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
FUTURE 50yr	123	119



Legend

- Town of Mayesville

Future 50-yr Surcharge (ft)

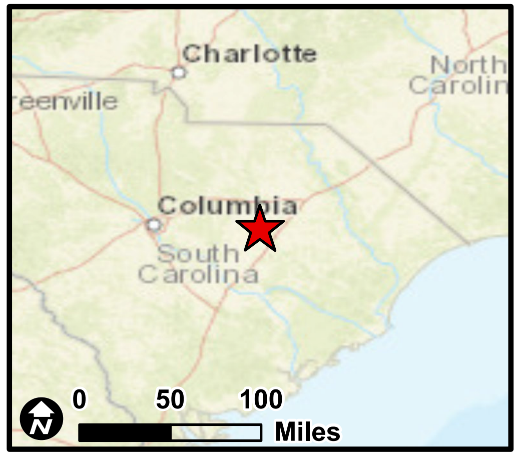
- < 0
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

Future 50-yr Pipe Capacity

- 0 - 25%
- 25 - 50%
- 50 - 75%
- 75 - 100%

N

Date: 5/20/2022



50-Year Storm
Future Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

50-Year Storm Max Flood Depth*

0.5 - 1ft

1 - 2ft

2 - 3ft

> 3ft

*Note: Maximum depth created using future conditions model

wood.

Job #: 6460210262

Drawn By: GC

Reviewed By: AV

Date: 5/20/2022

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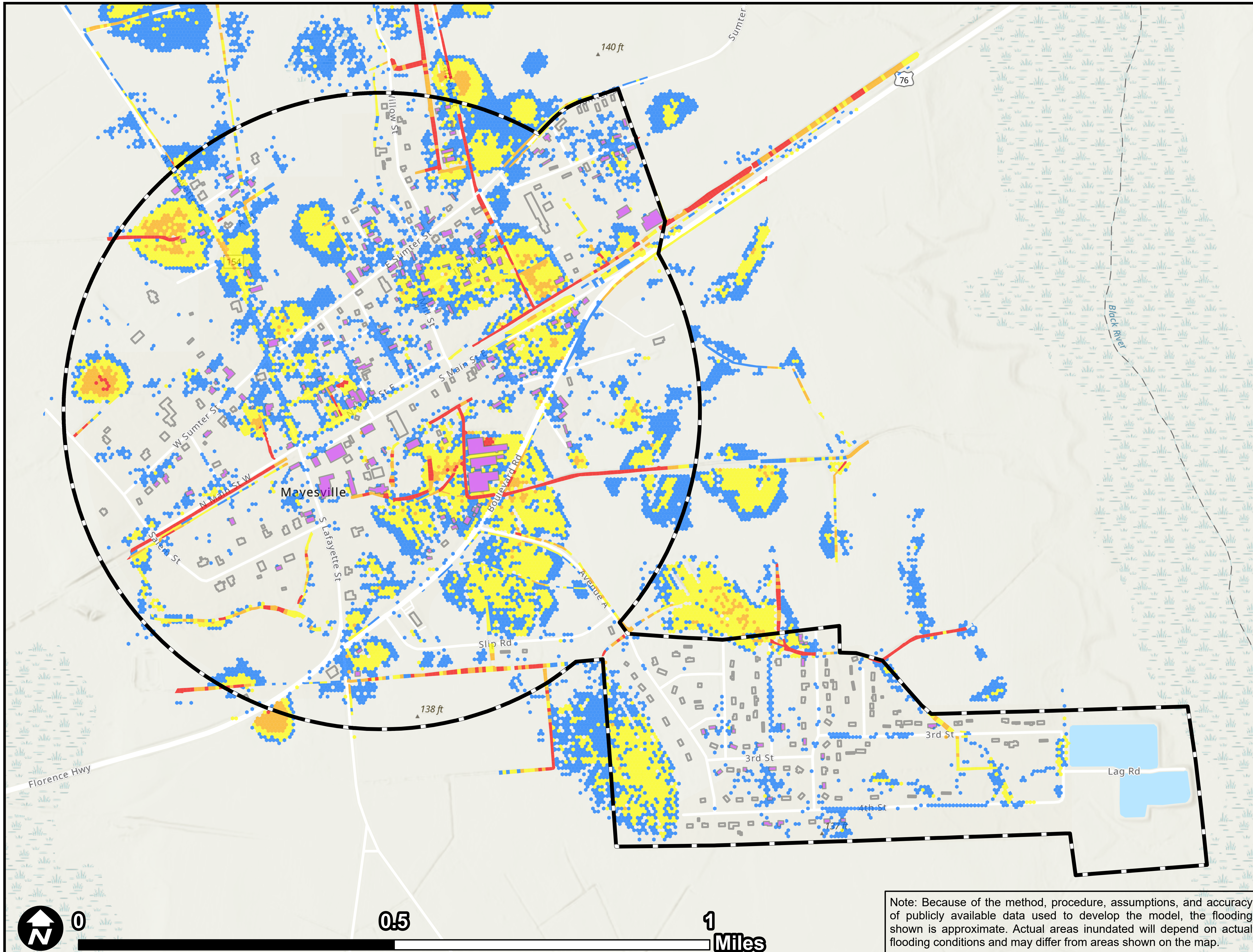


Note: Because of the method, procedure, assumptions, and accuracy of publicly available data used to develop the model, the flooding shown is approximate. Actual areas inundated will depend on actual flooding conditions and may differ from areas shown on the map.

wood.

McCORMICK TAYLOR

100-Year Storm
Future Conditions
Conveyance Capacity Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Town of Mayesville

Future 100-yr Surcharge (ft)

- < 0.0
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

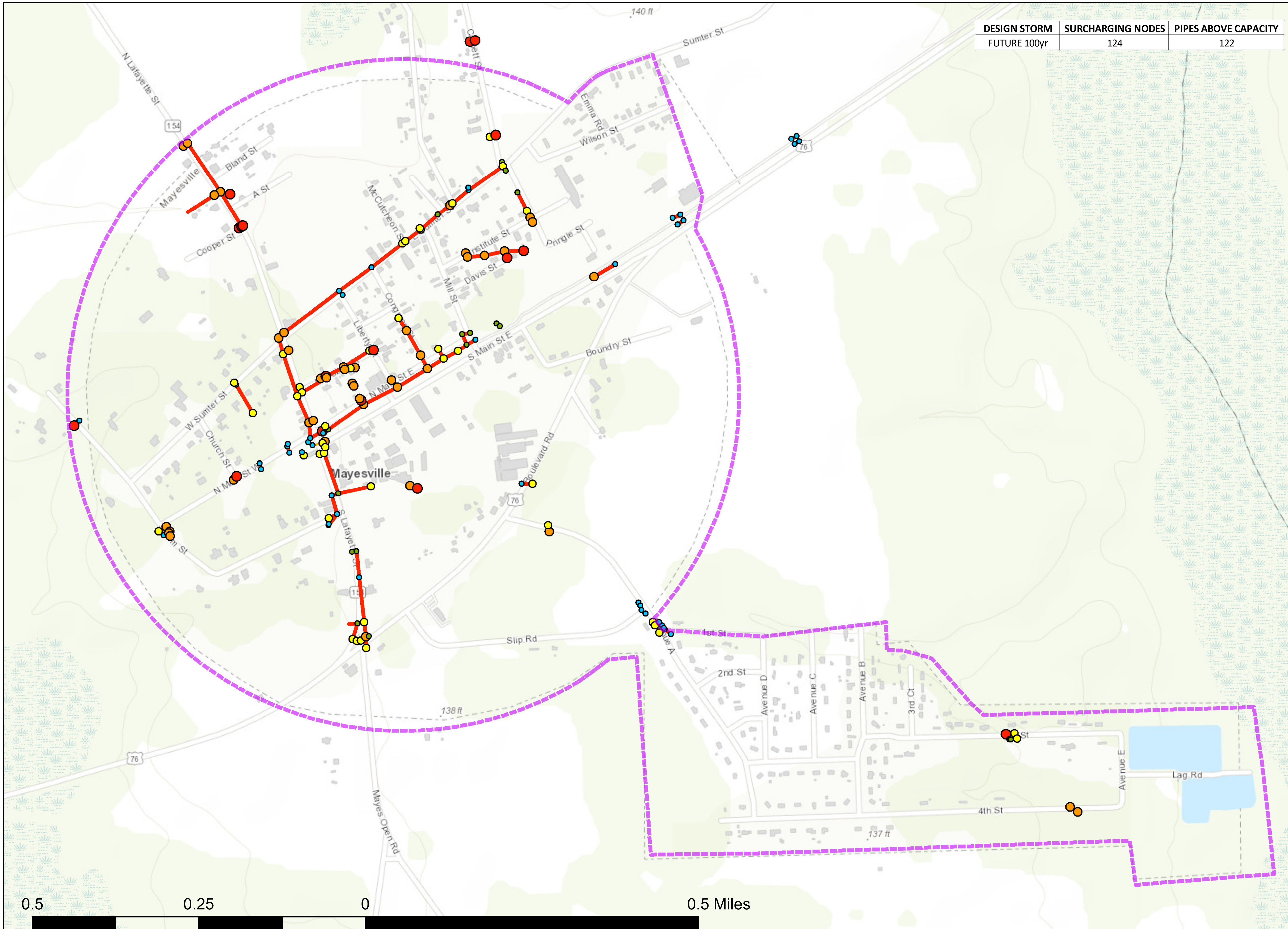
Future 100-yr Pipe Capacity

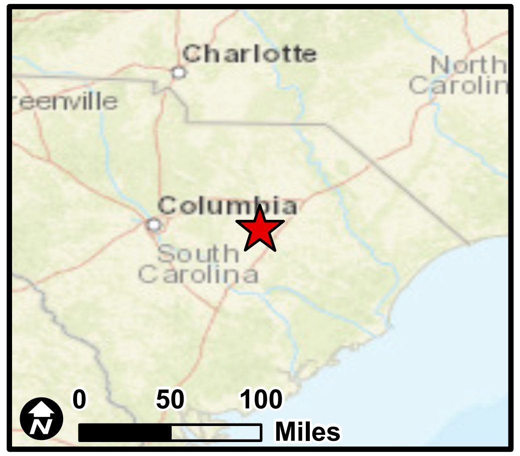
- 0 - 25%
- 25 - 50%
- 50 - 75%
- 75 - 100%

N

Date: 5/20/2022

DESIGN STORM	SURCHARGING NODES	PIPES ABOVE CAPACITY
FUTURE 100yr	124	122





100-Year Storm
Future Conditions
Maximum Flood Depth Map

Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary

Buildings

Vulnerable to Flooding

No Flooding

100-Year Storm Max Flood Depth*

0.5 - 1ft

1 - 2ft

2 - 3ft

> 3ft

*Note: Maximum depth created using future conditions model

Job #: 6460210262

Drawn By: GC

Reviewed By: AV

Date: 5/20/2022

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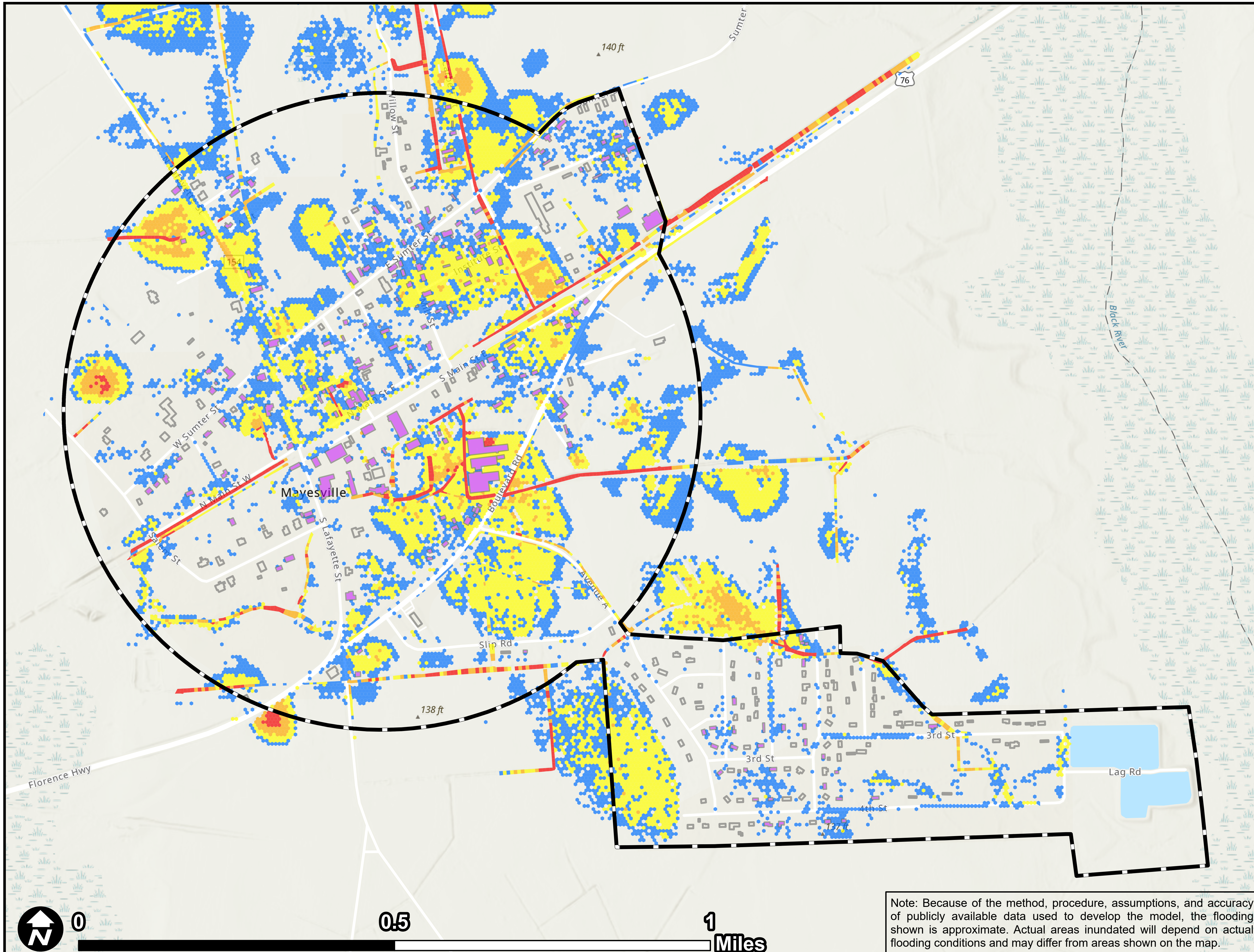


Note: Because of the method, procedure, assumptions, and accuracy of publicly available data used to develop the model, the flooding shown is approximate. Actual areas inundated will depend on actual flooding conditions and may differ from areas shown on the map.

APPENDIX C:

Existing Drainage System Record Drawings

FED ROAD DIST No.	STATE	COUNTY	DOCKET ~~PROJ.~~ No.	ROUTE No.	SHEET No.	TOTAL SHEETS
14	S. C.	LEE SUMTER	31.220 43.255	154	1	42-A

13-14-15-16-17

INDEX OF SHEETS

SOUTH CAROLINA
STATE HIGHWAY DEPARTMENT
COLUMBIA

PLAN AND PROFILE OF PROPOSED
STATE HIGHWAY

DOCKET NO. 31.220
DOCKET NO. 43.255
ROUTE NO. 154 & ALT. U.S. ROUTE NO. 76

LEE - SUMTER COUNTIES
FROM BISHOPVILLE TO MAYESVILLE

SCALES: PLAN AND PROFILE 1 INCH 100 FEET HORIZONTAL; 1 INCH 10 FEET VERTICAL.

SUMMARY OF ESTIMATED QUANTITIES

	31.220	43.255	
Shaping Roadway	81.244	6.634	M.L.F.
Bituminous Surfacing (Specification Section 61.)	211,852	21,256	Sq. Yds.

CONVENTIONAL SIGNS

State Line	Trolley Poles
County Line	Power Poles
City or Town Limits	Telephone or Telegraph Poles
Property Line	Marsh
Fence	Trees
Retaining Wall	Brush
Existing Road	Stumps
℄ and R.O.W. Lines of	Buildings
Proposed Road	Bridge
Railroad	Concrete Box Culvert
Levee or Embankment	Pipe Culvert
Guard Rail	Drop Inlet and Culvert
Point of Intersection (P. I.)	Hub on Center Line

LEGEND

PROPOSED PROJECT
OTHER ROADS

LAYOUT

Scale: 1 inch = 3000 feet

	31.220	43.255	
Net Length of Roadway =	15.374	1.256	Miles
Net Length of Bridges =	0.012	0.000	Miles
Net Length of Project =	15.386	1.256	Miles
Length of Exceptions =	0.008	0.001	Miles
Gross Length of Project =	15.394	1.257	Miles

Equalities in Stationing
STA. 155+72.2 = STA. 176+34.5
STA. 785+14.0 = STA. 785+19.7

Note: All workmanship and material on this project to conform with South Carolina State Highway Department Specifications, Contract and Bond; for Roads and Structures revised July 1st, 1933, as amended and approved by the U. S. Secretary of Agriculture

APPROVED DATE
MAYOR OF MAYESVILLE
COUNCILMAN
COUNCILMAN
D. C. Webster COUNCILMAN
COUNCILMAN

C. R. McMillan 7-10-45
APPROVED DATE
STATE HIGHWAY ENGINEER

RECOMMENDED FOR APPROVAL DATE
[redacted]
DISTRICT ENGINEER - BUREAU OF PUBLIC ROADS

RECOMMENDED FOR APPROVAL DATE
[redacted]
CHIEF ENGINEER - BUREAU OF PUBLIC ROADS

APPROVED DATE
[redacted]
DIRECTOR - BUREAU OF PUBLIC ROADS

38

Fed. Road Dist. No.	State	County	Proj. No.	Rt. No.	Sheet No.	Total Sheets
14	S.C.	LEE Sumter	31.220 43.255		2	

42-A

SOUTH CAROLINA HIGHWAY DEPARTMENT
COLUMBIA, S. C.

TYPICAL SECTIONS FOR BITUMINOUS SURFACING

SCALE: 1 IN = 2 FT.

NOTES:

SHAPING ROADWAY:- This work shall consist of scarifying, mixing and shaping the existing earth type base course, and also any additional earth type base course material, as outlined in Section 37 of the Standard Specifications; also the work necessary in shaping the shoulders and ditches to true lines and grades, including the removal of any excess material from the shoulders and ditches; also the mixing and shaping of intersections and ramps for driveways.

Shaping roadway will be measured by the thousand linear feet of roadway, and paid for at the contract unit price per thousand linear feet.

Drawn by T. J. Hendrix 12-15-37
Traced by Carl W. Metz 12-17-37 Revised July 5, 1945
Checked by L. A. Hendricks 12-18-37

APPROVED: J. M. Williamson, STATE HIGHWAY ENGINEER — DATE 1-20-38

B. S. DRAWING NO. 41

S. C. STATE HIGHWAY DEPARTMENT

TYPICAL SECTION

SHOWING

MUNICIPAL IMPROVEMENTS

SCALE:- 1 INCH = 2.5 FEET

NOTES:-

SHAPING ROADWAY:- This work shall consist of scarifying, mixing and shaping the existing earth type base course, and also any additional earth type base course material, as outlined in Section 37 of the Standard Specifications; also the work necessary in Shaping the Shoulders and ditches to true lines and grades, including the removal of any excess material from the Shoulders and ditches; also the mixing and shaping of Intersections and ramps for driveways.

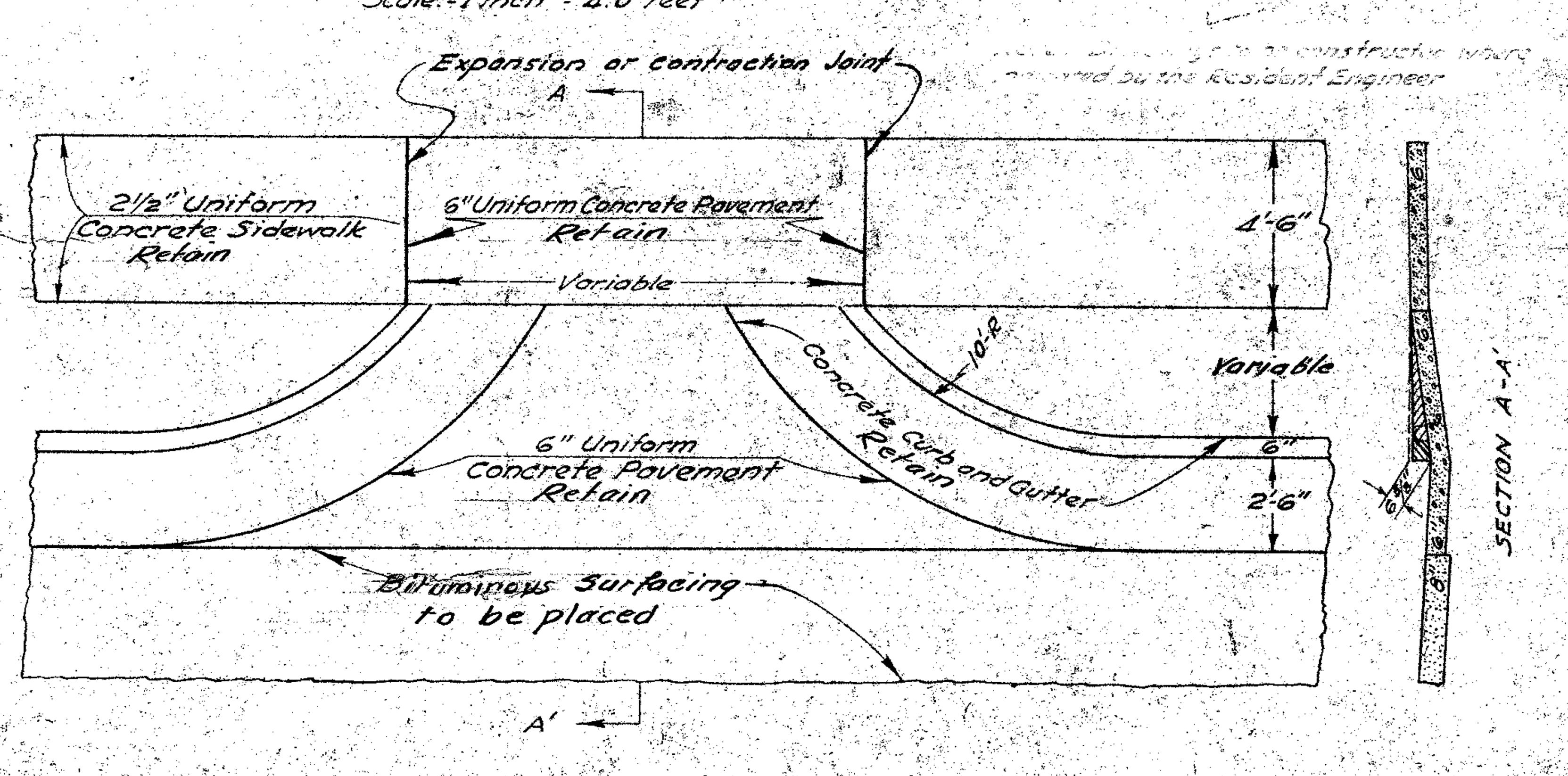
Shaping roadway will be measured by the thousand linear feet of roadway, and paid for at the contract unit price per thousand linear feet.

~~SELECTED EARTH MATERIAL:- This work shall consist of Common excavation material, earth type base course material or shoulder material selected and placed on the roadway where directed by the Engineer, and obtained from a source outside the roadway.~~

~~Selected earth material will be measured by the cubic yard as provided for in paragraph 37 F 1 or 37 F 3 of the Standard Specifications, and paid for at the contract unit price per cubic yard for Selected earth material as provided for in paragraph 37 G of the Standard Specifications.~~

DETAIL OF DRIVEWAY

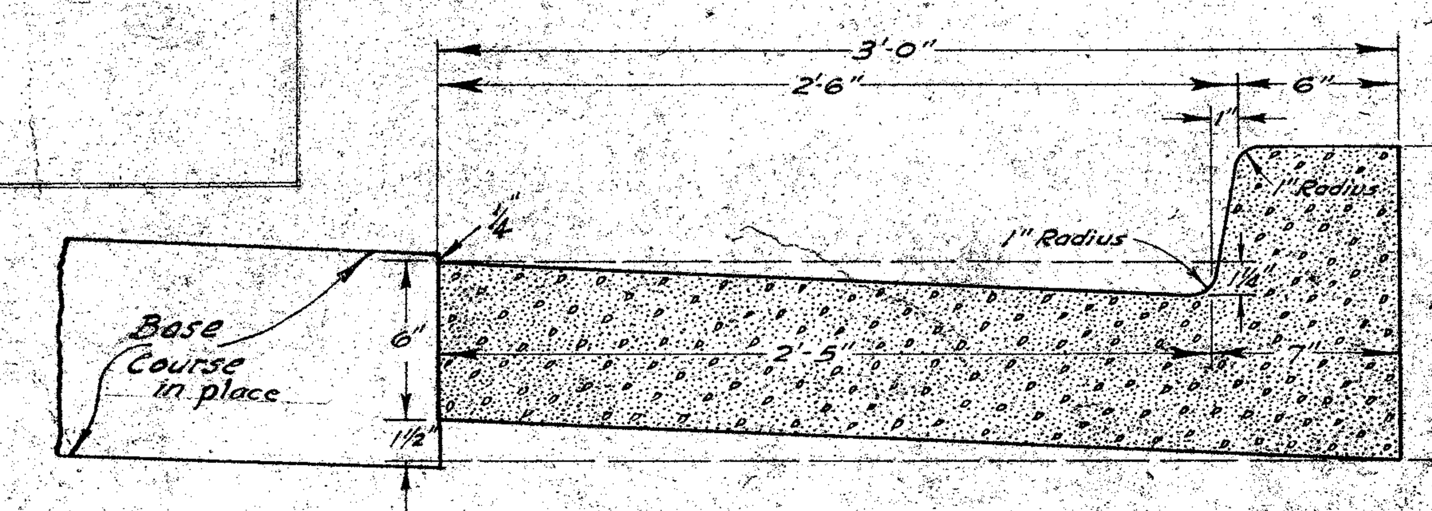
Scale:- 1 inch = 4.0 feet



DETAIL OF CONCRETE CURB AND GUTTER

Area = 1.76 □'

Scale: 1 inch = 6 inches



DRAWING NO. B.S. 1

Drawn by J.C.B.

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET	ROUTE	SHEET NO.	TOTAL SHEETS
14	S.C.	LEE	31.220	154	8	42A

B.M. No. 1. Square on top of curb 68 ft. right of sta. 0-26 El. 115.08

B.M. No. 2 Nail in root of 24 in. Pine 24 ft. right of sta. 9+35 El. = 113.57

B.M. No. 3 Nail in side of 12 in. Chinaberry 75 ft. left of sta. 23+10 El. 108.17

GENERAL CONSTRUCTION NOTES:-

Changes involving increased cost of project or changes in alignment must be specifically authorized by the State Highway Engineer. District Engineer may authorize minor alterations not in conflict with the Standard Practices of the Department and not involving increases in cost. Forward information on any change in alignment to the Columbia Office as soon as the revision is completed.

All curves of Thirty Minutes (0°30') and over are to be superelevated as shown on Sheet No. 4. Elevations shown are normal elevations before Superelevation is added.

The cost of adjusting Manholes and Drop Inlets shall be included in the price bid for shaping Roadway. Manholes and Drop Inlets shall be adjusted where necessary.

The following quantities are not shown in detail on the plans, but are included in the Summary of Estimated Quantities and may be varied during construction as directed by the Engineer:

~~Overhaul~~

~~C.Y.M. no additional Selected Earth Material~~
~~C.Y. Additional Material to be added where directed by the Engineer.~~

Bituminous Surfacing 9423 S.Y. for intersections and ramps for driveways.

FED. ROAD DIST. NO 14 | STATE SC | COUNTY LEE | DOCKET NO 31.220 | ROUTE NO 154 | SHEET NO 9 | TOTAL SHEETS
Superelevation begins on Left at Sta. 44+91.6
WILEY C. KING D. 5-16-41
MRS CONNIE REID HEARON Deed 5-16-41
ELDRIDGE BASKINS, D. 5-6-41 BALTIMORE MARYLAND
TO BISHOPVILLE
OLD ROAD
P.L.
S. 27°49' E.
In place 24 ft. of 24 in R.C. Pipe Retain
In place 56 ft. of 36 in. R.C. Pipe Retain
In place 54 ft. of 24 in. R.C. Pipe on 45° skew Retain
In place 51 ft. of 18 in. R.C. Pipe Retain
In place 21 ft. of 15 in. R.C. Pipe Retain
In place 21 ft. of 15in. R.C. Pipe Retain
In place Outfall Ditch
EXCEPTION TO PROJECT S.A.L. RAILROAD TRACK STA. 44+21.0 TO STA. 44+32.6
S.A.L. RAILROAD TO SUMTER
M.P. No 331 0.4 Mile +
P.C. 47+89.6
P.T. 58+39.6
Colored Church
Farm Road
Garden
T.H.
P.I. 53+30.9
Δ 21°24' Rt.
D. 2°00
T. 541.32
L. 1070.0
E. 50.T
MRS. CONNIE REID HEARON Deed 5-16-41
ELDRIDGE BASKINS Deed 5-6-41
36" Crepe Myrtle
Corner House
POST (old P.T.) 58+45.9
B.M. No. 4 Nail in tel. pole 100 ft. left Sta. 43+20 El. 102.23
B.M. No. 5 Nail in root of 18 in. Gum tree 30 ft left of Sta. 56+12 El. 95.93
400' V.C.
-0.84%
31+32.6 El. 102.48
Subgrade
-0.08%
44+00 El. 101.49
400' V.C.
-0.68%
400' V.C.
52+13.3 El. 95.94
52+00 El. 95.93
-0.38%
EXCEPTION TO PROJECT S.A.L. RAILROAD TRACK FROM STA. 44+21.0 TO STA. 44+32.6
110
100
90
30 1 2 3 4 5 6 7 8 9 40 1 2 3 4 5 6 7 8 9 50 1 2 3 4 5 6 7 8 9 60
PLATE 1 - PLAN-PROFILE
CHARLES BRUNING CO. INC. NEW YORK

FED. ROAD DIST. NO. 14 | STATE S.C. | COUNTY LEE | DOCKET NO. 31,220 | ROUTE NO. 154 | SHEET NO. 10 | TOTAL SHEETS 42-A
Superelevation Ends on left at Sta.
J. R. CROSSWELL D. 2-24-41
In Place 21 ft. of 15 in. R.C. pipe. Retain
POT. 74+18.32
6" Pine
R. W. McCUTCHEN D. 2-24-41
In Place 54' of 18" R.C. pipe. Retain
POT. 87+70.4
In Place 24' of 24" R.C. pipe. Retain
37½' R/W
50' R/W
S. 06° 25' E.
POT. 74+83.2
In Place 54 ft. of 18 in. R.C. pipe. Retain
In Place 54 ft. of 24 in. R.C. pipe. Retain
J. R. CROSSWELL D. 2-24-41
In Place 21 ft. of 15 in. R.C. pipe. Retain
R. W. McCUTCHEN D. 2-24-41
I-20
BM #6. NAIL IN ROOT 6" SWEET GUM 31' RT. OF STA. 72+31. EL. 89.50
100.0
90.0
80.0
SUBGRADE
-0.38%
400' V.C.
68+00 EL. 89.91
D.A.=15 A. C=0.3
-0.11%
D.A.=10 A. C=0.3
BERM DITCH ON LEFT
-0.10%
82+00 EL. 88.37
400' V.C.
D.A.=9 A. C=0.3
-0.45%
-0.32%
PC
PT
PC
PT
92.95
92.57
92.19
91.81
91.43
91.05
90.67
90.49
90.32
90.18
90.05
89.94
89.83
89.75
89.60
89.58
89.47
89.36
89.25
89.14
89.03
88.92
88.81
88.70
88.59
88.53
88.44
88.33
88.20
88.05
87.86
87.69
87.41
87.21
86.86
86.41
86.06
85.81
85.46
85.21
84.75
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
PLAN
PROFILE
EUGENE DIETZGEN CO., CHGO., N. Y.
PLATE 1-PLAN-PROFILE R. P. R. STANDARD

FED. ROAD DIST. NO. | STATE | COUNTY | DOCKET NO. | ROUTE NO. | SHEET NO. | TOTAL SHEETS
14 | S.C. | LEE | 31.220 | 154 | 11
R. W. Mc CUTCHEN
D 2-24-41
In Place 27 lf. of 24 in. R.C. pipe
Retain
J. E. Mc CUTCHEN
D 2-24-41
Edge of Swamp
Edge of Run
Slough
GIN BRANCH
Edge of Swamp
In Place 24 lf. of 18 in. R.C. pipe
Retain
50' R/W
37½' R/W
45' R/W
37½' R/W
S 06° 25' E
Construct Ramps on left and right
PRESENT ROAD
12" Pine Stump
P.O.T. 107+97.5
12" Pecans
P.O.T. 118+42.0
12" Gum
P.O.T. 96+17.9
12" Poplar
In Place 24 lf. of 18 in. R.C. pipe
Retain
Construct Quad 10 ft. X 10 ft. X 36 ft. R.C.
Box Culvert as shown on sheet No. 13
In Place 21 lf. of 18 in. R.C. pipe
Retain
R. W. Mc CUTCHEN
D 2-24-41
J. E. Mc CUTCHEN
D 2-24-41
Z
B.M. #7. NAIL IN ROOT 12" GUM 52' LT. OF STA. 100+00. EL. 73.97
BM. #8. NAIL IN TEL. POLE 25' RT. STA. 118+00. EL. 91.34 (EL. 91.27 ORIG. LINE)
BM. #9. NAIL IN ROOT 24" PECAN 38' LT. STA. 118+33. EL. 89.87
OVERHAUL
* BORROW TO BE USED FOR REPLACEMENT OF UNSTABLE MATERIAL
USE 54' SPECIAL SECTION
USE 32' FILL SECTION
EMBANKMENT OMITTED FOR CULVERT
USE 54' SPECIAL SECTION STA. 107+50 TO STA. 275+50
118+02.5
EL. = 91.28
SUBGRADE
600' V.C.
-0.45%
-1.90%
0.00%
95+00
EL. = 82.50
-0.55%
Berm Ditch on Left Only
Berm Ditch Elev.
HIGH WATER 80.5 (1928)
104+00
EL. = 82.50
+0.62%
-0.68%
90.0
80.0
70.0
82.81
82.63
81.70
79.80
77.90
76.00
75.52
75.11
74.56
74.01
84.75
84.30
83.85 - P.C.
83.63
83.44
83.26
83.00
82.96
82.82
82.72
82.64
82.58
82.54
82.51
82.50 - P.T.
82.50
82.50
82.50 - P.C.
82.51
82.55
82.62
82.70
82.81
82.96
83.13
83.32
83.55
83.79
84.06
84.36 - P.T.
84.98
85.60
86.22
86.85
87.48
88.11
88.73
89.36 - P.C.
89.64
89.89
90.08
90.21
90.30
90.33
90.32
90.25
90.14
89.97
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
PLAN
NOTE BOOK
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
PROFILE
SURVEYED
PLOTTED
GRADES CHECKED

EUGENE DIETZGEN CO., CHGO., N.Y.

PLATE 1-PLAN-PROFILE S.P.R. STANDARD

FED. RD. DIST. NO. 12
STATE S.C.
COUNTY LEE
DOCKET NO. 31.220
ROUTE NO. 154
SHEET NO. 13
TOTAL SHEETS 42-A
EST. MINNIE S. McCUTCHEN
By T. E. & James C. McCutchen, Executors
D 2-25-41
T. E. McCUTCHEN
D 2-24-41
Fed. Land Bank, M'tgee
Land Bank Commissioner, M'tgee
C-5-6-41
Supereleveation Begins on Left at Sta. 191+52.7
In Place 21 ft. of 15 in. R.C. pipe-Retain
In Place 21 ft. of 15 in. R.C. Pipe Retain
Supereleveation Ends on Right at Sta. 179+32.5
In Place 51' of 24" R.C. Pipe Retain
Retain 21 ft. of 15 in. R.C. Pipe
In Place 51' of 18" R.C. Pipe Retain
Retain 21 ft. of 15 in. R.C. Pipe
In Place 21 ft. of 15 in. R.C. pipe-Retain
P.T.-EQUALITY-Sta. 155+72.2 Back= Sta. 176+34.5 Ahead
P.I. 152+14.7
Δ = 14° 47' LT
D = 2° 00'
T = 371.7
L = 739.2
E = 24.0
P.I. 199+39.2
Δ = 6° 49' RT
D = 0° 30'
T = 682.5
L = 1363.3
E = 20.3
PC 192+56.7
S. 21° 12' E.
37½' R/W
50' R/W
Farm Road
Barn
N
BM NAIL IN 12" CHERRY 39' LT. STA 184+95 EL 88.10
BM NAIL IN 12" PINE 65' RT. STA 196+00 EL 88.07
P.I. 155+00 EL = 85.96
P.I. 185+00 EL 88.84
P.I. 199+00 EL 86.60
SUBGRADE
+0.37%
+0.20%
-0.16%
300' V.C.
400' V.C.
Berm Ditch on Left only
Berm Ditch Elev.
DA 39A C2.3
DA 17A C2.3
USE 54' SPECIAL SECTION STA 163+50 TO STA 275+50
90
80
90.0
80.0
150
155
180
185
190
195
200
EUGENE DIETZGEN CO., CHGO., N. Y.
PLATE 1-PLAN-PROFILE B.P.R. STANDARD
PLAN
PROFILE

FED. ROAD DIST. NO. 14
STATE S.C.
COUNTY LEE
DOCKET NO. 31220
ROUTE NO. 154
SHEET NO. 14
TOTAL SHEETS 42-A
T. E. Mc CUTCHEN
D 2-24-41
Fed. Land Bank, M'tgee
Land Bank Commissioner, M'tgee
C-5-6-41
Superelevation ends on Lt. Sta. 207+24
In place 51'-24" R.C. pipe
Retain
In Place 18'-15" R.C. Pipe
Retain
VERMELLE M. DUBOSE
D 2-13-41
Fed. Land Bank, M'tgee
Land Bank Commissioner, M'tgee - C 5-6-41
In Place 45'-24" R.C. pipe.
Retain
In Place 8'-18" relaid
C.I. pipe - Retain
P.O.T. 213+23.9
P.O.T. 226+81.0 (No Ref.)
P.T. 206+20.0
S16°09'E
37½' R/W
50' R/W
T. E. Mc CUTCHEN
D 2-24-41
Fed. Land Bank, M'tgee
Land Bank Commissioner, M'tgee
C 5-6-41
Retain 21 ft of 15 in. R.C. pipe
Retain 21'-15" R.C. pipe
No headwalls.
In Place 24'-15" R.C. Pipe
Retain
In Place 21'-15" R.C. pipe
No Retain
JOHN M. McCUTCHEN
D 2-11-41
VERMELLE M. DUBOSE
D 2-13-4-1
Fed. Land Bank, M'tgee
Land Bank Commissioner, M'tgee
C-5-6-41
B.M. NAIL IN 18" PECAN TREE 55 FT. RIGHT STA. 210+40 EL. 88.80
OVERHAUL 183 C.Y.H.M.
SUBGRADE
SPECIAL DITCH ON RIGHT ONLY
-0.20%
+0.16%
+0.26%
+0.65%
-0.18%
-0.14%
-0.06%
STA. 208+00
EL. = 88.04
400' V.C.
200
210
220
230
PLATE 1-PLAN-PROFILE
EUGENE DIETZGEN CO., CHGO., N. Y.
PLAN
PROFILE
NOTE BOOK
SURVEYED
PLOTTED
GRADES CHECKED
B.M.'s NOTED


FED. ROAD DIST. NO. 1A | STATE S.C. | COUNTY LEE | DOCKET NO. 31.220 | ROUTE NO. 154 | SHEET NO. 15 | TOTAL SHEETS 42-A
VERMELLE M. DUBOSE D 2-13-41
Fed. Land Bank, M'tgee
Land Bank Commissioner, M'tgee
C-5-6-41
P.C. 234+09.9
P.I. 243+41.3
Salvage 34'-6" C.M. pipe
In Place 66-18" R.C. pipe on 45° skew - Retain
In Place 8'-15" relaid T.C. pipe Retain
P.I. 243+41.3
Δ=18°28' Lt.
D=1°00'
T=931.4'
L=1846.7'
E=75.2
W. J. McCUTCHEN C-5-6-41
Fed. Land Bank, M'tgee C-5-6-41
In Place 28'-30" R.C. pipe Retain
In Place 76'-36" R.C. pipe
P.T. 252+56.6
37½' R/W
S16°09'E
S34°37'E
PRESENT ROAD
P.L.
In Place 21'-18" R.C. Pipe - Retain
Superelevation begins on Rt. Sta. 232+41.2
Retain 21'-18" of R.C. Pipe
JOHN M. McCUTCHEN D 2-1-41
Superelevation ends on Rt. Sta. 254+24.6
W. J. McCUTCHEN C 5-6-41
Fed. Land Bank, M'tgee C-5-6-41
Condemnation of W. J. McCutchen property held on 5-6-41 Covered road connection
B.M. NAIL IN ROOT 20" OAK 85 FT. RIGHT STA. 235+35 EL. 84.48
B.M. NAIL IN POWER POLE 65 FT. RIGHT STA. 251+90 EL. 81.15
SUBGRADE
-0.14%
-0.10%
-0.10%
-0.46%
254+00
F.L. = 81.60
400' V.C.
D.A.=1.9 Ac. C=0.2
D.A.=6.5 Ac. C=0.3
D.A.=1.0 Ac. C=0.3
Berm ditch on Left
Berm Ditch Rt.
90
80
70
79.00 78.90 78.80 78.70 78.60 78.50 78.40 78.30 78.20
84.96 84.82 84.68 84.54 84.40 84.26 84.12 83.98 83.84 83.70 83.56 83.42 83.28 83.14 83.00 82.86 82.72 82.58 82.44 82.30 82.16 82.02 81.88 - P.C. 81.80 81.70 81.58 81.44 81.28 81.10 80.90 80.68 - P.T. 80.22 79.76 79.30 78.84
230 1 2 3 4 5 6 7 8 9 240 1 2 3 4 5 6 7 8 9 250 1 2 3 4 5 6 7 8 9 260

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	LEE	31,220	154	16	42-A

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE B. P. R. STANDARD

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE B. P. R. STANDARD

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	LEE	31.220	154	18	42-A

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE B. P. R. STANDARD

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	LEE	31.220	154	19	42-A

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE B. P. R. STANDARD

FED. ROAD DIST. NO. | STATE | COUNTY | DOCKET NO. | ROUTE NO. | SHEET NO. | TOTAL SHEETS
14 | SC. | LEE | 31-220 | 154 | 20 | 42-A
P.T. 408+02.0
6" Oak Stumps
P.C. 395+42.0
1" Oak
20" Pine Stump
P.I. 401+72.6
8" Oak Stump
Pine Stump
POT. 390+92.2
30" Oak
W. E. McCUTCHEN
D 2-11-41
EARNEST DICKINSON (Minor)
MRS ELOISE S. DICKINSON (Legal Guardian)
C 5-6-41
Supereleyation Begins on Left at Sta. 394+38.0
Supereleyation Ends on Left at Sta. 409+06.0
In Place 21 ft of 15 in R.C. pipe. Retain
In place 31'-24" R.C. pipe. Retain
In place 51'-18" R.C. pipe. Retain
P.I. = 401+72.6
Δ = 6°-18' Rt.
D = 0°-30'
T = 630.6
L = 1260.0
E = 17.4
37½' R/W
50' R/W
S. 9° 07' W.
S. 15° 25' W.
E. B. McCUTCHEN, JR. D 2-11-41
Federal Land Bank, M'tgee
C 5-6-41
H. W. SHAW D 2-11-41
Federal Land Bank, M'tgee
Land Bank Commissioner, M'tgee
C 5-6-41
C. B. PLAYER
D 2-11-41
Federal Land Bank, M'tgee
Land Bank Commissioner, M'tgee
C 5-6-41
380
385
390
395
400
405
410
B.M. NAIL IN 12" GUM 190 FT. RIGHT STA 391+80 EL. 66.50
B.M. NAIL IN ROOT 16" HICKORY 80 FT. RIGHT STA 404+10 EL. 59.03
SUBGRADE
SPECIAL DITCH BOTH SIDES
D.A. = 25 Ac.
C = 0.2
STA. 391+395
El. = 67.25
400 V.C.
-0.98%
STA. 397+50
El. = 63.27
D.A. = 7 Ac.
C = 0.4
-0.19%
STA. 402+00
El. = 62.62
-1.70%
80
70
60
50
PLAN
PROFILE
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
GRADES CHECKED
B.M.'S NOTED
STRUCTURE NOTAT'NS CH'KD
NOTE BOOK
NO.
DATE
BY
EUGENE DIETZGEN CO., CHGO., N.Y.
PLATE 1-PLAN-PROFILE

PLAN
NOTE BOOK
NO.
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
BY
DATE

PROFILE
NOTE BOOK
NO.
SURVEYED
PLOTTED
GRADES CHECKED
B.M.'S NOTED
STRUCTURE NOTAT'NS CH'KD
BY
DATE

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE S. P. R. STANDARD

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET No.	ROUTE No.	SHEET No.	TOTAL SHEETS
14	S.C.	LEE	31.220	154	22	42-A

EUGENE DIETZGEN CO., CHGO., N.Y.

PLATE 1-PLAN-PROFILE B.P.R. STANDARD

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	LEE	31.220	154	23	42-B

PLATE 1-PLAN-PROFILE N.P.R. STANDARD

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET No.	ROUTE No.	SHEET No.	TOTAL SHEETS
14	S.C.	LEE	31.220	154	25	42A

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	LEE	31.220	154	26	[illegible]

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE

FED.ROAD DIST. NO. 14 | STATE S.C. | COUNTY LEE | DOCKET 31.220 | ROUTE NO. 154 | SHEET NO. 27 | TOTAL SHEETS 42-A
P.O.T. 597+93.0
30" Oak
20" Cedar
Porch Post
DR. B.L.HARRIS
D 2-10-41
Superelevation Begins on
Left at Sta. 603+25.1
PRESENT
ROAD
590
595
600
605
610
615
620
37½' R/W
50' R/W
S12°24'E
P.O.T. 597+93.0
In Place 15'-18"
pipe-Retain.
In Place 24'-30" R.C. pipe
Retain
T.H.
Smoke House
20' from T.H.
BRANCH
Retain 36'-18" Reloid R.C.
Pipe
Retain 8ft x 8ft x 42ft R.C. Box culvert
P.C. 604+93.1 (No Ref.)
In Place 21'-18"
R.C. pipe.
Retain
In Place 48'-18" R.C. pipe
Retain 24'-24" R.C. pipe.
No headwalls.
P.I. 616+49.3 (No Ref.)
Δ = 22°-49' RT.
D = 1°-00'
T = 1156.2'
L = 2281.7'
E = 115.5'
T. E. COOPER & BESSIE W. COOPER
D 2-11-41
Fed. Land Bank. M'tgee
Land Bank Commissioner M'tgee
C 5-6-41
DR. B.L HARRIS
D 2-10-41
B.M. NAIL IN ROOT 20" CEDAR 37 FT.
RIGHT STA. 597+75 EL. 49.77
EXC. 1123 EMB. 936
TOT. 1123 TOT. 1123
SUBGRADE
-0.68%
-0.90%
100' V.C.
594+83.6 EL.=45.13
Berm Ditch on Right
Berm Ditch Elev.
D.A. = 1300
+0.42%
607+00
EL. = 50.24
400' V.C.
+0.06%
60
50
40
48.42
47.74
47.06
46.49 - P.C.
46.38
46.10
45.89
45.74
45.66
45.66
45.72
45.85
45.87 - P.T.
46.04
46.46
46.88
47.30
47.72
48.14
48.56
48.98
49.40 - P.C.
49.60
49.78
49.93
50.06
50.17
50.26
50.32
50.36 - P.T.
50.42
50.48
50.54
50.60
50.66
50.72
50.78
50.84
50.90
50.96
51.02
590 1 2 3 4 5 6 7 8 9 600 1 2 3 4 5 6 7 8 9 610 1 2 3 4 5 6 7 8 9 620
PLAN
NOTE BOOK
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
PROFILE
GRADES CHECKED
B.M.'s NOTED
STRUCTURE NOTATIONS CH'KD
BY
DATE
EUGENE DIETZGEN CO., CHGO., N.Y.
PLATE 1-PLAN-PROFILE S.P.R. STANDARD

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE D. P. R. STANDARD

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
12	S.C.	LEE	31.220	154	29	42-B

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE S. P. R. STANDARD

FED. RD. DIST. NO. 14
STATE S.C.
COUNTY LEE
DOCKET NO. 31.220
ROUTE NO. 154
SHEET NO. 30
TOTAL SHEETS
SARAH CHARLES (Col) D 2-13-41
HAMILTON CORBETT D 2-10-41
In Place 21'-18" R.C. pipe Retain
POT 684+670
MRS. W. S. WHEELER D 3-17-41
HAMILTON CORBETT D 2-10-41
In Place 42'-18" R.C. pipe
J.F BLAND D 2-10-41
In Place 21'-15" R.C. pipe Retain
50' R/W
37½' R/W
S10°25'W
Retain 21'-12" R.C. Pipe
In Place 21'-18" R.C. pipe. Retain
In Place 21'-15" R.C. pipe Retain
Retain 52'-36" R.C. pipe.
Retain 24 ft. of 30 in. R.C. pipe in outfall ditch.
HAMILTON CORBETT D 2-10-41
MRS. W. S. WHEELER HICKORY, N.C. D 3-17-41
B.M. NAIL IN ROOT 20" PINE 50 FT. RIGHT STA. 682+80 EL. 27.23
B.M. NAIL IN ROOT 18" CHINABERRY RIGHT STA. 696+15 EL. 47.24
B.M. NAIL IN 10" OAK 15 FT. RIGHT STA. 704+00 EL. 45.86
USE 5B SPECIAL SECTION FROM STA. 676+00 TO STA. 688+00
USE 6B SPECIAL SECTION TO STA. 695+20
687+19.6 EL.=48.49
SUBGRADE +0.10%
+0.10%
+0.10%
400' V.C.
-0.14%
400' V.C.
+0.10%
+0.10%
Berm Ditch Right & Left
SPECIAL DITCH ON BOTH SIDES
Berm Ditch Left
707+00 EL=45.82
Elev. Berm Ditch
P.C.
P.T.
PLATE 1-PLAN-PROFILE
EUGENE DIETZGEN CO., CHGO., N.Y.

EUGENE DIETZGEN CO., CHGO., N.Y.
PLATE 1-PLAN-PROFILE S.P.R. STANDARD

FED. RD. DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	LEE	31.220	154	32	42-A

FED. ROAD DIST. NO. 14
STATE S.C.
COUNTY LEE
DOCKET NO. 31.220
ROUTE NO. 154
SHEET NO. 33
TOTAL SHEETS 47.B
J.F. BLAND
D 2-10-41
P.I. 779+32.5
Δ=23°36' Lt.
D=2°00'
T=598±
L=1180.0
E=61.8
P.O.T. 770+17.3
P.C. 773+34.0
P.T. 785+14.0
S11°09'W
S12°27'E
37½' R/W
50' R/W
In Place 84'-18" 36" R.C. Pipe - Retain
In Place 21'-18" R.C. pipe Retain
In Place 54'-24" R.C. Pipe Retain
In Place 21'-15" R.C. pipe Retain
In place 32'-30" R.C. pipe. Retain
Superelevation begins on Rt. Sta. 770+36
Superelevation Ends on Rt. Sta. 788+17
E.L. COOPER
D 2-15-41
6" Pecan
6" Pecans
4" Pecan
6" Pines
30" Pine
15" Chinaberry
B.M. NAIL IN 30" PINE 90 FT. RT. STA. 779+10 EL. 30.90
EXC 1509
TOT 1509
EXC 3139
TOT 3139
770+50
EL. = 38.25
SUBGRADE
400 V.C.
-0.88%
776+50
EL. = 32.97
DA=60 AC.
C=0.3
+0.12%
C=0.2
DA=25 A.
794+21
EL. = 35.21
-0.26%
C=0.4
DA=35 A.
40
30
20
37.71
37.62
37.46
37.21
36.89
36.49 - P.T.
36.05
35.17
34.73 - P.C.
34.30
33.97
33.69
33.47
33.31
33.21
33.18
33.21 - P.T.
33.27
33.39
33.51
33.63
33.75
33.87
33.99
34.10
34.22
34.34
34.46
34.58
34.70
34.82
34.94
34.97 - P.C.
35.00
35.03
35.04
35.03
34.99
34.93
34.85
34.74
34.69 - P.T.
34.48
34.22
33.96
770
780
790
800
EUGENE DIETZGEN CO., CHGO., N.Y.
PLATE 1-PLAN-PROFILE S.P.R. STANDARD
PLAN
NOTE BOOK
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
PROFILE
GRADES CHECKED
B.M.'s NOTED
STRUCTURE NOTES TRNSCH'KD

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE R. R. STANDARD

FED. ROAD DIST. NO. 14
STATE S.C.
COUNTY SUMTER
DOCKET NO. 43.255
ROUTE NO. 154
SHEET NO. 35
TOTAL SHEETS 47.B
In Place 24'-15" R.C. pipe Retain
HAMILTON CORBETT D 2-10-41
SURVEY STA. 833+94.0 END OF DOCKET NO. 31.220 AND BEGINNING OF DOCKET NO. 43.255 AT THE SUMTER COUNTY LINE.
J.F. BLAND D 2-10-41
LILLIE RHODES COOPER D 2-15-41
See Storm Drain Note on next sheet
Retain 54'-18" R.C. pipe, and with two Std. 24"x36" drop inlets
COUNTY LINE
LEE COUNTY
SUMTER COUNTY
POT. 839+78.5
POT. 855+09.0
S33°49'E
MARY M. SHAW D 2-10-41
FEDERAL LAND BANK, M'TGEE
LAND BANK COMMISSIONER M'TGEE C 5-6-41
In place 52'-30" R.C. pipe. Retain
H.W. TILLER D 2-10-41
In Place 21'-15" Relaid C.M. pipe - Retain
MINNIE & ROSALEE DESCHAMPS D 2-20-41
In Place 21'-15" R.C. pipe Retain
L. EMMA MAYES D 2-15-41
Retain 20'-18" relaid R.C. pipe.
In Place 21'-15" R.C. pipe. Retain
ELIZABETH W. MAYES
THOMAS P. MAYES
W.D. MAYES
F.J. MAYES
D 2-15-41
MRS. C.B. FORT D 2-15-41
MRS. CORA A. SANDERS, M'tgee D 5-6-41
W.H. DEAN D 2-12-41
B.M. NAIL IN ROOT 24" DEAD OAK 65 FT LEFT STA. 843+17 EL. 34.01
B.M. NAIL IN ROOT 18" CEDAR 200 FT RIGHT STA. 857+00 EL. 34.35
SURVEY STA. 833+94.0 END OF DOCKET NO. 31.220 AND BEGINNING OF DOCKET NO. 43.255 AT THE SUMTER COUNTY LINE.
400' V.C.
-0.08%
+0.16%
845+00 EL.=34.80
-0.30%
-0.10%
SUBGRADE
833+50 EL.=32.88
D.A.=5.0 Acres C=0.2
BERM DITCH ON LEFT
BERM DITCH ELEVATIONS
28.40 28.35 28.25 28.15 28.05 27.95 27.85 27.75 27.65 27.55 27.45 27.35 27.25 27.15 27.05 27.00
33.16 33.08 33.04 33.01 32.99 32.99 33.00 33.03 33.07 33.13 33.20 33.28 33.44 33.60 33.76 33.92 34.08 34.24 34.40 34.48 34.55 34.58 34.62 34.67 34.82 34.44 34.34 34.20 34.05 33.75 33.45 33.15 32.85 32.55 32.25 31.95 31.65 31.35 31.05 30.75 30.68 30.60 30.47
P.C. P.T. P.C. P.T. P.C.
830 1 2 3 4 5 6 7 8 9 840 1 2 3 4 5 6 7 8 9 850 1 2 3 4 5 6 7 8 9 860
40 30 20
PLAN
PROFILE
EUGENE DIETZGEN CO., CHGO., N.Y.
PLATE 1 PLAN-PROFILE S.P.R. STANDARD

EUGENE DIETZGEN CO., CHGO., N.Y.

PLATE 1-PLAN-PROFILE B.P.R. STANDARD


FED. ROAD DIST. NO. 14
STATE S.C.
COUNTY SUMTER
DOCKET NO. 43265
ROUTE NO. 154
SHEET NO. 37
TOTAL SHEETS 42-B
MAYESVILLE BAPTIST CHURCH
By T.B. FORT
D 2-14-41
Church +60-62'±
J. F. BLAND
D 4-7-41
MRS. H. L. THOMAS D 2-13-41
Res +73-41'±
Pine Tree
Pecan
P.I. 866+69.3
21" Gum
Res. +00-78'±
C. D. COOPER D 2-10-41
Res +00-75'±
H. D. ANDERSON
ANNIE ANDERSON
MARY SUE ANDERSON
CARRIE ANDERSON
D 2-12-41
Walnut
Bridge
P.T. 868+57.3
Tele. Pole
S 18°-41' E
30' R/W
Retain Curb and Gutter, and Sidewalk
Place 36 ft of 18 in R.C. pipe
P.I. = 866+69.3
Δ = 15°08' Rt
D = 4°00'
T = 190.3'
L = 378.3'
E = 12.6'
Construct Intersection as shown.
W. H. DEAN
D 2-12-41
Street
S. M. RHODES
D 2-13-41
Shrubbery
Res.
ELIZABETH S. WILSON
D 2-15-41
Drive
Drop inlet
866
867
868
869
870
871
872
Subgrade
-0.10%
+0.06%
-0.26%
300' V.C.
870+50
El. 29.79
29.76
29.67
29.65
29.64
29.65
29.67 P.I.
29.70 = P.C.
29.72
29.71
29.67
29.61
29.52
29.40 P.I.
PLAN
PROFILE
NOTE BOOK
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
GRADE CHECKED
B.M.'s NOTED
STRUCTURE NOTATIONS CHK'D
BY
DATE

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	SUMTER	42265	154	38	42-A

EUGENE DIETZGEN CO., CHGO., N.Y.

PLATE 1-PLAN-PROFILE S.P.R. STANDARD

FED. ROAD DIST. NO. 14 | STATE S.C. | COUNTY SUMTER | DOCKET NO. 43265 | ROUTE NO. 154 | SHEET NO. 39 | TOTAL SHEETS 42
N
Construct Intersection as shown
H. W. TILLER D 2-10-41
HAMILTON CORBETT 30 R/W D 2-10-41
CORBETT & RHODES By HAMILTON CORBETT 30' R/W D 2-10-41
Retain 45 ft. of 15 in. R.C. pipe
Retain 15 ft. of 18 in. R.C. pipe
as shown on sheet no. 8
In Place 40 ft. of 18 in. R.C. pipe Retain
Warehouse (Brick foundation) 30'
Tin Building 29'
12' Shed Brick Pillars
Gas Pump +65
W. D. RHODES D 2-15-41 30' R/W
HAMILTON CORBETT 30' R/W D 2-15-41 30' R/W
Brick Stores 27.5'
C. E. MAYES 30' R/W D 2-14-41 30' R/W
9' Conc. Side Walk
Street
To Lynchburg
Construct Intersection as shown
Total Earth Type Surface Course = 18 C.Y.
Total Conc. Curb and Gutter (3'0") = 47 L.F.
A.C.L. R.R.
EXCEPTION TO PROJECT
A.C.L. Railroad Crossing
Sta. 883+62.0 to Sta. 883+72.0
S. 18° 41' E.
Retain 36 ft. of 18 in. R.C. pipe
Catch Basin (Type 1)
as shown on sheet no.
Fire Hydrant
Retain Curb and Gutter and Sidewalk
4' Sidewalk
See 24 in. R.C. pipe note on preceding sheet
Catch Basin (Type 1)
as shown on sheet no. 8
Residence
Drive
Ditch
Brick Stores Begin +90
MAYESVILLE TEL. CO. 30' R/W D 2-15-41 By J.F. Bland
Mrs. V. C. WEINBERG 28' R/W C-5-41
Mrs. H. L. THOMAS D 2-13-41 30' R/W
W. H. DEAN 30' R/W D 2-15-41
R. J. MAYES EST By Mrs. VIVA MAYES 30' R/W D 2-13-41
BESSIE COOPER 30' R/W D 2-14-41
MRS. CARO C. SPENCER 30' R/W D 2-15-41
Street
Sidewalk Ends +50
Retain 40 ft. of 30 in. R.C. pipe
Retain 128 ft. of 24 in. R.C. pipe
Construct Intersection as shown
Total Earth Type Surface Course = 10 C.Y.
Total Conc. Curb & Gutter (3'0") = 31 L.F.
To Sumter
A.C.L. R.R.
Mrs. M. E. BLAND D 2-10-41
30' R/W D 2-12-41
Mrs. P. M. TILLER
Retain 222 ft. of 24 in. R.C. pipe on right from Sta. 880+03 to Sta. 882+25
30' R/W D 2-13-41
W. M. BRADLEY EST. By J. W. Bradley, Exec.
SCALE - 1 IN. = 20 FT.
B.M. Nail in root 48" oak 20 ft. Rt. Sta. 879+35 El 30.06
B.M. Nail in root 20" chinaberry 150' Lt. Sta. 882+00 El 28.89
EXC 661 | EMB 373
TOT 661 | TOT 661
EXCEPTION TO PROJECT
A.C.L. Railroad Crossing
Sta. 883+62.0 to Sta. 883+72.0
883+67.7 El 31.39
878+50 El 29.25
Subgrade
-0.32%
300 V.C.
720 V.C.
50 V.C.
+0.10%
882+00 El 28.33
883+00 El 28.43
1st RAIL - STA. 883+62.3 - EL = 31.53
2nd RAIL - STA. 883+69.8 - EL = 31.56
29.18 | 29.21 | 29.18 | 29.10 | 28.97-PT | 28.81 | 28.65 | 28.49-PC | 28.38 | 28.38-PT | 28.40-PC | 28.70 | 29.52-PT | 30.19-PC | 30.61 | 30.89 | 30.91 | 30.38-PT | 30.52
878 | 9 | 880 | 1 | 2 | 3 | 884
32 | 30 | 28
PLAN
PROFILE
EUGENE DIETZGEN CO., CHGO., N. Y.
PLATE 1-PLAN-PROFILE

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	SUMTER	43.255	154	40	42-A

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	SUMTER	43255	ALT. 76	41	42-A

EUGENE DIETZGEN CO., CHGO., N. Y.

PLATE 1-PLAN-PROFILE B. P. R. STANDARD

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
14	S.C.	SUMTER	43255	154	42	42 OA

FED. ROAD DIST. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1A	S.C.	SUMTER	43.255	Alt. 76	42-A	42-A

APPENDIX D:
Mayesville Photolog

Figure 1. Main Street Facing East

Figure 2. Drainage Inlet At Main Street and Lafayette Street

Figure 3. Lafayette Street Facing South

Figure 4. Main Street

Figure 6. Typical Drainage Inlet along Main Street

Figure 5. Catch basin along Main Street

Figure 7. Drainage Inlet along Main Street

Figure 8. Typical Drainage Inlet Along Sumter Street

Figure 9. Typical Drainage Inlet Along Sumter Street

Figure 10. Typical Drainage Inlet Along Sumter Street

Figure 11. Liberty Street

Figure 12. Liberty Street

Figure 13. Stormwater Management Pond behind Museum

Figure 14. Republic Street

Figure 15. Main Street at Lafayette Street

Figure 16. Typical Drainage Inlet along Lafayette Street

Figure 17. Main Street

Figure 18. Drainage Channel Along Walking Trail

Figure 19. Drainage Channel Along Walking Trail

Figure 20. Drainage Channel Along Avenue A

Figure 21. Culvert under private drive at the end of Avenue B

Figure 22. Typical Street Ponding along Avenue B

Figure 23. Typical Open Section, Avenue A

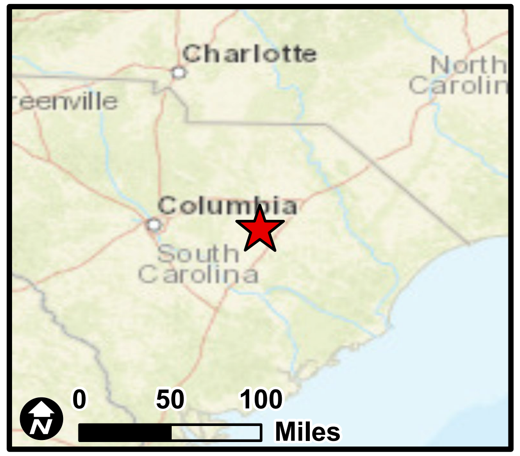
Figure 24. Lafayette Street at US 76

Figure 25. Salem Street

Figure 26. Lafayette Street at Sumter Street

Appendix E

Land Cover Map



Land Cover Map

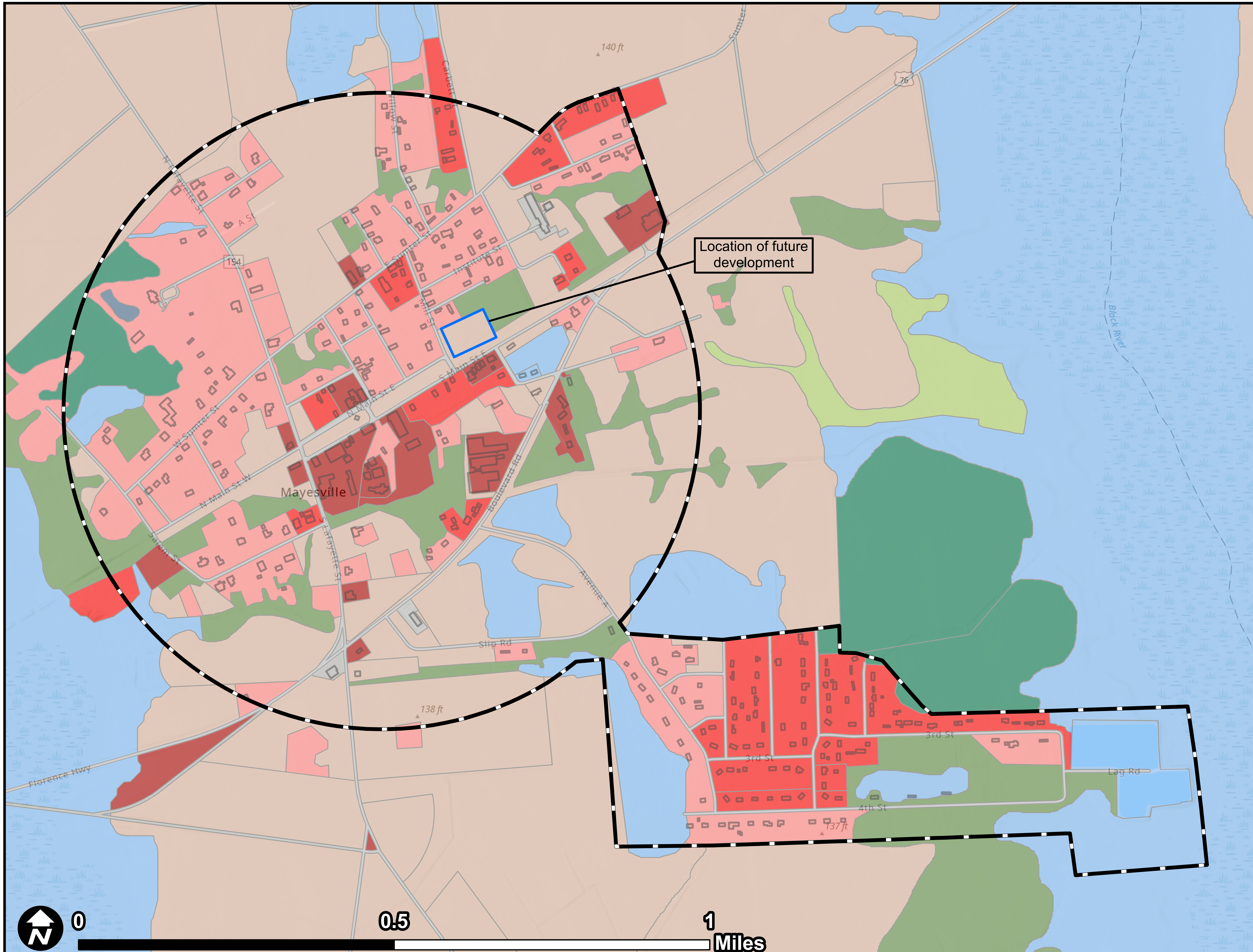
Town of Mayesville
Stormwater Study
Sumter County, SC

Legend

Mayesville Town Boundary
Buildings
Land Cover (NLCD 2019)
Roads/Impervious
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Mixed Forest
Deciduous Forest
Evergreen Forest
Woody Wetlands
Open Water

Job #: 6460210262
Drawn By: GC
Reviewed By: AV
Date: 5/23/2022

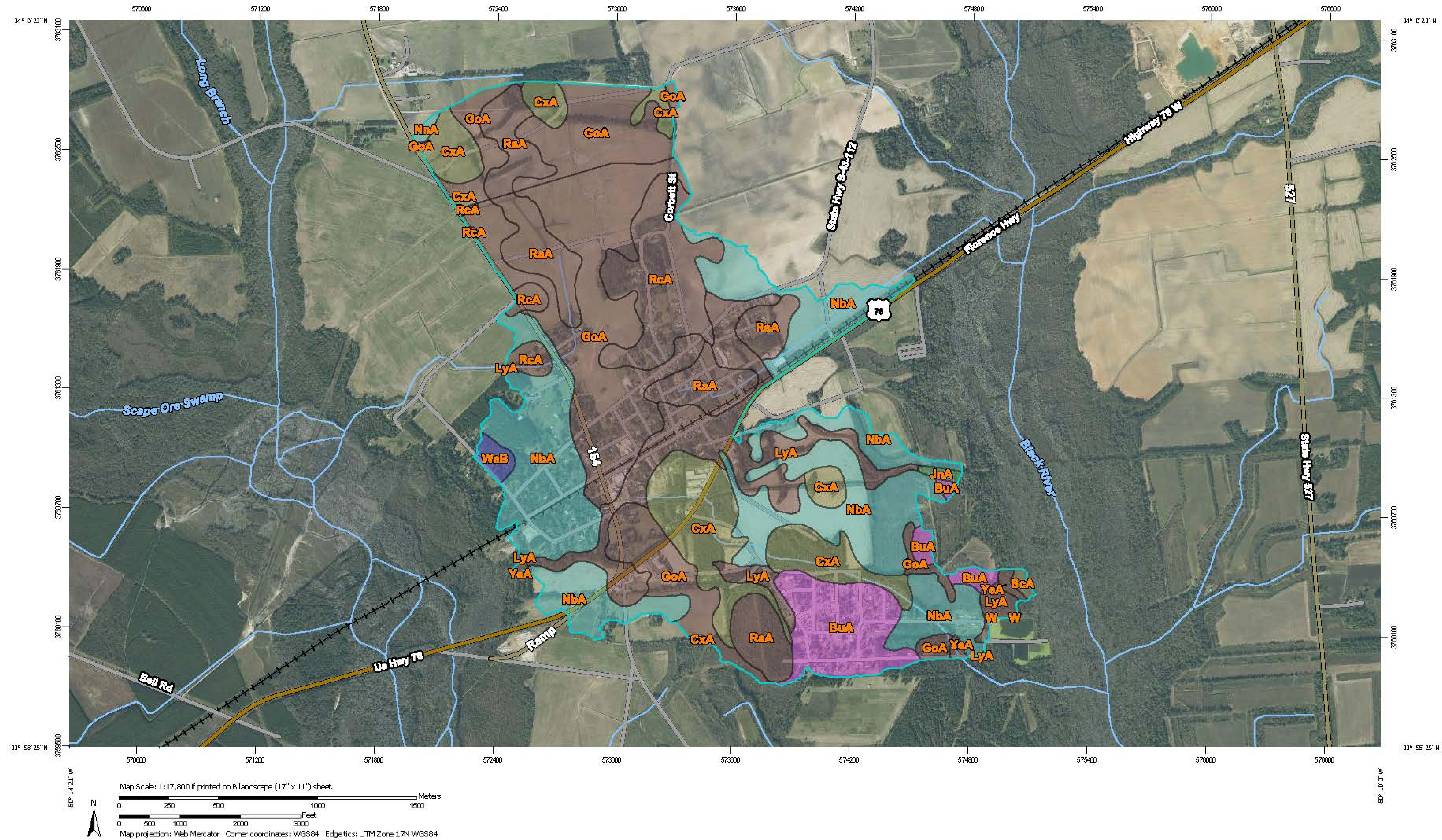
The map shown here has been created with all due and reasonable care and is strictly for use with Wood project number 6480210262. Wood assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.



\\cba-fs1\projects\Environmental\2020 + Projects\Org 6480\0262 - Town of Mayesville\13 GIS

Appendix F

NRCS Soil Web Survey - Mayesville



Map Scale: 1:17,800 if printed on B landscape (17" x 11") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lee County, South Carolina
Survey Area Data: Version 23, Aug 30, 2021

Soil Survey Area: Sumter County, South Carolina
Survey Area Data: Version 18, Aug 30, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 3, 2019—Nov 10, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CxA	Coxville sandy loam, 0 to 2 percent slopes	C/D	36.0	3.0%
GoA	Goldsboro sandy loam, 0 to 2 percent slopes	B/D	80.5	6.6%
NnA	Noboco-Goldsboro complex, 0 to 2 percent slopes	C	2.2	0.2%
RaA	Rains sandy loam, 0 to 2 percent slopes	B/D	25.7	2.1%
Subtotals for Soil Survey Area			**144.4**	**11.9%**
Totals for Area of Interest			**1,214.6**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BuA	Butters-Blanton complex, 0 to 2 percent slopes	A	76.0	6.3%
CxA	Coxville-Rains complex, 0 to 2 percent slopes	C/D	104.2	8.6%
GoA	Goldsboro-Noboco complex, 0 to 2 percent slopes	B/D	229.0	18.9%
JnA	Johnston mucky sandy loam, 0 to 2 percent slopes, frequently flooded	A/D	2.8	0.2%
LyA	Lynchburg-Rains complex, 0 to 2 percent slopes	B/D	121.4	10.0%
NbA	Noboco-Norfolk complex, 0 to 2 percent slopes	C	328.3	27.0%
RaA	Rains sandy loam, 0 to 2 percent slopes	B/D	97.7	8.0%
RcA	Rains-Coxville-Lynchburg complex, 0 to 2 percent slopes	B/D	95.8	7.9%
ScA	Scapo-Mouzon complex, 0 to 2 percent slopes, frequently flooded	C/D	2.7	0.2%
W	Water		0.0	0.0%
WaB	Wagram-Norfolk-Lucknow complex, 0 to 4 percent slopes	B	7.3	0.6%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
YeA	Yemassee-Johns complex, 0 to 2 percent slopes, rarely flooded	B/D	5.1	0.4%
Subtotals for Soil Survey Area			**1,070.2**	**88.1%**
Totals for Area of Interest			**1,214.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: *None Specified*

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

APPENDIX G:

FEMA Flood Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole–foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD 29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was South Carolina State Plane. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East–West Highway
Silver Spring, Maryland 20910
(301) 713–3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Sumter City–County Planning Commission. This information was photogrammetrically compiled at a scale of 1 : 4,800 from aerial photography dated 1989.

This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de–annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

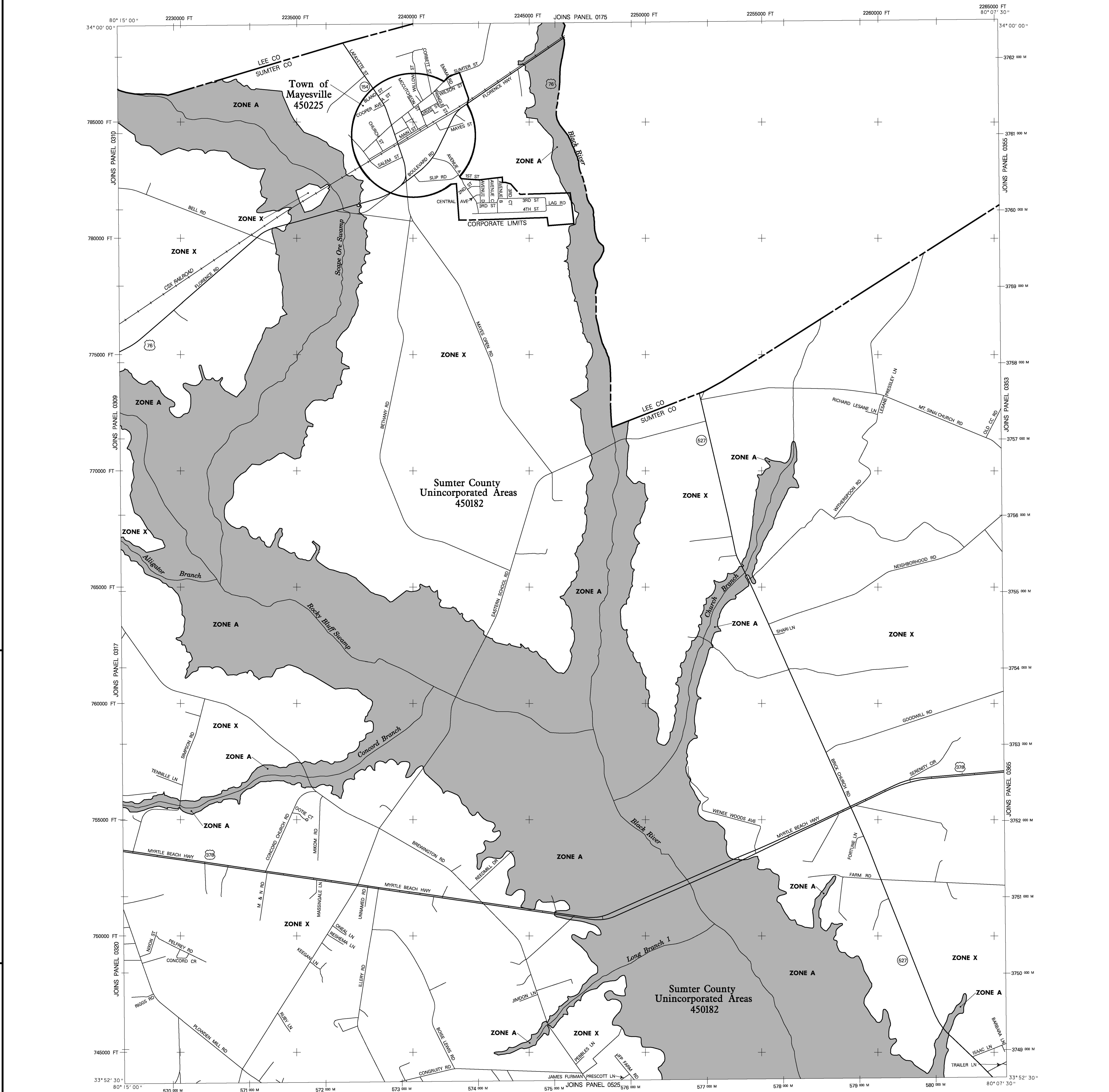
Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1–877–336–2627) or visit the FEMA website at http://www.fema.gov.

DNR

This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of South Carolina and the Federal Emergency Management Agency (FEMA). The State of South Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the state of South Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

http://www.dnr.state.sc.us/



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100–year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water–surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the National Geodetic Vertical Datum of 1929

(A)———(A)	Cross section line
(23)———(23)	Transect line
97° 07' 30", 32° 22' 30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276 000 M	1000–meter Universal Transverse Mercator grid values, zone 17
600000 FT	5000–foot grid values: South Carolina State Plane coordinate system, (FIPSZONE 3900), Lambert Conformal Conic projection.
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
FEBRUARY 16, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1–800–638–6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0350D

FIRM
FLOOD INSURANCE RATE MAP
SUMTER COUNTY SOUTH CAROLINA AND INCORPORATED AREAS

PANEL 350 OF 625

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MAYESVILLE, TOWN OF	450225	0350	D
SUMTER COUNTY	450182	0350	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 45085C0350D

EFFECTIVE DATE FEBRUARY 16, 2007

Federal Emergency Management Agency

APPENDIX H

Estimated Depth of Flooding at Each Structure

DISCLAIMER: Appendix H has been removed from the public version report due to sensitive content, including Personal Identifiable Information. Please visit https://scor.sc.gov/contact-us to contact the SC Office of Resilience and request additional information.

Existing Conditions, Current Precipitation

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Proposed Conditions, Current Precipitation

OID	Condition	Parcel ID Number	Street Number	Street Name	Owner	Builing Foot Print (SqFt)	Calculated Improved Fair Market Price	Improved Fair Market Price per sq ft ($/sqft)	Replacement Price per sq ft ($/sqft)	Value per sqft ($)	2 YR Max Flood Depth	10 YR Max Flood Depth	10 YR Max Flood Due To Road	25 YR Max Flood Depth	25 YR Max Flood Due To Road	50 YR Max Flood Depth	50 YR Max Flood Due To Road	100 YR Max Flood Depth	100 YR Max Flood Due To Road	Existing Drainage Name	Existing Drainage Area	Existing Drainage Notes	Proposed Drainage Name	Proposed Drainage Area	Proposed Drainage Notes	Proposed Drainage Network	Report Section
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Existing Conditions, Future Precipitation

OID	Condition	Parcel ID Number	Street Number	Street Name	Owner	Building Foot Print (SqFt)	Improved Fair Market Price	2 YR Max Flood Depth	10 YR Max Flood Depth	25 YR Max Flood Depth	50 YR Max Flood Depth	100 YR Max Flood Depth	Existing Drainage Name	Existing Drainage Area	Existing Drainage Notes	Proposed Drainage Name	Proposed Drainage Area	Proposed Drainage Notes	Proposed Drainage Network	Report Section
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Proposed Conditions, Future Precipitation

OID	Condition	Parcel ID Number	Street Number	Street Name	Owner	Building Foot Print (SqFt)	Improved Fair Market Price	2 YR Max Flood Depth	10 YR Max Flood Depth	25 YR Max Flood Depth	50 YR Max Flood Depth	100 YR Max Flood Depth	Existing Drainage Name	Existing Drainage Area	Existing Drainage Notes	Proposed Drainage Name	Proposed Drainage Area	Proposed Drainage Notes	Proposed Drainage Network	Report Section
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APPENDIX I
Benefit Cost Analyses

FEMA | Benefit-Cost Calculator

V.6.0 (Build 20230324.2039 | Release Notes)

Benefit-Cost Analysis

Project Name: 7.1 Drainage Improvement @ Mayesville, South Carolina

				Using 7% Discount Rate			Using 3% Discount Rate (For FY22 BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Drainage Improvement @ 29104, Mayesville, South Carolina		DFA - Riverine Flood	$ 1,406,870	$ 6,160,695	0.23	$ 2,494,630	$ 6,439,273	0.39
TOTAL (SELECTED)				**$ 1,406,870**	**$ 6,160,695**	**0.23**	**$ 2,494,630**	**$ 6,439,273**	**0.39**
TOTAL				**$ 1,406,870**	**$ 6,160,695**	**0.23**	**$ 2,494,630**	**$ 6,439,273**	**0.39**

Property Configuration

Property Title:	Drainage Improvement @ 29104, Mayesville, South Carolina
Property Location:	29104, Sumter, South Carolina
Property Coordinates:	33.98804000000007, -80.20899999999995
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation

Drainage Improvement @ 29104, Mayesville, South Carolina

Project Useful Life (years):	50
Project Cost:	$5,838,406
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$23,353

Damage Analysis Parameters - Damage Frequency Assessment

Drainage Improvement @ 29104, Mayesville, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	1,188,137	0	0	0	0	0	1,188,137
25	1,324,401	0	0	0	0	0	1,324,401
50	1,324,401	0	0	0	0	0	1,324,401
100	1,625,358	0	0	0	0	0	1,625,358

Annualized Damages Before Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	1,188,137	75,265
25	1,324,401	26,488
50	1,324,401	14,672
100	1,625,358	16,253
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	5,462,297	132,678

Professional Expected Damages After Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	124,195	0	0	0	0	0	124,195
25	503,319	0	0	0	0	0	503,319
50	721,797	0	0	0	0	0	721,797
100	721,797	0	0	0	0	0	721,797

Annualized Damages After Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	124,195	15,001
25	503,319	12,055
50	721,797	7,218
100	721,797	7,218
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	2,071,108	41,492

Standard Benefits - Ecosystem Services

Drainage Improvement @ 29104, Mayesville, South Carolina

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$0

Additional Benefits - Social

Drainage Improvement @ 29104, Mayesville, South Carolina

Number of Workers:	10
Expected Annual Social Benefits:	$148,435

Benefits-Costs Summary

Drainage Improvement @ 29104, Mayesville, South Carolina

Total Standard Mitigation Benefits:	$1,258,435
Total Social Benefits:	$148,435
Total Mitigation Project Benefits:	$1,406,870
Total Mitigation Project Cost:	$6,160,695
Benefit Cost Ratio - Standard:	0.20
Benefit Cost Ratio - Standard + Social:	0.23

FEMA

Benefit-Cost Calculator

V.6.0 (Build 20230324.2039 | Release Notes)

Benefit-Cost Analysis

Project Name: 7.4 Drainage Improvement @ Mayesville, South Carolina

				Using 7% Discount Rate			Using 3% Discount Rate (For FY22 BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Drainage Improvement @ 29104, Mayesville, South Carolina		DFA - Riverine Flood	$ 4,655,738	$ 5,487,793	0.85	$ 8,220,260	$ 5,736,274	1.43
TOTAL (SELECTED)				**$ 4,655,738**	**$ 5,487,793**	**0.85**	**$ 8,220,260**	**$ 5,736,274**	**1.43**
TOTAL				**$ 4,655,738**	**$ 5,487,793**	**0.85**	**$ 8,220,260**	**$ 5,736,274**	**1.43**

Property Configuration

Property Title:	Drainage Improvement @ 29104, Mayesville, South Carolina
Property Location:	29104, Sumter, South Carolina
Property Coordinates:	33.98804000000007, -80.20899999999995
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation

Drainage Improvement @ 29104, Mayesville, South Carolina

Project Useful Life (years):	50
Project Cost:	$5,200,323
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$20,830

Damage Analysis Parameters - Damage Frequency Assessment

Drainage Improvement @ 29104, Mayesville, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	2,943,071	0	0	0	0	0	2,943,071
25	3,539,975	0	0	0	0	0	3,539,975
50	4,290,045	0	0	0	0	0	4,290,045
100	5,330,856	0	0	0	0	0	5,330,856

Annualized Damages Before Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	2,943,071	193,665
25	3,539,975	77,940
50	4,290,045	47,822
100	5,330,856	53,308
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	16,103,947	372,735

Professional Expected Damages After Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	641,688	0	0	0	0	0	641,688
25	753,154	0	0	0	0	0	753,154
50	753,154	0	0	0	0	0	753,154
100	894,283	0	0	0	0	0	894,283

Annualized Damages After Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	641,688	41,711
25	753,154	15,063
50	753,154	8,207
100	894,283	8,943
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	3,042,279	73,924

Standard Benefits - Ecosystem Services

Drainage Improvement @ 29104, Mayesville, South Carolina

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$0

Additional Benefits - Social

Drainage Improvement @ 29104, Mayesville, South Carolina

Number of Workers:	36
Expected Annual Social Benefits:	$531,923

Benefits-Costs Summary

Drainage Improvement @ 29104, Mayesville, South Carolina

Total Standard Mitigation Benefits:	$4,123,815
Total Social Benefits:	$531,923
Total Mitigation Project Benefits:	$4,655,738
Total Mitigation Project Cost:	$5,487,793
Benefit Cost Ratio - Standard:	0.75
Benefit Cost Ratio - Standard + Social:	0.85

Benefit-Cost Calculator

V.6.0 (Build 20230324.2039 | Release Notes)

Benefit-Cost Analysis

Project Name: 7.8 Drainage Improvement @ Mayesville, South Carolina

				Using 7% Discount Rate			Using 3% Discount Rate (For FY22 BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Drainage Improvement @ 29104, Mayesville, South Carolina		DFA - Riverine Flood	$ 9,235,126	$ 417,620	22.11	$ 17,026,337	$ 427,974	39.78
TOTAL (SELECTED)				**$ 9,235,126**	**$ 417,620**	**22.11**	**$ 17,026,337**	**$ 427,974**	**39.78**
TOTAL				**$ 9,235,126**	**$ 417,620**	**22.11**	**$ 17,026,337**	**$ 427,974**	**39.78**

Property Configuration

Property Title:	Drainage Improvement @ 29104, Mayesville, South Carolina
Property Location:	29104, Sumter, South Carolina
Property Coordinates:	33.98804000000007, -80.20899999999995
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation

Drainage Improvement @ 29104, Mayesville, South Carolina

Project Useful Life (years):	50
Project Cost:	$405,641
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$868

Damage Analysis Parameters - Damage Frequency Assessment

Drainage Improvement @ 29104, Mayesville, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	5,361,847	0	0	0	0	0	5,361,847
25	6,728,541	0	0	0	0	0	6,728,541
50	7,038,537	0	0	0	0	0	7,038,537
100	8,004,754	0	0	0	0	0	8,004,754

Annualized Damages Before Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	5,361,847	360,387
25	6,728,541	137,636
50	7,038,537	75,061
100	8,004,754	80,047
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	27,133,679	653,131

Professional Expected Damages After Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0

Annualized Damages After Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	0	0
25	0	0
50	0	0
100	0	0
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Standard Benefits - Ecosystem Services

Drainage Improvement @ 29104, Mayesville, South Carolina

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$0

Additional Benefits - Social

Drainage Improvement @ 29104, Mayesville, South Carolina

Number of Workers:	15
Expected Annual Social Benefits:	$221,431

Benefits-Costs Summary

Drainage Improvement @ 29104, Mayesville, South Carolina

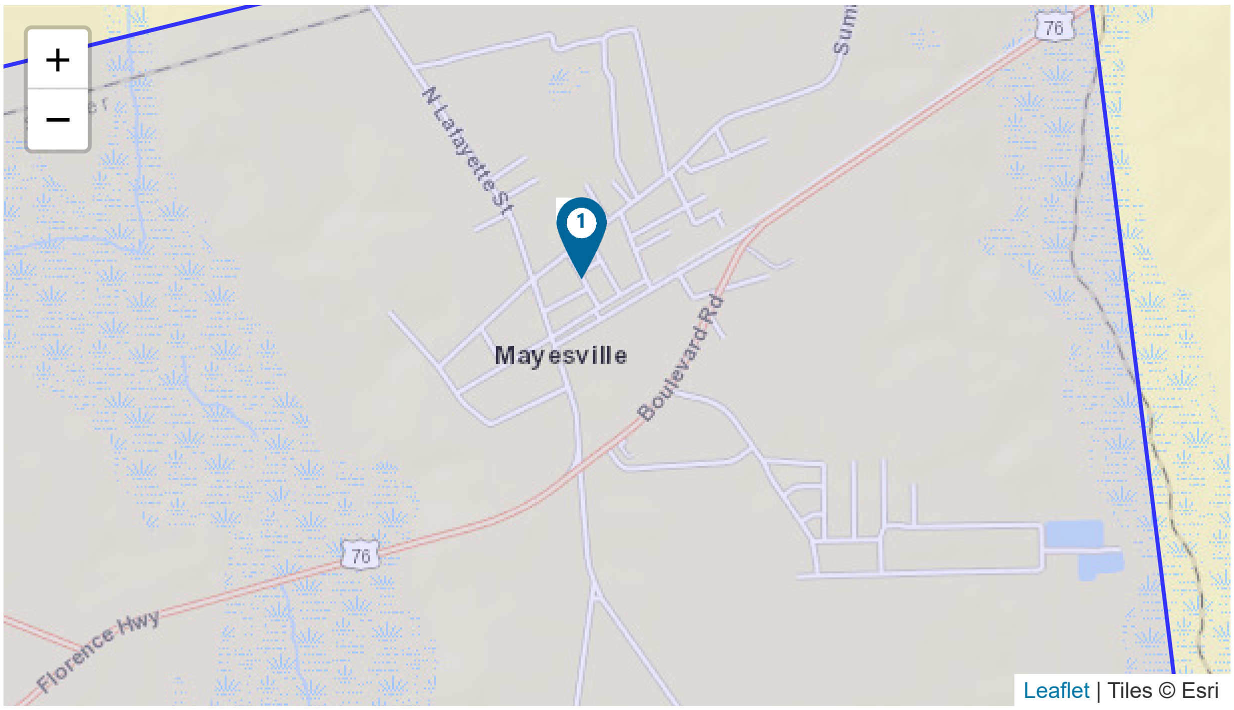
Total Standard Mitigation Benefits:	$9,013,695
Total Social Benefits:	$221,431
Total Mitigation Project Benefits:	$9,235,126
Total Mitigation Project Cost:	$417,620
Benefit Cost Ratio - Standard:	21.58
Benefit Cost Ratio - Standard + Social:	22.11

Benefit-Cost Calculator

V.6.0 (Build 20230324.2039 | Release Notes)

Benefit-Cost Analysis

Project Name: 7.10a Drainage Improvement @ Mayesville, South Carolina



				Using 7% Discount Rate			Using 3% Discount Rate (For FY22 BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Drainage Improvement @ 29104, Mayesville, South Carolina		DFA - Riverine Flood	$ 1,049,267	$ 1,776,369	0.59	$ 1,802,262	$ 1,832,375	0.98
TOTAL (SELECTED)				**$ 1,049,267**	**$ 1,776,369**	**0.59**	**$ 1,802,262**	**$ 1,832,375**	**0.98**
TOTAL				**$ 1,049,267**	**$ 1,776,369**	**0.59**	**$ 1,802,262**	**$ 1,832,375**	**0.98**

Property Configuration

Property Title:	Drainage Improvement @ 29104, Mayesville, South Carolina
Property Location:	29104, Sumter, South Carolina
Property Coordinates:	33.98804000000007, -80.20899999999995
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Residential Building
Analysis Method Type:	Professional Expected Damages

Cost Estimation

Drainage Improvement @ 29104, Mayesville, South Carolina

Project Useful Life (years):	50
Project Cost:	$1,711,574
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$4,695

Damage Analysis Parameters - Damage Frequency Assessment

Drainage Improvement @ 29104, Mayesville, South Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1950
Analysis Duration:	74 Use Default:Yes

Professional Expected Damages Before Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	499,127	0	0	0	0	0	499,127
25	623,212	0	0	0	0	0	623,212
50	955,575	0	0	0	0	0	955,575
100	1,185,089	0	0	0	0	0	1,185,089

Annualized Damages Before Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	499,127	33,464
25	623,212	15,434
50	955,575	10,642
100	1,185,089	11,851
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	3,263,003	71,391

Professional Expected Damages After Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	58,927	0	0	0	0	0	58,927
25	94,662	0	0	0	0	0	94,662
50	94,662	0	0	0	0	0	94,662
100	94,662	0	0	0	0	0	94,662

Annualized Damages After Mitigation

Drainage Improvement @ 29104, Mayesville, South Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	58,927	4,481
25	94,662	1,893
50	94,662	947
100	94,662	947
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	342,913	8,268

Standard Benefits - Ecosystem Services

Drainage Improvement @ 29104, Mayesville, South Carolina

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$0

Additional Benefits - Social

Drainage Improvement @ 29104, Mayesville, South Carolina

Number of Workers:	12
Expected Annual Social Benefits:	$178,122

Benefits-Costs Summary

Drainage Improvement @ 29104, Mayesville, South Carolina

Total Standard Mitigation Benefits:	$871,145
Total Social Benefits:	$178,122
Total Mitigation Project Benefits:	$1,049,267
Total Mitigation Project Cost:	$1,776,369
Benefit Cost Ratio - Standard:	0.49
Benefit Cost Ratio - Standard + Social:	0.59