MINUTES
City Council Public Works & Utilities Committee

Wednesday, October 7, 2026 – 3:30 p.m.
City Council Chambers

Members Present:	Lauren Wise, Chair, Council Member Gary Daniel, Vice Chair, Council Member (arrived at 3:37pm) Owen Carson, Citizen Member (Remote) Mayor Maureen Copelof, Ex-Officio
Staff Present:	Wilson Hooper, City Manager (arrived at 3:40pm) David Todd, Assistant City Manager Dennis Richardson, Water Treatment Plant Supervisor Aaron Winans, Wastewater Treatment Plant Supervisor Shawnee Cummings, Assistant to the City Manager
Guests:	Brie Saur (McAdams), Max Grogan (McAdams), Mary Beth Hall (McAdams)
Media:	None

A. Welcome and Call to Order

Committee Chair Lauren Wise called the meeting to order at 3:32 p.m.

B. Certification of Quorum

Assistant to the City Manager Shawnee Cummings certified that a quorum was present.

C. Approval of Agenda

Mr. Carson moved, seconded by Mr. Wise to approve the agenda as presented. The motion carried unanimously.

D. Approval of Minutes – September 2, 2026 Meeting

Mr. Carson moved, seconded by Mr. Wise to approve the minutes of the September 2, 2026 meeting as presented. The motion carried unanimously.

E. Project Updates – Mr. Todd presented the following updates:

1. Public Works Update

Mr. Todd compiled a list of updates on work performed by Public Works employees in the past 30 days, outside of their normal scope of work and day-to-day responsibilities. Notable items are highlighted in yellow.

Water

Performed pump station and extinguisher inspections, piled dirt and brush at Public Works lower yard to prepare for mulching, performed hydrant flow test at 373 Morris Road, flushed chlorine out of new 6-inch water line at Brevard Academy and took samples to Water Treatment Plant, checked and/or repaired 4 water line leaks, and relocated 1 water meter.

Sewer

Checked and performed weekly inspections of wastewater lift stations, verified pump run times, inspected wet wells, pulled and cleaned out pumps, recorded data (hours, condition of wet wells, total gallons, etc.) and mowed/weedeated. Performed locates, 320 as of 9/30/26 for the year. Completed 1 residential tap and 1 commercial tap. Assisted the County with a sewer blockage. Inspected manholes for new housing development. Replaced 8' section of 8" PVC sewer main at Caldwell and Probart, pipe had collapsed and caused a sinkhole. Seeded and strawed where taps were made and sewer service lines were replaced. Cleaned 830 feet of sewer line (as of 9/30/26). Required Footage for 2026: 31,680 feet; cleaned to Date: 47,077 feet, exceeding requirement by 15,397. Completed video Inspections of 892 feet (as of 9/30/26). Attended meetings regarding sewer system for new housing development, sewer line to be bored under road at Caldwell and Silversteen, and the new Gallimore Road Lift Station. Zach and John completed continuing education and attended collections and distribution school. The Sewer Department assisted Streets/Sanitation and the Water Department, as well as cut/cleared downed trees on Main Street, cleared out the parking lot behind City Hall, and prepped for fence installation at PHF.

Streets & Sanitation

Completed 5 sidewalks and curb repairs, patched 10 potholes, collected 13 loads of loose brush, completed 6 special waste collections, cleaned 30 storm drains, erected 7 banners, delivered 8 recycling carts, assisted the Water Department and collected:
15,144 tons of trash
50 tons of recycling
17 tons of cardboard

Garage

Completed 284 fleet maintenance work orders as of 9/30/26.

Building & Grounds

This time of year, results in extensive mowing for Buildings and Grounds B&G), specifically on the sports fields, 36 acres of parks and properties and bike paths. In addition to mowing the B&G crew both nail and light dragged all 6 fields once a week, completed daily trash check and removal, and lifted batting cage net for little league to pour concrete. The B&G crew maintained mowers and sharpened blades and cleaned and washed work trucks, trimmed bushes at St. Timothy's, completed weekly weed removal at Clemson Plaza, the bump outs and in the roundabouts, watered downtown planters, and completed removal of a downed tree on Cherry Street impacting a residents property, and removal of downed trees at the Tannery Skatepark.

In addition to grounds work the B&G crew performed monthly safety inspections, assisted Heart of Brevard with set up and running of the art festival, completed work orders (set up for meetings, etc.), painted the track system for the ceiling tile, started building a fence in the back parking lot, installed humidifiers and drain lines, helped remove bushes and trees in the back parking lot and replaced downspouts and cleaned gutters. They installed caps on signposts at Hap Simpson, repaired air conditioning unit and installed additional handicap parking signs at the Police Department, winterized Franklin Park pool, installed new signs cleaned the City Public Restrooms and Buildings, maintained and relocated dog waste stations, and completed other miscellaneous work orders.

Mr. Todd also provided a brief update on the building envelope work at City Hall, which aims to help reduce water intrusion into the building during rain events.

Mr. Wise asked about the status of a few trees in Franklin Park that need to be removed. Mr. Todd stated that they are on the list to address, but they have not gotten to them yet.

2. Stormwater Master Plan

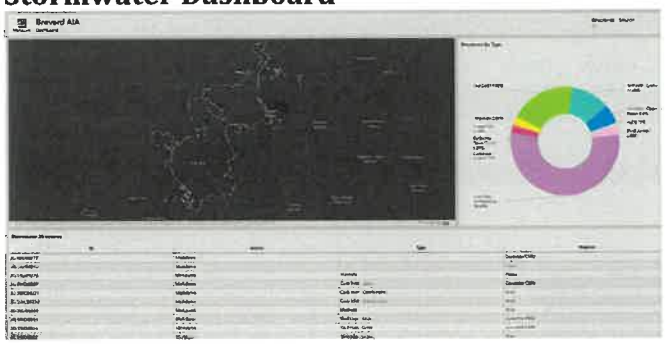
McAdams is contracted for the Citywide Stormwater Master Plan and recently completed Phase 1 in June, which focused on Existing Conditions Analysis. This effort is supported by desktop analysis, geodatabase development and management, analysis of existing stormwater systems, preliminary CIP prioritization planning, and UDO updates.

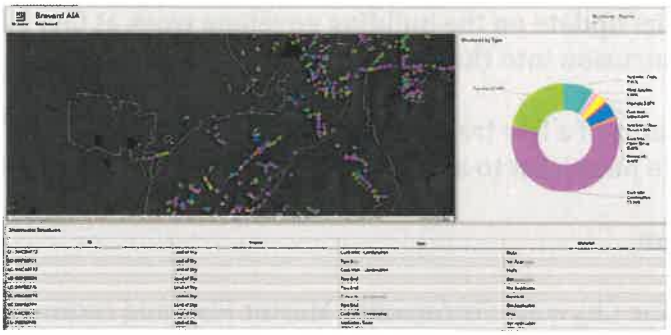
A draft report was submitted to the City at the end of June to complete Phase 1. This included existing conditions hydraulic modeling results, CIP prioritization, the UDO updates, CCTV reports, and a GIS geodatabase compiling stormwater inventory from Land of Sky and McAdams' data collection. The City reviewed the report and a revised deliverable addressing the City comments has been submitted.

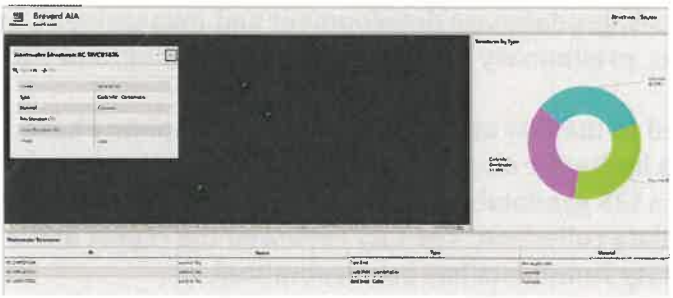
Below is the schedule:

1. Completed Asset Geodatabase and Dashboard
2. ERU Analysis is underway
    a. McAdams and the City met August 5th to review changes from the initial meeting and provide feedback.
    b. City to review and respond to McAdams in September with any feedback regarding the tool used to create the ERU.
3. Phase 2 completed in fiscal year 2027 (July 2026 – June 2027)
    a. Schematic Design and Identification of Funding
    b. Preliminary project identification for hotspot areas is underway
    c. Environmental services provided by Equinox to begin in October

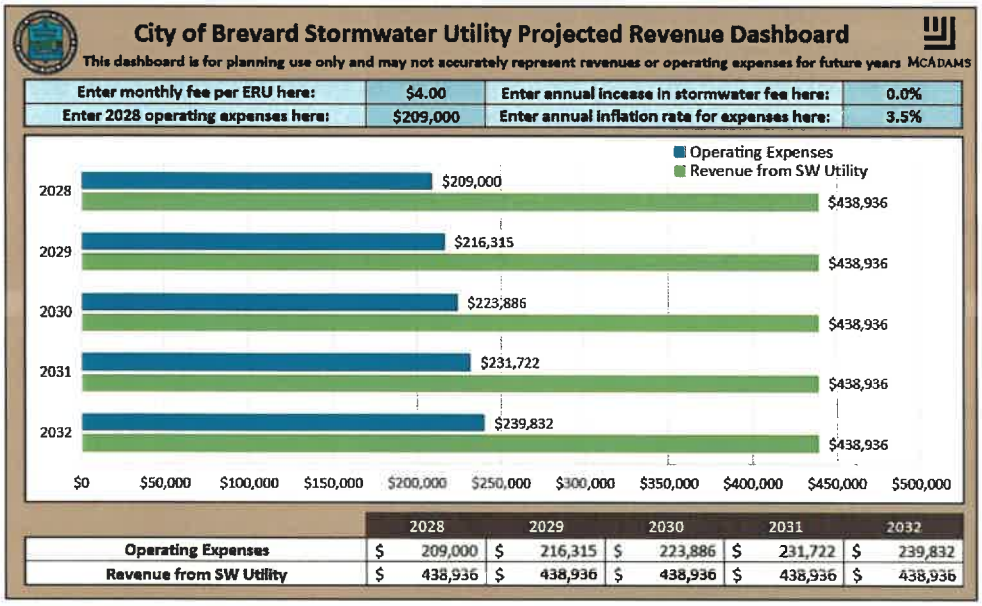
Stormwater Dashboard







ERU Dashboard



City of Brevard Stormwater Utility Projected Revenue Dashboard

This dashboard is for planning use only and may not accurately represent revenues or operating expenses for future years MCADAMS

Enter monthly fee per ERU here:	$4.00	Enter annual increase in stormwater fee here:	0.0%
Enter 2028 operating expenses here:	$209,000	Enter annual inflation rate for expenses here:	3.5%

	2028	2029	2030	2031	2032
Operating Expenses	$ 209,000	$ 216,315	$ 223,886	$ 231,722	$ 239,832
Revenue from SW Utility	$ 438,936	$ 438,936	$ 438,936	$ 438,936	$ 438,936

Property Breakdown

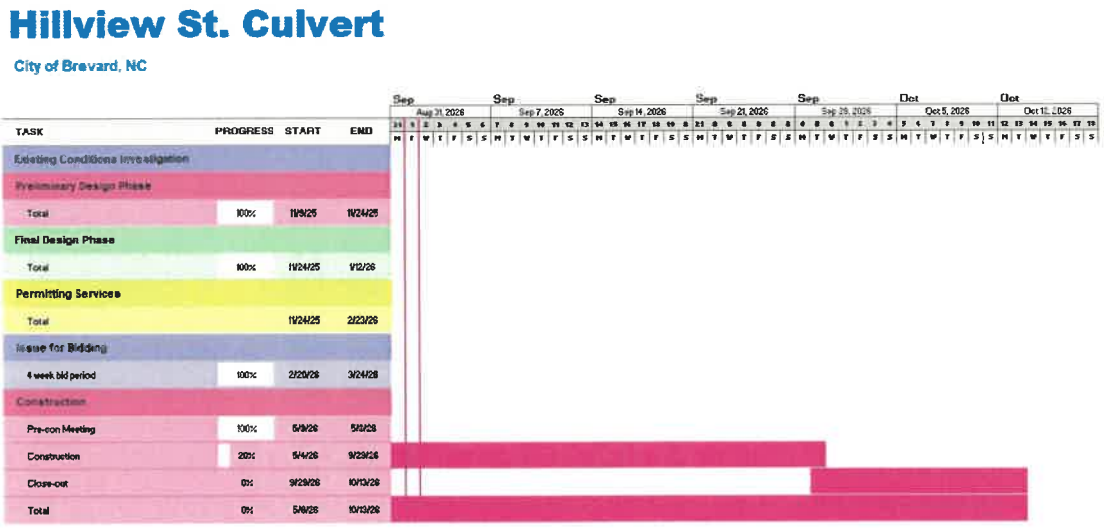
Total properties:	**4,260**
Commercial/Non-SF Properties:	629
Single Family (SF) Properties:	3,091
SF properties with BUA measured:	*322*
SF properties with BUA not measured:	*2,764*
SF properties classified as "oversized":	*5*
Vacant Properties:	540
ERU (average BUA on a SF parcel), sq. ft.:	**3,408**
Total ERUs:	**9,056**

Oversized SF properties have a dwelling unit size > 6,000 sq ft and BUA > 5,000 sq ft, they are charged per ERU

Vacant properties are those with no BUA

3. Hillview Street Culvert Update

- The 4" gas main at the southern end of the culvert has been removed and tops have been placed. Interior creek bed fill has been placed and exterior backfill has been placed, compacted, and tested.
- The gas main located at the north end has been determined to be a 2" main. The Contractor has been made aware that they need to coordinate that relocation also. This was reiterated to the contractor as recently as 10/6/26.
- The 6" water main in Phase 1 has been successfully lowered.
- The 14" watermain remains an obstacle to placement of the fifth culvert section. One inserta-valve has been installed and a second is on order and expected to be delivered late this week or early next week. Once the second valve is inserted into the main, both valves can be closed and the main can be lowered, which will allow further installation of the culvert. The main lowering is expected to require one week.
- Materials continue to be stockpiled onsite and, in the field, located southwest of the intersection of Hillview Street and Cashiers Valley Road (i.e., South of the Silversteen Park and Mary C. Jenkins Community Center parking area).
- The delay in obtaining the two inserta-valves will further extend the completion date. An update to the below schedule will be provided at the time that the second inserta-valve is received.



Mayor Copelof requested that Staff find additional ways to communicate with affected homeowners regarding progress on this project, whether it be mailers, going door to door, or providing fliers at local churches. She added that many people do not get their information from the channels we post on, such as our website, social media, etc.

4. Water Treatment Plant Renovation Update

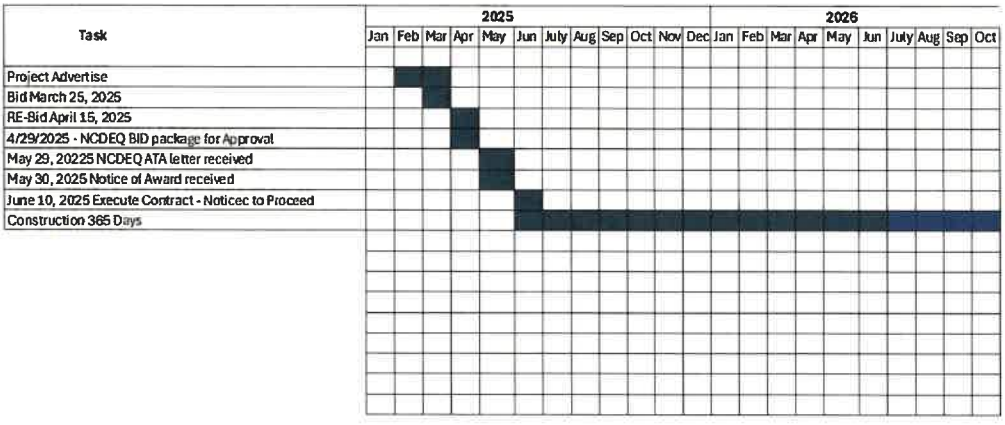
Work to date:

1. Overflow pipe from the new Clearwell to existing Clearwell: core into existing tank completed, pipe work completed. Final supports are completed. See photos attached
2. New generator start up occurred September 14th, with Staff training set for September 15th. The Generator passed the Load Bank Test
3. Electrical hoist for settling tank (transfer) pump is installed, and operational.
4. New Sludge transfer pump installed and operational.
5. Continued working on the pump room electrical (on-going) as we anticipate an October arrival of the new pumps and motors.

Upcoming work: Work over the next couple of months

Delivery of New Pumps – Last update is sometime in October

City of Brevard - Water Treatment Plant Improvements :
NCDEQ SRP-D-ARP-0222
Brown PA - 20042



There was additional discussion regarding a recent event in which the WTP lost power and had issues running their pumps on a generator. Mayor Copelof asked if Staff have a written communication plan regarding water conservation efforts and at what point are elected officials notified. Mr. Hooper said the plan is in a few peoples' heads, but it is not written down anywhere and that elected officials would be notified several hours before the public is notified. Mayor Copelof requested a written communication plan from Staff regarding water conservation events.

5. Sewer Lift Station Rehabilitation Project

Gallimore Road Site

- TP Howard (TPH) has been installing electrical equipment at the site and is awaiting delivery of the PLC.

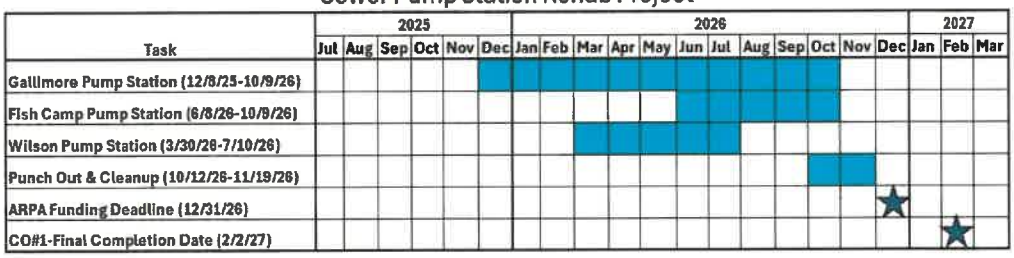
- An additional barrel section was installed on Manholes 4 and 5 near the creek, raising them by 3 feet.
- Mandrel testing is complete; however, vacuum testing still needs to be performed.

Wilson Road Site
- Generator startup and training were completed on site on 9/29.

Fish Camp Site
- TPH is awaiting the metal platform before continuing electrical work on site.

General
- Shop drawings and submittals are nearing completion, and all major equipment has been approved.

Sewer Pump Station Rehab Project



6. Wastewater Treatment Plant Update

Based on discussions with Staff, it was determined that pursuing 401/404 permitting was the best approach to the Phase 1 design. KCI is continuing to prepare the 401/404 permit applications and will be submitting the necessary documentation within the next couple of weeks along with the other outstanding permit/funding applications.

KCI and their subconsultants have also coordinated with Duke Energy on the sizing of the new transformer, which will be sized to accommodate the new Phase 1 loads and the additional loading need for the potential upgrades to the RBCs and solids handling facilities. The load letter required by Duke Energy will be provided to the City this week.

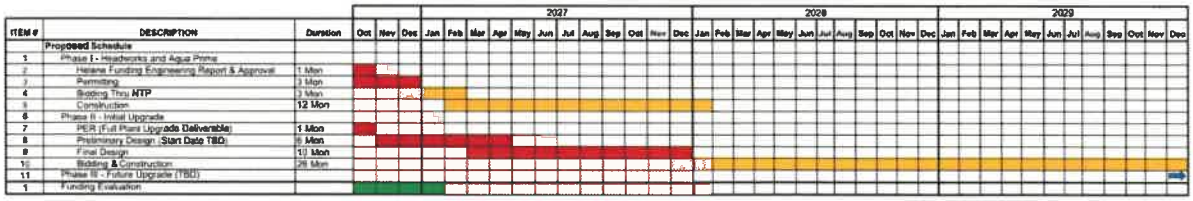
This week the City received the Funding Offer documents from DWI for the Helene funding. Once the necessary documents are completed, submitted and approved by DWI the City can start receiving reimbursements, up to 15% of the funding amount prior to construction, and the funds can be applied to the Construction of Phase 1. KCI will assist the City as needed to complete this documentation.

KCI will continue to work with the City staff on pursuing Phase 2 funding and the RBC evaluation.

BREVARD WWTP PER/PHASE 1 & 2 UPGRADE DESIGN - ESTIMATED PROJECT SCHEDULE KCI TECHNOLOGIES

ITEM #	DESCRIPTION	Duration	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
			2027																
	Proposed Schedule																		
1	Phase I - Headworks and Aqua Prime																		
2	Helene Funding Engineering Report & Approval	1 Mon																	
3	Permitting	3 Mon																	
4	Bidding Thru NTP	3 Mon																	
5	Construction	12 Mon																	
6	Phase II - Initial Upgrade																		
7	PER (Full Plant Upgrade Deliverable)	1 Mon																	
8	Preliminary Design (Start Date TBD)	6 Mon																	
9	Final Design	10 Mon																	
10	Bidding & Construction	26 Mon																	
11	Phase III - Future Upgrade (TBD)																		
1	Funding Evaluation																		

BREVARD WWTP PER/PHASE 1 & 2 UPGRADE DESIGN - ESTIMATED PROJECT SCHEDULE KCI TECHNOLOGIES



7. Tannery Smokestack

The Environmental Management Plan (EMP) for the Smokestack removal has been reviewed and approved by DEQ.

D.H. Griffin has been awarded the contract to remove both the underground vault and smokestack. The contract was revised to include saving 10 pallets of bricks for use on a future project. D.H. Griffin has ordered the needed geotextile materials. D.H. Griffin has been notified of the approved EMP, they are reviewing the revised plan and will hopefully mobilize within the next couple of weeks.

Our engineer has resubmitted the Vault EMP package and is waiting to hear back from DEQ. We anticipate the vault EMP will be approved in the next week. However, vault demolition will be less impactful on the trail construction compared to the smokestack removal.

Demolition, once started, is estimated to take about a month to complete for the smokestack and a couple of weeks for the vault.

F. FOG Program Outreach

Mr. Todd provided a brief update, noting that the most recent water bills sent out contained a one-pager on the FOG program and in the next water bill, something will be sent out to food service establishments (FSEs). He said it may not be the survey that was previously discussed but it will be something very similar.

Mr. Winans was able to find a software, used by MSD, that helps manage the FOG program. The software tracks compliance of FSEs, indicates the number of grease traps

and date of last inspection, identifies outstanding items that require action on the part of FSEs, records fines issued to establishments, and has a customer-facing platform for FSEs and grease haulers. Mr. Todd added that the software was relatively inexpensive, and they have been given the green light to purchase it. He added that it will help them get more information than they would from the survey, and they will be going to FSEs one-by-one to request information needed for FSEs in the system. Mr. Winans said the software will alleviate a lot of the foundational work that would have been done in spreadsheets. He added that FSEs will be able to access part of the system and log when they have their grease traps inspected. Grease haulers will also have access to a part of the software and will be able to note when an outstanding item was not completed. The haulers are already familiar with the software because MSD uses it and they will be able to upload relevant documents so that no one has to chase down paperwork. The software provider said they have found surveys to be ineffective because it is hard to get truthful answers. Mr. Winans added that it will be more effective to send the FOG Coordinator out to FSEs to inform them of what the City will be looking for and to conduct initial inspections as he adds the FSEs' information into the software. He will provide a list of FSEs to the software provider, who will enter all of the establishments, addresses, etc. in the system so that Staff will not have to enter it manually.

Mayor Copelof asked if we have gotten any pushback from restaurants. Mr. Winans said there were inquiries from Smokey Sunrise and The Yard, but no pushback at this time.

Mayor Copelof said many of our restaurants are Spanish-speaking and communicating this information to them will be very important. Mr. Winans said most of the outreach and notices are in both English and Spanish. When FSEs exhibit noncompliance, their employees may be required to complete an online FOG training and take an assessment to ensure employees understood the training, and the trainings and test are bilingual.

Mr. Daniel asked if The Yard actually does any food prep. Mr. Winans said the ice cream and coffee are high BOD because of the milk, so depending on what goes down the drain, it could apply to them. Similarly, it applies to Kilwins due to their ice cream.

G. Review of McAdams Stormwater Master Plan Phase 1 Draft

Mr. Todd stated that when we started the Stormwater Master Plan, we identified 10 hotspot areas to focus on. One of the results that came out of this work is that not all of the hotspots necessarily fall under stormwater infrastructure. He added that a few have a flooding problem, as opposed to a stormwater problem, which has some overlap but requires different remedies, as they are not addressed with stormwater infrastructure. Mr. Grogan said he is excited to present the Phase 1 results (Attachment A) and thanked Mr. Todd, Mr. Ray, and Mr. Shook, among others, for their guidance during the process.

During Phase 1, McAdams conducted CCTV work, conducted engineering analyses, documented existing conditions, created a geodatabase that compiled McAdams' data and Land of Sky's data, and developed a dashboard to house all the data. In addition, they helped draft updates to the UDO and used their data to create a prioritization

network matrix. Mr. Grogan stated that they developed a draft Phase 1 Report and will continue to build on that during Phase 2, which will consist of preliminary planning, funding identification, and alternative options for solutions. Lastly, they also included an analysis of two culverts related to the Ecusta Trail.

Mr. Grogan provided a map of the 10 hotspot areas included in this project (Attachment B) and stated that they focused on areas with known flooding issues and deficiencies with stormwater capture. Ms. Saur saw much of the infrastructure in person, visited the hotspots, and noted flooded areas during rain events before working with S&ME to conduct CCTV efforts. They examined about 4,000 linear feet of CCTV and found much of the infrastructure to be in poor to fair condition. Each pipe was inspected and their respective conditions were logged in inspection reports that note the severity and type of deficiencies using NASSCO scoring. Mr. Grogan said the scoring and logged conditions will inform their recommendation on what actions to take in each specific area.

Mr. Wise asked if poor to fair condition is typical for a City of our age. Mr. Grogan said yes, the pipes are reaching the end of their shelf life, both for reinforced concrete pipes (RCP) that last about 50 years and corrugated metal pipes (CMP) that last about 20-30 years. Much of what was installed in the 1970s and 1980s is showing significant defects.

The field data collected for pipes includes the longitude and latitude coordinates of the pipes, the dimensions, any clogging, pipe material, depth to pipe invert, and any additional notes. Similarly, field data was collected on structures, including inlets, manholes, etc., and it includes the coordinates, number of pipe connections, type of structure, any clogging, structure material, structure depth, and any additional notes. All of the data is accessible on the dashboard. Mr. Grogan noted that the dashboard does not document every stormwater pipe and structure in the City. He further recommended the City continue to update and refine the database over time.

Two culverts related to future Ecusta Trail crossings were examined to evaluate their condition and determine whether they should be replaced now or later. The City paid for the culvert inspections, one within City limits and one outside, and it was determined that the culverts should be replaced now, given that there will already be active construction. Replacement culverts will be funded through the Ecusta Trail project.

Mr. Grogan briefly covered the UDO updates and changes were made to improve equitability, consistency with State rules, achievability, and flexibility in stormwater control measures. Additional changes were made to improve clarity for the development community, which will hopefully result in better submittals to Staff, and help detect problems with stormwater control measures to address them sooner. Mr. Todd said the updates were brought to Council and approved, so the updates are in place now.

Mr. Hooper stated that Mr. Grogan gave the caveat that the inventory does not cover every single stormwater pipe and structure in the City and the other caveat is that the inventory is a mix of public and private pipes. He added that private pipes are further divided up by private pipes the City has maintenance agreements for and private pipes

that the City does not have maintenance agreements and easements for. Part of the long-term stormwater improvements will involve Staff selectively identifying private pipes to take ownership and responsibility of. He stated that everyone who owns a private pipe thinks it should be a City pipe, which is not feasible and why Staff needs to be selective.

For the prioritization matrix (Attachment A), Mr. Grogan said they incorporated weighting mechanisms to identify the likelihood of failure and the consequence of failure for each of the hotspot areas. The criteria used to determine the likelihood of failure and consequence of failure are detailed in Attachment B. Mr. Todd said with the exception of hotspots that fall into flood resiliency projects, the priority ranking provided by the matrix will be what guides our next phase of work. Mr. Grogan said the Cherry St. neighborhood and Ducks Drive neighborhood fall into the flood resilience category, as they are in FEMA flood zones and it is difficult to make a flood zone not flood.

Ms. Saur covered the existing conditions modeling and results (Attachment A), which used either 2D PCSWMM, 1D PCSWMM, or 2D HEC-RAS. Modeling shows the flooding extents and incorporated homeowner accounts about where flooding occurrences.

Grove + Dogwood St. (2D PCSWMM): Ms. Saur explained that Public Works changed the alignment of one of the pipes near Betsy Smith's house about a year ago and the flooding was very close to the home's foundation. They are now able to look at the pipe sizes to determine if they are sufficient to handle the amount of stormwater or if they need to be upsized. She added that they are modeling a 10-year storm and with a 10-year storm, they want to keep the stormwater underground within the pipes and catch basins as much as possible. With a 10-year storm, they are still seeing substantial flooding on the model and therefore, it is a good place for a hotspot to be identified.

Oakwood Dr. (2D PCSWMM): Ms. Saur stated that this area consists of driveway culverts and open channel that feeds into Lamb Creek. The front yards in this area are currently flooding and the water is flowing over top of the driveways, creating a safety issue when residents cannot get in and out of their homes during flood events.

Duckworth Ave. (1D PCSWMM): Each pipe in this area was analyzed to identify the biggest storm that each could handle. Red is a 2 year storm, which is a small, but high intensity storm, and pipes highlighted in red are completely full during a 2-year storm event. Red pipes indicate a 2-year level of service and the goal is for all the pipes to have a 10-year level of service. Most of the pipes are red, meaning that this area is running under a high pressurized system in lower storm events. In this neighborhood, there are reports of flooding in backyards and pipes traveling through private property that are undersized. There is about 25 acres of drainage area traveling through the neighborhood, which is significant for the size of pipes, and it is catching the drainage from much of Downtown's impervious areas. Mr. Todd added that pipes do go through private properties but in many cases, there is no clear legal indication of ownership. In some cases, the lines on private property may be carrying public stormwater and in other cases, they may be ditches that someone decided to put a pipe in. If there is not an easement or something that

declares the pipe to be the City's, it will create difficult legal challenges in dealing with those issues. Mr. Todd is still going through the paperwork in those cases to try and identify ownership of the pipes, but it is challenging because if we use City funds to start fixing private pipes, there is no indication of where to stop. Ms. Saur said it is up to each municipality on how they choose to deal with pipes on private property that could be carrying public stormwater and causing a flooding issue, and they see municipalities who want to fix those issues, keep pipes in the public right-of-way for maintenance, and eliminate any liability issues with homeowners, while other municipalities want to avoid anything on private property.

Mayor Copelof asked if we have identified where we have private-public property issues. She added that we have been addressing the issues here and there as they arise. Mr. Hooper said he does not think we are there yet because that was not considered in the scope of this project. Mayor Copelof asked if we know where those issues are in the 10 hotspot areas. Mr. Hooper said it is property-by-property, as we may have easements for some properties and not for others, and Staff has not done all the research yet. He added that we know where pipes go under private property but we do not know if ownership is clear. Mr. Todd said Staff worked on the pipe on Betsy Smith's property in the past, so they felt they had some implied ownership. Mr. Hooper added that ownership over Ms. Smith's pipe has since been formalized.

Oakdale St. (1D PCSWMM): The portion of Oakdale St. between Caldwell St. and Broad St. is considered to be a "sag" because both Caldwell and Broad are higher up and there is frequent flooding in that section of Oakdale. Similar to Duckworth Ave., most of the pipes in this area are red, indicating they are full during a 2-year storm.

Varsity + Gaston St. (1D PCSWMM): The flooding in this area comes down Gaston St. to the intersection with Varsity St. The majority of the pipes are red and the pipes are 36", which is a fairly large size system, but the system is getting anywhere from 23-33 acres of drainage and much of that is coming from downtown's impervious surfaces. There is a house at the corner, where there is a catch basin at the bottom that is not in the best shape. From there, the pipe goes under their house and discharges in the backyard to the creek. Mr. Todd added that there are two parallel pipes carrying stormwater and then another coming from the Universalist Church parking lot, which has sink holes.

44 Maple St. (1D PCSWMM): Ms. Saur said this case is what Mr. Todd was alluding to, in that a pipe goes directly under a house and shed. While the pipe is sized appropriately and the lot does not necessarily experience flooding, this is more of an infrastructure issue and there will need to be a decision about how to address the pipe, foundation issues, etc. A camera was used to look at the pipe under the house and about 75 ft. in, the camera was directly under the house. The pipe seems to be in good condition and the pipe may have been placed in a ditch so that the land could be built upon. Mr. Daniel asked if it is privately owned. Mr. Todd said he is still trying to find out. Mr. Hooper said it likely is because we have not found anything.

Silversteen Dr. Culvert (2D HEC-RAS): The purple, light blue, and dark blue indicate flooding extents for 10-year, 25-year, and 100-year storms, respectively. The model shows the road flooding in a 10-year storm and the goal is to design the road to only experience flooding during a 25-year or 50-year storm. Silversteen Dr. has required repaving due to the flooding, so this is an opportunity to upsize the culvert to reduce flooding and impacts to the road. The area, Norton Creek, is in a FEMA floodplain and has almost 1.5 square miles of drainage flowing to it, which is significant. The pipe starts as a 60", converts to a 66" and then converts to a 72" pipe, which is uncommon and can cause structural issues. Mr. Todd said while Hillview Culvert will now be sized for a 100-year storm, this culvert is still very undersized. There is stream bank restoration work taking place upstream of the culvert and stream bank stabilization work taking place downstream of the culvert.

Batson Rd. Culvert (2D HEC-RAS): Similar to the Silversteen Dr. Culvert, the model shows flooding over the road in a 10-year storm and this road has also required repaving due to frequent flooding. Ms. Saur said by right-sizing the culvert, the goal is to reduce the frequency of flooding on the road. The current culvert is 36" and transitions from a concrete pipe to a plastic pipe. There is also a bend in the pipe, therefore, this culvert has both structural issues and blind junction areas.

Cherry St. and Ducks Drive neighborhoods (2D HEC-RAS): Ms. Saur said these areas do not have a lot of stormwater infrastructure associated with them. Ducks Drive does not have any driveway culverts, and Cherry St. has some privately owned driveway culverts. Other than 2 large culverts crossing under Cherry St. and Old Hendersonville Hwy, there is no other stormwater infrastructure. Ms. Saur showed a FEMA floodplain map and explained that in current times, if you were trying to build a house here, you would not. The homes are likely old and pre-date the floodplain maps. There are even some houses in the floodway, which is not allowed anymore. Due to the flooding coming from the French Broad River and Lamb Creek, there is no amount of stormwater pipes that could be placed in the ground to fix the issue. Floodplains are meant to flood during storms, so it will be difficult to find a solution for this area. Mr. Todd added that Ducks Drive is a trailer park and all of those trailers were raised to be out of the floodplain. For Cherry St., some of the homes have been raised and some of the homes are still disputing that. Some homeowners have requested a buyout but none have been awarded at this time.

Mr. Todd said that in discussing the flood resiliency aspect with Aaron Bland, the Assistant Planning Director, there are 4 flood prone areas in the City. In addition to the 2 listed here, there are Davidson River Rd. and Cemetery Rd. Of those areas, Cherry St. is in the City limits, but the other 3 are within the extraterritorial jurisdiction (ETJ). He added that Jane Margaret with Land of Sky (LoS) has been helping look for grants for Phase 2 of this project and there is more availability of grants to deal with homes in a flood-prone area than there is for stormwater infrastructure, which is much harder to find. Mr. Todd recommended removing Cherry St. and Ducks Drive from Phase 2 efforts to seek funding and putting them in a separate category that would be addressed in the same way we address floodplain

issues. Flood resiliency grants could be sought out for these areas rather than stormwater infrastructure improvements, as they will require a different effort, and we could focus on the 8 hotspots that have true stormwater infrastructure issues. He added that upsizing the culverts in the area will not fix the issues so he does not know if it is a wise use of money to continue pursuing the areas in the floodplain.

Mr. Hooper asked why there are two columns each for both the likelihood of failure and consequence of failure (Attachment B). Mr. Grogan said the scoring was weighted and there was a second column to standardize the scores out of 10.

Mr. Hooper asked about the GIS map and whether that is something the City can update. Ms. Saur said the dashboard is housed under McAdams' GIS license but they sent staff all of the raw data and the geodatabase, so staff can house the geodatabase and all of the shape files on the City's software and update it as needed. Mr. Hooper asked how long McAdams is willing to keep it on their software. Ms. Saur said that is something being discussed internally with their GIS group, as they have a few dashboards, so they are still seeing what that looks like. Mr. Todd said even if staff are capable of accessing and updating the data in the field, he is worried about someone making a mistake when updating the data or accidentally deleting something. He added that with the Water and Sewer AIA work that Alvin created in GIS, they came to an agreement that he would compile all updates and Alvin would update all 3 GIS maps quarterly. Mr. Carson noted that there are ways to control and regulate access in GIS, and recommended training our employees on how to update the data digitally in the future so that the data entry does not have to be outsourced.

The Committee thanked McAdams for their work and for presenting the results.

Committee Comments

Mayor Copelof asked if we ever answered the Deertrack residents on their stormwater culvert issue. Mr. Hooper said he does not think so, but he is confident now in the answer we are going to give. He added that similar to the earlier discussed case, the City had some implied responsibility and they were checking with public works employees to see if we had performed work there in the past and not recorded it. Wesley and other public works employees do not have any recollection of any work being performed there, so they believe the CMP was put there by the HOA without being accepted by the City and therefore, it is their responsibility. Mr. Carson asked about the context. Mr. Hooper explained that at the entrance to the neighborhood near Resada Dr., there is a small sink hole in the yard that has not washed all the mud away, but it could pose a small hazard to someone walking down the road because there are no sidewalks. The residents asked the City to fix it and after examining the plat, there was infrastructure dedicated to the City, but that pipe was not included because it was a ditch at the time. Mr. Hooper said he has to inform them that their HOA is responsible for it, but if they find any additional information as to City ownership, he will change his mind. He has not yet seen any documentation indicating that the City is legally responsible.

Mr. Winans said last Wednesday he traveled to Noonday Wastewater Treatment Plant and 30 years ago, they took 48 RBCs out of service. He went with a department head from MSD and they inspected the RBCs that have been out of service. They found that all the RBCs were in amazing condition, in clear water, and had all the component parts. Mr. Winans said he has handed it off to the director at MSD because they would be interested in purchasing a lot more than we would. Initial discussions were all or nothing, but negotiations are now ongoing. He wanted everyone to be aware of that and Mr. Todd added that this may reduce the need for the electric driven RBC upgrades. He added that we were at risk because we could not find spares, but if we find enough spares, we may be able to move forward without electric driven RBCs. All of the Noonday RBCs are high density RBCs, but Mr. Winans thinks he can make that work. Mr. Todd said it is a really good option, but they are going to get more information before recommending a path forward.

H. Public Comment

No members of the public spoke during the Public Comment period.

I. Set Next Meeting – Wednesday, November 4, 2026 at 3:30pm

The next regular meeting of the committee will be on November 4, 2026 at 3:30pm.

J. Adjourn

There being no further business, the meeting was adjourned at 5:34 p.m.

Minutes Approved: November 4, 2026

Lauren Wise, Chair, Council Member
Gary Daniel, Vice Chair, Council Member

Shawnee A. Cummings
Shawnee Cummings
Assistant to the City Manager



McAdams

Phase 1 Results – Stormwater MP

City of Brevard

Team Introduction

McAdams Team



Max Grogan
PE

McAdams |
Senior Project Manager



Mary Beth Hall
EIT

McAdams |
Designer I



Brie Saur
PE

McAdams |
Assistant Project Manager

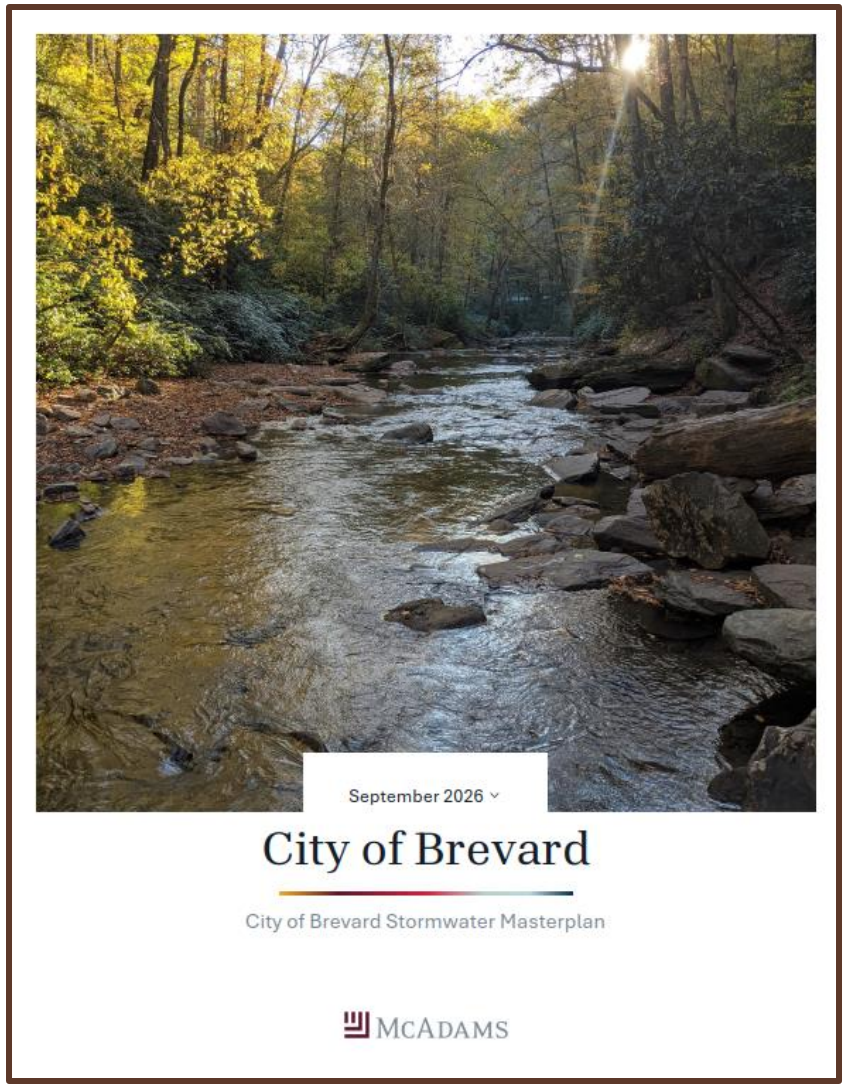
Support Team

- **Annette Lucas PE**
  McAdams | Program Management
- **Allison Anolik**
  McAdams | Funding Advisory Services
- **Matt McCurdy**
  S&ME | CCTV Services
- **Owen Carson**
  Equinox | Environmental Assessment + GSI Support

Stormwater Master Plan Implementation

Phase 1 (Identification of Projects)
(FY26: July 2025 – June 2026)

- Preliminary Design Phase
  - Project Management + Administration
  - Pipe Cleaning / CCTV + Traffic Control
  - Field Data Collection
- Existing Conditions Analysis
  - Geodatabase Management + Dashboard Creation
  - Analysis of Existing Stormwater Systems
- Engineering Concept + Design Plans
  - CIP Prioritization Development + Implementation
  - Stormwater Assessment Report
- Policy + Program Recommendations
  - UDO Update
- Ecusta Trail – Culvert Analysis

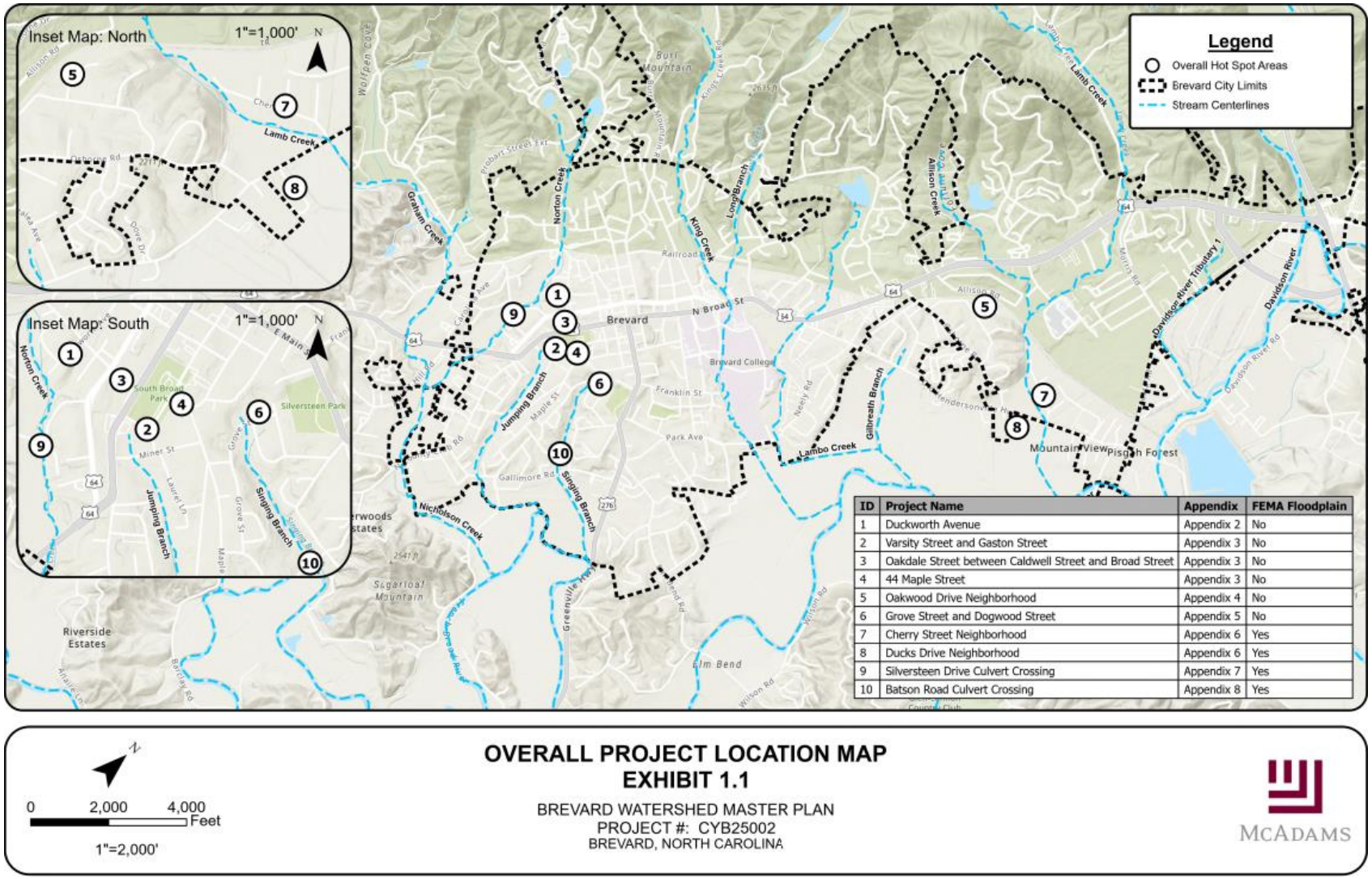


Scoped Area

Hotspot Areas (10 Total)

FIELD DATA COLLECTION

1. Duckworth Avenue
2. Varsity Street and Gaston Street
3. Oakdale Street between Caldwell Street and Broad Street
4. 44 Maple Street
5. Oakwood Drive Neighborhood
6. Grove Street and Dogwood Street
7. Cherry Street Neighborhood
8. Ducks Drive Neighborhood
9. Silversteen Drive Culvert Crossing
10. Batson Road Culvert Crossing



ID	Project Name	Appendix	FEMA Floodplain
1	Duckworth Avenue	Appendix 2	No
2	Varsity Street and Gaston Street	Appendix 3	No
3	Oakdale Street between Caldwell Street and Broad Street	Appendix 3	No
4	44 Maple Street	Appendix 3	No
5	Oakwood Drive Neighborhood	Appendix 4	No
6	Grove Street and Dogwood Street	Appendix 5	No
7	Cherry Street Neighborhood	Appendix 6	Yes
8	Ducks Drive Neighborhood	Appendix 6	Yes
9	Silversteen Drive Culvert Crossing	Appendix 7	Yes
10	Batson Road Culvert Crossing	Appendix 8	Yes

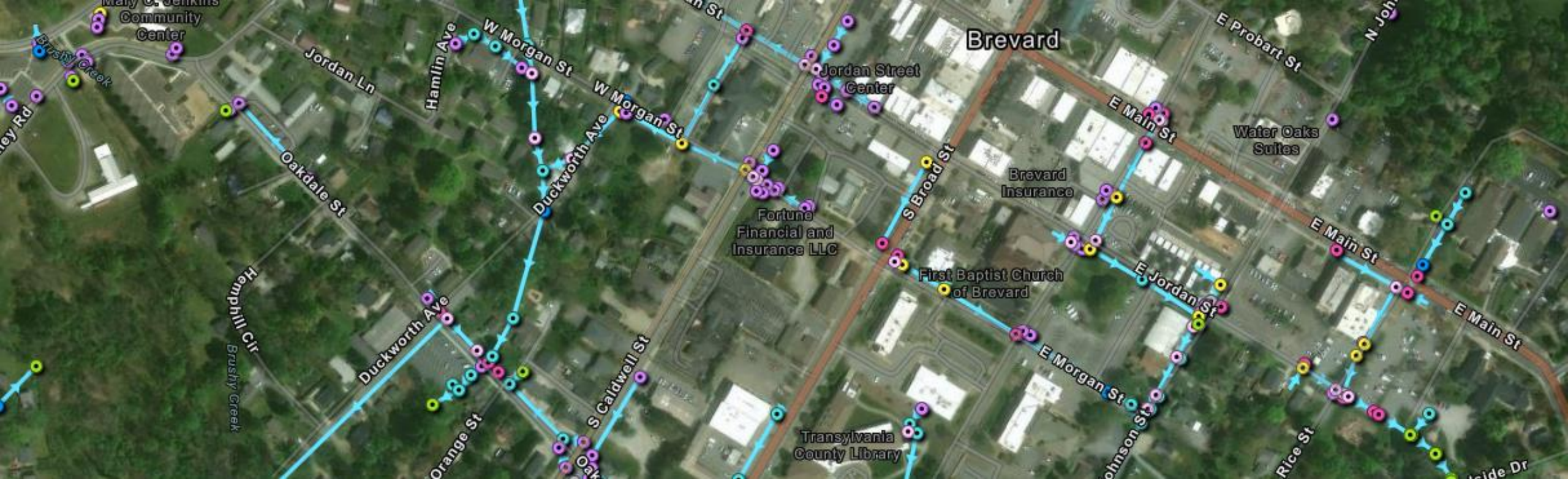
0 2,000 4,000 Feet

1"=2,000'

OVERALL PROJECT LOCATION MAP
EXHIBIT 1.1

BREVARD WATERSHED MASTER PLAN
PROJECT #: CYB25002
BREVARD, NORTH CAROLINA

McAdams

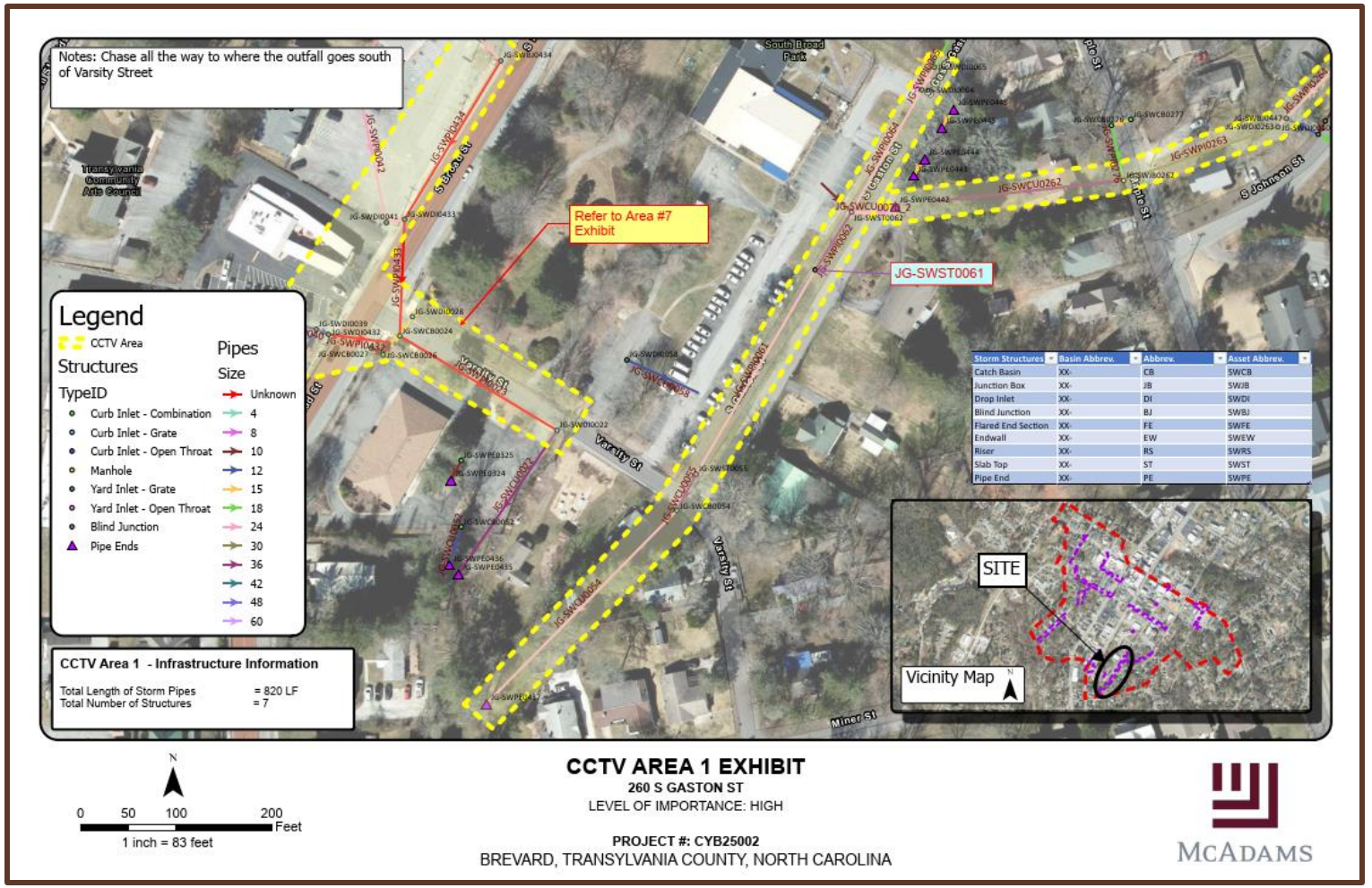


Field Data Collection

CCTV Results

S&ME Report

- CCTV Overview
  - 3,741 linear feet of CCTV
  - Majority RCP or CMP
  - Majority 12-inch to 36-inch diameter
- CCTV Conclusions + Recommendations
  - Majority poor to fair condition
  - Pipe deformities present
  - Soil and roots protruding
- Deliverables
  - CCTV Overview Narrative
  - Pipe CCTV Summary Table
  - Inspection Reports
  - NASSCO Scoring
  - Video + photo



WinCan

Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
3/31/2026			Tony Prelozny	U-916-07005448	JG-SWCB0054_JG-SWPE043
Year laid:	Pre-cleaning: No Pre-Cleaning	Direction: Downstream	Pipe Joint Length:	Total Length: 11.4 '	Length Surveyed: 11.4 '

City:	Brevard	Drainage Area:		Upstream MH:	JG-SWCB0054
Street:	Varsity St.	Media Label:		Up Rim to Invert:	0.0
Location Code:		Flow Control:		Downstream MH:	JG-SWPE0437
Location Details:		Sheet Number:		Down Rim to Invert:	0.0
Pipe shape:	Circular	Sewer Use:	Stormwater Pipe	Total gallons used:	0.0
Pipe size:	24 "	Sewer Category:	SEC	Joints passed:	0
Pipe material:	Reinforced Concrete Pipe	Purpose:		Joints failed:	0
Lining Method:		Owner:			
Additional Info:	JG-SWCB0054 TO JG-SWPE0437				

1:86	Distance	Code	Observation	Grade	
JG-SWCB0054					
	0.0	MGO	Miscellaneous General Observation / START INSPECTION		
	0.0	AMH	Manhole / JG-SWCB0054		
	0.0	MWL	Water Level, 5% of the vertical dimension / WATER/SILT		MWL - 0.00
	0.0	CL	Crack Longitudinal at 12 o'clock / CRACKING	S2	
	5.6	B	Broken from 11 o'clock to 12 o'clock / BROKE/CHIPPED AREA AT JOINT	S4	CL - 0.00
	11.1	CM	Crack Multiple from 9 o'clock to 3 o'clock / VARIOUS CRACKS	S3	
	11.3	BVV	Broken Void Visible from 4 o'clock to 7 o'clock / BROKE OUT AREA W/VOID	S5	CL - 0.00
	11.3	OBI	Obstruction Intruding Through Wall, 10% of cross sectional area from 3 o'clock to 9 o'clock / PVC PIPE, POSSIBLY SEWER LINE INSTALLED	M5	
	11.3	MGO	Miscellaneous General Observation / UNABLE TO CONTINIUE INSPECTION DUE TO VOID AND PVC		
	11.3	MGO	Miscellaneous General Observation / USING ZOOM, SHOWS RCP STOPS, BECOMES CMP		



JG-SWCB0054_JG-SWPE0437_260331_133913Obstruction Intruding Through Wall, 10% of cross sectional area from 3 o'clock to 9 o'clock.jpg, 00:08:41, 11.32ft
Obstruction Intruding Through Wall, 10% of cross sectional area from 3 o'clock to 9 o'clock / PVC PIPE, POSSIBLY SEWER LINE INSTALLED



Pipe CCTV Summary Table

Brevard Stormwater Master Plan-Pipe CCTV Services
S&ME Project No. 25410037

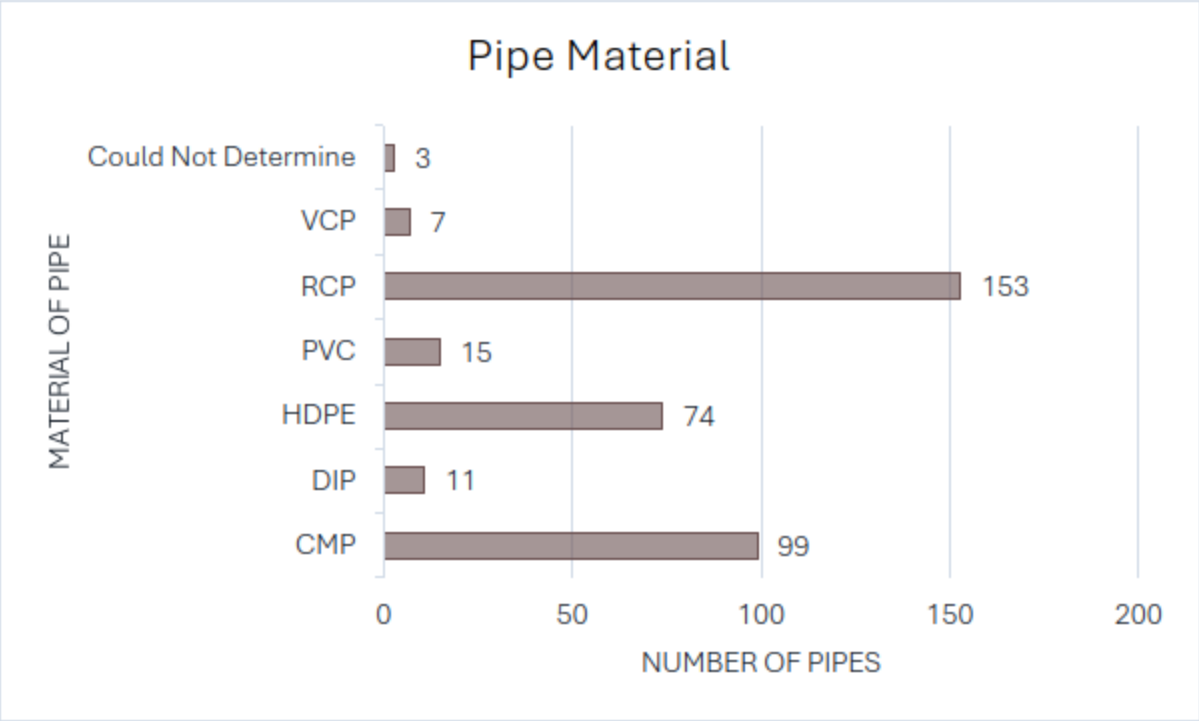
Pipe Segment	Area	Pipe Dimensions (in)	Pipe Material	Pipe Length Explored (ft)	Summary of Comments Pipe shape is circular and joint offset is medium unless noted
JG-SWCB0026_JG-SWCB0024	1	10x18	Corrugated Metal	11.3	oval; joint offset; good condition; leaves; water level 5% of vertical dimension
JG-SWCB0026_JG-SWCB0027		10x18	Corrugated Metal	11.1	oval; joint offset; fair condition; leaves/debris; water level 5% of vertical dimension
JG-SWCB0054_JG-SWPE0437		24	Reinforced Concrete	11.4	multiple cracks; broken/chipped areas; broken void; obstruction intruding through wall (PVC pipe); poor condition; inspection ended at 11 ft due to void and PVC pipe; silt; water level 5% of vertical dimension; pipe transitions to corrugated metal beyond 11.4 ft
JG-SWCB0054_JG-SWST0055		24	Corrugated Metal	37.5	joint offset; extreme debris (rocks/bricks); water level 20% to 35% of vertical dimension; fair condition
JG-SWDI0022_JG-SWCB0024		36	Corrugated Metal	122.1	deformed flexible elliptical; sagging; joint offset; water level 30 to 60% vertical water level; poor condition; rocks/dirt/silt; inspection ended at 122 ft due to water
JG-SWDI0022_JG-SWPE0435		36	Corrugated Metal	28.2	joint offset; separation and sealant/soil visible; poor condition; water level 10% of vertical dimension; pipe shows signs of shape change/oval
JG-SWDI0028_JG-SWCB0024		15	Corrugated Metal	14.1	joint offset; blind junction at 14 ft (end of pipe); fair condition
JG SWDI0065 TO JG SWDI0064		24	Reinforced Concrete	18.1	joint offset; broke out area to connect additional pipe; water level 10 to 20% of vertical dimension; poor condition
JG SWPE0325 TO JG SWPE0324		12	Reinforced Concrete	1.1	water level 40% of vertical dimension; rocks/dirt/silt/leaves; could not test due to extreme debris
JG-SWPE0435_JG-SWDI0022		36	Corrugated Metal	145.5	Circular to slight oval; joint offset and separation; stopped at 145 ft due to damage; water level 20 to 35% vertical dimension; rocks/dirt
JG-SWPEO436_JG-SWCB0052		36	Reinforced Concrete	78.8	joint offset; visible broken void; reinforcement wire exposed; obstruction built into structure (apparent RCP); roots on each side; stopped at 78 ft – extreme silt/dirt; water level 30 to 40% vertical dimension
JG-SWST0062_JG-SWDI0064		24	Corrugated Metal	145	joint offset; crack circumferential; signs of separation; reinforcement wire exposed; fair/poor condition; rocks/dirt; water level 15 to 35% vertical dimension
JG-SWST0062_JG-SWST0055		36	Reinforced Concrete	307.6	longitudinal cracking; joint offset; broken areas w reinforcement wires and soil exposed; gauge from install; fair/poor condition; water level 5 to 10% vertical dimension

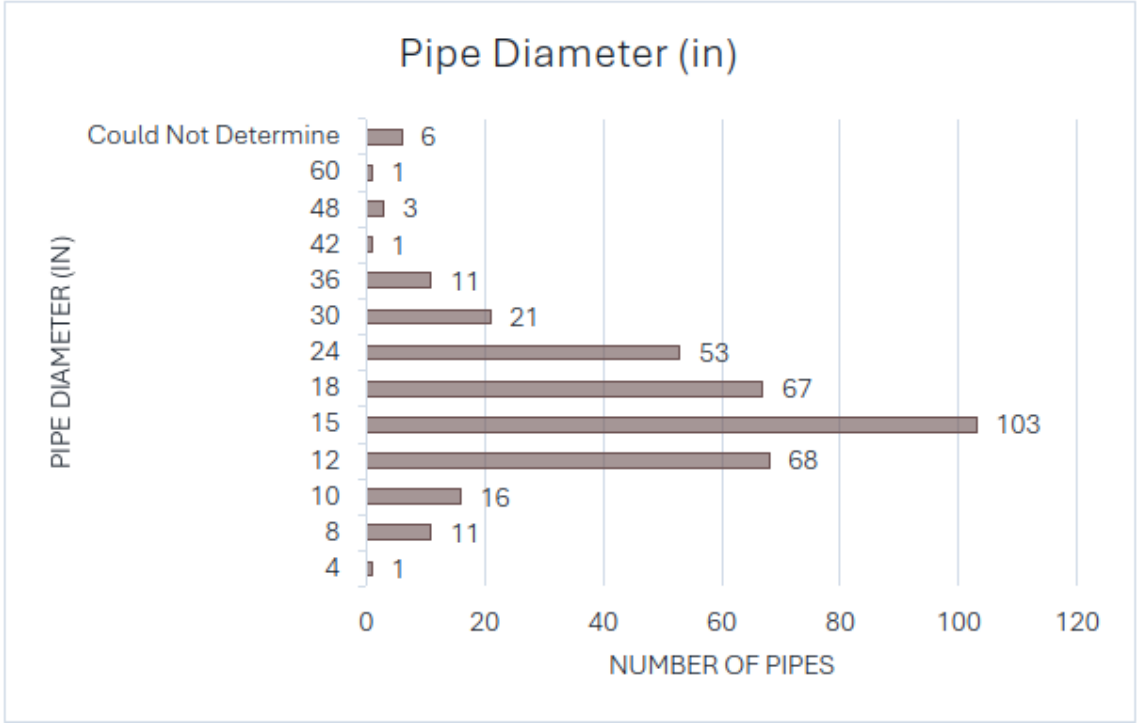
Field Data

Overview

PIPE DATA COLLECTED

- Longitude and Latitude Coordinates
- Pipe Dimension
- Clogging
- Material
- Depth to Pipe Invert
- Miscellaneous Notes



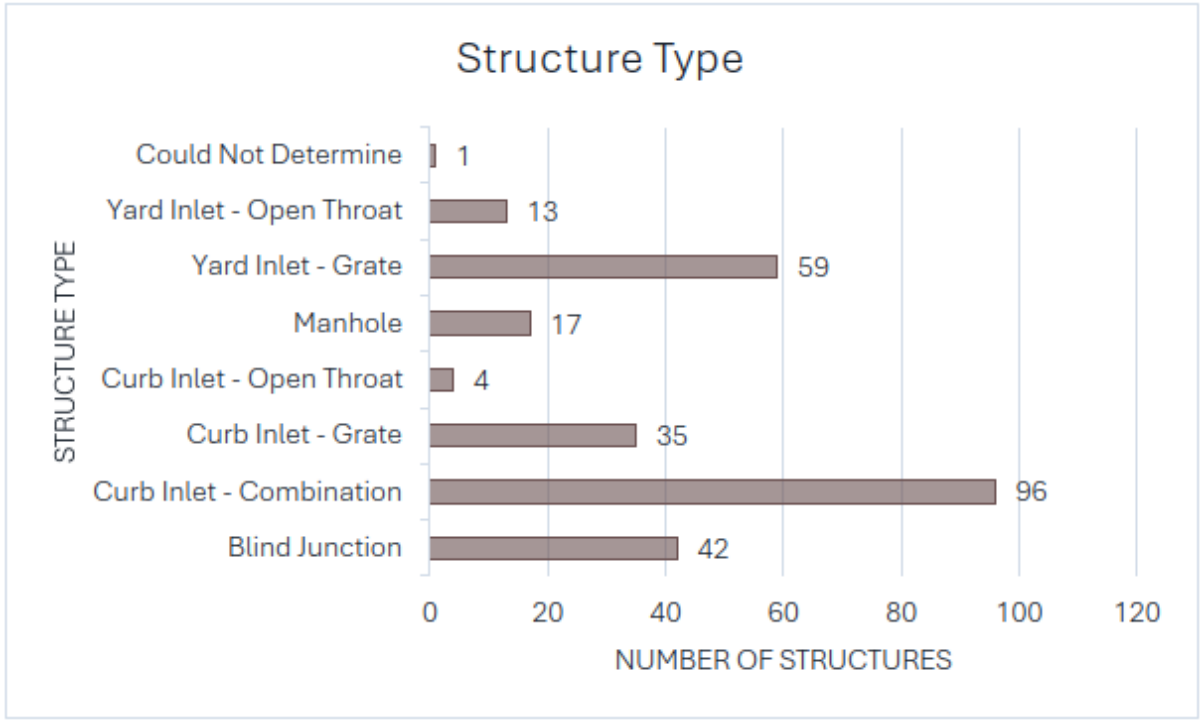


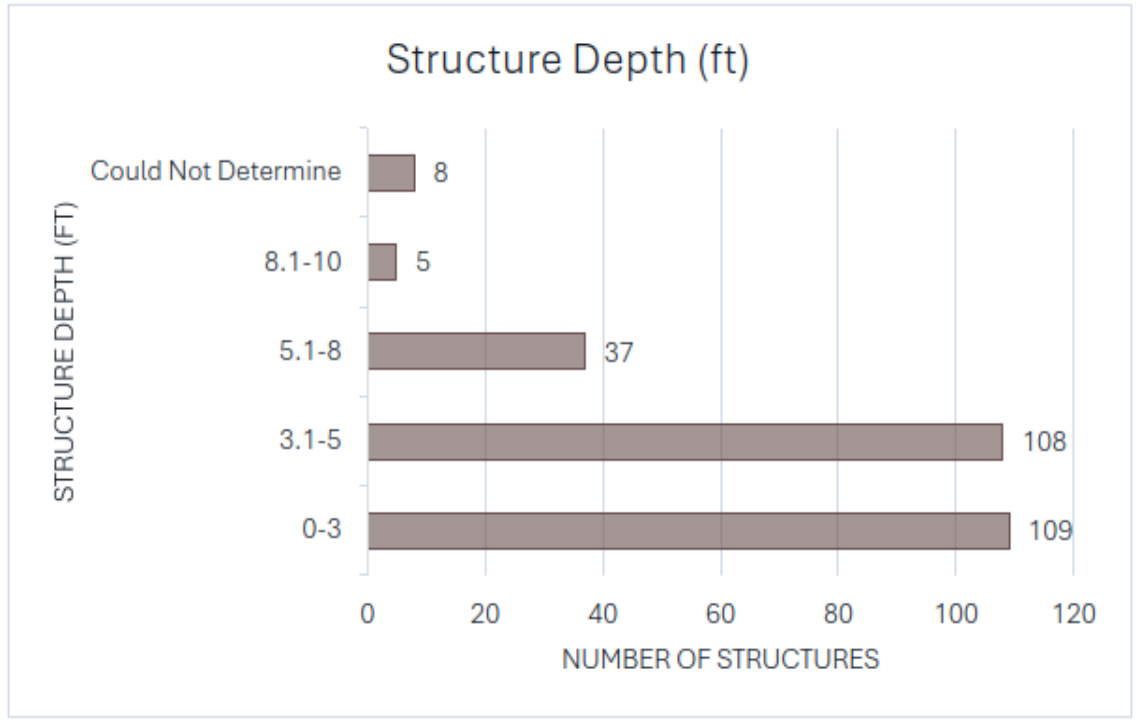
Field Data

Overview

STRUCTURE DATA COLLECTED

- Longitude and Latitude Coordinates
- Number of Pipe Connections
- Type of Structure
- Clogging
- Material
- Structure Depth
- Miscellaneous Notes



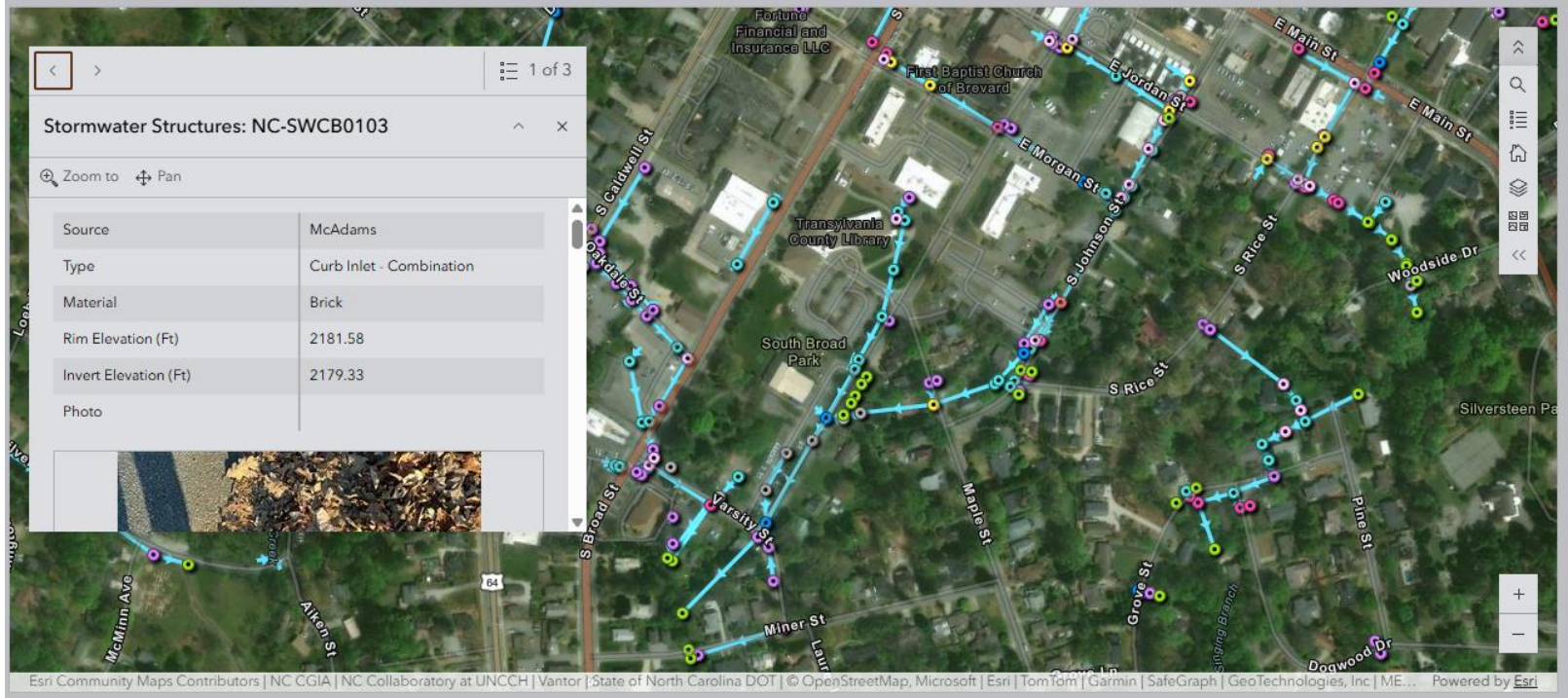


Field Data - Dashboard

Brevard AIA
McAdams Dashboard

Structures - Source
All

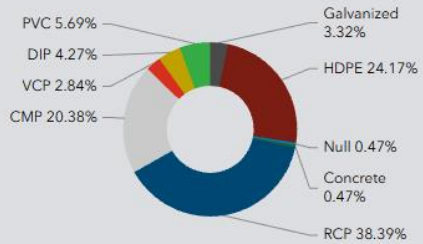
Pipes - Source
All



Structures by Type



Pipes by Material

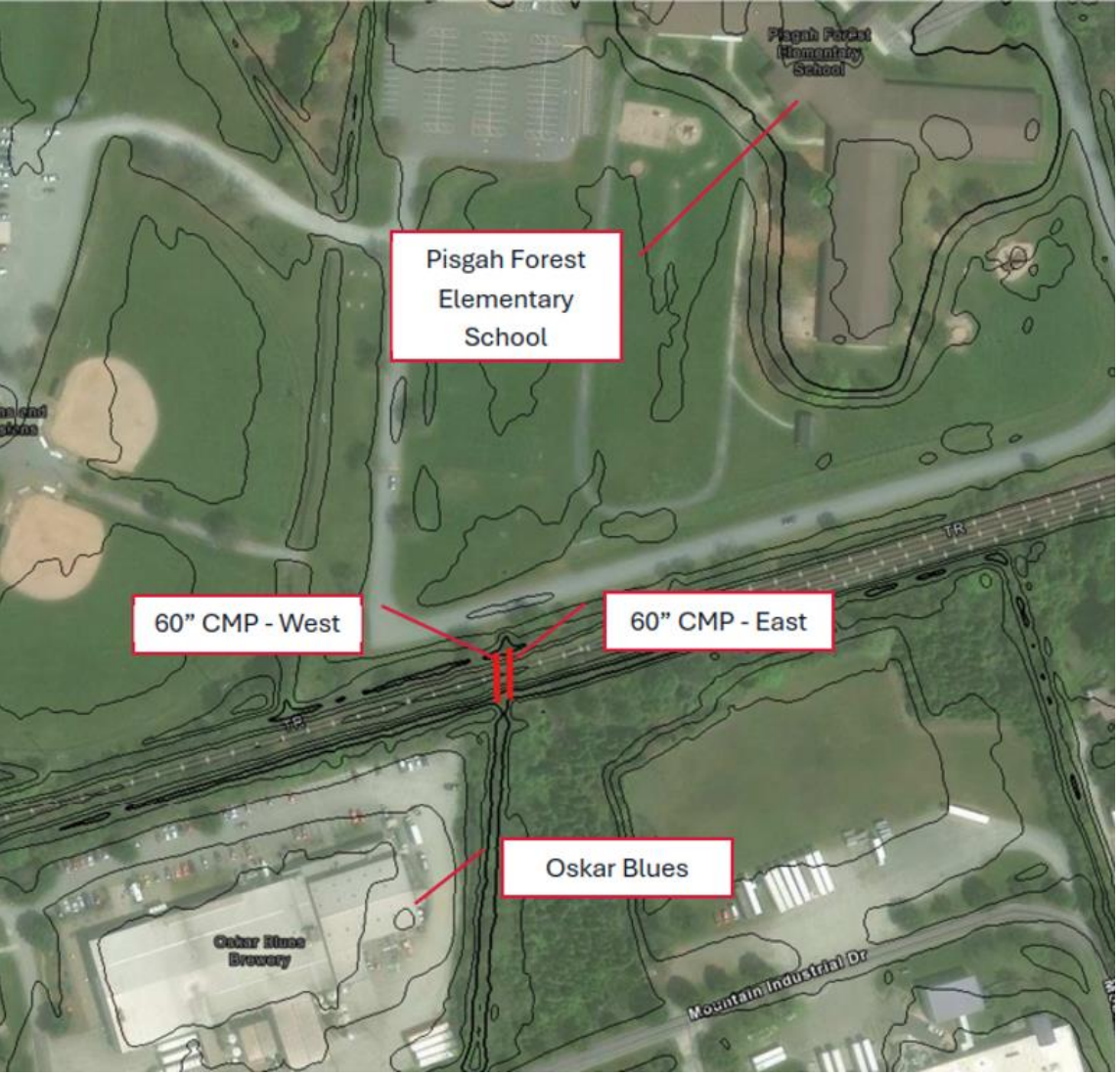


Stormwater Structures

ID	Source	Type	Material
JG-SWCB0270	McAdams	Curb Inlet - Combination	Brick
JG-SWCB0077	McAdams	Curb Inlet - Combination	Concrete/CMU
JG-SWJB0262	McAdams	Manhole	Brick
JG-SWDI0006	McAdams	Yard Inlet - Grate	Concrete/CMU
NC-SWDI0092	McAdams	Curb Inlet - Grate	Brick
NC-SWCB0103	McAdams	Curb Inlet - Combination	Brick
NC-SWCB0098	McAdams	Curb Inlet - Combination	Concrete/CMU

Stormwater Pipes

ID	Source	Material	Size (In)
NC-SWPI0097	McAdams	RCP	15
SB-SWPI0479	McAdams	HDPE	18
SB-SWPI0414	McAdams	HDPE	24
NC-SWPI0159	McAdams	RCP	15
NC-SWPI0158	McAdams	RCP	15
SB-SWPI0415	McAdams	HDPE	24
SB-SWPI0416	McAdams	HDPE	24



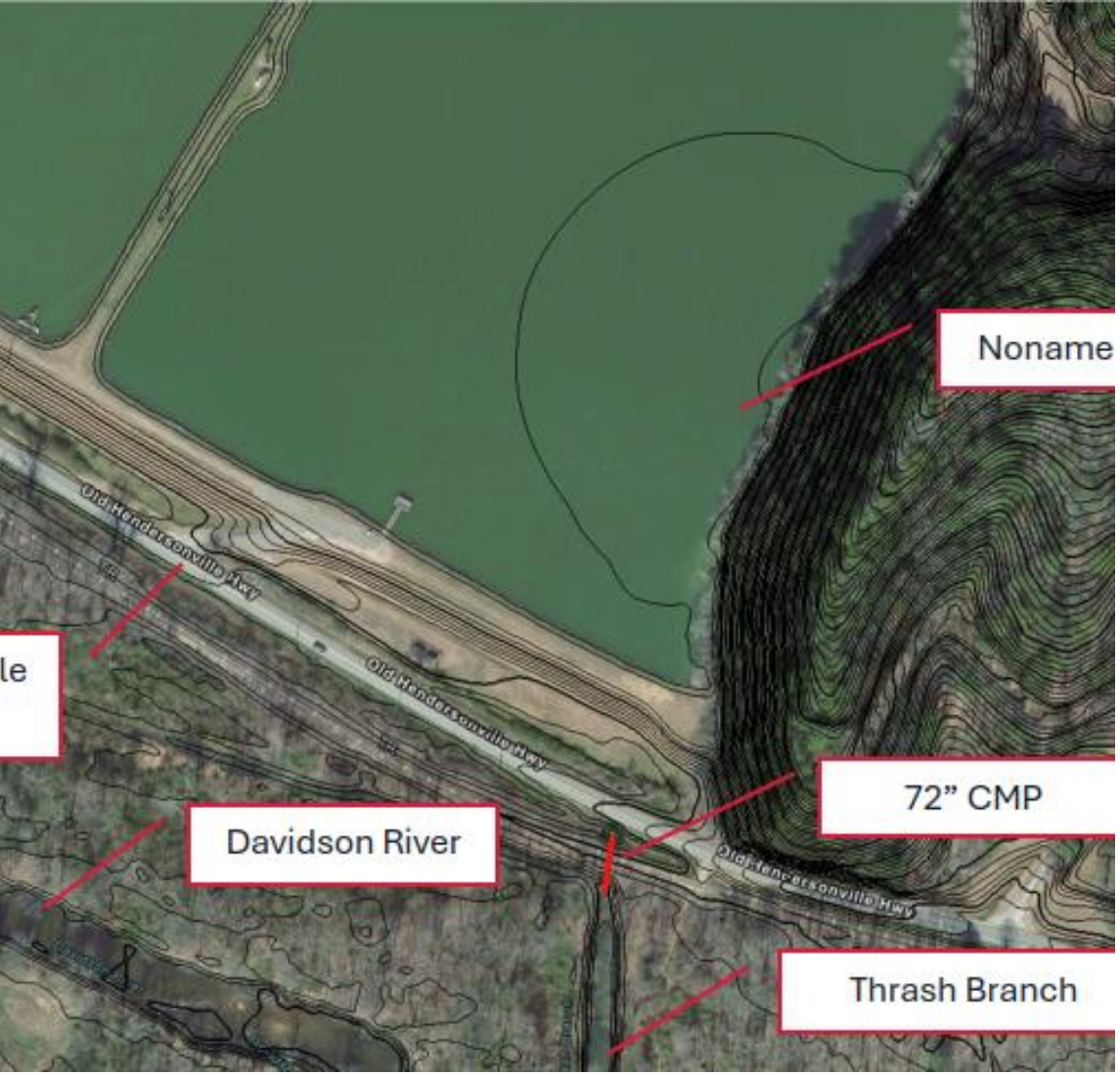






SITE 1 – DUAL 60-INCH CMP

Ecusta Trail – Culvert Analysis









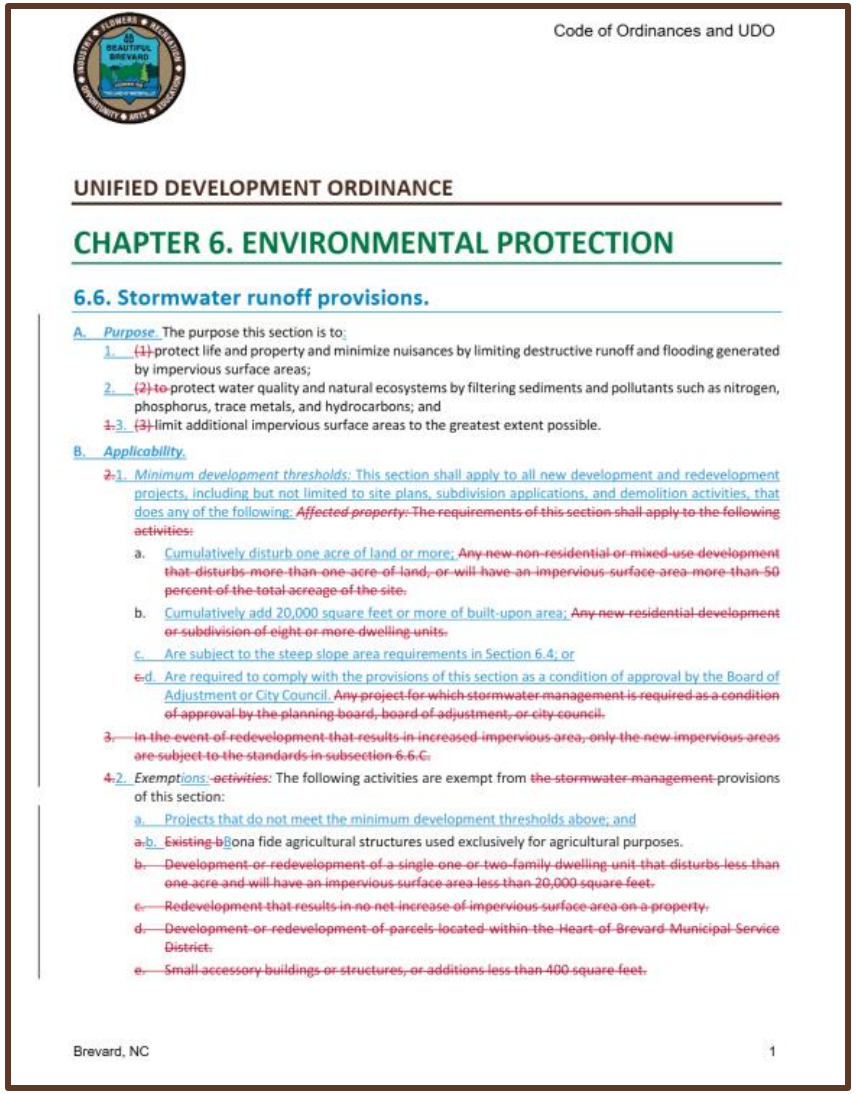
SITE 2 – 72-INCH CMP

Ecusta Trail – Culvert Analysis

Overview of UDO Updates

Summary of Changes, Part 1

- Applicability
  - Before: based on the size of the development with smaller developments considered exempt
  - After: based on the amount of built-upon area
  - Benefit: more equitable
- Design Standards
  - Before: 85% Total Suspended Sediment removal
  - After: use primary Stormwater Control Measure (SCM)
  - Benefit: consistent with state rules and more achievable
- Low Impact Development (LID)
  - Before: LID required but not defined
  - After: LID defined based on the type of SCM and incentivized by reducing the size of the storm that must be captured and treated
  - Benefit: LID is defined and encouraged but there is flexibility to choose other approaches



Code of Ordinances and UDO

UNIFIED DEVELOPMENT ORDINANCE

CHAPTER 6. ENVIRONMENTAL PROTECTION

6.6. Stormwater runoff provisions.

A. *Purpose.* The purpose this section is to:
1. ~~(1)~~ protect life and property and minimize nuisances by limiting destructive runoff and flooding generated by impervious surface areas;
2. ~~(2) to~~ protect water quality and natural ecosystems by filtering sediments and pollutants such as nitrogen, phosphorus, trace metals, and hydrocarbons; and
~~1.~~3. ~~(3)~~ limit additional impervious surface areas to the greatest extent possible.

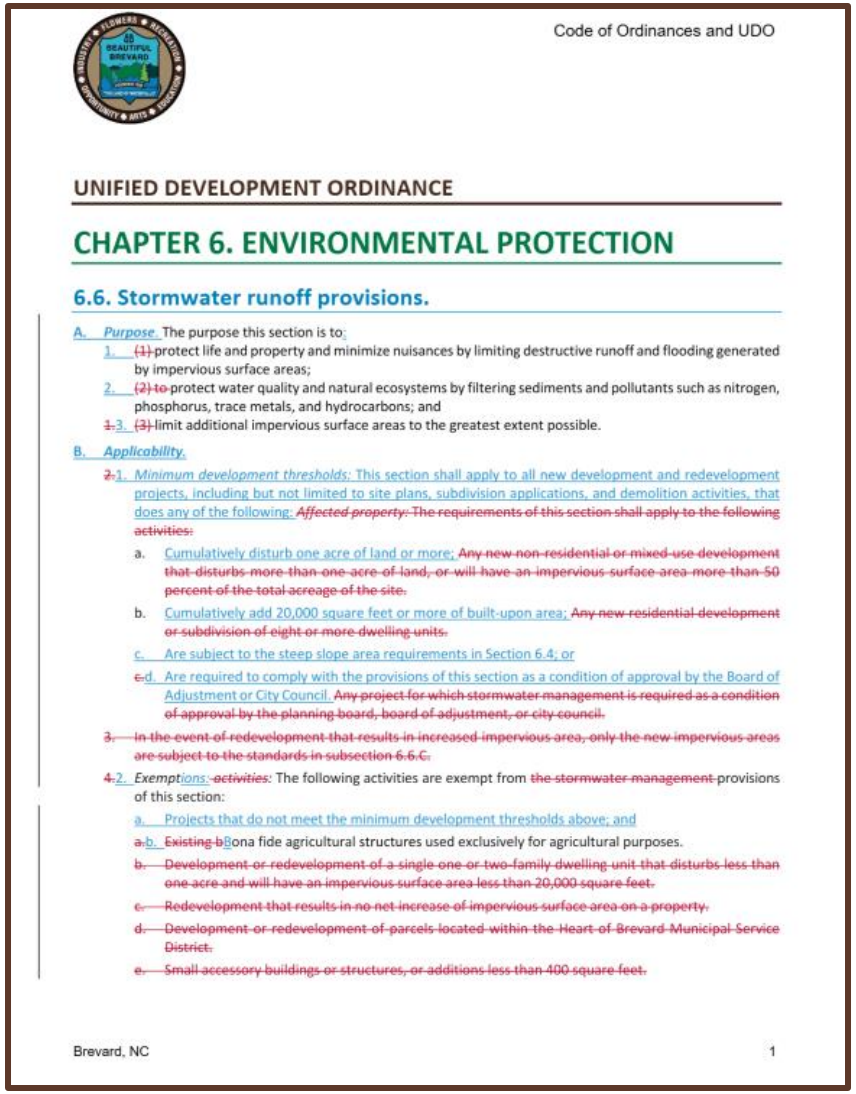
B. *Applicability.*
~~2.~~1. *Minimum development thresholds:* This section shall apply to all new development and redevelopment projects, including but not limited to site plans, subdivision applications, and demolition activities, that does any of the following: ~~*Affected property:* The requirements of this section shall apply to the following activities:~~
a. Cumulatively disturb one acre of land or more; ~~Any new non-residential or mixed-use development that disturbs more than one acre of land, or will have an impervious surface area more than 50 percent of the total acreage of the site.~~
b. Cumulatively add 20,000 square feet or more of built-upon area; ~~Any new residential development or subdivision of eight or more dwelling units.~~
c. Are subject to the steep slope area requirements in Section 6.4; or
~~c~~d. Are required to comply with the provisions of this section as a condition of approval by the Board of Adjustment or City Council. ~~Any project for which stormwater management is required as a condition of approval by the planning board, board of adjustment, or city council.~~
~~3. In the event of redevelopment that results in increased impervious area, only the new impervious areas are subject to the standards in subsection 6.6.C.~~
~~4.~~2. *Exemptions ~~activities~~:* The following activities are exempt from ~~the stormwater management~~ provisions of this section:
a. Projects that do not meet the minimum development thresholds above; and
~~a.~~b. ~~Existing b~~Bona fide agricultural structures used exclusively for agricultural purposes.
~~b. Development or redevelopment of a single one or two-family dwelling unit that disturbs less than one acre and will have an impervious surface area less than 20,000 square feet.~~
~~c. Redevelopment that results in no net increase of impervious surface area on a property.~~
~~d. Development or redevelopment of parcels located within the Heart of Brevard Municipal Service District.~~
~~e. Small accessory buildings or structures, or additions less than 400 square feet.~~

Brevard, NC 1

Overview of UDO Updates

Summary of Changes, Part 2

- Stormwater Management Plan
  - Before: not many details provided about the process
  - After: detailed process for applying for and obtaining stormwater plan approval
  - Benefit: more clarity for development community and hopefully better quality submittals for staff
- Operation and Maintenance of SCMs
  - Before: not many details provided
  - After: SCMs must be inspected once every two years and details about the contents of O&M agreements and inspection reports
  - Benefit: requirements are more clear and hopefully problems with SCMs will be caught and addressed sooner



Code of Ordinances and UDO

UNIFIED DEVELOPMENT ORDINANCE

CHAPTER 6. ENVIRONMENTAL PROTECTION

6.6. Stormwater runoff provisions.

A. *Purpose.* The purpose this section is to:
1. ~~(1)~~ protect life and property and minimize nuisances by limiting destructive runoff and flooding generated by impervious surface areas;
2. ~~(2) to~~ protect water quality and natural ecosystems by filtering sediments and pollutants such as nitrogen, phosphorus, trace metals, and hydrocarbons; and
~~1.~~3. ~~(3)~~ limit additional impervious surface areas to the greatest extent possible.

B. *Applicability.*
~~2.~~1. *Minimum development thresholds:* This section shall apply to all new development and redevelopment projects, including but not limited to site plans, subdivision applications, and demolition activities, that does any of the following: ~~*Affected property:* The requirements of this section shall apply to the following activities:~~
a. Cumulatively disturb one acre of land or more; ~~Any new non-residential or mixed-use development that disturbs more than one acre of land, or will have an impervious surface area more than 50 percent of the total acreage of the site.~~
b. Cumulatively add 20,000 square feet or more of built-upon area; ~~Any new residential development or subdivision of eight or more dwelling units.~~
c. Are subject to the steep slope area requirements in Section 6.4; or
~~c.~~d. Are required to comply with the provisions of this section as a condition of approval by the Board of Adjustment or City Council. ~~Any project for which stormwater management is required as a condition of approval by the planning board, board of adjustment, or city council.~~
~~3. In the event of redevelopment that results in increased impervious area, only the new impervious areas are subject to the standards in subsection 6.6.C.~~
~~4.~~2. *Exemptions; activities:* The following activities are exempt from ~~the stormwater management~~ provisions of this section:
a. Projects that do not meet the minimum development thresholds above; and
~~a.~~b. ~~Existing b~~Bona fide agricultural structures used exclusively for agricultural purposes.
~~b. Development or redevelopment of a single one or two-family dwelling unit that disturbs less than one acre and will have an impervious surface area less than 20,000 square feet.~~
~~c. Redevelopment that results in no net increase of impervious surface area on a property.~~
~~d. Development or redevelopment of parcels located within the Heart of Brevard Municipal Service District.~~
~~e. Small accessory buildings or structures, or additions less than 400 square feet.~~

Brevard, NC 1





Prioritization Results

Prioritization Results

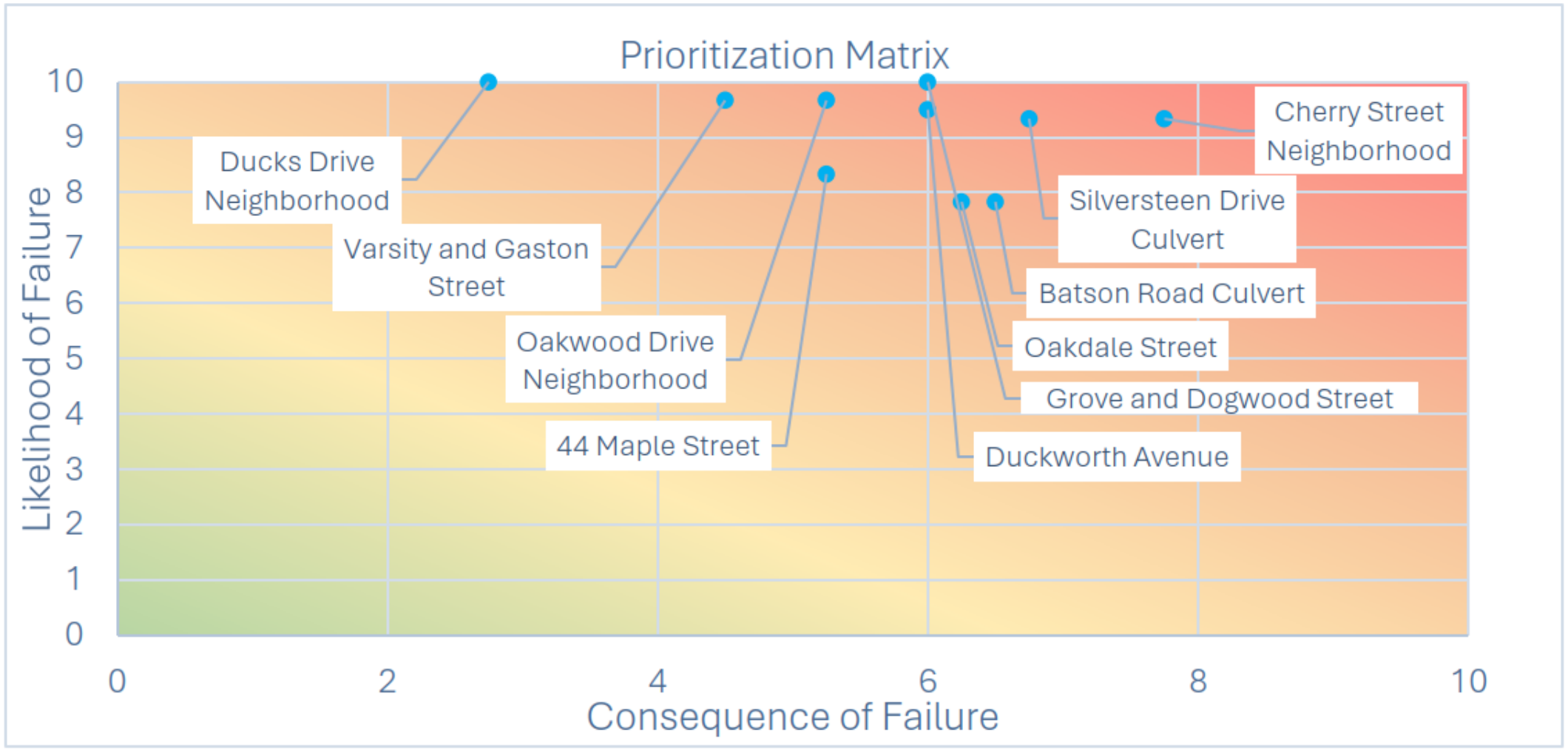


Figure 1: Prioritization Matrix – PWS Results

Prioritization Results

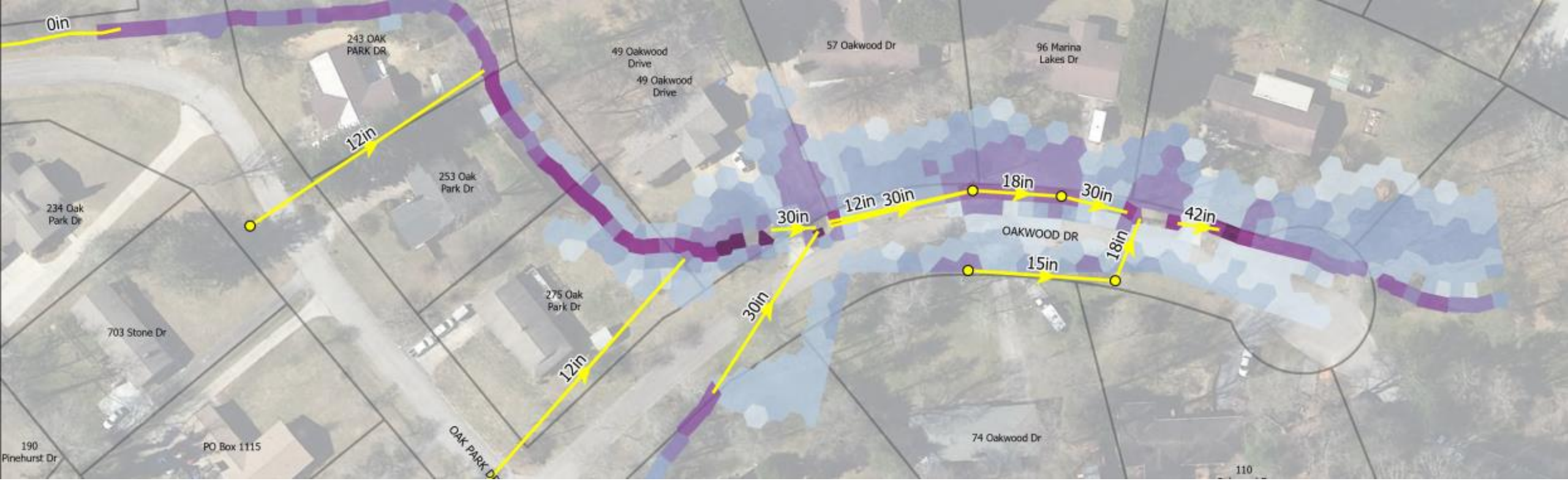
Hot Spot Area	Consequence of Failure	Consequence of Failure / 10	Likelihood of Failure	Likelihood of Failure / 10
Cherry Street Neighborhood	3.1	7.8	5.6	9.3
Grove and Dogwood Street	2.4	6.0	6	10.0
Silversteen Drive Culvert	2.7	6.8	5.6	9.3
Duckworth Avenue	2.4	6.0	5.7	9.5
Oakwood Drive Neighborhood	2.1	5.3	5.8	9.7
Varsity and Gaston Street	1.8	4.5	5.8	9.7
Batson Road Culvert	2.6	6.5	4.7	7.8
Oakdale Street	2.5	6.3	4.7	7.8
44 Maple Street	2.1	5.3	5	8.3
Ducks Drive Neighborhood	1.1	2.8	6	10.0

Hot Spot Area	Total Score	Product Weighted Score	Priority Ranking
Cherry Street Neighborhood	8.7	72.33	1
Grove and Dogwood Street	8.4	60.00	2
Silversteen Drive Culvert	8.3	63.00	3
Duckworth Avenue	8.1	57.00	4
Oakwood Drive Neighborhood	7.9	50.75	5
Varsity and Gaston Street	7.6	43.50	6
Batson Road Culvert	7.3	50.92	7
Oakdale Street	7.2	48.96	8
44 Maple Street	7.1	43.75	9
Ducks Drive Neighborhood	7.1	27.50	10

Prioritization Results

Table 1: Prioritization scoring overview

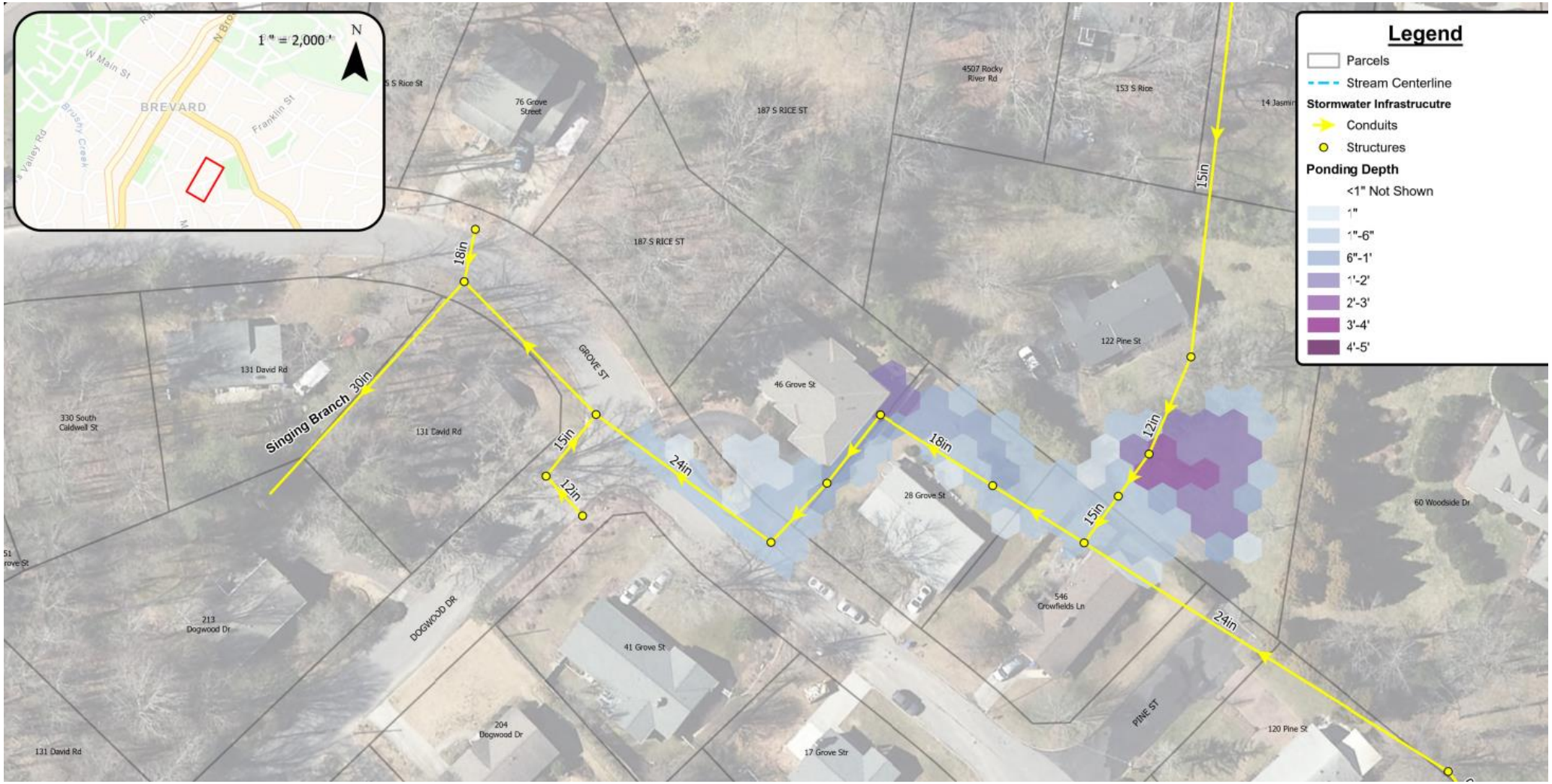
Hot Spot Area	Total Score	Priority Ranking
Cherry Street Neighborhood	8.7	1
Grove and Dogwood Street	8.4	2
Silversteen Drive Culvert	8.3	3
Duckworth Avenue	8.1	4
Oakwood Drive Neighborhood	7.9	5
Varsity and Gaston Street	7.6	6
Batson Road Culvert	7.3	7
Oakdale Street	7.2	8
44 Maple Street	7.1	9
Ducks Drive Neighborhood	7.1	10



Existing Conditions Results

Existing Conditions Results

Grove + Dogwood Street (*10-Year*)



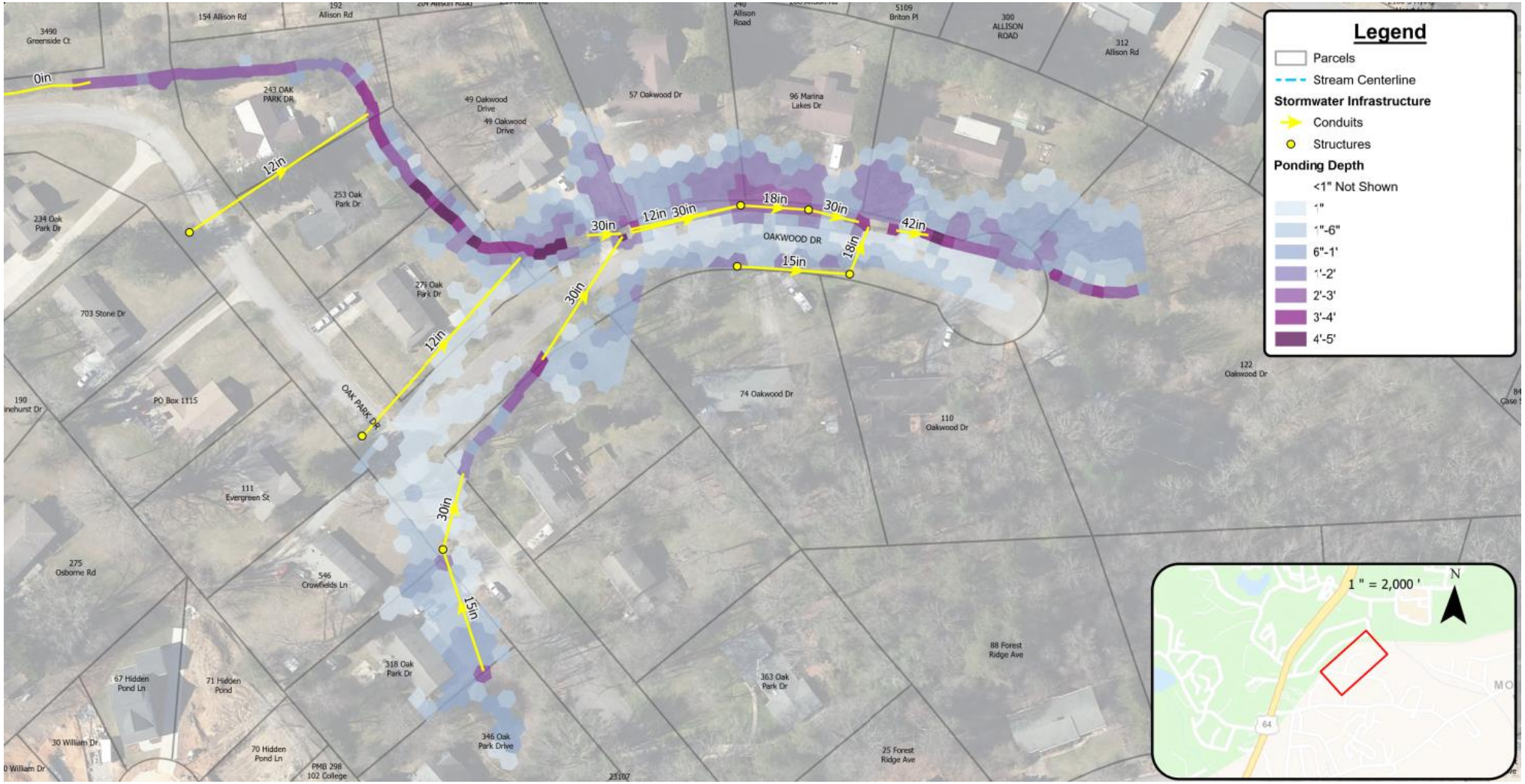
Existing Conditions Results

Area ID	Likelihood of Failure			
	Hydraulic Level of Service	Material	Maintenance Access / Constructability	LoF Score
Duckworth Avenue	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(7) Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Oakdale Street	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8) Meets Retrofit	(8) Brick	(10) Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure					
	Proximity to Roads and Roadway Type*	Proximity to Structures*	Diameter / Pipe Size	Public Responsibility / Safety	Depth to Asset	CoF Score
Duckworth Avenue	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Varsity and Gaston Street	(5) Residential / Local	(6) Utility Infrastructure	(4) 2.00' (24")	(10) City Right-of-Way	(1) 0'-5'	1.8
Oakdale Street	(8) Collector / 2 Lane Thoroughfare	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(6) 5'-10'	2.5
44 Maple Street	(0) Private	(8) Dwelling	(6) 3.00' (36")	(5) Private Property not within Easement (City benefit)	(6) 5'-10'	2.1
Oakwood Drive Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(7) 3.50' (42")	(10) City Right-of-Way	(1) 0'-5'	2.1
Grove and Dogwood Street	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Cherry Street Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(10) Greater than 6.00' / Box Culvert	(10) City Right-of-Way	(8) 10'-12'	3.1
Ducks Drive Neighborhood	(0) Private	(8) Dwelling	(1) 1.00' (12")	(5) Private Property not within Easement (City benefit)	(1) 0'-5'	1.1
Silversteen Drive Culvert	(5) Residential / Local	(6) Utility Infrastructure	(8) 5.00 (60")	(10) City Right-of-Way	(6) 5'-10'	2.7
Batson Road Culvert	(5) Residential / Local	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(8) 10'-12'	2.6

Existing Conditions Results

Oakwood Drive Neighborhood (*10-Year*)



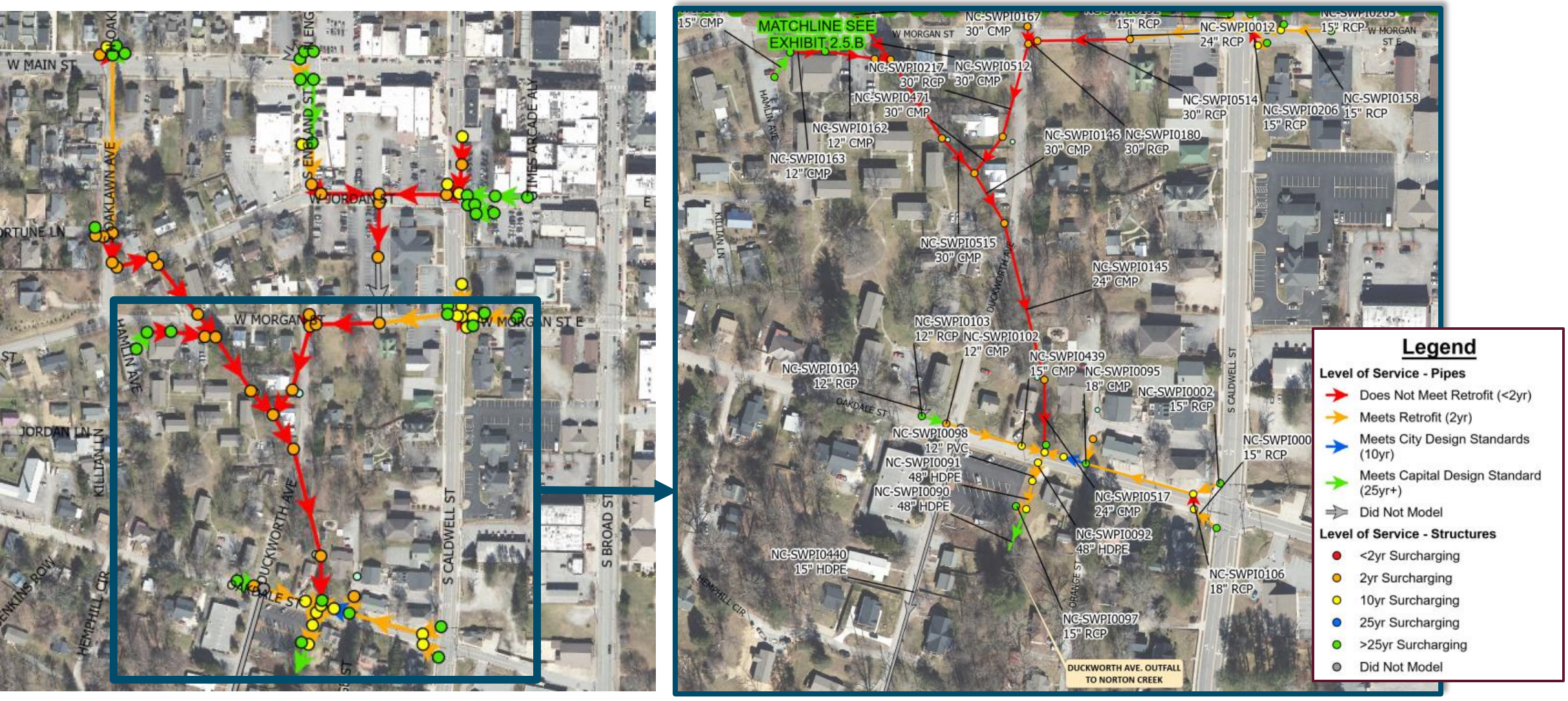
Existing Conditions Results

Area ID	Likelihood of Failure			
	Hydraulic Level of Service	Material	Maintenance Access / Constructability	LoF Score
Duckworth Avenue	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(7) Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Oakdale Street	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8) Meets Retrofit	(8) Brick	(10) Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure					
	Proximity to Roads and Roadway Type*	Proximity to Structures*	Diameter / Pipe Size	Public Responsibility / Safety	Depth to Asset	CoF Score
Duckworth Avenue	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Varsity and Gaston Street	(5) Residential / Local	(6) Utility Infrastructure	(4) 2.00' (24")	(10) City Right-of-Way	(1) 0'-5'	1.8
Oakdale Street	(8) Collector / 2 Lane Thoroughfare	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(6) 5'-10'	2.5
44 Maple Street	(0) Private	(8) Dwelling	(6) 3.00' (36")	(5) Private Property not within Easement (City benefit)	(6) 5'-10'	2.1
Oakwood Drive Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(7) 3.50' (42")	(10) City Right-of-Way	(1) 0'-5'	2.1
Grove and Dogwood Street	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Cherry Street Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(10) Greater than 6.00' / Box Culvert	(10) City Right-of-Way	(8) 10'-12'	3.1
Ducks Drive Neighborhood	(0) Private	(8) Dwelling	(1) 1.00' (12")	(5) Private Property not within Easement (City benefit)	(1) 0'-5'	1.1
Silversteen Drive Culvert	(5) Residential / Local	(6) Utility Infrastructure	(8) 5.00 (60")	(10) City Right-of-Way	(6) 5'-10'	2.7
Batson Road Culvert	(5) Residential / Local	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(8) 10'-12'	2.6

Existing Conditions Results

Duckworth Avenue



Existing Conditions Results

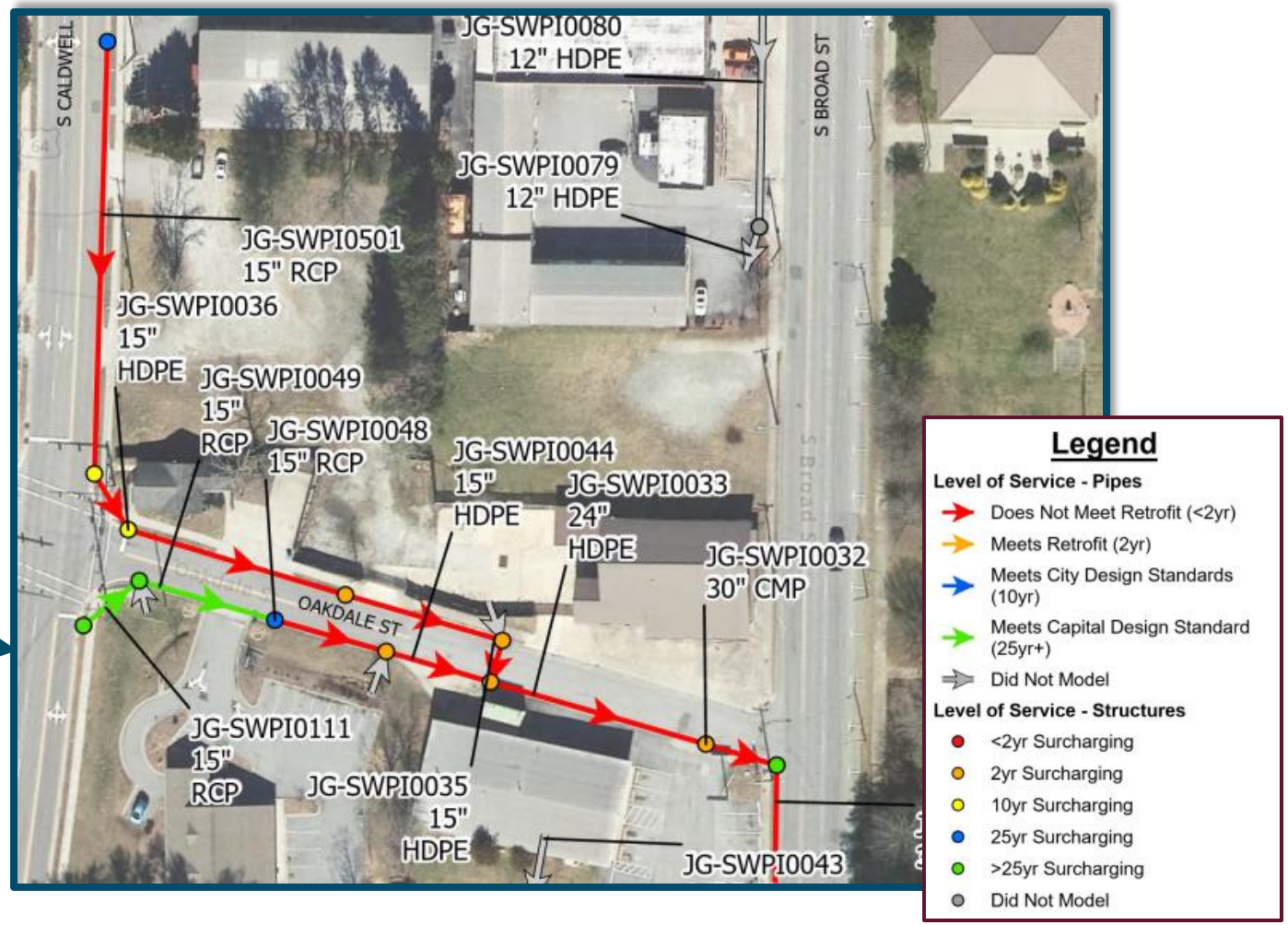
Area ID	Likelihood of Failure			
	Hydraulic Level of Service	Material	Maintenance Access / Constructability	LoF Score
Duckworth Avenue	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(7) Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Oakdale Street	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8) Meets Retrofit	(8) Brick	(10) Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure					
	Proximity to Roads and Roadway Type*	Proximity to Structures*	Diameter / Pipe Size	Public Responsibility / Safety	Depth to Asset	CoF Score
Duckworth Avenue	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Varsity and Gaston Street	(5) Residential / Local	(6) Utility Infrastructure	(4) 2.00' (24")	(10) City Right-of-Way	(1) 0'-5'	1.8
Oakdale Street	(8) Collector / 2 Lane Thoroughfare	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(6) 5'-10'	2.5
44 Maple Street	(0) Private	(8) Dwelling	(6) 3.00' (36")	(5) Private Property not within Easement (City benefit)	(6) 5'-10'	2.1
Oakwood Drive Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(7) 3.50' (42")	(10) City Right-of-Way	(1) 0'-5'	2.1
Grove and Dogwood Street	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Cherry Street Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(10) Greater than 6.00' / Box Culvert	(10) City Right-of-Way	(8) 10'-12'	3.1
Ducks Drive Neighborhood	(0) Private	(8) Dwelling	(1) 1.00' (12")	(5) Private Property not within Easement (City benefit)	(1) 0'-5'	1.1
Silversteen Drive Culvert	(5) Residential / Local	(6) Utility Infrastructure	(8) 5.00 (60")	(10) City Right-of-Way	(6) 5'-10'	2.7
Batson Road Culvert	(5) Residential / Local	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(8) 10'-12'	2.6

Existing Conditions Results

Oakdale Street





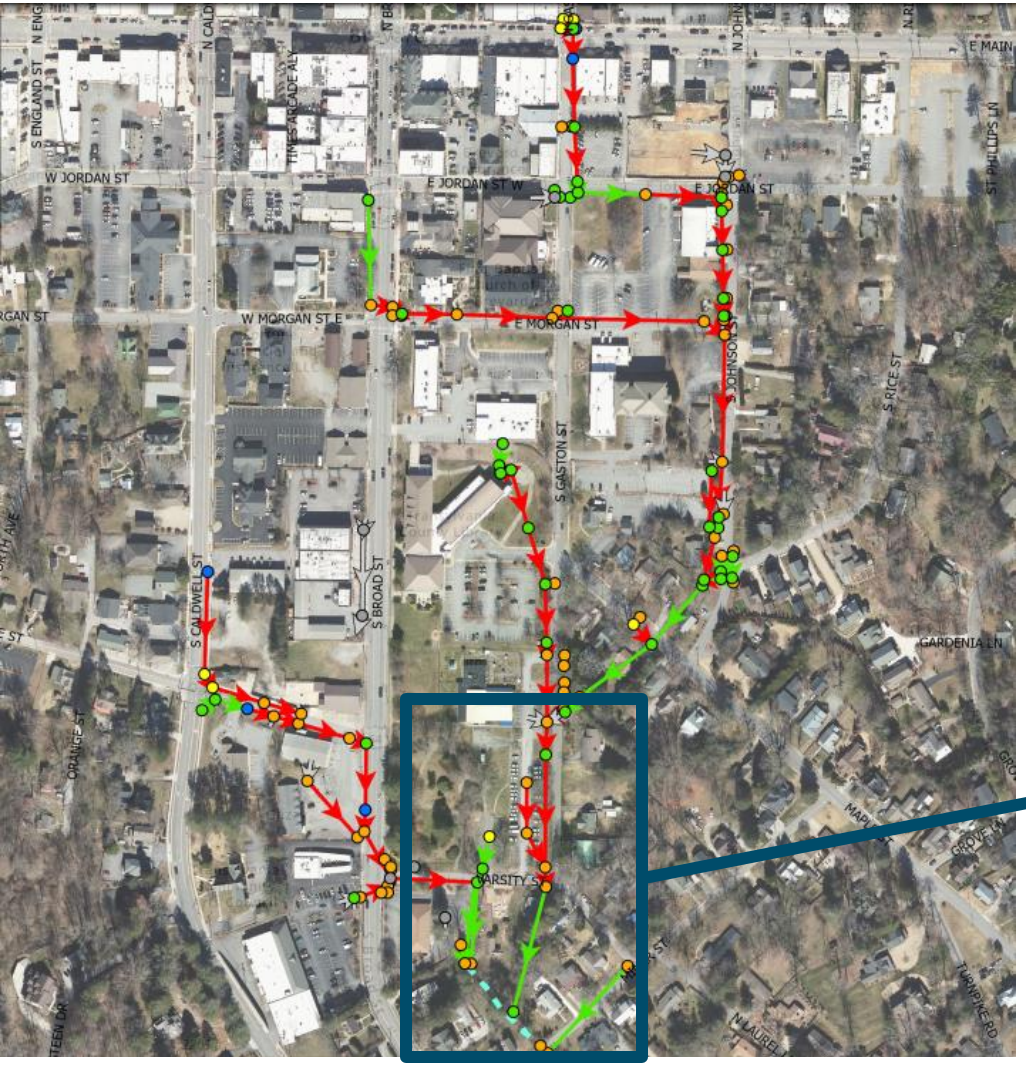
Existing Conditions Results

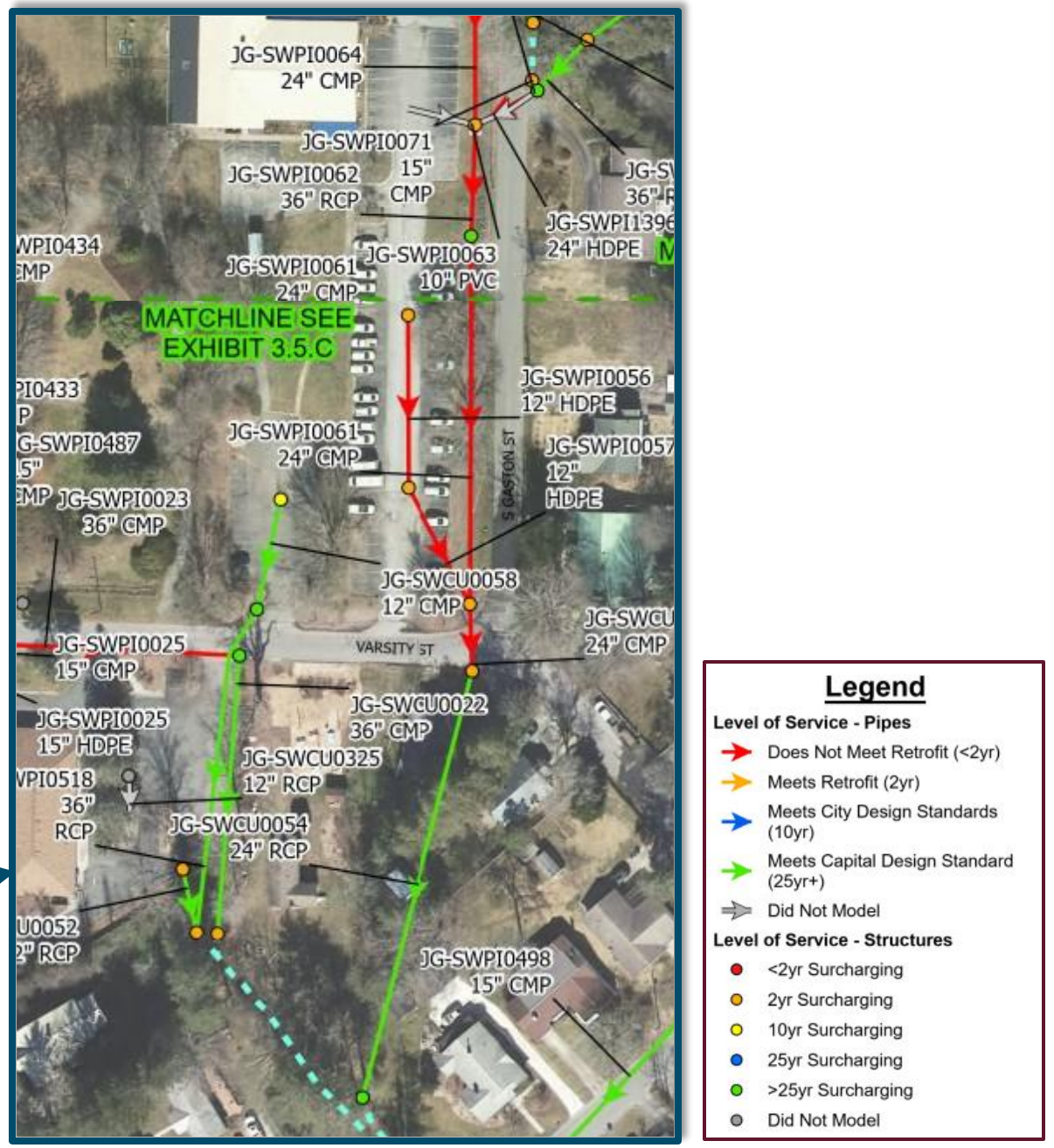
Area ID	Likelihood of Failure			
	Hydraulic Level of Service	Material	Maintenance Access / Constructability	LoF Score
Duckworth Avenue	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(7) Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Oakdale Street	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8) Meets Retrofit	(8) Brick	(10) Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure					
	Proximity to Roads and Roadway Type*	Proximity to Structures*	Diameter / Pipe Size	Public Responsibility / Safety	Depth to Asset	CoF Score
Duckworth Avenue	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Varsity and Gaston Street	(5) Residential / Local	(6) Utility Infrastructure	(4) 2.00' (24")	(10) City Right-of-Way	(1) 0'-5'	1.8
Oakdale Street	(8) Collector / 2 Lane Thoroughfare	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(6) 5'-10'	2.5
44 Maple Street	(0) Private	(8) Dwelling	(6) 3.00' (36")	(5) Private Property not within Easement (City benefit)	(6) 5'-10'	2.1
Oakwood Drive Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(7) 3.50' (42")	(10) City Right-of-Way	(1) 0'-5'	2.1
Grove and Dogwood Street	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Cherry Street Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(10) Greater than 6.00' / Box Culvert	(10) City Right-of-Way	(8) 10'-12'	3.1
Ducks Drive Neighborhood	(0) Private	(8) Dwelling	(1) 1.00' (12")	(5) Private Property not within Easement (City benefit)	(1) 0'-5'	1.1
Silversteen Drive Culvert	(5) Residential / Local	(6) Utility Infrastructure	(8) 5.00 (60")	(10) City Right-of-Way	(6) 5'-10'	2.7
Batson Road Culvert	(5) Residential / Local	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(8) 10'-12'	2.6

Existing Conditions Results

Varsity + Gaston Street





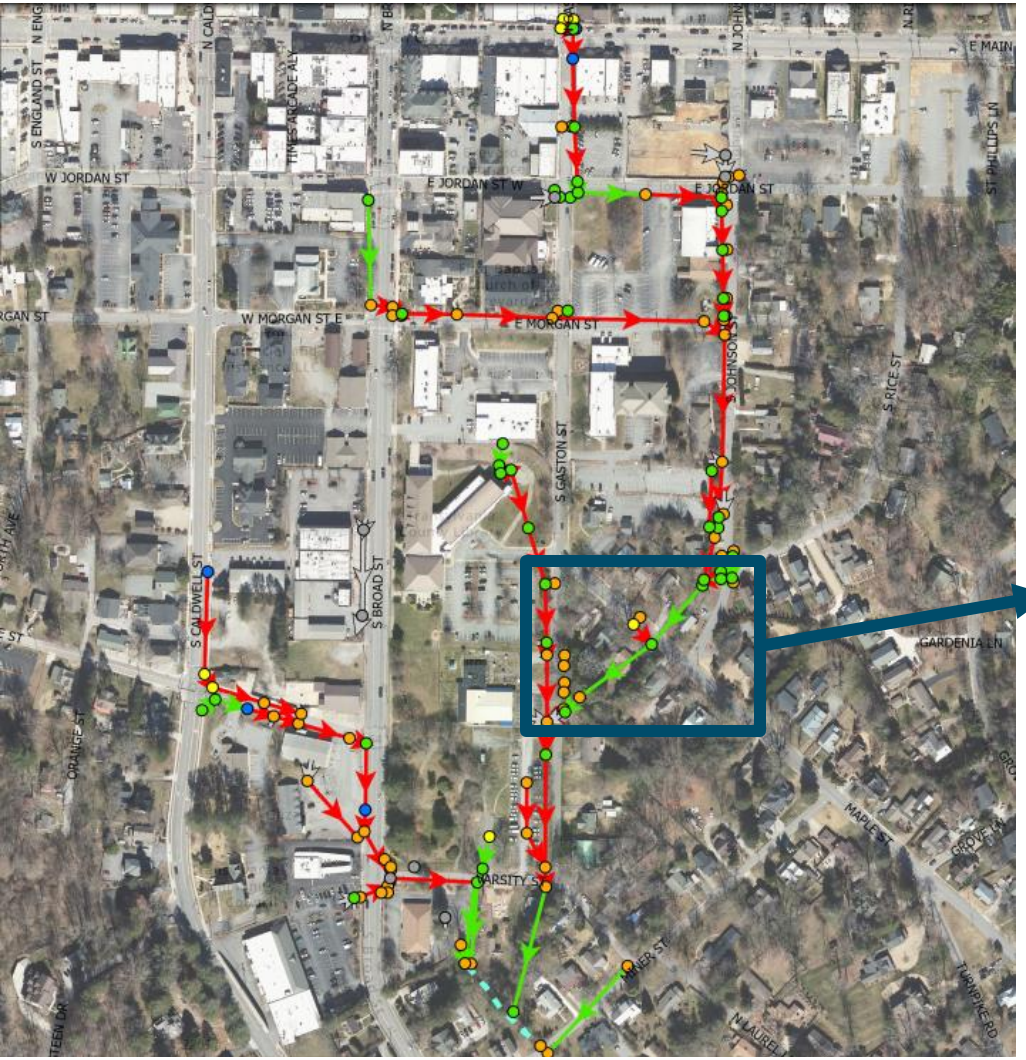
Existing Conditions Results

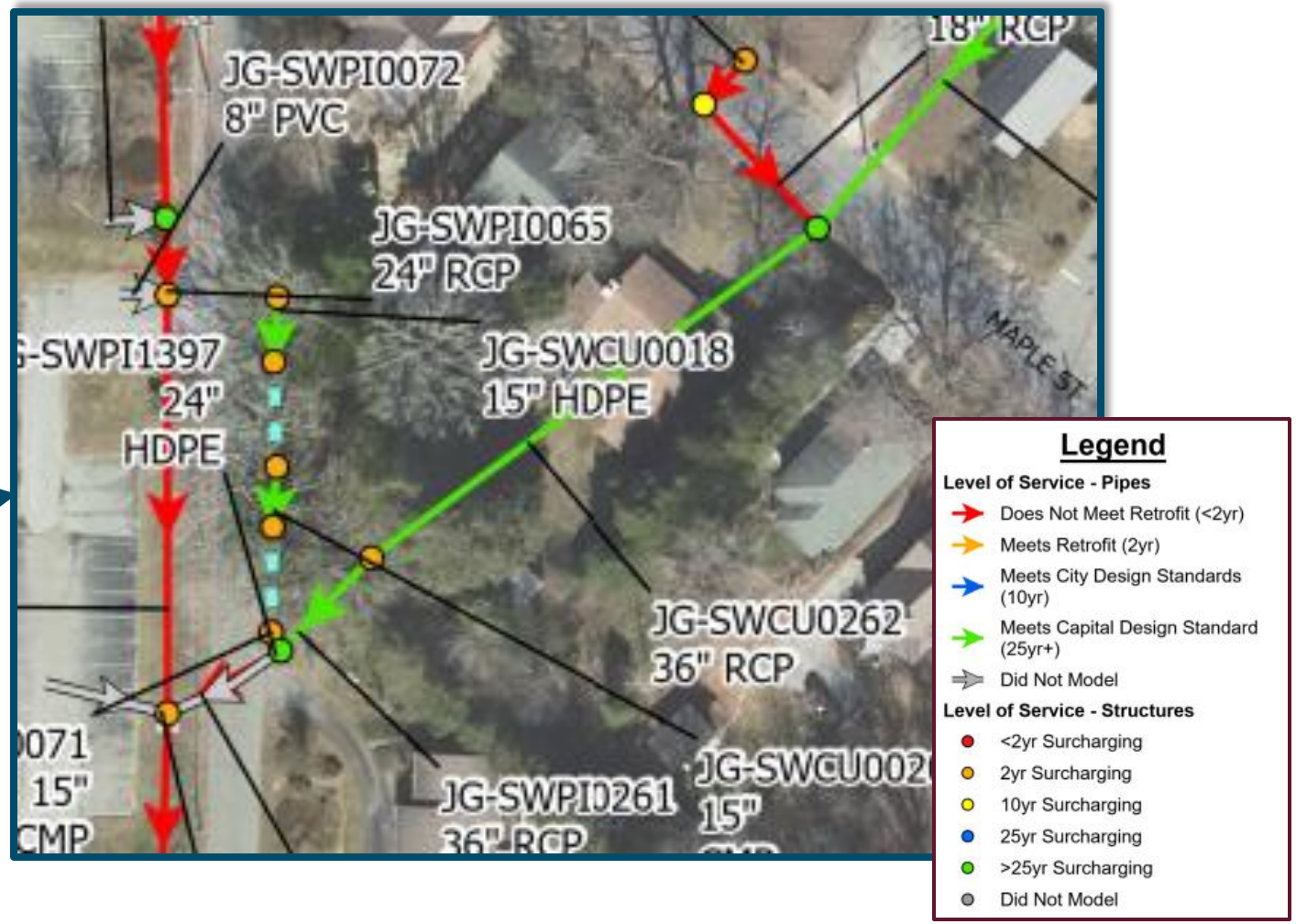
Area ID	Likelihood of Failure			
	Hydraulic Level of Service	Material	Maintenance Access / Constructability	LoF Score
Duckworth Avenue	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(7) Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Oakdale Street	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8) Meets Retrofit	(8) Brick	(10) Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure					
	Proximity to Roads and Roadway Type*	Proximity to Structures*	Diameter / Pipe Size	Public Responsibility / Safety	Depth to Asset	CoF Score
Duckworth Avenue	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Varsity and Gaston Street	(5) Residential / Local	(6) Utility Infrastructure	(4) 2.00' (24")	(10) City Right-of-Way	(1) 0'-5'	1.8
Oakdale Street	(8) Collector / 2 Lane Thoroughfare	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(6) 5'-10'	2.5
44 Maple Street	(0) Private	(8) Dwelling	(6) 3.00' (36")	(5) Private Property not within Easement (City benefit)	(6) 5'-10'	2.1
Oakwood Drive Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(7) 3.50' (42")	(10) City Right-of-Way	(1) 0'-5'	2.1
Grove and Dogwood Street	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Cherry Street Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(10) Greater than 6.00' / Box Culvert	(10) City Right-of-Way	(8) 10'-12'	3.1
Ducks Drive Neighborhood	(0) Private	(8) Dwelling	(1) 1.00' (12")	(5) Private Property not within Easement (City benefit)	(1) 0'-5'	1.1
Silversteen Drive Culvert	(5) Residential / Local	(6) Utility Infrastructure	(8) 5.00 (60")	(10) City Right-of-Way	(6) 5'-10'	2.7
Batson Road Culvert	(5) Residential / Local	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(8) 10'-12'	2.6

Existing Conditions Results

44 Maple Street













PIPE CONDITION

44 Maple Street

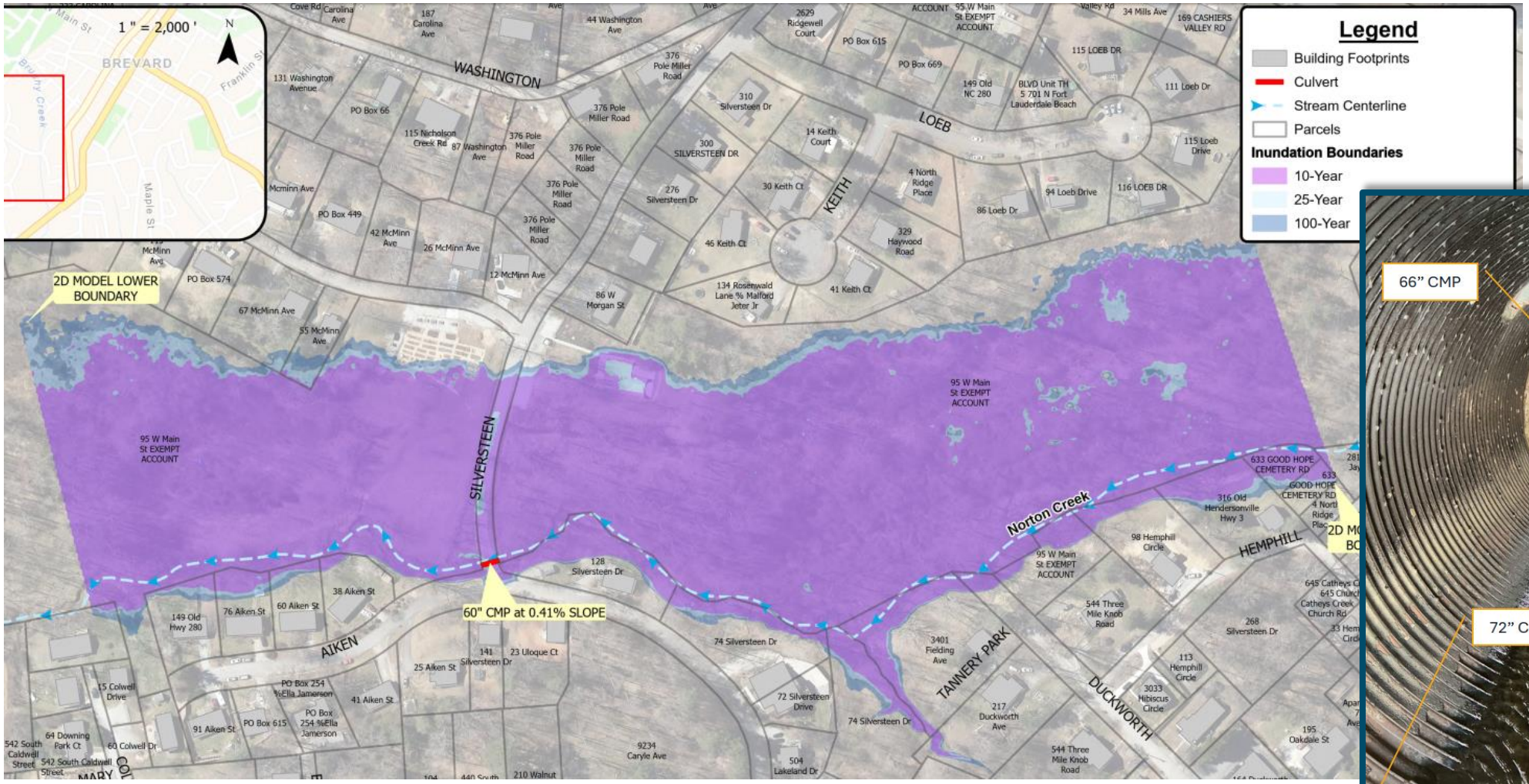
Existing Conditions Results

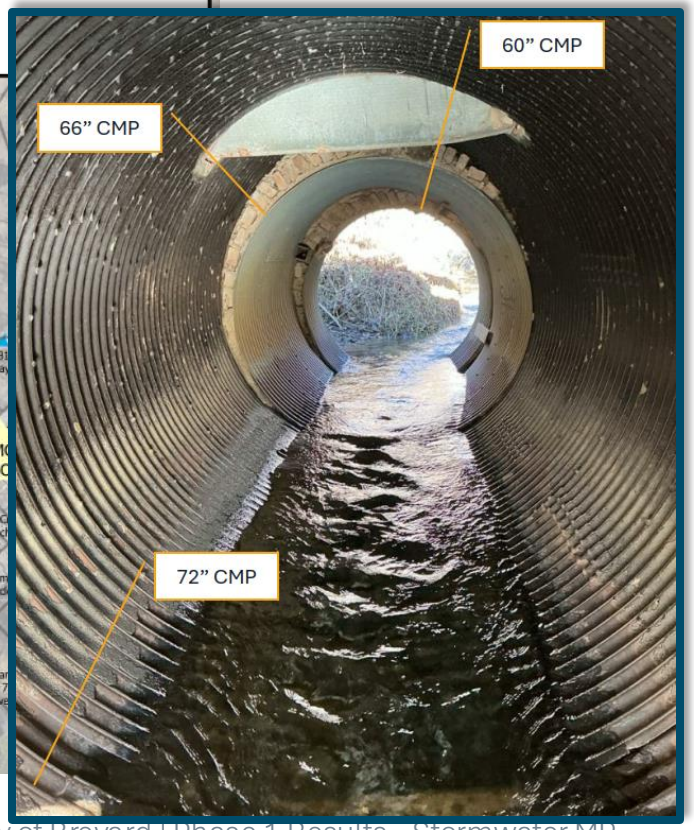
Area ID	Likelihood of Failure						
	Hydraulic Level of Service		Material		Maintenance Access / Constructability		LoF Score
Duckworth Avenue	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(7)	Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(8)	Slab Top Inlets (without access)	5.8
Oakdale Street	(10)	Does Not Meet Retrofit	(1)	HDPE	(6)	Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8)	Meets Retrofit	(8)	Brick	(10)	Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(8)	Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(10)	Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(6)	Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(10)	Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(6)	Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10)	Does Not Meet Retrofit	(1)	HDPE	(6)	Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure											
	Proximity to Roads and Roadway Type*		Proximity to Structures*		Diameter / Pipe Size		Public Responsibility / Safety		Depth to Asset		CoF Score
Duckworth Avenue	(5)	Residential / Local	(8)	Dwelling	(4)	2.00' (24")	(10)	City Right-of-Way	(6)	5'-10'	2.4
Varsity and Gaston Street	(5)	Residential / Local	(6)	Utility Infrastructure	(4)	2.00' (24")	(10)	City Right-of-Way	(1)	0'-5'	1.8
Oakdale Street	(8)	Collector / 2 Lane Thoroughfare	(6)	Utility Infrastructure	(5)	2.50' (30")	(10)	City Right-of-Way	(6)	5'-10'	2.5
44 Maple Street	(0)	Private	(8)	Dwelling	(6)	3.00' (36")	(5)	Private Property not within Easement (City benefit)	(6)	5'-10'	2.1
Oakwood Drive Neighborhood	(5)	Residential / Local	(6)	Utility Infrastructure	(7)	3.50' (42")	(10)	City Right-of-Way	(1)	0'-5'	2.1
Grove and Dogwood Street	(5)	Residential / Local	(8)	Dwelling	(4)	2.00' (24")	(10)	City Right-of-Way	(6)	5'-10'	2.4
Cherry Street Neighborhood	(5)	Residential / Local	(6)	Utility Infrastructure	(10)	Greater than 6.00' / Box Culvert	(10)	City Right-of-Way	(8)	10'-12'	3.1
Ducks Drive Neighborhood	(0)	Private	(8)	Dwelling	(1)	1.00' (12")	(5)	Private Property not within Easement (City benefit)	(1)	0'-5'	1.1
Silversteen Drive Culvert	(5)	Residential / Local	(6)	Utility Infrastructure	(8)	5.00 (60")	(10)	City Right-of-Way	(6)	5'-10'	2.7
Batson Road Culvert	(5)	Residential / Local	(6)	Utility Infrastructure	(5)	2.50' (30")	(10)	City Right-of-Way	(8)	10'-12'	2.6

Existing Conditions Results

Silversteen Drive Culvert





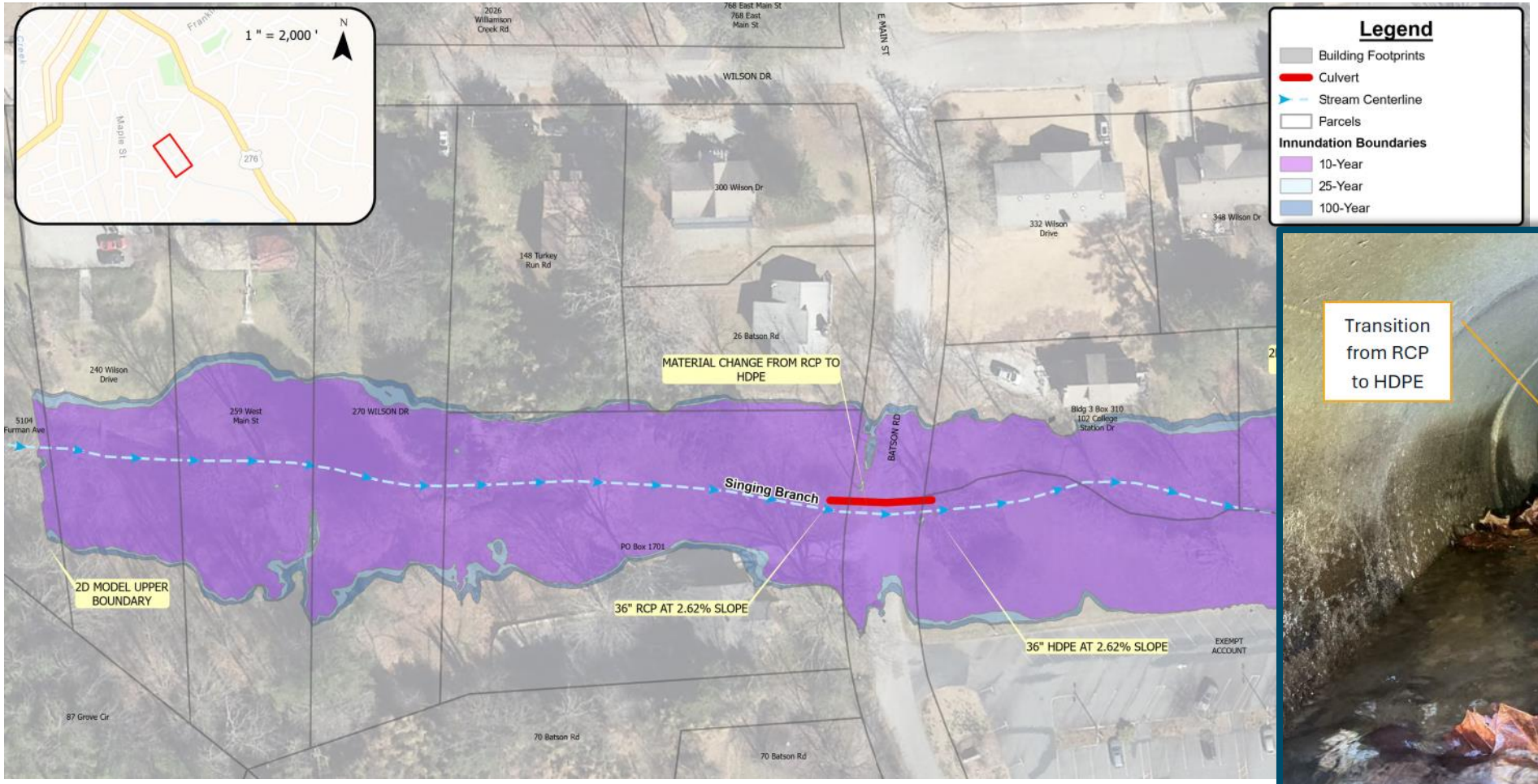
Existing Conditions Results

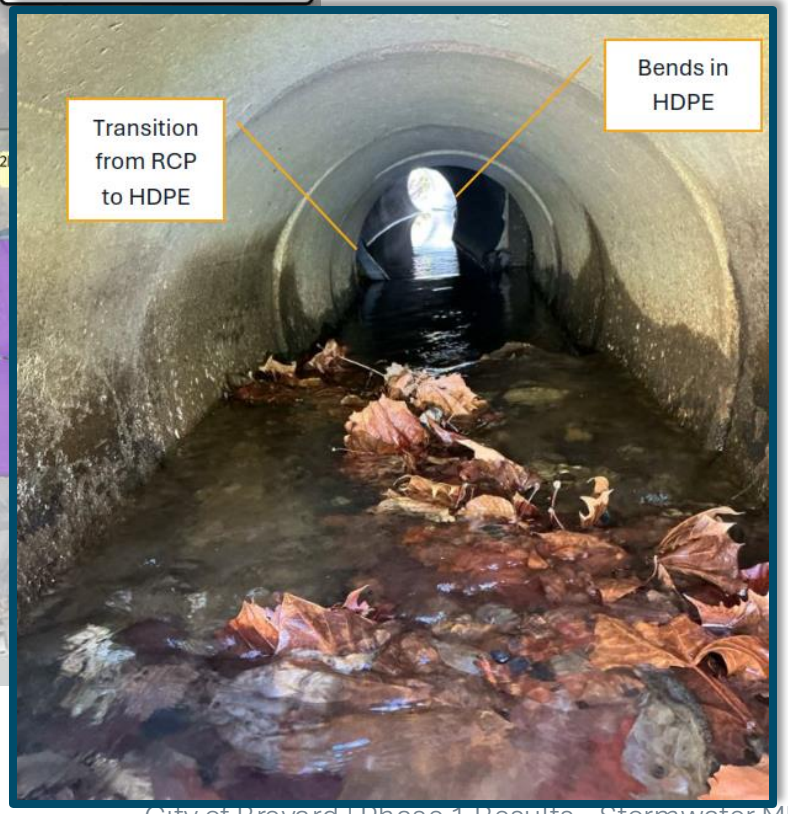
Area ID	Likelihood of Failure						LoF Score
	Hydraulic Level of Service		Material		Maintenance Access / Constructability		
Duckworth Avenue	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(7)	Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(8)	Slab Top Inlets (without access)	5.8
Oakdale Street	(10)	Does Not Meet Retrofit	(1)	HDPE	(6)	Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8)	Meets Retrofit	(8)	Brick	(10)	Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(8)	Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(10)	Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(6)	Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(10)	Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10)	Does Not Meet Retrofit	(10)	Metal (CMP)	(6)	Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10)	Does Not Meet Retrofit	(1)	HDPE	(6)	Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure										CoF Score
	Proximity to Roads and Roadway Type*		Proximity to Structures*		Diameter / Pipe Size		Public Responsibility / Safety		Depth to Asset		
Duckworth Avenue	(5)	Residential / Local	(8)	Dwelling	(4)	2.00' (24")	(10)	City Right-of-Way	(6)	5'-10'	2.4
Varsity and Gaston Street	(5)	Residential / Local	(6)	Utility Infrastructure	(4)	2.00' (24")	(10)	City Right-of-Way	(1)	0'-5'	1.8
Oakdale Street	(8)	Collector / 2 Lane Thoroughfare	(6)	Utility Infrastructure	(5)	2.50' (30")	(10)	City Right-of-Way	(6)	5'-10'	2.5
44 Maple Street	(0)	Private	(8)	Dwelling	(6)	3.00' (36")	(5)	Private Property not within Easement (City benefit)	(6)	5'-10'	2.1
Oakwood Drive Neighborhood	(5)	Residential / Local	(6)	Utility Infrastructure	(7)	3.50' (42")	(10)	City Right-of-Way	(1)	0'-5'	2.1
Grove and Dogwood Street	(5)	Residential / Local	(8)	Dwelling	(4)	2.00' (24")	(10)	City Right-of-Way	(6)	5'-10'	2.4
Cherry Street Neighborhood	(5)	Residential / Local	(6)	Utility Infrastructure	(10)	Greater than 6.00' / Box Culvert	(10)	City Right-of-Way	(8)	10'-12'	3.1
Ducks Drive Neighborhood	(0)	Private	(8)	Dwelling	(1)	1.00' (12")	(5)	Private Property not within Easement (City benefit)	(1)	0'-5'	1.1
Silversteen Drive Culvert	(5)	Residential / Local	(6)	Utility Infrastructure	(8)	5.00 (60")	(10)	City Right-of-Way	(6)	5'-10'	2.7
Batson Road Culvert	(5)	Residential / Local	(6)	Utility Infrastructure	(5)	2.50' (30")	(10)	City Right-of-Way	(8)	10'-12'	2.6

Existing Conditions Results

Batson Road Culvert





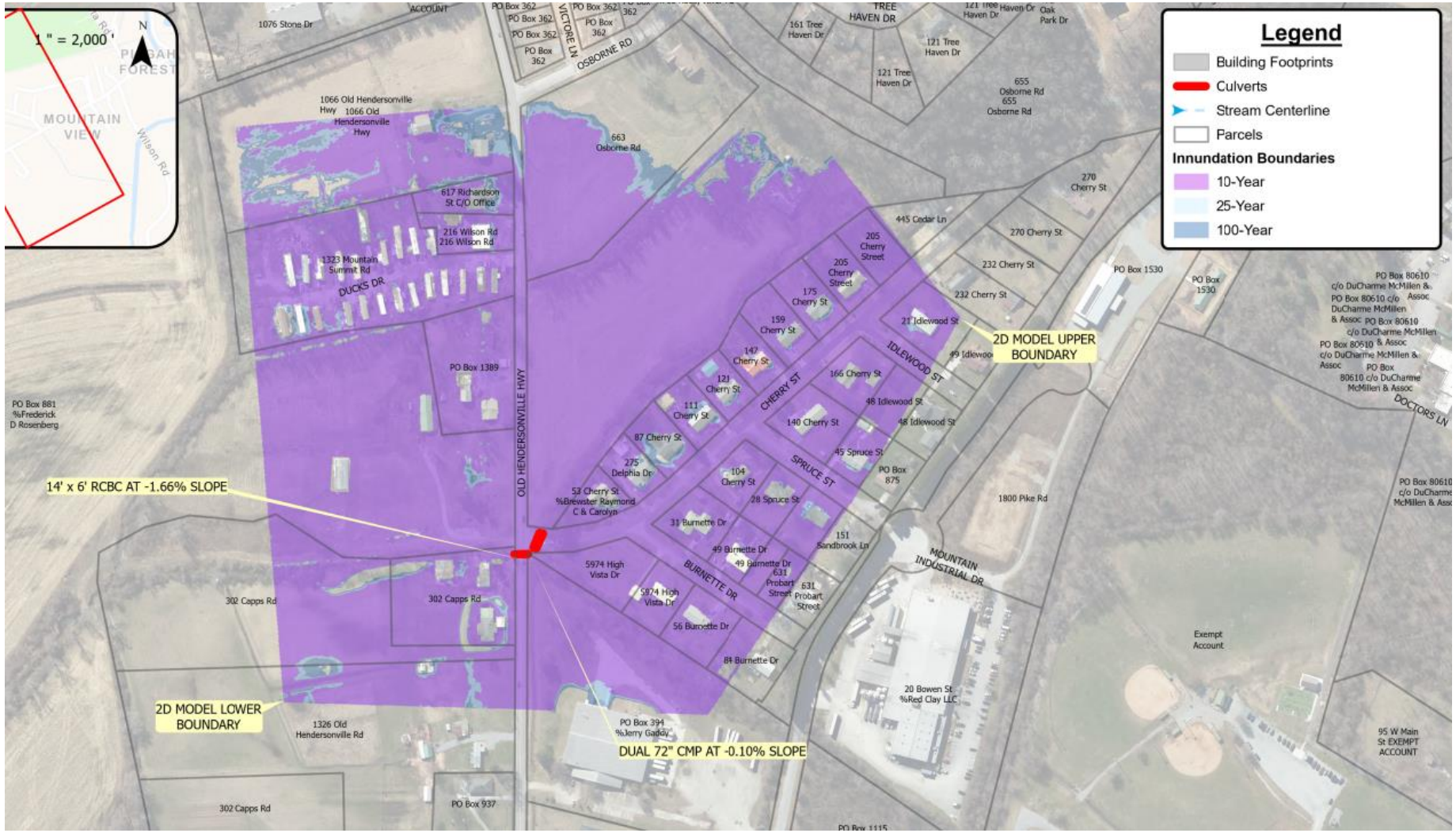
Existing Conditions Results

Area ID	Likelihood of Failure			
	Hydraulic Level of Service	Material	Maintenance Access / Constructability	LoF Score
Duckworth Avenue	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(7) Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Oakdale Street	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8) Meets Retrofit	(8) Brick	(10) Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure					
	Proximity to Roads and Roadway Type*	Proximity to Structures*	Diameter / Pipe Size	Public Responsibility / Safety	Depth to Asset	CoF Score
Duckworth Avenue	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Varsity and Gaston Street	(5) Residential / Local	(6) Utility Infrastructure	(4) 2.00' (24")	(10) City Right-of-Way	(1) 0'-5'	1.8
Oakdale Street	(8) Collector / 2 Lane Thoroughfare	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(6) 5'-10'	2.5
44 Maple Street	(0) Private	(8) Dwelling	(6) 3.00' (36")	(5) Private Property not within Easement (City benefit)	(6) 5'-10'	2.1
Oakwood Drive Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(7) 3.50' (42")	(10) City Right-of-Way	(1) 0'-5'	2.1
Grove and Dogwood Street	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Cherry Street Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(10) Greater than 6.00' / Box Culvert	(10) City Right-of-Way	(8) 10'-12'	3.1
Ducks Drive Neighborhood	(0) Private	(8) Dwelling	(1) 1.00' (12")	(5) Private Property not within Easement (City benefit)	(1) 0'-5'	1.1
Silversteen Drive Culvert	(5) Residential / Local	(6) Utility Infrastructure	(8) 5.00 (60")	(10) City Right-of-Way	(6) 5'-10'	2.7
Batson Road Culvert	(5) Residential / Local	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(8) 10'-12'	2.6

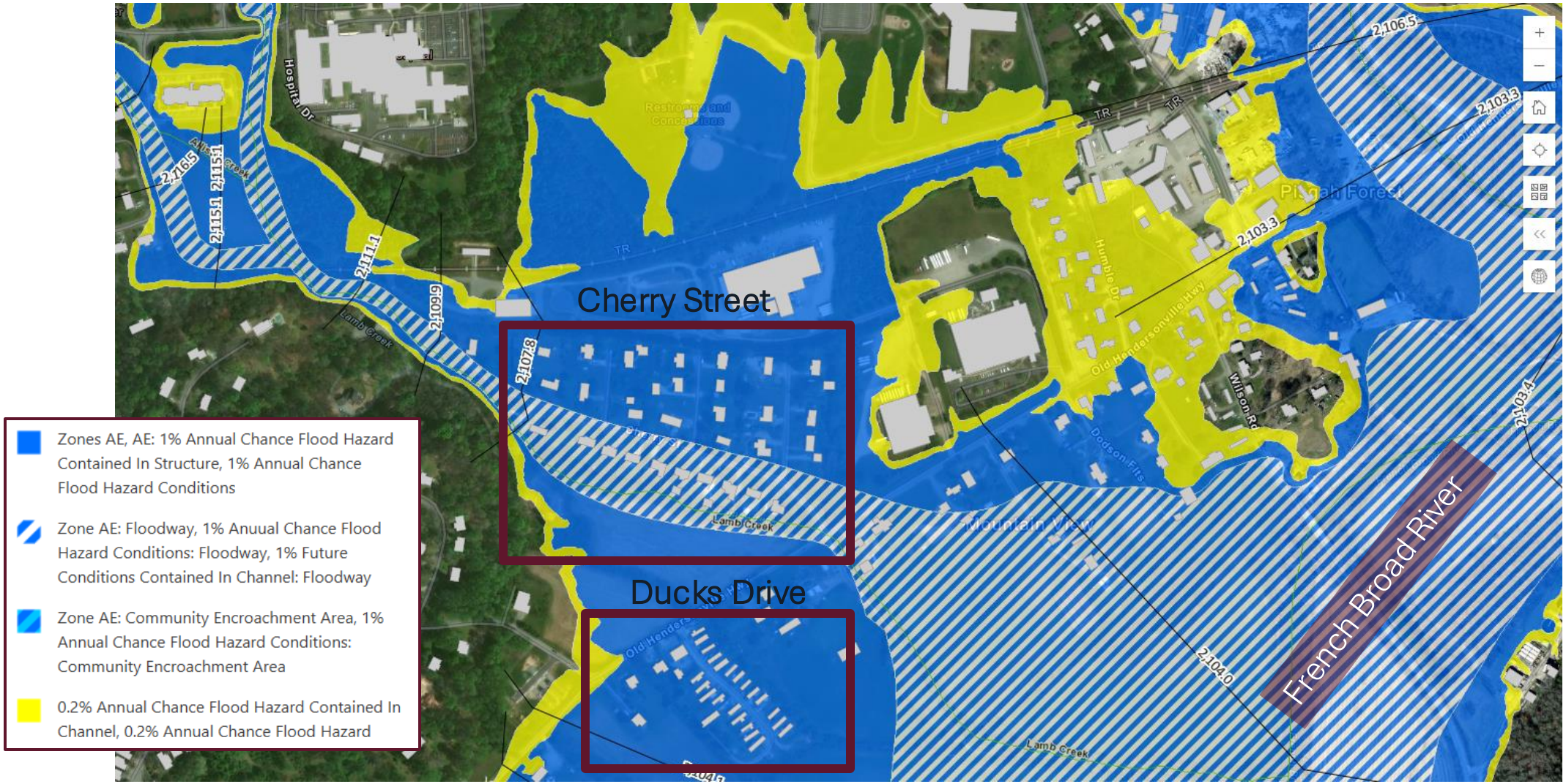
Existing Conditions Results

Cherry Street and Ducks Drive Neighborhoods



Existing Conditions Results

Cherry Street and Ducks Drive Neighborhoods – FEMA Floodplain



Existing Conditions Results

Area ID	Likelihood of Failure			
	Hydraulic Level of Service	Material	Maintenance Access / Constructability	LoF Score
Duckworth Avenue	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(7) Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Oakdale Street	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8) Meets Retrofit	(8) Brick	(10) Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

Area ID	Consequence of Failure					
	Proximity to Roads and Roadway Type*	Proximity to Structures*	Diameter / Pipe Size	Public Responsibility / Safety	Depth to Asset	CoF Score
Duckworth Avenue	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Varsity and Gaston Street	(5) Residential / Local	(6) Utility Infrastructure	(4) 2.00' (24")	(10) City Right-of-Way	(1) 0'-5'	1.8
Oakdale Street	(8) Collector / 2 Lane Thoroughfare	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(6) 5'-10'	2.5
44 Maple Street	(0) Private	(8) Dwelling	(6) 3.00' (36")	(5) Private Property not within Easement (City benefit)	(6) 5'-10'	2.1
Oakwood Drive Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(7) 3.50' (42")	(10) City Right-of-Way	(1) 0'-5'	2.1
Grove and Dogwood Street	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Cherry Street Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(10) Greater than 6.00' / Box Culvert	(10) City Right-of-Way	(8) 10'-12'	3.1
Ducks Drive Neighborhood	(0) Private	(8) Dwelling	(1) 1.00' (12")	(5) Private Property not within Easement (City benefit)	(1) 0'-5'	1.1
Silversteen Drive Culvert	(5) Residential / Local	(6) Utility Infrastructure	(8) 5.00 (60")	(10) City Right-of-Way	(6) 5'-10'	2.7
Batson Road Culvert	(5) Residential / Local	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(8) 10'-12'	2.6





Flood Resiliency vs Stormwater Infrastructure

Prioritization Results

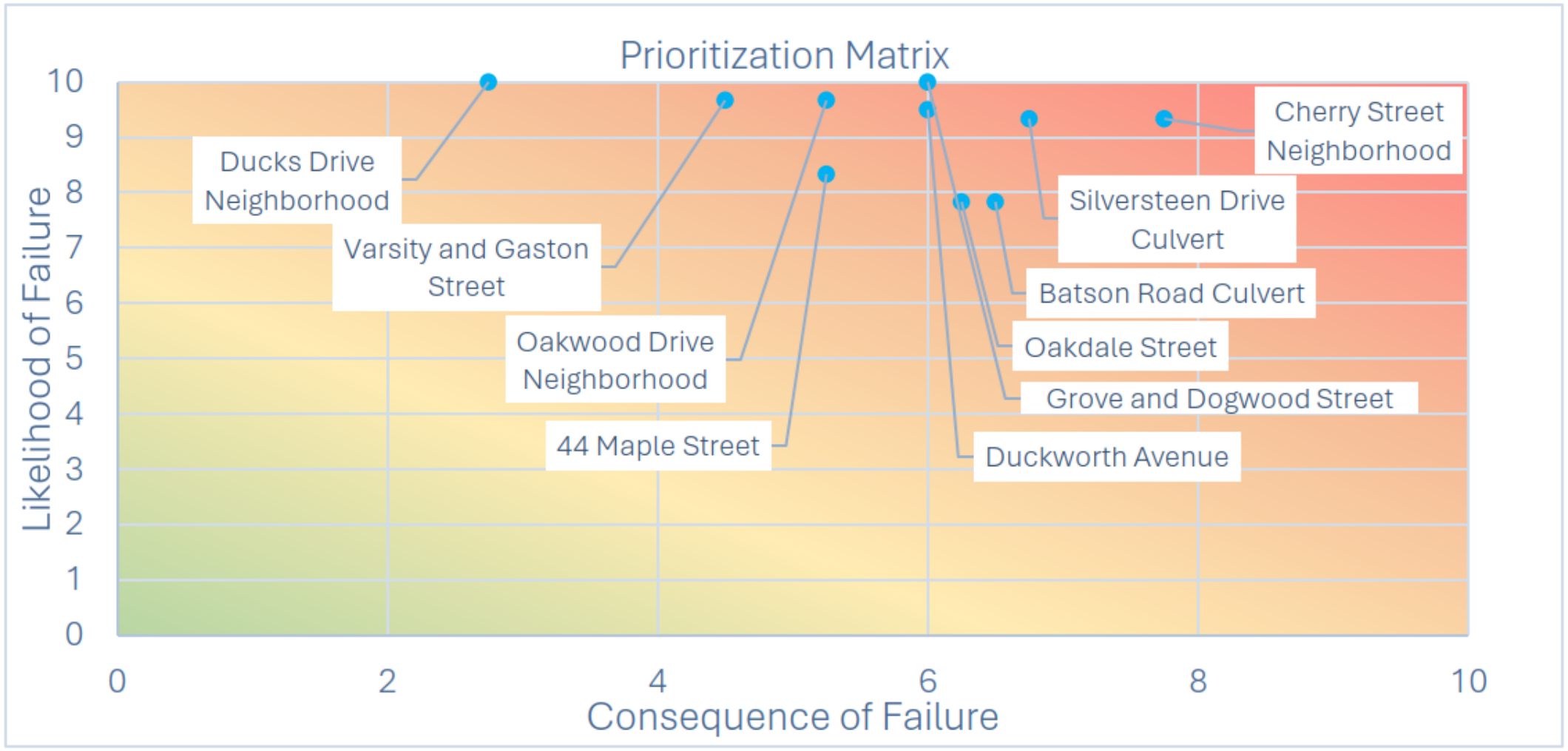


Figure 1: Prioritization Matrix – PWS Results

Prioritization Results

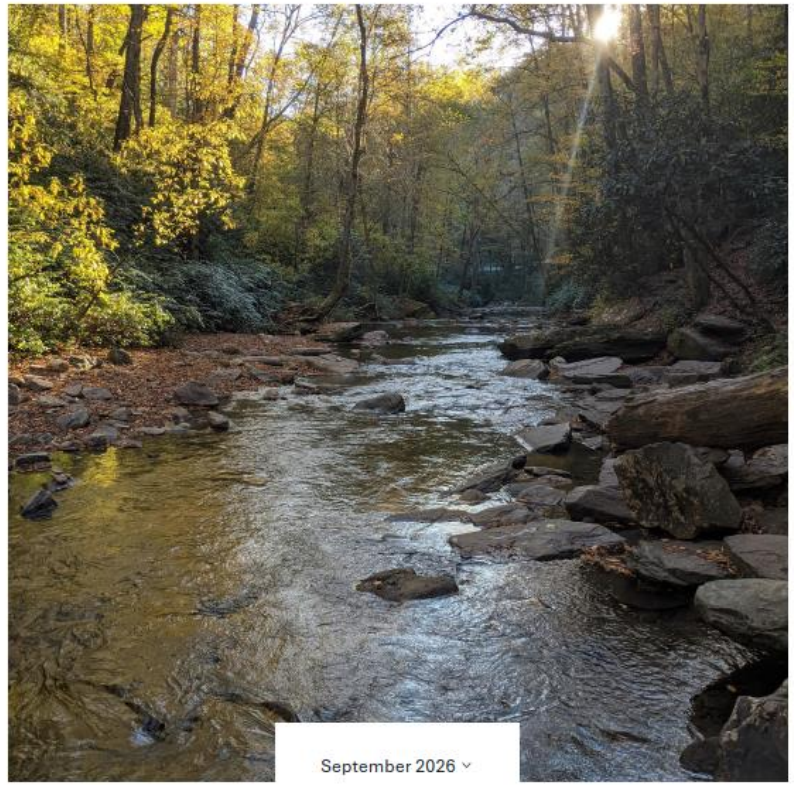
Table 1: Prioritization scoring overview

Hot Spot Area	Total Score	Priority Ranking
Cherry Street Neighborhood	8.7	1
Grove and Dogwood Street	8.4	2
Silversteen Drive Culvert	8.3	3
Duckworth Avenue	8.1	4
Oakwood Drive Neighborhood	7.9	5
Varsity and Gaston Street	7.6	6
Batson Road Culvert	7.3	7
Oakdale Street	7.2	8
44 Maple Street	7.1	9
Ducks Drive Neighborhood	7.1	10

Stormwater Master Plan – Phase 2

Phase 2 (Schematic Design and Funding)
(FY 27: July 2026 – June 2027)

- Preliminary Design Phase
  - Project Management + Administration
- Existing Conditions Analysis
  - Environmental Regulations - Equinox
- Engineering Concept + Design Plans
  - Preliminary Plans + Alternatives
  - Stormwater Infrastructure O&M
- Policy + Program Recommendations
  - Identification of Funding Opportunities
  - Stormwater ERU Analysis



McAdams

Thank you











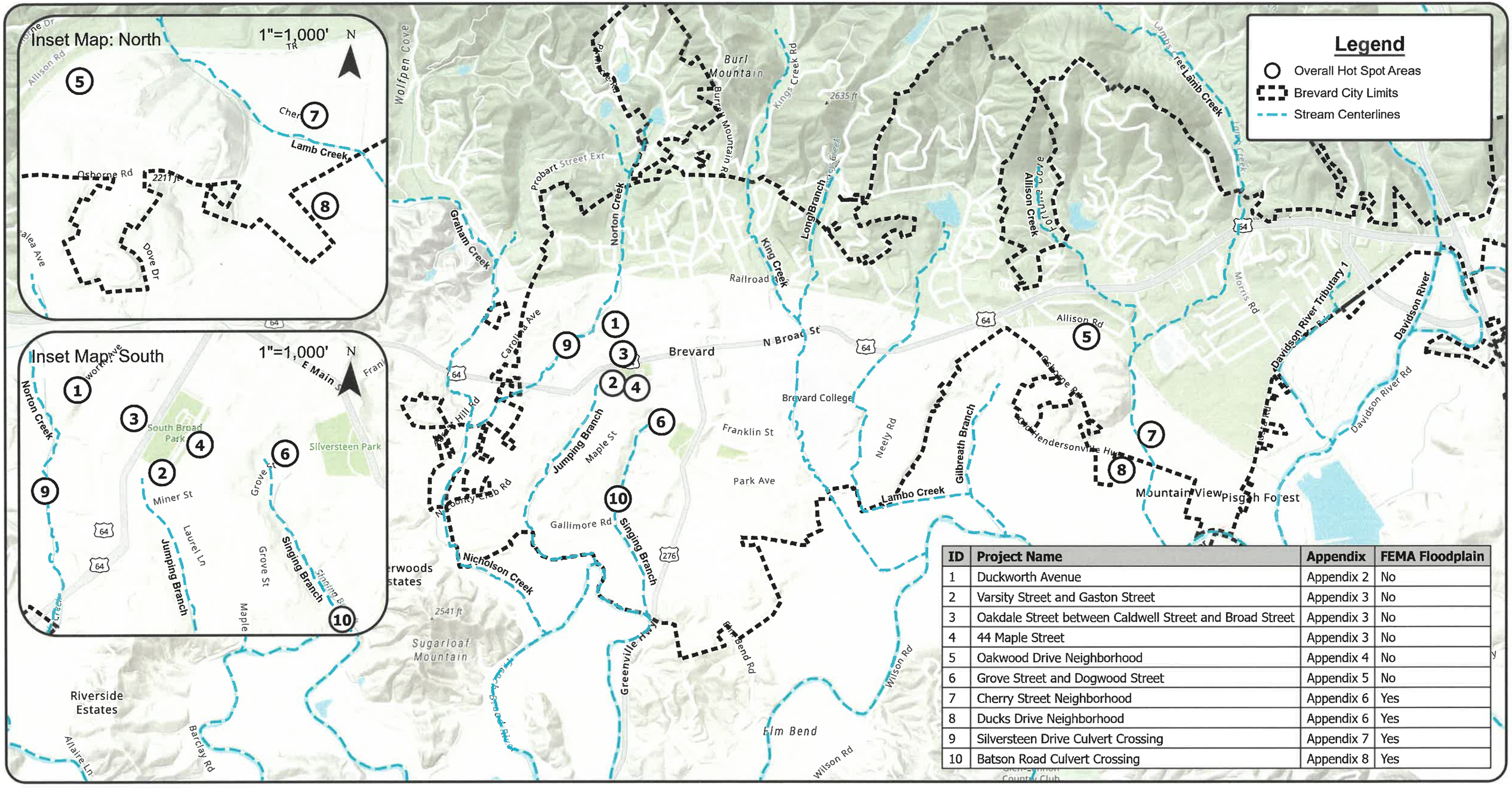












ID	Project Name	Appendix	FEMA Floodplain
1	Duckworth Avenue	Appendix 2	No
2	Varsity Street and Gaston Street	Appendix 3	No
3	Oakdale Street between Caldwell Street and Broad Street	Appendix 3	No
4	44 Maple Street	Appendix 3	No
5	Oakwood Drive Neighborhood	Appendix 4	No
6	Grove Street and Dogwood Street	Appendix 5	No
7	Cherry Street Neighborhood	Appendix 6	Yes
8	Ducks Drive Neighborhood	Appendix 6	Yes
9	Silversteen Drive Culvert Crossing	Appendix 7	Yes
10	Batson Road Culvert Crossing	Appendix 8	Yes

N

0 2,000 4,000 Feet

1"=2,000'

OVERALL PROJECT LOCATION MAP
EXHIBIT 1.1

BREVARD WATERSHED MASTER PLAN
PROJECT #: CYB25002
BREVARD, NORTH CAROLINA

McAdams

MCADAMS

EXISTING INFRASTRUCTURE PRIORITIZATION SCORING
APPENDIX 1.3.A

Hot Spot Area	Consequence of Failure	Consequence of Failure / 10	Likelihood of Failure	Likelihood of Failure / 10	Total Score	Product Weighted Score	Priority Ranking
Cherry Street Neighborhood	3.1	7.8	5.6	9.3	8.7	72.33	1
Grove and Dogwood Street	2.4	6.0	6	10.0	8.4	60.00	2
Silversteen Drive Culvert	2.7	6.8	5.6	9.3	8.3	63.00	3
Duckworth Avenue	2.4	6.0	5.7	9.5	8.1	57.00	4
Oakwood Drive Neighborhood	2.1	5.3	5.8	9.7	7.9	50.75	5
Varsity and Gaston Street	1.8	4.5	5.8	9.7	7.6	43.50	6
Batson Road Culvert	2.6	6.5	4.7	7.8	7.3	50.92	7
Oakdale Street	2.5	6.3	4.7	7.8	7.2	48.96	8
44 Maple Street	2.1	5.3	5	8.3	7.1	43.75	9
Ducks Drive Neighborhood	1.1	2.8	6	10.0	7.1	27.50	10

	Likelihood of Failure			
Area ID	Hydraulic Level of Service	Material	Maintenance Access / Constructability	LoF Score
Duckworth Avenue	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(7) Vegetation (large diameter trees > 4", shrubs, etc.)	5.7
Varsity and Gaston Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Oakdale Street	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7
44 Maple Street	(8) Meets Retrofit	(8) Brick	(10) Permanent Structures (Buildings, sheds, etc.)	5.0
Oakwood Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(8) Slab Top Inlets (without access)	5.8
Grove and Dogwood Street	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Cherry Street Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Ducks Drive Neighborhood	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(10) Permanent Structures (Buildings, sheds, etc.)	6.0
Silversteen Drive Culvert	(10) Does Not Meet Retrofit	(10) Metal (CMP)	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	5.6
Batson Road Culvert	(10) Does Not Meet Retrofit	(1) HDPE	(6) Adjacent to Above Ground Utility Infrastructure / Power Poles	4.7

	Consequence of Failure					
Area ID	Proximity to Roads and Roadway Type*	Proximity to Structures*	Diameter / Pipe Size	Public Responsibility / Safety	Depth to Asset	CoF Score
Duckworth Avenue	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Varsity and Gaston Street	(5) Residential / Local	(6) Utility Infrastructure	(4) 2.00' (24")	(10) City Right-of-Way	(1) 0'-5'	1.8
Oakdale Street	(8) Collector / 2 Lane Thoroughfare	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(6) 5'-10'	2.5
44 Maple Street	(0) Private	(8) Dwelling	(6) 3.00' (36")	(5) Private Property not within Easement (City benefit)	(6) 5'-10'	2.1
Oakwood Drive Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(7) 3.50' (42")	(10) City Right-of-Way	(1) 0'-5'	2.1
Grove and Dogwood Street	(5) Residential / Local	(8) Dwelling	(4) 2.00' (24")	(10) City Right-of-Way	(6) 5'-10'	2.4
Cherry Street Neighborhood	(5) Residential / Local	(6) Utility Infrastructure	(10) Greater than 6.00' / Box Culvert	(10) City Right-of-Way	(8) 10'-12'	3.1
Ducks Drive Neighborhood	(0) Private	(8) Dwelling	(1) 1.00' (12")	(5) Private Property not within Easement (City benefit)	(1) 0'-5'	1.1
Silversteen Drive Culvert	(5) Residential / Local	(6) Utility Infrastructure	(8) 5.00 (60")	(10) City Right-of-Way	(6) 5'-10'	2.7
Batson Road Culvert	(5) Residential / Local	(6) Utility Infrastructure	(5) 2.50' (30")	(10) City Right-of-Way	(8) 10'-12'	2.6

LIKELIHOOD OF FAILURE				
	Parameter	Weight %	Description	Score
LOF	Hydraulic Level of Service	40%	Does Not Meet Retrofit	10
			Meets Retrofit	8
			Meets City Design Standards (CDS)	3
			Meets Capital Design Standard	1

McAdams Comments

Hydraulic Level of Service is reflective of the hydraulic capacity of the analyzed system. The application of actual storm/rainfall data or more in-depth hydrologic and hydraulic analysis will determine whether an asset is meeting City Design Standards, a reduced level of service, or a lower/failing level of service.

Closed Conduits:
Retrofit = Capacity for 2-year storm intensities
City Design Standard = Capacity for 10-year storm intensities
Capital Design Standard = Capacity for 25-year storm intensities
Culvert Crossings:
Retrofit = Capacity for 10-year storm intensities
City Design Standard = Capacity for 25-year storm intensities
Capital Design Standard = Capacity for 100-year storm intensities

LIKELIHOOD OF FAILURE				
	Parameter	Weight %	Description	Score
LOF	Material	10%	Metal (CMP)	10
			Brick	8
			VCP	8
			Stone	8
			Steel (DIP)	6
			Other	5
			HDPE	1
			Concrete	1
			Did not Inspect	0

McAdams Comments

Material parameter is intended to supplement the physical integrity parameter by accounting for the design life of multiple asset materials, most notably the shorter lifespan and reduced resiliency of metal and clay pipes. It is assumed if the material for an asset is stone, the installation date exceeds the expected life of the asset.

LIKELIHOOD OF FAILURE				
	Parameter	Weight %	Description	Score
LOF	Maintenance Access / Constructability	10%	Permanent Structures (Buildings, sheds, etc.)	10
			Blind Junction	10
			Slab Top Inlets (without access)	8
			Vegetation (large diameter trees > 4", shrubs, etc.)	7
			Public Tap-Ins	6
			Adjacent to Above Ground Utility Infrastructure / Power Poles	6
			Fencing (all types)	5
			No Access Ladder	5
			Ingress / Egress Vegetation < 4"	4
			N/A	0

McAdams Comments

Maintenance Access / Constructability is intended to reflect the general access to an asset during construction activity or routine inspection. Regular maintenance of stormwater assets increases their lifespan and minimizes the need for replacement or repairs. If replacement or repairs are required, this parameter reflects specific difficulties in removal and replacement of existing stormwater infrastructure. Effective access supports asset preservation and ease in constructability.

CONSEQUENCE OF FAILURE				
	Parameter	Weight %	Description	Score
COF	*Proximity to roads and roadway type	5%	3 & 6 Lane Thoroughfare	10
			4-Lane Thoroughfare	10
			Emergency Route	10
			Collector / 2 Lane Thoroughfare	8
			Residential / Local	5
			Private	0

McAdams Comments

Proximity to roads and roadway type can be indicative of population density, economic activity, average daily traffic, and heavy truck traffic. In general, the consequences of asset failure under a thoroughfare tend to be greater than under a local road. Consideration of the location of flood impacts since flooding does not necessarily occur at the location of the asset (an undersized pipe on private property may back up water and contribute to street flooding.)

Note that the higher value of "Proximity to Roads and Roadway Type" and "Proximity of Structures" totals 10% and the highest score is taken for prioritization.

CONSEQUENCE OF FAILURE				
	Parameter	Weight %	Description	Score
COF	*Proximity to structures	5%	Critical Facility	10
			FFE Principal Structure	8
			Dwelling	8
			Utility Infrastructure	6
			Right-of-Way	5
			Sidewalk	4
			Driveway / Private Garage	4
			Attached Garage	3
			Detached Garage	3
			Crawl Space	3
			HVAC	3
			Open Space / Lawn	0
			Non-City Owned	0

McAdams Comments

Proximity to structures can be indicative of whether vertical structures (typically homes) are prone to flooding or physical damage due to the sink holes and other subsurface voids near a structure's foundation. Is asset under or within the zone of influence of a city-maintained road. Consideration of the location of flood impacts since flooding does not necessarily occur at the location of the asset (an undersized pipe on private property may back up water and contribute to structure flooding.)

Note that the higher value of "Proximity to Roads and Roadway Type" and "Proximity of Structures" totals 10% and the highest score is taken for prioritization.

CONSEQUENCE OF FAILURE				
	Parameter	Weight %	Description	Score
COF	Diameter / Pipe Size	10%	Greater than 6.00' / Box Culvert	10
			6.00' (72")	9
			5.50' (66")	9
			5.00 (60")	8
			4.50' (54")	8
			4.00' (48")	7
			3.50' (42")	7
			3.00' (36")	6
			2.50' (30")	5
			2.00' (24")	4
			1.50' (18")	4
			1.25' (15")	3
			1.00' (12")	1
			Less than 1.00' (12")	1

McAdams Comments

Diameter/Pipe Size: Pipes are categorized based on diameter (largest dimension for non-circular pipes) with larger pipe sizes receiving greater Consequence of Failure consideration. Drainage structures are scored based on the largest incoming or outgoing pipe asset.

CONSEQUENCE OF FAILURE				
	Parameter	Weight %	Description	Score
COF	Public Responsibility / Safety	10%	City Right-of-Way	10
			Private Property within Easement	10
			Private Property not within Easement (City benefit)	5
			NCDOT Right-of-Way	3
			Private Property not within Easement (no benefit)	0

McAdams Comments

Public responsibility reflects whether an asset is within the City right-of-way, within a City storm drainage easement, or on private property; and whether the asset maintenance is beneficial to the overall City drainage system. Furthermore, these categories are indicative of potential City liabilities and the magnitude of residents that could potentially be at risk.

CONSEQUENCE OF FAILURE				
	Parameter	Weight %	Description	Score
COF	Depth to Asset	10%	> 12'	10
			10'-12'	8
			5'-10'	6
			0'-5'	1
			Did not inspect	0

McAdams Comments

Depth to Asset: Pipes are categorized based on the maximum depth of upstream and downstream drainage structures/ end treatments with deeper pipes receiving greater Consequence of Failure consideration.