Draft Watershed Management Plan for Sulphur Spring Branch

Athens-Clarke County

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Executive Summary

The objective of this watershed management plan (WMP) is to provide ACC with a guidance document that characterizes the Sulphur Spring Branch watershed and provides recommendations for structural and programmatic BMPs that can be implemented to reduce nonpoint source pollution and improve the overall health of the watershed. This WMP is the result of a collaborative effort between Tetra Tech, ARCADIS, and ACC, and incorporates the United States Environmental Protection Agency's (EPA's) Nine Key Elements for WMPs that guide watershed management efforts throughout the country. A watershed characterization was conducted as part of this WMP to document current conditions and watershed impairments through stream walks and a review of existing information, including watershed models, geographical information system (GIS) data, water quality data, and previous reports and studies. A comprehensive analysis of potential site-specific and watershed-wide management improvement opportunities based on watershed needs has identified structural and programmatic BMPs that are recommended for implementation.

The headwaters of this watershed begin within ACC, and Sulphur Spring Branch forms part of the northeast border of the county. The drainage area of the Sulphur Spring Branch watershed is 10 square miles. The study area portion of the watershed, within ACC, is 4.6 square miles in size. There are no named tributaries to Sulphur Spring Branch within ACC. Sulphur Spring Branch discharges into Beaverdam Creek outside of ACC, which flows into the South Branch Broad River, which then flows to the Broad River. Land cover in the study area primarily consists of forest and pasture/cropland, with about 2 percent impervious cover consisting mainly of roadways. No environmentally sensitive areas were identified in the Sulphur Springs Brach watershed.

There are no streams in the Sulphur Spring Branch watershed study area that are listed as impaired on the draft Georgia 2016 Integrated 305(b)/303(d) List of Streams.

No potential point sources were identified in the study area. Potential nonpoint sources of pollution in the Sulphur Spring Branch watershed include stormwater runoff from ACC's municipal separate storm sewer system (MS4) as well as runoff from forested and agricultural lands. Results of recent water quality monitoring efforts suggest that surface waters in the study area are generally in compliance with the DO, pH, and temperature standards adopted by the State of Georgia, with few exceptions. FC bacteria geometric means indicate that one of the two sampling stations in the watershed exceeded the May-through-October standard for the single geometric mean collected for that time of year. Average total nitrogen (TN), total phosphorous (TP), and total suspended solids (TSS) concentrations meet the ACC benchmarks.

Stream walks in the Sandy Creek watershed were conducted in October 2016 through December 2016 along the main stem of Sulphur Spring Branch and one tributary system. Most reaches in the Sulphur Spring Branch watershed received overall stream condition scores of suboptimal or marginal. No reaches received a poor stream condition score. Fallen trees, large woody debris jams, and beaver activity were noted in several places throughout the watershed. Livestock are actively accessing several

locations along a tributary over a 2,000-foot long reach causing bank erosion and contributing fecal matter directly to the stream.

Based on information obtained in the watershed characterization, FC bacteria and buffer enhancement were identified as watershed-wide management needs.

A desktop GIS analysis and field assessment was conducted to identify potential watershed improvement opportunities. Structural projects, including stormwater control best management practices (BMPs) and restoration BMPs were evaluated and prioritized. Two site-specific management measures are recommended for implementation in the Sulphur Spring Branch watershed, including one stormwater control BMP, and one programmatic BMP (Table ES-1). Concept plans and cost estimates were developed for the recommended projects. Programmatic measures that can be implemented watershed-wide are also recommended.

Table ES-1. Recommended Site-Specific Management Measures

BMP ID	Project Description
SS-Prog-01	Sulphur Spring Branch Concrete Dam Removal
SS-Str-01	W.R. Coile Middle School Rain Garden

This WMP includes an implementation schedule with suggested annual activities, activities that can be taken every 3-5 years, and long-term efforts spanning 5-10 years. As changes occur in the watershed and additional data become available, however, watershed management needs and management opportunities might change. Therefore, this WMP should be revisited regularly and revised as needed to ensure that the watershed continues to be managed effectively into the future.

1 Introduction

1.1 Background

Since 2010, Tetra Tech and ARCADIS, in partnership with Athens-Clarke County (ACC), Georgia, have produced several guidance documents to assess and improve the health of ACC's rivers and streams in support of the Countywide Watershed Improvement Program. The work completed through this partnership has led to development of an analytical process that informs the monitoring and characterization of watershed conditions. This includes the establishment of goals, objectives, indicators, and benchmarks for evaluating management needs and measuring success; and the identification and prioritization of management opportunities, including the use of hydrologic and water quality models to assess structural best management practices (BMPs).

Prior to this effort, the Tetra Tech-ARCADIS-ACC team created watershed management documents for Big Creek, Brooklyn Creek, Carr Creek, Cedar Creek, Hunnicutt Creek, McNutt Creek, Shoal Creek, Tanyard Creek, and Trail Creek in accordance with the overarching goals of the Watershed Improvement Program. In 2016, the team proceeded with development of watershed management plans (WMPs) for nine more watersheds: Bear Creek, East Fork Trail Creek, Malcolm Branch, Middle Oconee River, North Oconee River, Sandy Creek, Sulphur Springs Branch, Turkey Creek, and Walton Creek.

1.2 WMP Objectives

The objective of this WMP is to provide ACC with a guidance document that characterizes the Sulphur Spring Branch watershed and provides recommendations for structural and programmatic BMPs that can be implemented to reduce nonpoint source pollution and improve the overall health of the watershed. The methodology used by the Tetra Tech-Arcadis-ACC team to identify appropriate management measures to accomplish this objective are discussed throughout the following sections. The Sulphur Spring Branch WMP incorporates the United States Environmental Protection Agency's (USEPA) Nine Key Elements for WMPs. The nine key elements are:

1. Identify sources contributing to nonpoint source pollution.
2. Estimated expected load reductions.
3. Describe nonpoint source management measures.
4. Estimate Implementation costs.
5. Educate the public to engage public support.
6. Develop an implementation schedule.
7. Describe interim milestones.
8. Implement adaptive management measures to gauge success.
9. Monitor the effectiveness of implementation efforts.

1.3 Stakeholders

Many departments and entities are stakeholders in ACC's watershed management activities. Following are the key stakeholders:

- ACC Central Services
- ACC Leisure Services
- ACC Mayor and Commission
- ACC Planning
- ACC Public Utilities
- ACC Transportation and Public Works Department Stormwater Management Program
- Georgia Department of Environmental Protection (GaEPD)
- The Public (Businesses, Residents, and other Members of the Community)

The ACC Transportation and Public Works Department Stormwater Management Program coordinates closely on watershed management efforts with other ACC departments, including Public Utilities, Planning, Central Services, and Leisure Services.

To meet National Pollutant Discharge Elimination System (NPDES) permit requirements, the Public Utilities Department has conducted watershed assessments in all of the county's watersheds and developed a watershed protection plan (WPP) in 2009 (JJG 2009). This WMP builds on and supplements information provided in the WPP. The Leisure Services Department manages all of ACC's park properties. These parks compose a large area of land that is owned and managed by ACC and are, therefore, high-priority areas for implementing watershed improvement projects. Interdepartmental meetings are held with these departments, the Planning Department, and the Central Services Department to promote communication and coordination between departments on large projects in order to meet the overall needs of ACC.

2 Watershed Characterization

This watershed characterization describes existing conditions in the portion of the Sulphur Spring Branch watershed within ACC. Geographical information system (GIS) data, along with information from previous studies and monitoring efforts were reviewed and assessed in order to understand the nature and condition of the watershed. The following sections include information on watershed location and water resources, land cover, ecoregion, environmentally sensitive areas, potential sources of pollution, stream walk assessments, and water quality. Key information is provided in the narrative and depicted in figures and summary tables. Additional details, including stream walk assessment notes and data tables and water quality data are provided in the appendices.

2.1 Location and Water Resources

Sulphur Spring Branch flows east out of ACC, where it discharges into Beaverdam Creek. Beaverdam Creek then flows into the South Branch Broad River, which then flows to the Broad River. The Broad River empties into the Savannah River, which flows to the Atlantic Ocean. The study area portion of the Sulphur Spring Branch watershed is part of the Sulphur Spring Branch-Beaverdam Creek Hydrologic Unit Code 12 (HUC 12) watershed (30601040403).

The Sulphur Spring Branch watershed is located in the east part of ACC and is roughly bounded by Moores Grove Road, Pittard Road, and Harve Mathis Road (Figure 1). The headwaters of this watershed begin within ACC, and Sulphur Spring Branch forms part of the northeast border of the county. There are no named tributaries to Sulphur Spring Branch within ACC, but there is an unnamed stream system that feeds into Sulphur Spring Branch just downstream of the county line. The farthest downstream point of the study area is the point where Sulphur Spring Branch flows out of ACC. The drainage area of the Sulphur Spring Branch watershed, down to its confluence with Beaverdam Creek is 10 square miles. The extent of the Sulphur Spring Branch watershed is shown in Figure 2-1. The study area portion of the watershed, within ACC, is 4.6 square miles in size and is shown in Figure 2-2.

There are no streams in the Sulphur Spring Branch watershed study area that are listed as impaired on the draft Georgia 2016 Integrated 305(b)/303(d) List of Streams.

There are no United States Geological Survey stream gages in the watershed study area. There also are no groundwater recharge areas in the watershed study area, according to the map of the Most Significant Groundwater Recharge Areas of Georgia (GaEPD 1982).

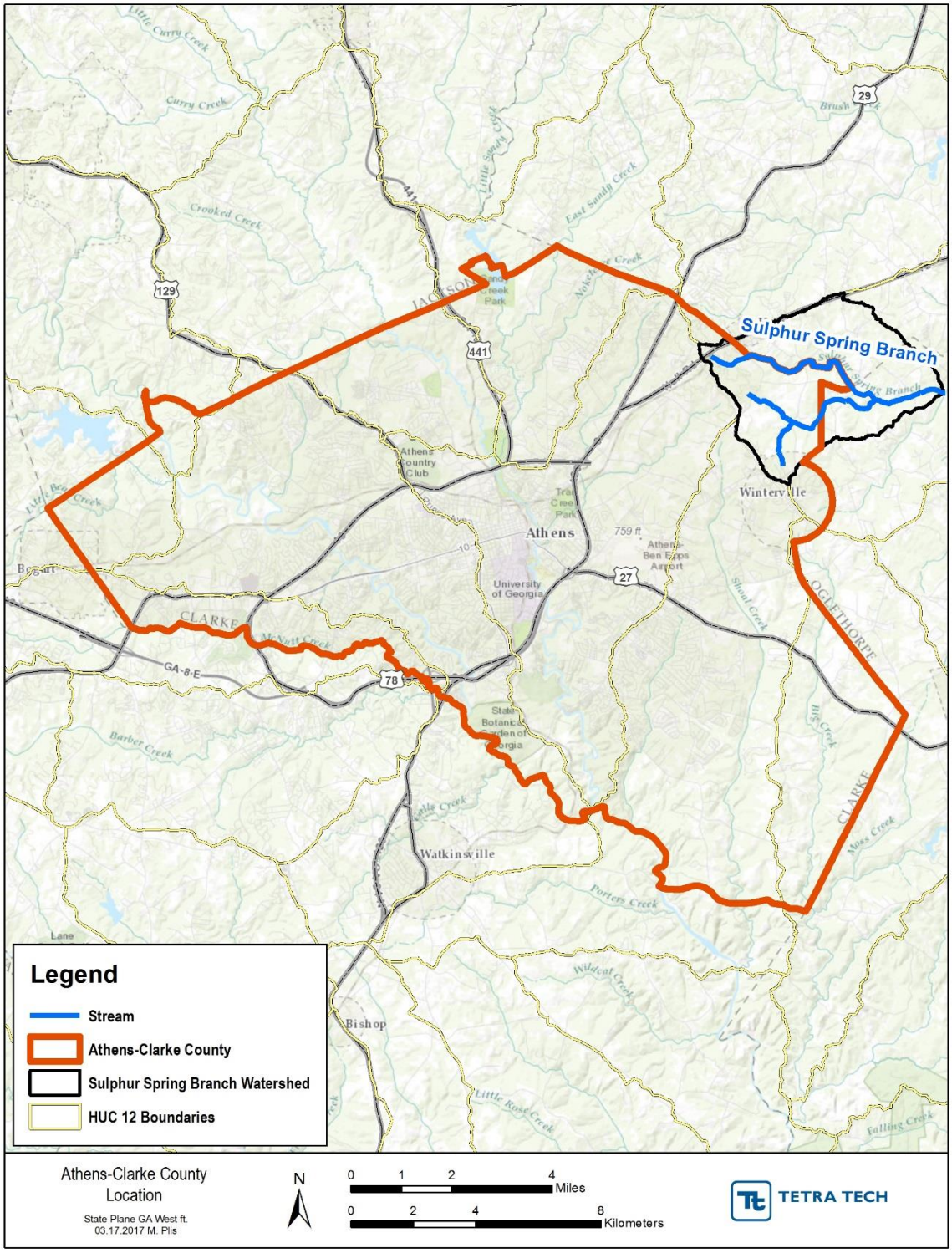

Figure 2-1. Sulphur Spring Branch Watershed Location

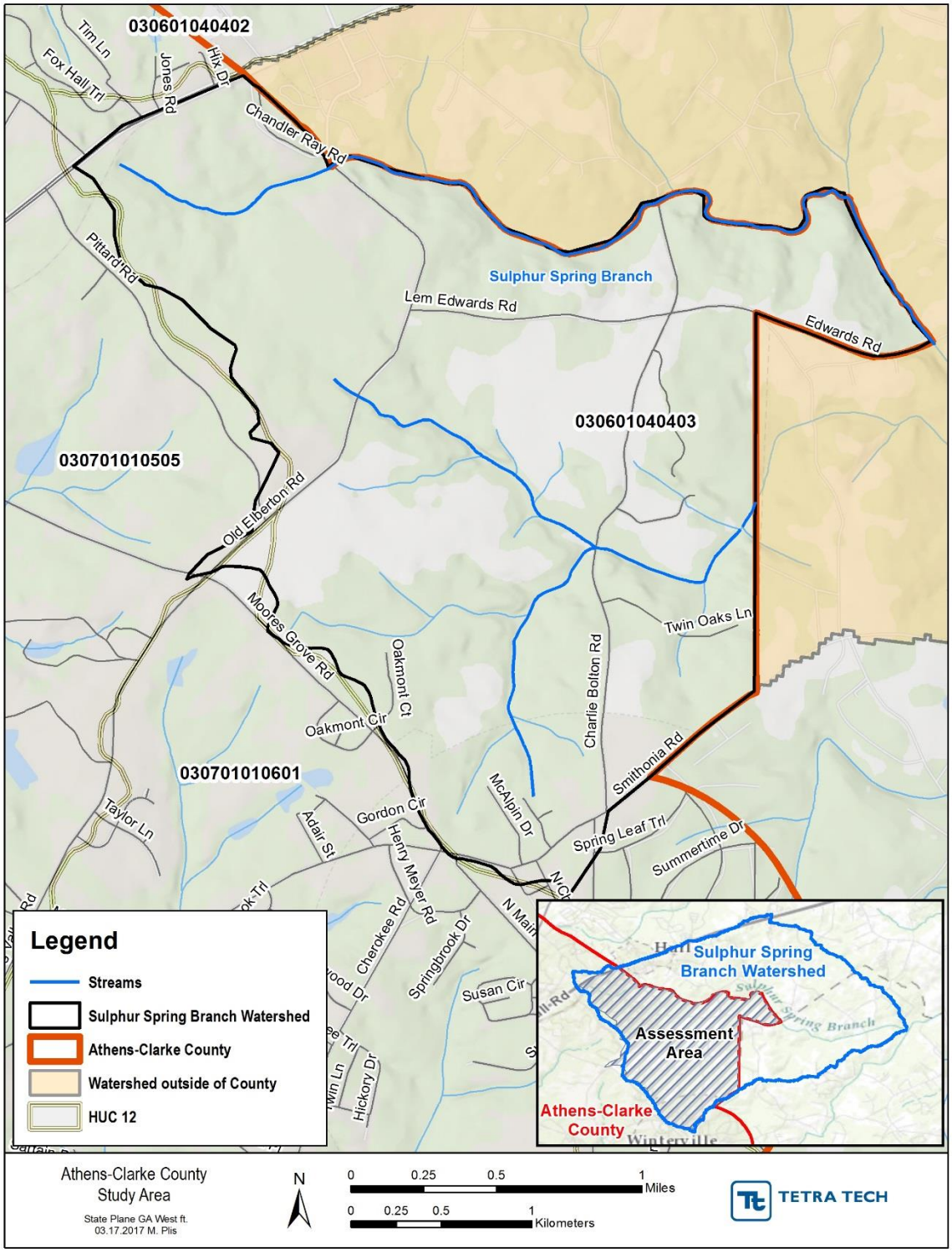

Figure 2-2. Sulphur Spring Branch Watershed Study Area

2.2 Land Cover

The land cover in the study area consists of approximately 53 percent forest, 22 percent pastureland/cropland, 13 percent developed, 2 percent wetland, and the remainder is comprised of other land covers. Land cover information for the watershed was obtained from the 2011 National Land Cover Database (NLCD) as shown in Figure 2-3. This NLCD coverage has a spatial resolution of 30 meters. The percent breakdown by land cover in the study area portion of the watershed is shown in Table 2-1.

Table 2-1. Athens-Clarke County Sulphur Spring Branch Watershed 2011 NLCD Land Cover

NLCD Land Cover	% Land Cover
Open Water	0.3%
Developed	13.0%
Barren	1.1%
Forest	53.0%
Shrub/Scrub	3.0%
Herbaceous	5.7%
Pasture/Crop	22.1%
Wetland	1.8%

There are 10.6 miles of streams in the study area. Based on the 2011 NLCD land use and land cover data, 1.1 miles of streams in the watershed (approximately 10 percent) are directly connected to cropland or pasture land.

The study area is about 2 percent impervious, consisting mainly of roadways. Impervious cover is shown in Figure 2-4 and is based on the 2011 NLCD impervious coverage.

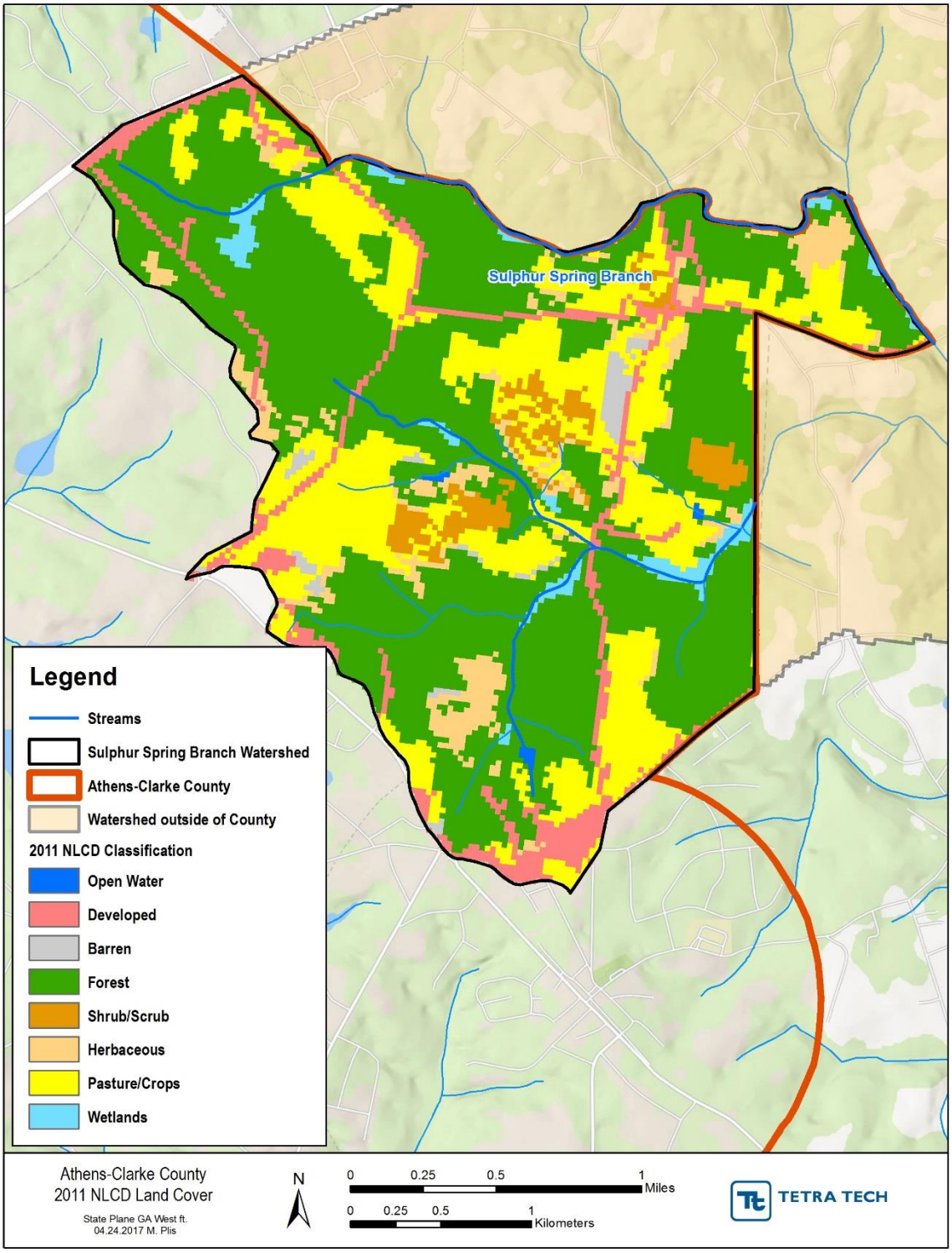

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Figure 2-3. 2011 NLCD Land Cover

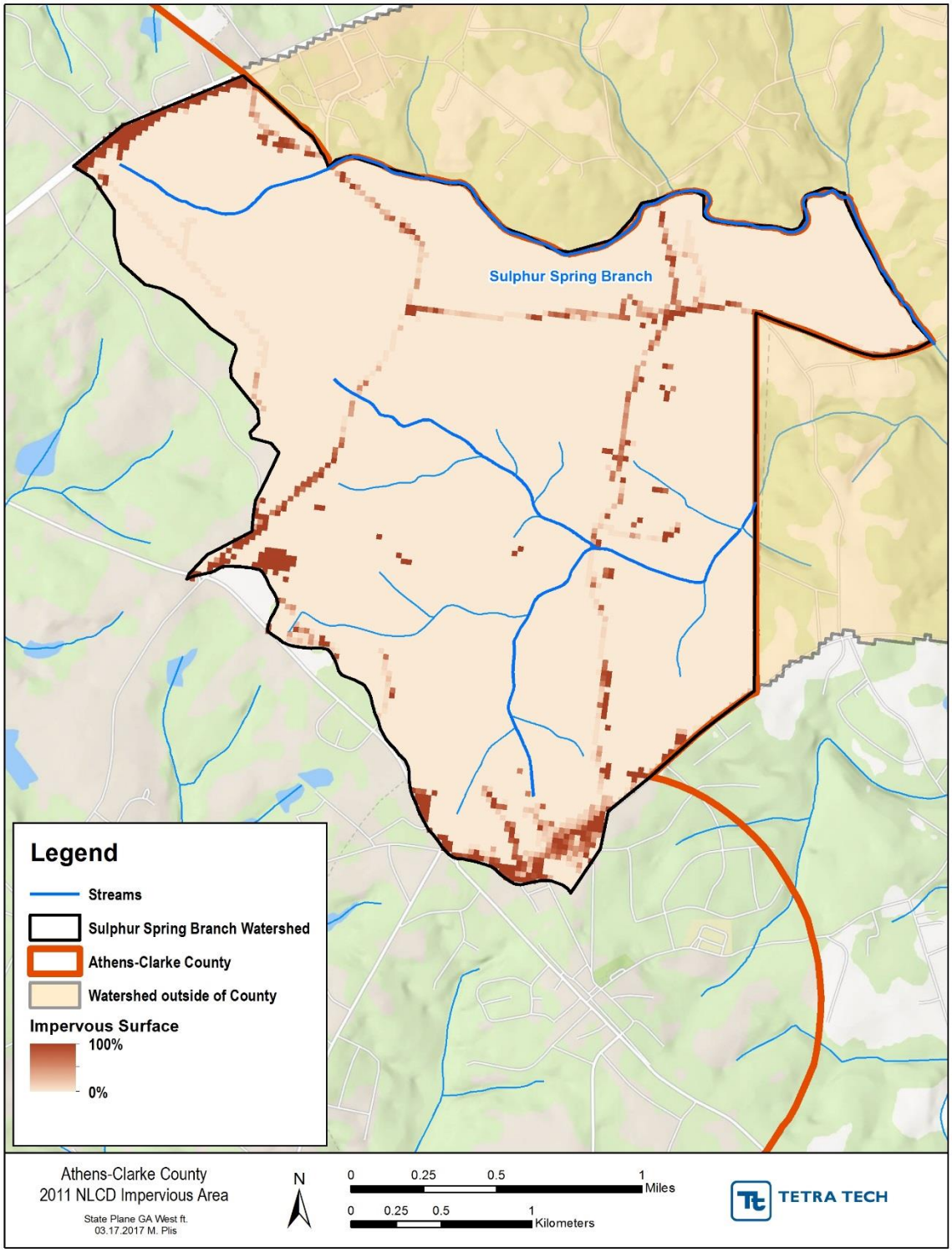

Figure 2-4. 2011 NLCD Impervious Cover

2.3 Ecoregion

The study area and all of ACC are located within the Southern Outer Piedmont level IV ecoregion (45b). This ecoregion has lower elevations, less relief, and less precipitation than the Southern Inner Piedmont ecoregion (45a) to the northwest. Loblolly-shortleaf pine is the major forest type, with less oak-hickory and oak-pine than 45a. Gneiss, schist, and granite are the dominant rock types, covered with deep saprolite and mostly red, clayey subsoils. The majority of soils are Kanhapludults. The southern boundary of the ecoregion occurs at the Fall Line, where unconsolidated coastal plain sediments are deposited over the Piedmont metamorphic and igneous rocks (Griffith et al. 2001).

2.4 Environmentally Sensitive Areas

Environmentally sensitive areas include wetlands, water supply watersheds, and other natural areas that are important for wildlife habitat and/or recreational use. There are no water supply watersheds in the watershed. The National Wetland Inventory (NWI) Map does not identify any notable wetlands within the study area. A few small areas identified as Palustrine Unconsolidated Bottom wetlands, as shown in Figure 2-5, appear to be stormwater detention ponds.

No other environmentally sensitive areas were identified.

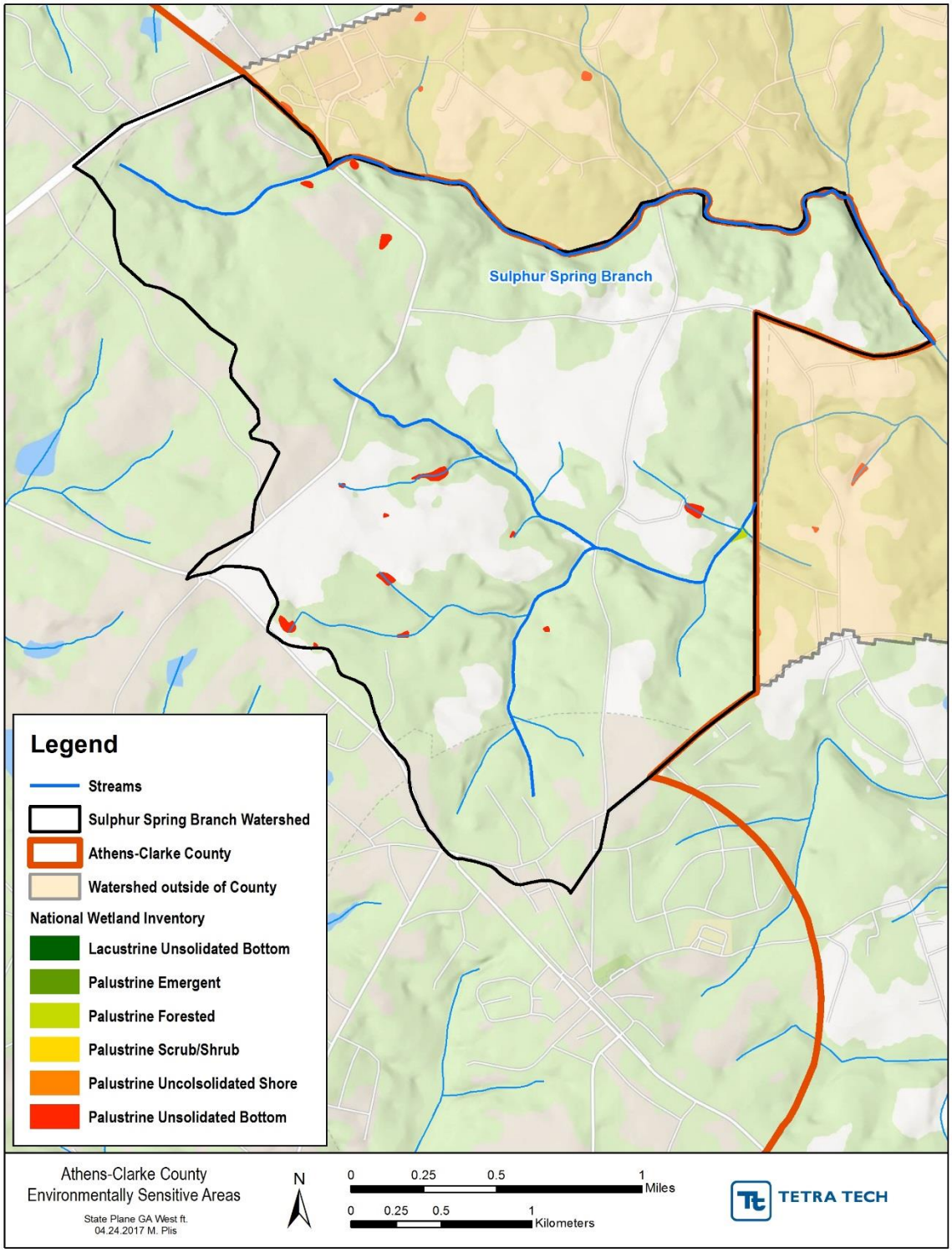

Figure 2-5. Environmentally Sensitive Areas

2.5 Potential Sources of Pollution

A search was conducted for known point sources of pollution from state and federal databases including the GaEPD database of NPDES permits (GaEPD 2013) and the United States Environmental Protection Agency (USEPA) Envirofacts Multisystem Search (USEPA 2016). The online EPA Multisystem Search pulls multiple environmental databases for facility information. No potential point sources were identified in the study area.

Potential nonpoint sources of pollution in the Sulphur Spring Branch watershed include stormwater runoff from ACC's municipal separate storm sewer system (MS4) as well as runoff from forested and agricultural lands. Oil, grease, and metals are common pollutants in runoff from urban areas. Fertilizers (nutrient pollution), herbicides, and pesticides can enter streams through runoff from agricultural 9and residential lands. Fecal coliform (FC) bacteria and other bacteria that are a concern for human health can come from the waste of humans and other animals. These sources can include pets, wild animals, farms, leaky sewer pipes, and septic systems. Sediment can also be a pollutant when excess amounts enter surface waters from eroding upland areas and from eroding stream banks. Due to the high percentage of crop and pasture land in this watershed, fertilizers, pesticides, herbicides, and sediment are of greatest concern.

2.7 Stream Condition

Stream walks were conducted in October 2016 through December 2016 to characterize existing stream conditions, identify areas of impairment, help identify potential causes of impairment, and help identify priority areas for management efforts. Stream walks in the Sulphur Spring Branch watershed were conducted along the main stem of Sulphur Spring Branch and one tributary system, as shown in Figure 2-6.

2.7.1 Methodology

The stream walks consisted of collecting data points on computer tablets using the Environmental Systems Research Institute (Esri) Collector application while walking within wadeable streams and from the stream bank or by canoe for unwadeable streams. For consistency, data points were selected at distance intervals based on stream size (about 40 times the stream width) or when a significant change in channel form or stream characteristics was observed.

To quantify stream condition, each of four stream condition parameters—in-stream habitat rankings, bankface vegetation density, bank erosion ratings, and floodplain connection—were scored on a scale of 0 to 20, with 20 being the best possible individual parameter score. Overall stream condition for each reach was determined by totaling the scores of the four parameters, with 80 being the best possible score. The total numerical scores were given narrative condition ratings as follows:

- Poor: 0-23
- Marginal: 24-40
- Suboptimal: 41-63
- Optimal: 64-80

In addition to the stream condition parameter scores, each data point included global positioning system information; photographs capturing general stream features; and a reach level assessment that characterized surrounding land use, base flow as a percentage of channel width, dominant substrate, water clarity, aquatic plants in stream, wildlife in and around the stream, stream shading, channel dynamics, and reach accessibility. Geomorphic observations were also recorded that included bank height, channel width, and areas of erosion and mass wasting.

The range of data collected, along with the range of values and classifications defined in the tablets for the field assessments, is summarized in the table of Data Types and Classifications in Tablet (appendix A).

Once the data were collected, they were organized and processed geospatially with corresponding attribute tables in GIS in order to produce figures. The complete set of processed geospatial data was also provided to ACC for future use.

Stream condition and other data collected during this assessment were used to help identify and prioritize capital improvement projects such as stormwater control and stream restoration measures.

Refer to section 3.3.5 for a detailed discussion of evaluation and prioritization of management opportunities.

2.7.2 Results

The stream condition scores for each data point collected in the study area watershed are provided in appendix B. Each assessment point and the overall condition rating of each stream reach is shown in Figure 2-6, with detail panels shown in Figure 2-7 and Figure 2-8. Notable features observed in the watershed are shown in Figure 2-9, with detail panels shown in Figure 2-10 and Figure 2-11.

Stream walk data summary tables are included in appendix C. Field notes and photographs from the stream walks are provided in appendix D.

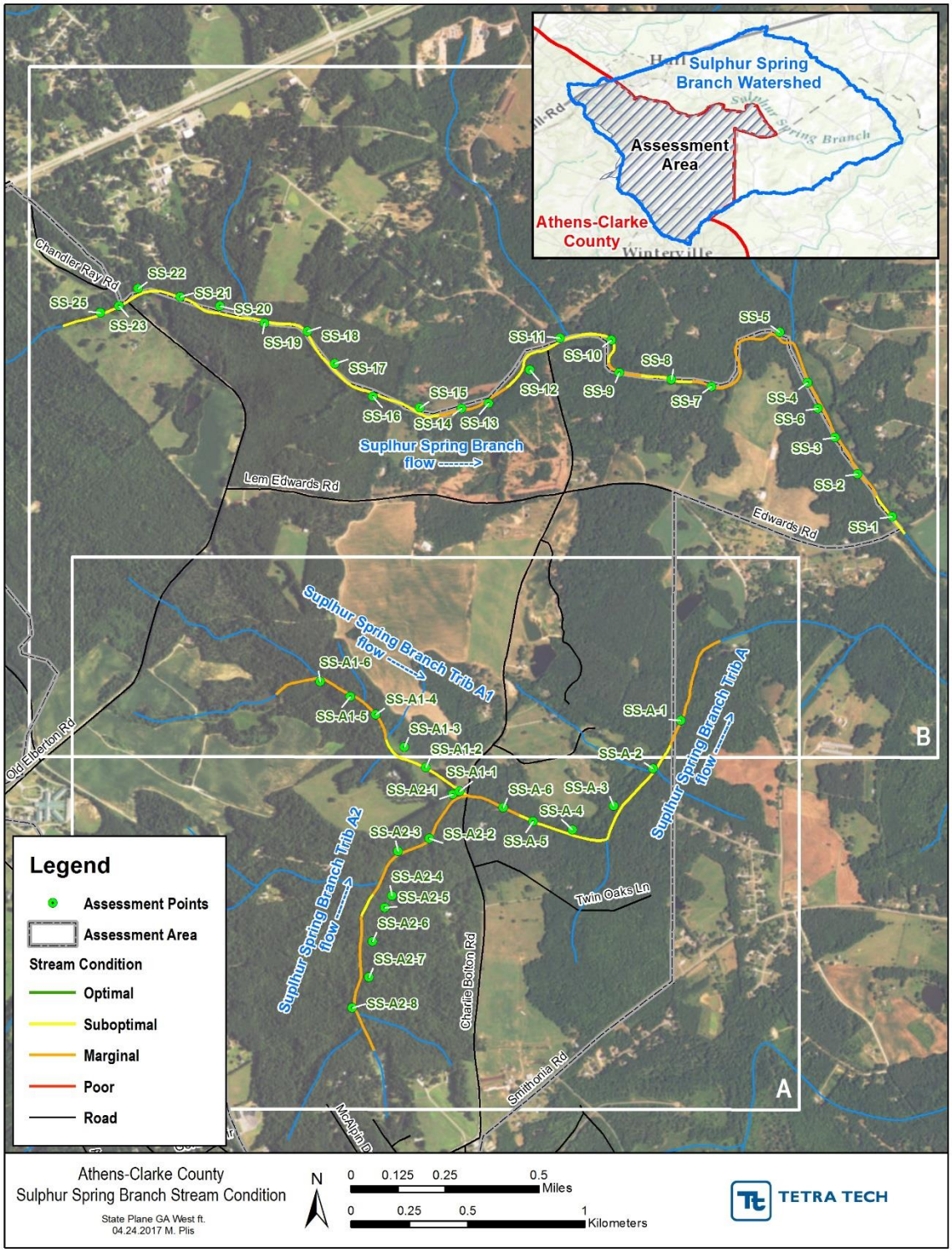

Figure 2-6. Stream Reach Condition Ratings

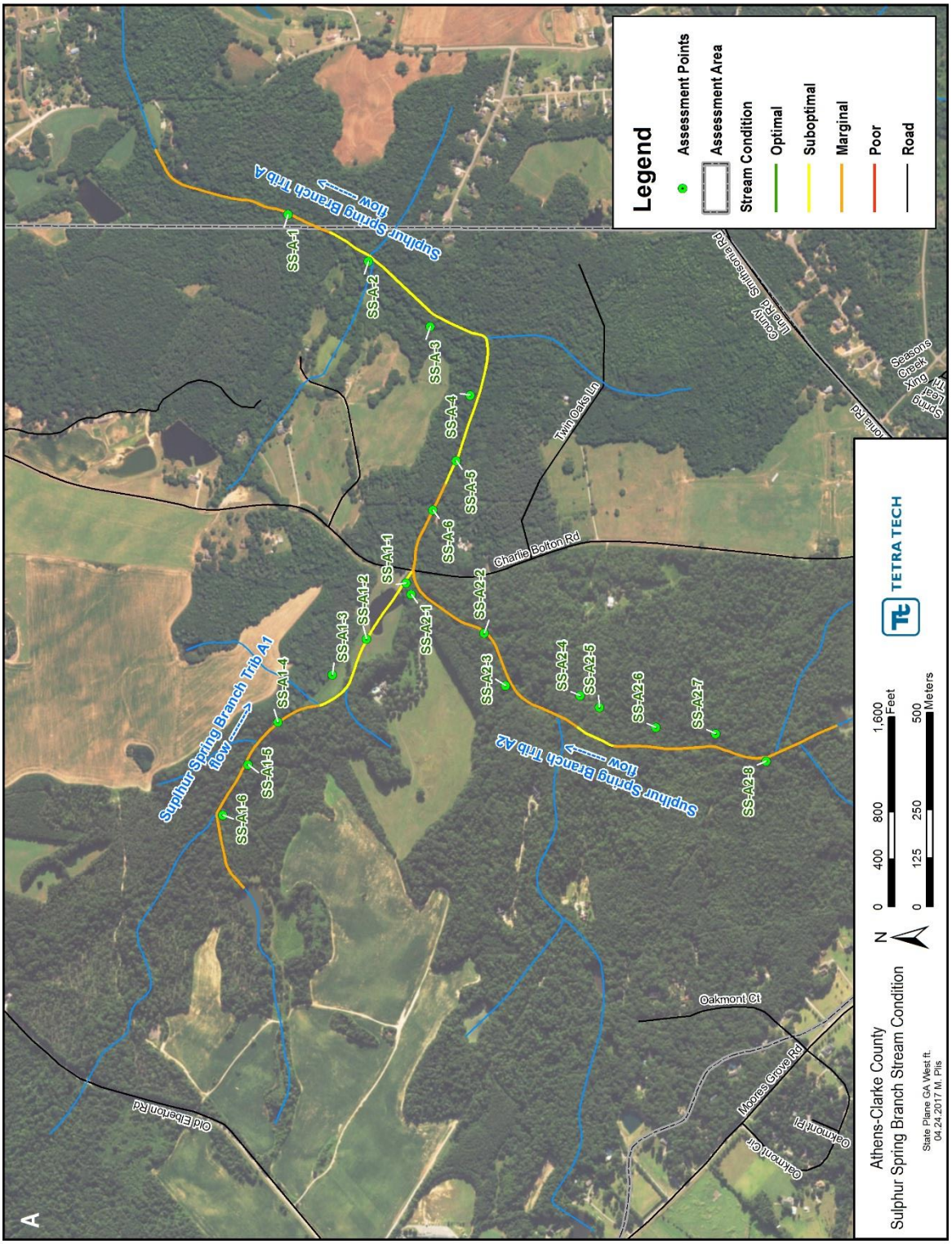

Figure 2-7. Stream Reach Condition Ratings—Panel A

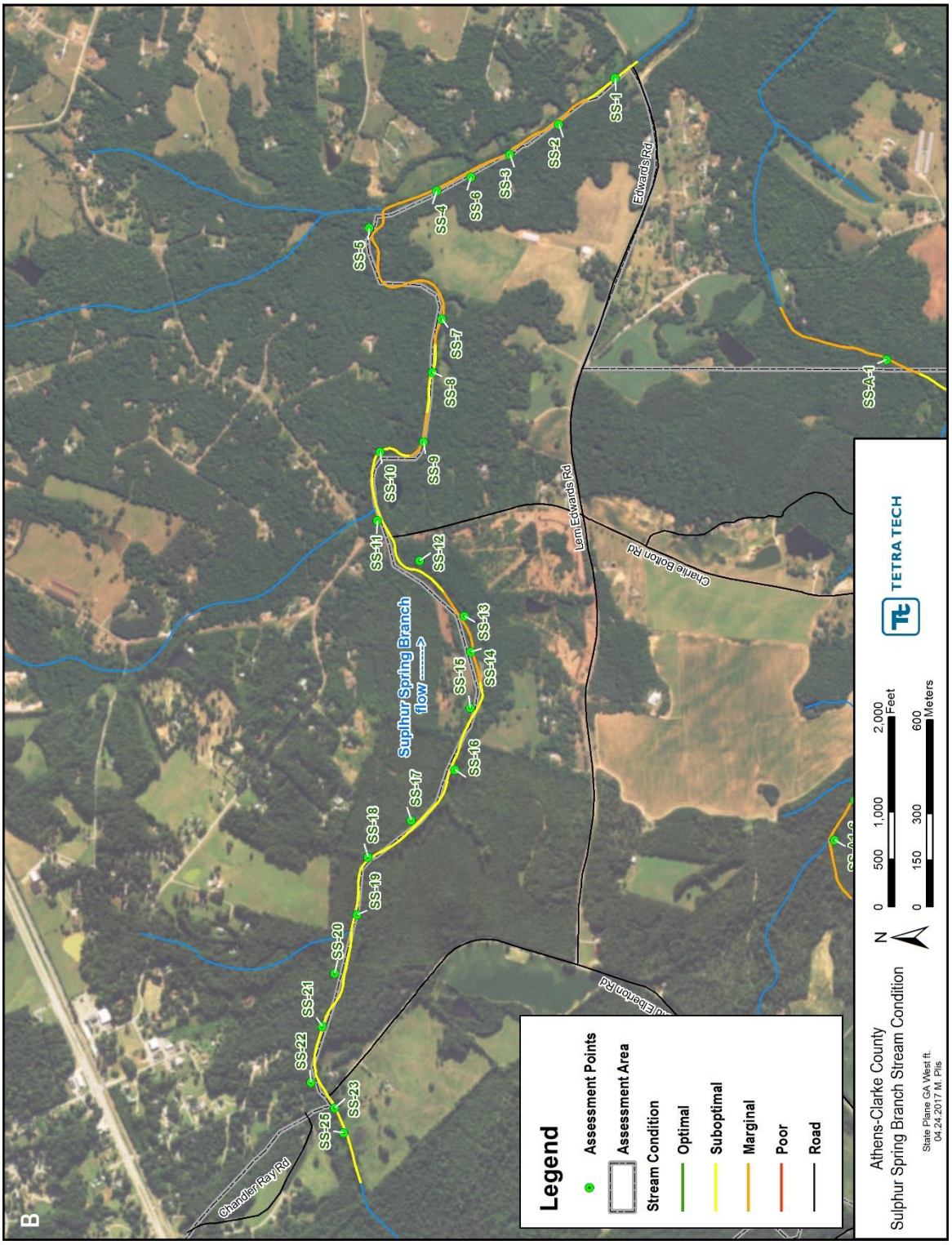

Figure 2-8. Stream Reach Condition Ratings—Panel B

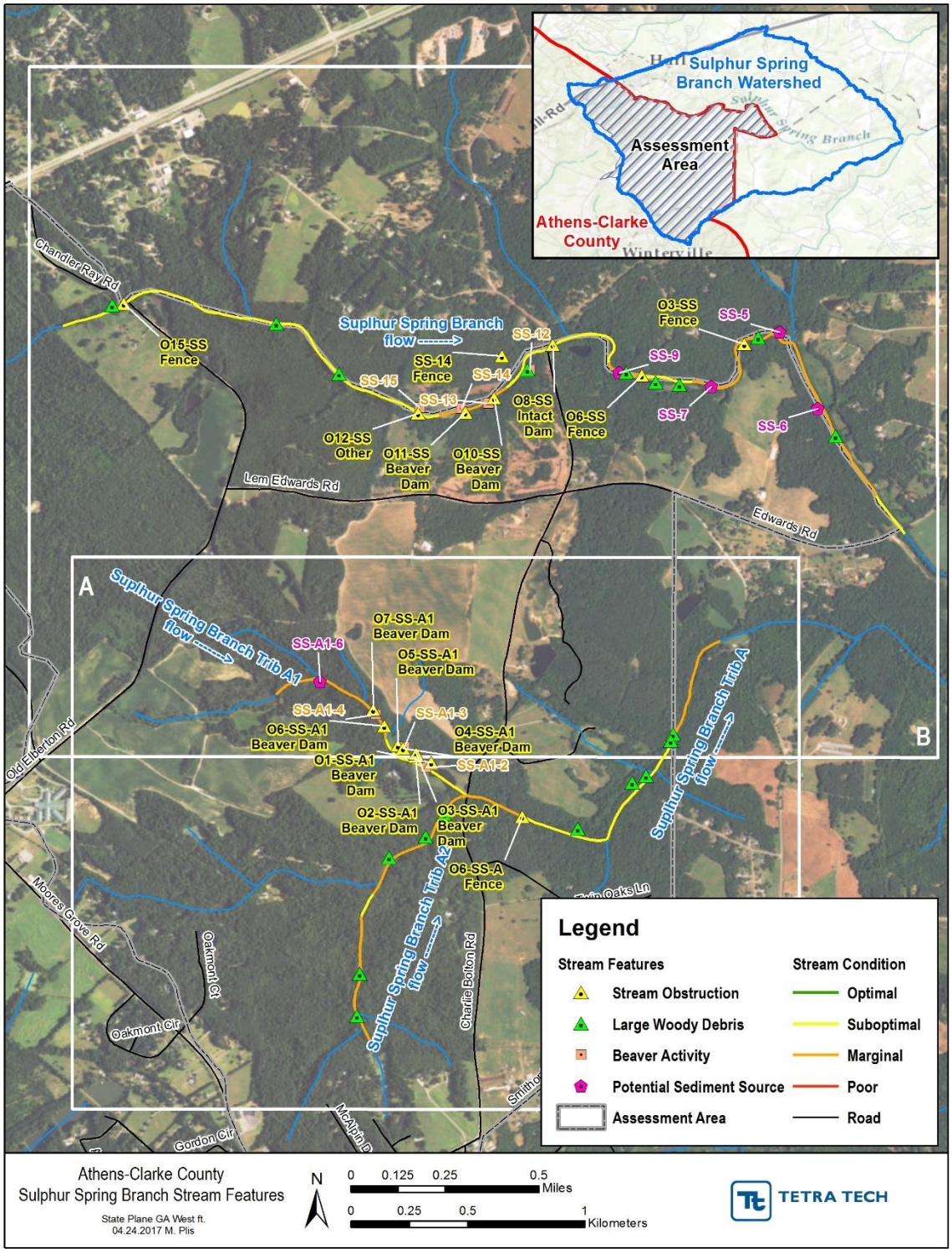

Figure 2-9. Stream Assessment Features

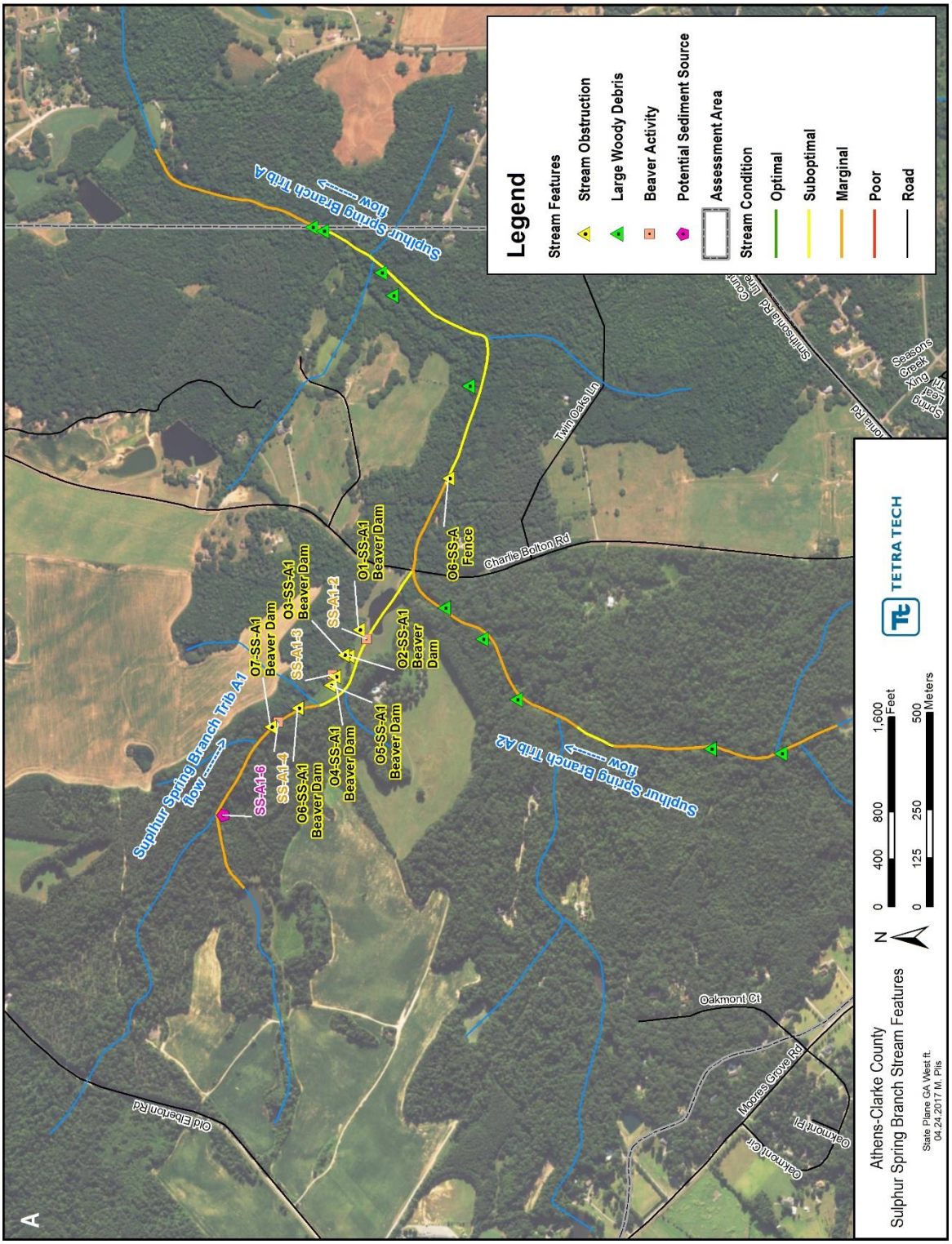

Figure 2-10. Stream Assessment Features—Panel A

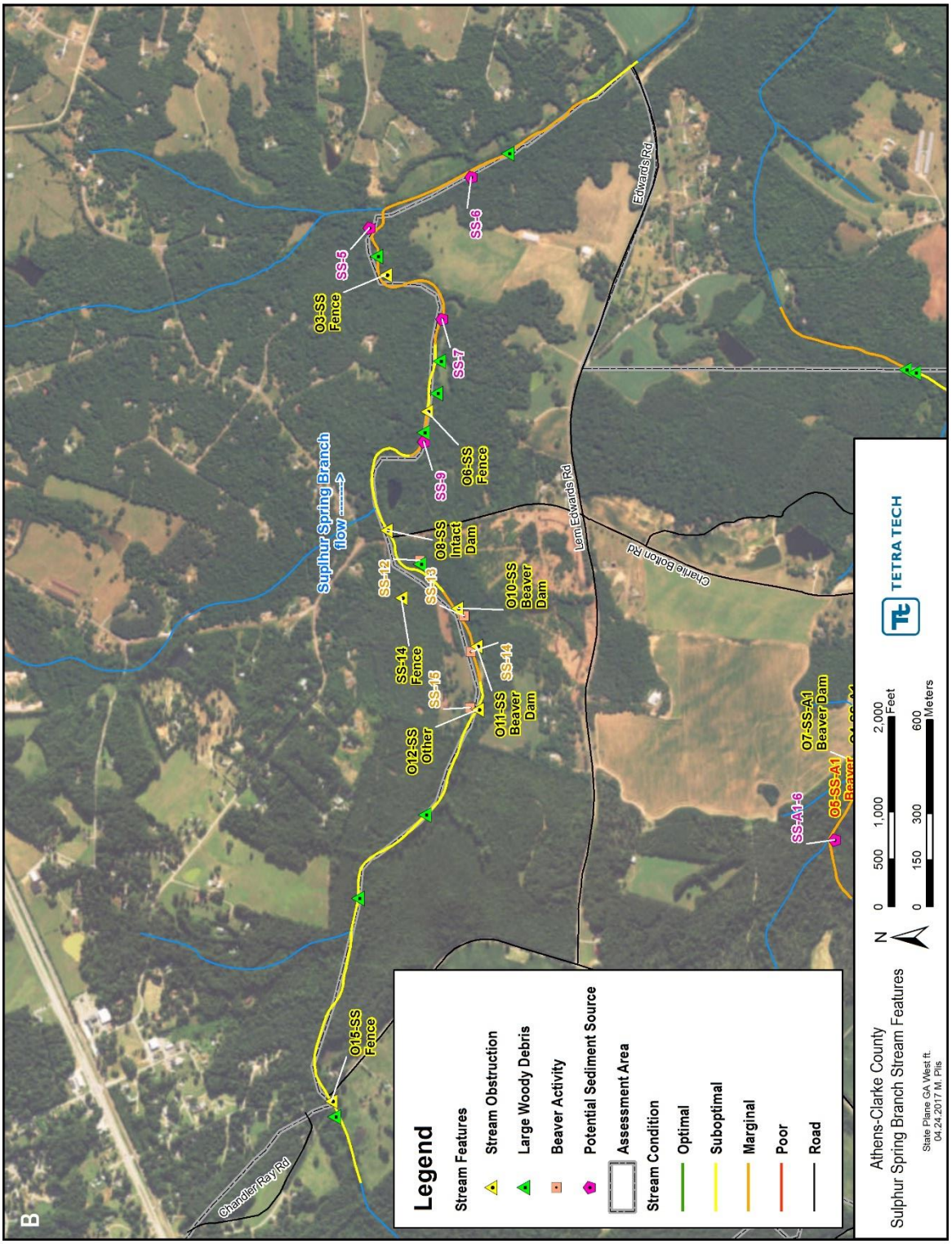

Figure 2-11. Stream Assessment Features—Panel B

2.8 Water Quality

There are two water quality monitoring stations in the study area (SS1 and SS2) that were monitored by ACC from 2013 to 2014. Monitoring stations are shown in Figure 2-12. ACC does not have a regulatory obligation to conduct long-term monitoring. However, they have a proactive Stormwater Management Program that includes conducting monitoring on a rotating basis between the different watersheds in ACC to get representative conditions in the major streams and track trends in water quality over time. Collecting and testing water quality samples over time will provide a general picture of what pollutants are a concern in ACC's waterways.

The federal Clean Water Act has led to the development of water quality standards to restore and maintain the chemical, physical, and biological health of the nation's surface waters. Agencies use these standards to guide watershed management activities. The classification of a water body's designated use (e.g., drinking water supply) determines the applicable water standards. Sulphur Spring Branch has a designated use of fishing according to Georgia's Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03 (O.C.G.A. 2015[1]). State standards for dissolved oxygen (DO), pH, FC bacteria, and temperature for waters with the designated use of fishing are listed in Table 2-2.

Table 2-2. Georgia Water Quality Standards for Designated Use of Fishing (GaEPD 2015)

Dissolved Oxygen	pH	FC Bacteria	Temperature
Daily average of 5.0 mg/L and no less than 4.0 mg/L at all times	6.0-8.5	May-Oct < 200 colonies/100 mL as a geometric mean based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours, and 4,000 colonies/100 mL as a single-sample maximum.	Not to exceed 90 degrees Fahrenheit (32 degrees Celsius)
		Nov–Apr < 1,000 colonies/100 mL as a geometric mean based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours, and 4,000 colonies/100 mL as a single-sample maximum.	

Notes: mg/L = milligrams per liter; mL = milliliters.

[1] O.C.G.A (Official Code of Georgia Annotated). 2015. Georgia's Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03. Amended: F. Oct. 2, 2015; eff. Oct. 22, 2015.

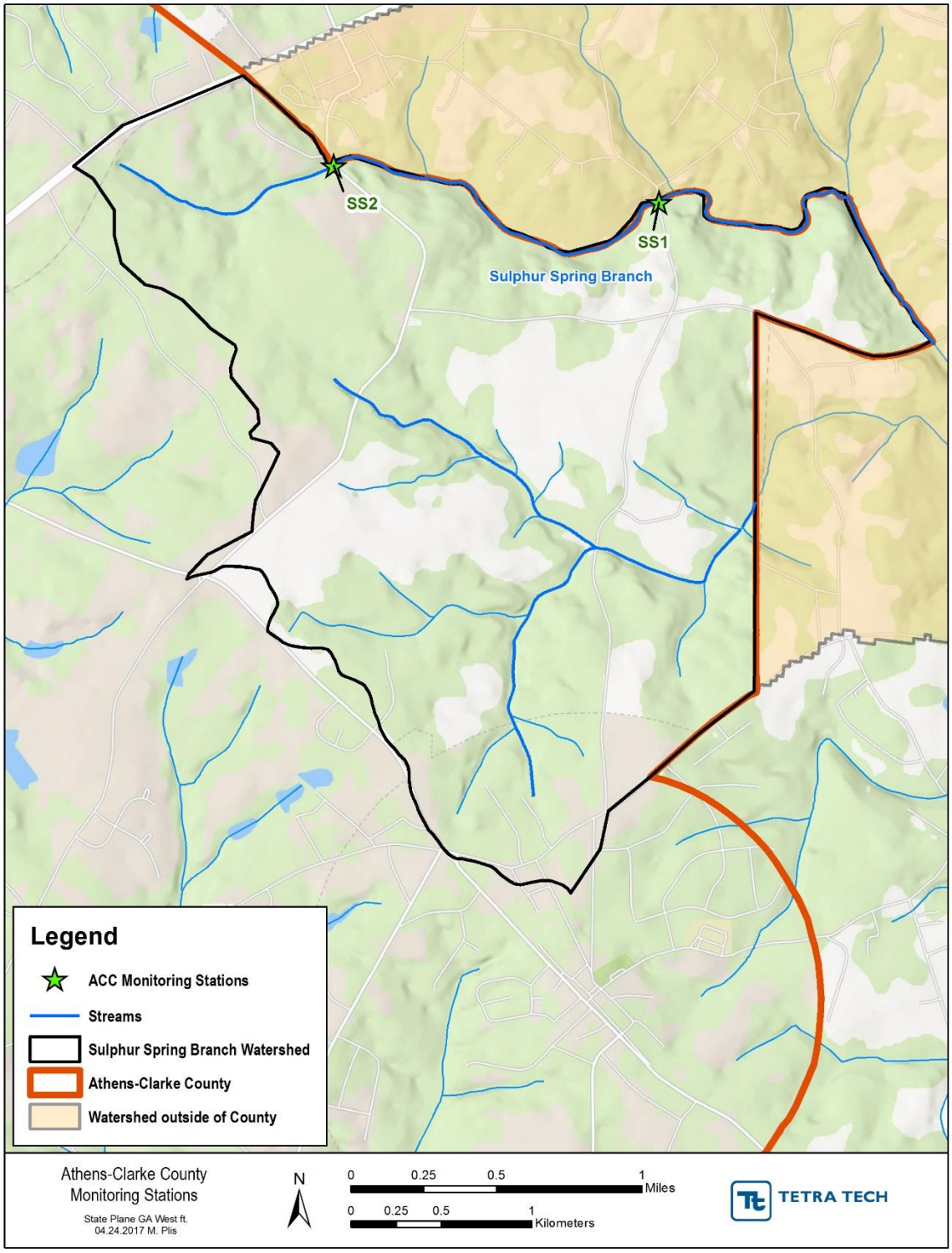

Figure 2-12. Water Quality Monitoring Stations

Water quality data collected by ACC from 2013 to 2014 is summarized in Table 2-3. In this table, standards are based on the state standards for DO, pH, FC, and temperature, as shown in Table 2-2. Standards for all other parameters are based on benchmark values used by ACC that are not regulatory standards. FC bacteria geometric means collected by ACC are shown in Table 2-4.

Plots of the raw grab sample data for DO, FC, pH, and temperature collected at each station are shown in Figure 2-13 through Figure 2-16. Data was collected from July 2013 through May 2014. The full set of tabulated data is provided in appendix E.

Table 2-3. ACC Monitoring Station Water Quality Data (2013-2014)

Parameter	Unit	Standard	SS1				SS2			
			Samples	Average	Min	Max	Samples	Average	Min	Max
Conductivity	mS/cm	≤ 0.3	16	0.029	0.002	0.040	16	155.765	0.001	816.400
Dissolved Oxygen	mg/L	≥ 4*	16	12.65	6.00	78.70	16	8.77	0.02	66.50
Fecal Coliform Bacteria	cols/100mL	Varies	16	402	99	1,553	13	181	0	501
Ammonium (NH_4)	mg/L	not established	1	56.24	56.24	56.24	1	1.11	1.11	1.11
pH	Standard units	6.0 - 8.5*	16	6.39	1.74	8.94	16	6.10	2.10	7.87
Temperature	Degrees Celsius	≤ 32*	16	14.19	6.79	21.14	16	10.45	6.51	17.42
Total Nitrogen	mg/L	≤3	1	1.15	1.15	1.15	1	1.78	1.78	1.78
Total Phosphorus	µg/L	≤ 200	1	18.00	18.00	18.00	1	5.00	5.00	5.00
Total Suspended Solids	mg/L	≤ 13	2	6	2	10	2	5	3	6

Notes: cols/100 mL = colonies per 100 milliliters; µg/L = micrograms per liter; mg/L = milligrams per liter; max = maximum; min = minimum; mS/cm = millisiemens per centimenter. Red cells indicate averages not meeting the standard. Orange cells indicate minimum or maximum values not meeting the standard. * indicates state standard.

Table 2-4. Fecal Coliform Data and Water Quality Standard Comparison (2013-2014)

Parameter	Unit	Standard	Sample Dates	SS1				SS2			
				Samples	Geomean	Min	Max	Samples	Geomean	Min	Max
Fecal coliform bacteria May - Oct	cols/ 100 mL	<200	July 30-Aug 27, 2013	5	352	179	921	N/A	N/A	N/A	N/A
Fecal coliform bacteria Nov - Apr	cols/ 100 mL	<1,000	Feb 4-25, 2014	4	447	138	1,553	4	51	24	75

Notes: cols/100 mL = colonies per 100 milliliters; max = maximum; min = minimum. Red cells indicate averages not meeting the standard.

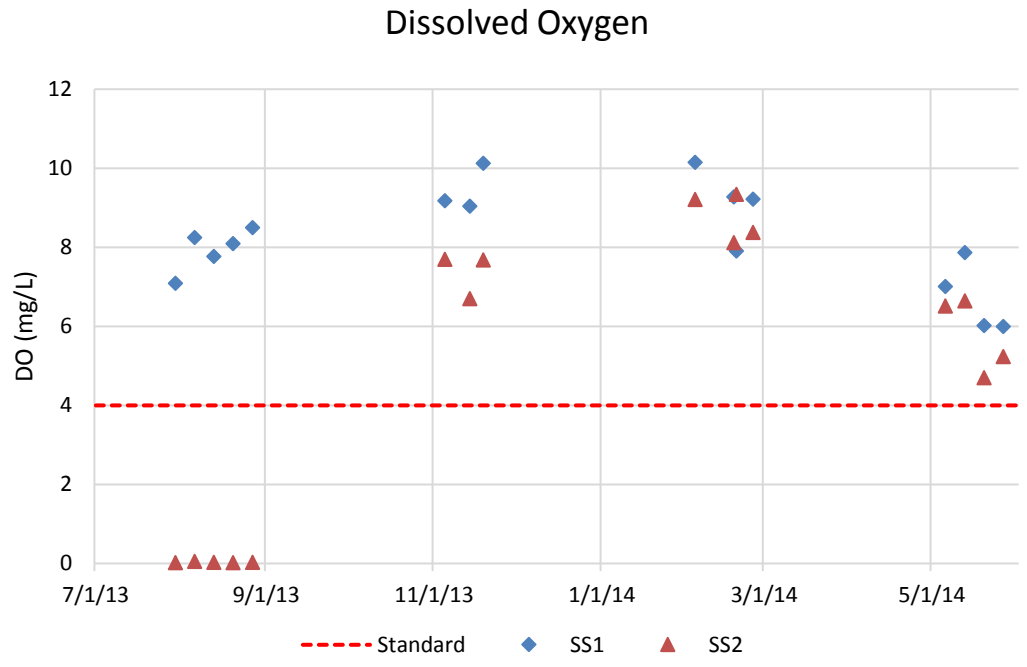

Figure 2-13. Dissolved Oxygen Grab Sample Results for Sulphur Spring Branch Stations

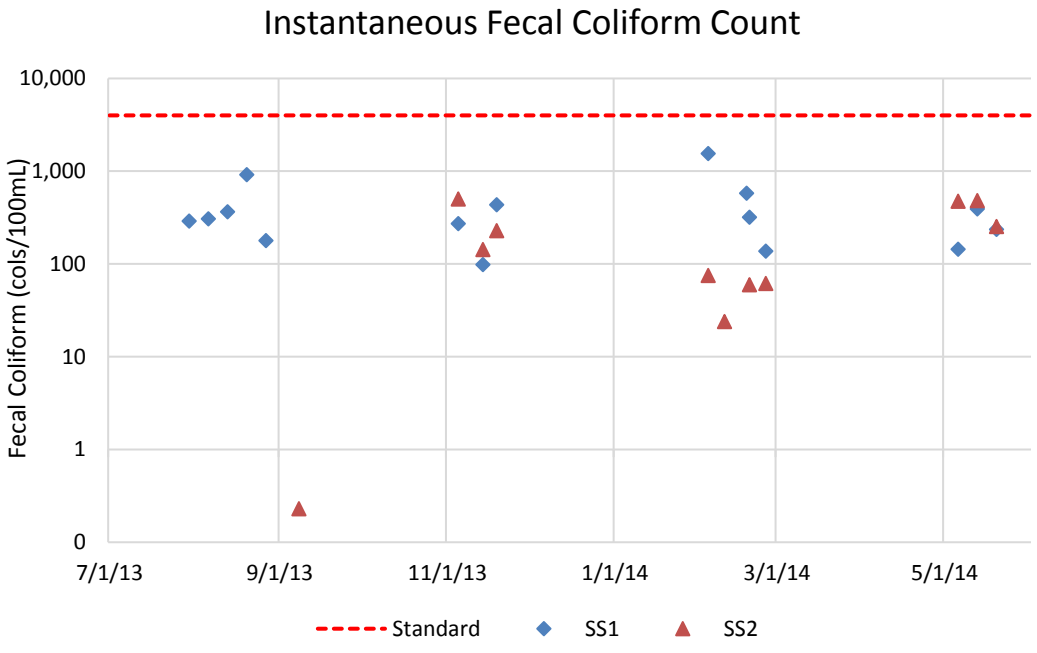

Figure 2-14. FC Bacteria Grab Sample Results for Sulphur Spring Branch Stations

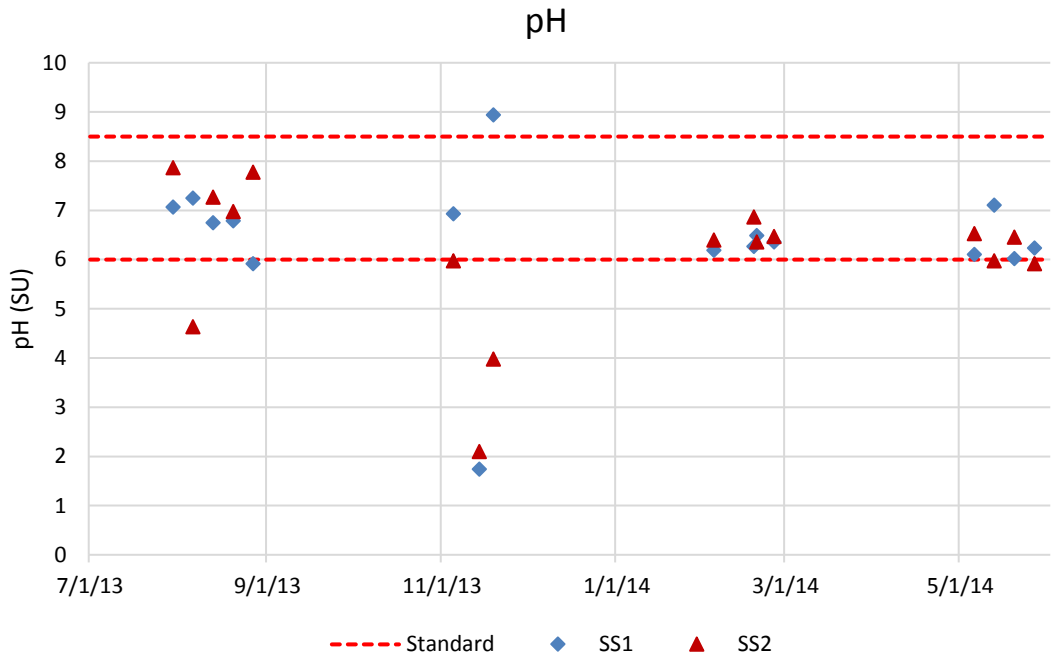

Figure 2-15. pH Grab Sample Results for Sulphur Spring Branch Stations

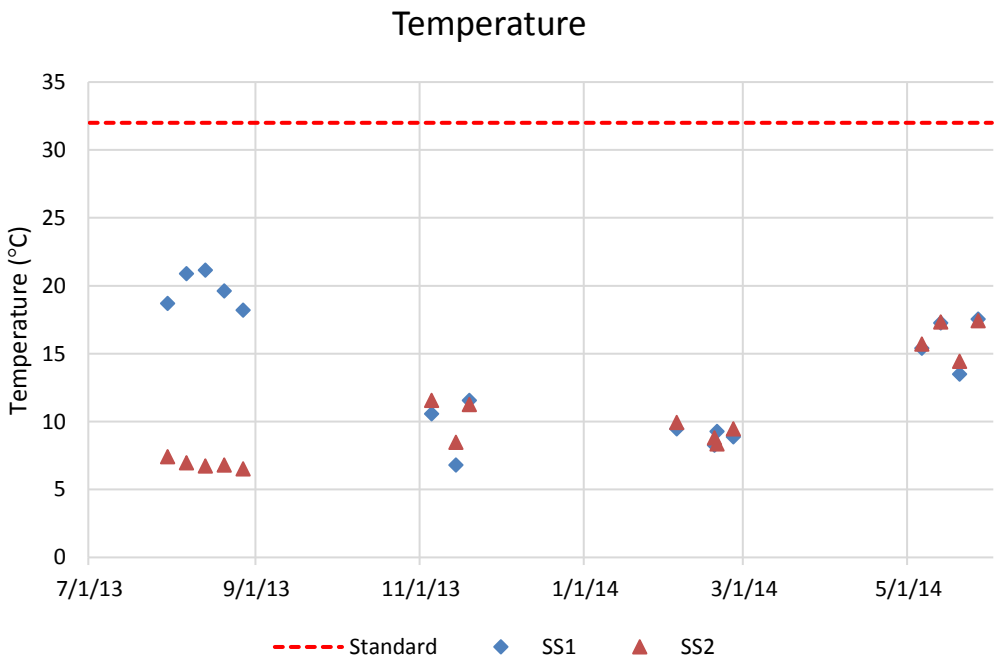

Figure 2-16. Temperature Grab Sample Results for Sulphur Spring Branch Stations

Results of the water quality sampling effort suggest that surface waters in the study area are generally in compliance with the DO, pH, and temperature standards adopted by the State of Georgia. Average concentrations of DO and average measurements of pH and temperature in Sulphur Spring Branch are well within the State standards. On occasion, individual pH measurements did not meet the state standards, but do not appear to be indicative of chronic water quality problems. The pH standard maximum of 8.5 was exceeded on one occasions at station SC-1. The pH standard minimum was not met on one occasion at station SS1 and on several occasions at station SS2 where measurements were below 6.0.

FC geometric means indicate that both Sulphur Spring Branch stations comply with the November-through-April standard but station SS-1 exceeded the May-through-October standard for the single geometric mean that was calculated for that time of year (Table 2-4). Average total nitrogen (TN), total phosphorous (TP), and total suspended solids (TSS) concentrations meet the standards at both stations. The conductivity standard of 0.3 mS/cm was exceeded on five consecutive occasions in 2013 at station SC-2, but appears to be the result of an equipment or recording error.

2.9 Summary

This watershed characterization describes existing conditions in the Sulphur Springs Branch watershed within ACC. The nature and condition of the study area was characterized from previous studies, monitoring efforts, and stream assessments.

The Sulphur Spring Branch watershed is composed primarily of forest land, with pasture/crop land being the next most prevalent land cover. The study area is only about 2 percent impervious, and does not contain any impaired streams on Georgia's draft 2016 Integrated 305(b)/303(d) List of Streams.

Water quality monitoring data indicate that FC bacteria may be a concern in the study area. Although limited data has been collected, there was one exceedance of the May-through-October state standard.

Notable key findings from the stream assessment include the following:

- The highest quality stream reaches were marginal to suboptimal.
- No poor-quality stream reaches were identified.
- Fallen trees and Large Woody Debris jams were noted in several places throughout the watershed.
- Beaver activity was extensive along Sulphur Spring Branch, just upstream of Charlie Bolton Road, and along Trib A1.
- Livestock are actively accessing several locations over a 2,000-foot long reach between barbed wire fences at O3-SS and O6-SS causing bank erosion and contributing fecal matter directly to stream.

3 Watershed Management Measures

3.1 Current Measures

ACC is currently implementing numerous structural and programmatic management measures to maintain and improve water quality throughout the county. The implementation of these measures is a collaborative effort by various ACC departments and other stakeholders mentioned in section 1.3.

As part of ACC's efforts to implement watershed protection strategies, measures have been taken to prevent detrimental changes in hydrologic conditions and reduce, prevent, or treat stormwater pollutants through protective ordinances, development reviews/inspection programs, staff training sessions, public education and outreach, compliance with ACC's Phase II MS4 permit, water quality monitoring, and long-term watershed characterization studies. A complete list of BMPs and programmatic management activities implemented from July 2016 through June 2017 is included in Table 2-1 of the 2016-2017 Public Utilities Department WPP Annual Report and provided as appendix F of this WMP.

3.2 Watershed Management Needs

3.2.1 Method for Determining Management Needs

Eight watershed management needs were identified across ACC based on information obtained from the watershed characterizations. Decision criteria were developed to determine if a management need applied to each assessed watershed. The criteria for determining ACC management needs are listed in Table 3-1. The table also identifies which of these management needs apply to the Sulphur Spring Branch watershed. Shaded cells indicate that the need is watershed-wide.

Table 3-1. Watershed Management Needs Decision Criteria

Management Need	Decision Criteria	Applicable to Sulphur Spring Branch[a]
FC Bacteria	Listed as impaired for FC; or Geometric mean not meeting state WQ standards.	Yes
Sediment	Listed as impaired for biota (fish or macro) due to sediment; or Average TSS value greater than standard of 13 mg/L.	
pH	Average value not meeting state WQ standards.	
Conductivity	Average value greater than the standard of 0.3 mS/cm.	
Dissolved Oxygen	Average value not meeting state WQ standards.	
Wetland Preservation	Large wetland areas identified in NWI Map.	
Buffer Enhancement	High percentage of cropland/pastureland directly adjacent to streams.	Yes
Hydrology	Watershed is ≥ 10% impervious; or Poor stream condition scores.	

Note: mg/L = milligrams per liter; mS/cm = millisiemens per centimenter.

a Dark shading indicates the management need is watershed-wide.

3.2.2 Management Needs by Area

The Sulphur Spring Branch watershed was determined to have the following watershed management needs. For each management need a rationale is provided in addition to identifying to what area of the watershed it applies. Refer to Figure 3-1 for locations of management needs by area.

FC Bacteria: Limited data has been collected, however the one geometric mean that was calculated for the May–October monitoring period exceeded the state standard for fecal coliform bacteria. Therefore, this was determined to be a watershed-wide management need. Areas outside of ACC, along the northern side of Sulphur Spring Branch may also be contributing to high FC concentrations, limiting the ability of ACC to meet state standards.

Buffer Enhancement: There is a high percentage of crop/pasture land directly adjacent to streams in the Sulphur Spring Branch watershed. Therefore, buffer enhancement is a watershed-wide management need.

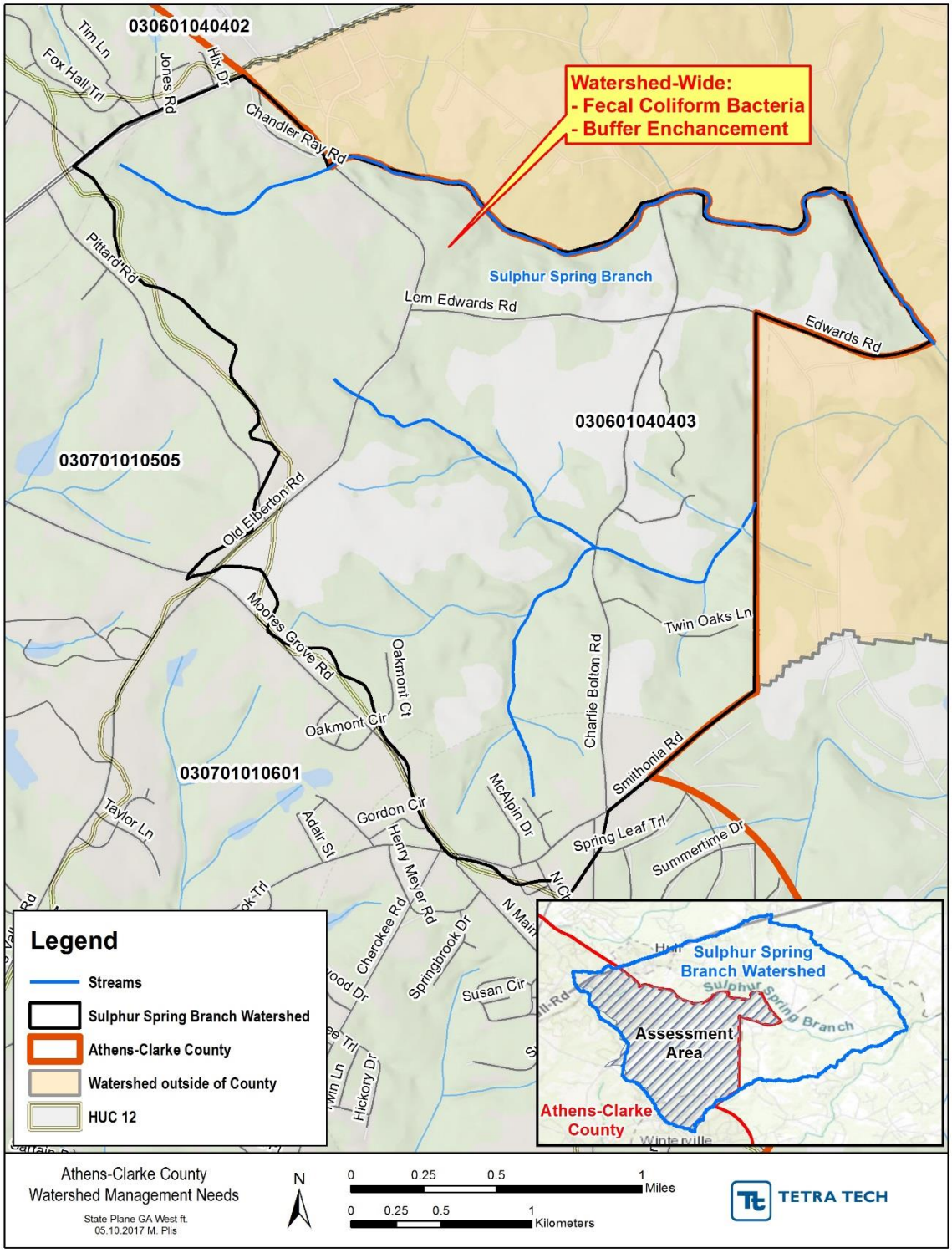

Figure 3-1. Sulphur Spring Branch Management Needs

3.3 Management Opportunities

The Tetra Tech-Arcadis-ACC team conducted a GIS analysis and field assessment to identify watershed management opportunities, including stormwater control, restoration, and programmatic measures. Particular consideration was taken by the team to identify and prioritize opportunities that target the management needs specific to the Sulphur Spring Branch watershed. This section presents details and results of the analytical methodology employed by the team to develop a prioritized list of viable opportunities, including parcel screening criteria, field assessment information, BMP modeling scenarios, and scoring and ranking metrics.

3.3.1 Identification of Potential Sites for Management Opportunities through GIS Analysis

A GIS screening analysis was conducted as an initial step in identifying potential sites for watershed improvement measures. Eleven metrics were used to score all parcels in the watershed. Point values were assigned to different categories within each metric so that preferred attributes received a higher score (Table 3-2). Some site features were preferred over others when selecting candidate sites because they had features such as publicly owned land, large parcel size, and close proximity to an impaired stream. Weighting of preferred features was done within the scoring system itself, rather than applying a weighting factor to each metric. Therefore, the total possible points are different for individual metrics. Individual metric scores were summed to obtain a total score for each parcel in the watershed. The maximum score possible was 119. All parcels in the watershed were scored and ranked based on this system.

The top 20 ranked sites in each watershed were evaluated further using GIS data and Google Earth images to evaluate the potential for management opportunities on these parcels. Some parcels were removed from further consideration if opportunities were limited (based on ownership information, existing land use, position in the watershed, access constraints, and other factors). Some parcels had characteristics that informed programmatic management opportunities (e.g., preservation opportunities, stream buffer enhancement, and agricultural BMPs), but did not require a site visit.

Additional sites were added to the list of places to visit in the field following consultation with the Transportation and Public Works Department and the Leisure Department, both of which provided a list of sites already identified as having stormwater management concerns and other potential management opportunities. Other sites were added based on opportunities identified from stream walks or from a visual scan of the watershed in Google Earth and GIS. The visual scan helped identify sites that might not have been captured by the scoring metrics such as highly disturbed or erosional areas. A list of the sites identified for field assessments is included in Table 3-3 and their locations are shown on Figure 3-2.

Table 3-2. Metrics and Scoring System for Site Prioritization

Parcel Metric		Score	Source	Notes
Publicly Owned	County Gov	20	ACC GIS layer	Higher scores assigned to publicly owned parcels.
	Other County	15		
	State Owned	10		
	No	1		
Planned Development	Yes	20	ACC GIS layer	Targets parcels slated for development as opportunities for BMP incorporation.
	No	0		
Within 150 ft of Agricultural Stream Segment	Yes	10	Based on National Land Cover Database (NLCD)	Targets parcels contributing runoff from agricultural and/or livestock activity.
	No	0		
Impervious Cover %	76-100	10	Based on National Land Cover Database (NLCD)	Targets parcels with higher impervious cover.
	51-75	7.5		
	26-50	5		
	0-25	2.5		
Hydrologic Soil Group	A	10	USDA Web Soil Survey coverage	Targets parcels with more permeable soils.
	B	7.5		
	C	5		
	D	2.5		
Parcel Size (ac)	1.52+	10	ACC tax parcel data	Higher scores for large parcels as they are more suitable for BMP opportunities.
	0.61-1.51	7.5		
	0.34-0.60	5		
	0.0-0.33	0		
Within 150 ft of Impaired Stream Segment	Yes	10		Targets parcels in proximity to stream segments listed as Impaired on the 303(d) list.
	No	0		
Erosion Score	Poor	8	On-site visual assessment	Higher scores assigned to parcels proximal to stream segments with obvious erosion issues.
	Marginal	6		
	Suboptimal	4		
	Optimal	0		
Vegetation Score	Poor	8	On-site visual assessment	Higher scores assigned to parcels lacking vegetative coverage along banks.
	Marginal	6		
	Suboptimal	4		
	Optimal	0		
Overall Score	Poor	8	On-site visual assessment	Composite score combining bank erosion, vegetation coverage, in-stream habitat conditions, floodplain connection, and accessibility.
	Marginal	6		
	Suboptimal	4		
	Optimal	0		
Zoning	C-G	5	ACC GIS layer	Commercial – General.
	C-D	5		Commercial – Downtown.
	C-N	5		Commercial – Neighborhood.

Parcel Metric		Score	Source	Notes
	C-O	5		Commercial – Office.
	E-I	2.5		Employment – Industrial.
	I	2.5		Industrial.

Notes: ac = acres; ft = feet; USDA = U.S. Department of Agriculture.

Table 3-3. Sites Identified for Field Assessment

Parcel No.	Owner	Publicly Owned	Planned Development Parcel	Agricultural Stream Segment	Impervious Cover %	Hydrologic Soil Group	Parcel Size	Impaired Stream Reach	Erosion Score	Vegetation Score	Overall Score	Parcel Zoning	Total Score	Rank in Watershed[a]
Public														
222 020A	CLARKE COUNTY SCHOOL DISTRICT	15	0	0	2.5	7.5	10.0	0	1	1	1	0	38	19
Private														
273 001A	EVANS VICKIE A	1	0	10	2.5	7.5	10.0	0	6	6	6	0.00	49.0	2
274 001	BAIRD JOSEPH B JR	1	0	10	2.5	7.5	10.0	0	4	6	6	0.00	47.0	5
274 001B	THUMANN DONALD R	1	0	10	2.5	7.5	10.0	0	4	6	6	0.00	47.0	5
281 010D	EVANS VICKIE A	1	0	10	2.5	7.5	10.0	0	4	6	6	0.00	47.0	5
273 001B	EVANS VICKIE A	1	0	10	2.5	7.5	10.0	0	4	4	6	0.00	45.0	9
273 004	HOOPER J D & ETHELEEN HOOPER LIFE ESTATE HOOPER DAVID LEE	1	0	10	2.5	7.5	10.0	0	4	4	4	0.00	43.0	10
214 026	RAY ROBERT C	1	0	10	2.5	7.5	10.0	0	4	4	4	0.00	43.0	10
281 010E	BROWN WALTER J JR & FAITH K	1	0	0	2.5	7.5	10.0	0	6	6	6	0.00	39.0	14
274 008	CANWOOD CORPORATION INC	1	0	0	2.5	7.5	10.0	0	6	6	6	0.00	39.0	14
281 010A	CHEATHAM ANNIE & ROGER HILTEN	1	0	0	2.5	7.5	10.0	0	4	6	6	0.00	37.0	20
281 006	WILLIAMS MARVIN R	1	0	0	2.5	7.5	10.0	0	4	6	6	0.00	37.0	20
281 001	BROWN WALTER J JR & FAITH K BROWN	1	0	0	2.5	7.5	10.0	0	4	6	6	0.00	37.0	20

Note:

a Rank indicates rank among all parcels in the watershed. Parcels with the same total score received the same rank.

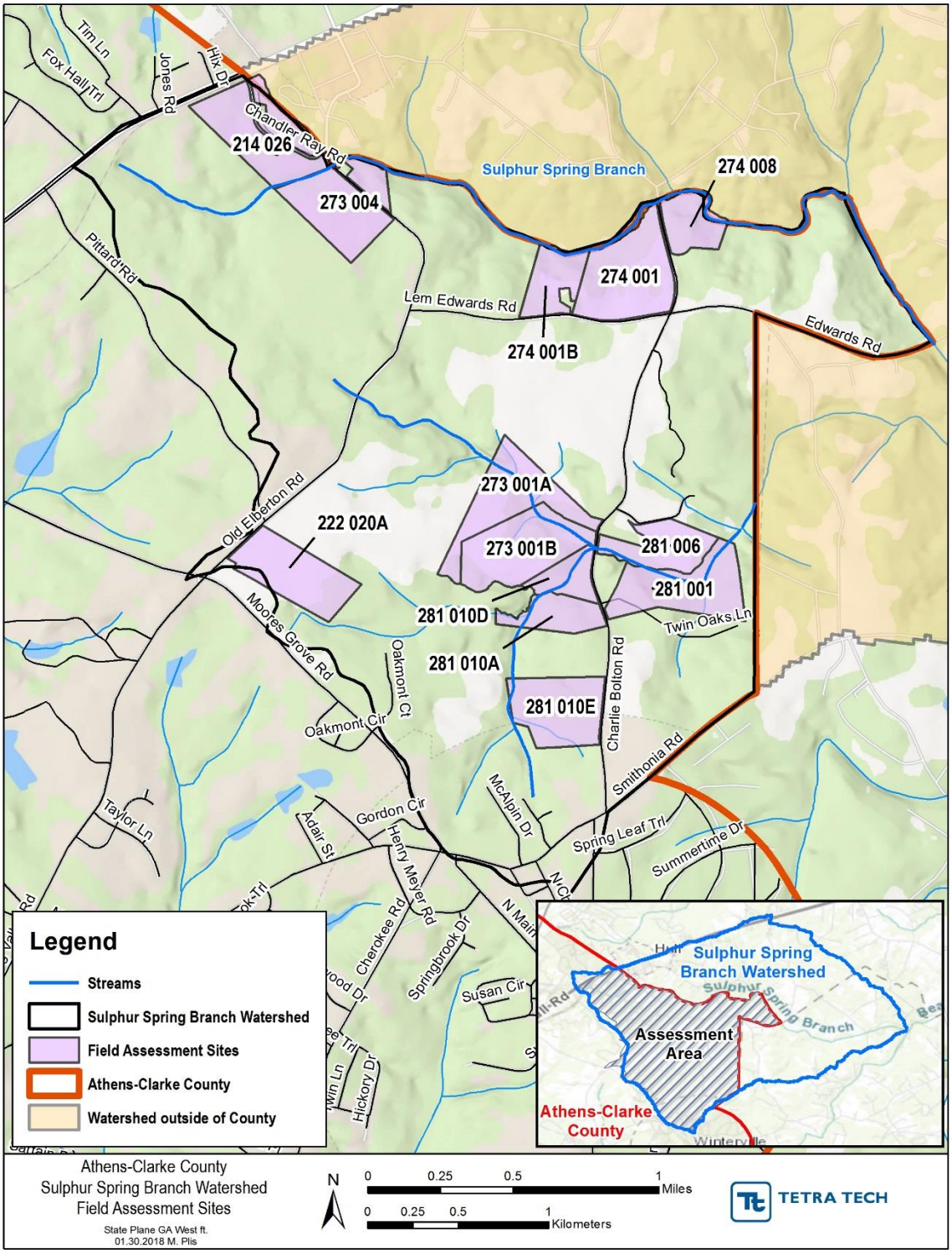

Figure 3-2. Sulphur Spring Branch Field Assessment Sites

3.3.2 Field Assessment

Each site identified for field assessment was visited to further evaluate opportunities for management measures. Access to some sites was limited, either because of private ownership or because of fencing. In addition to the identified site field assessments, a windshield survey was performed while traveling throughout the study area to identify other parcels where opportunities might exist. If new opportunities were identified, they were assessed at that time.

Watershed Improvement Opportunity Field Assessment forms (appendix G) were filled out for sites where management opportunities exist and for sites where it was important to document existing site conditions in support of the general watershed characterization. The forms include information about landowners, existing conditions, land use, and potential utility conflicts as well as a description of proposed management measures and photo notes.

3.3.3 Initial Site Screening and Identification of Management Opportunities

Following the field assessments, sites that had no viable management opportunities and those that had significant constraints or challenges were removed from further consideration. The remaining sites were identified as candidate sites for watershed improvement opportunities. Two sites were identified in the Sulphur Spring Branch watershed. Parcel information and potential opportunities for the candidate sites are listed in Table 3-4 and the site locations are shown in (Figure 3-3). BMPs were assigned a unique ID based on an abbreviation of the watershed name and whether the BMP is structural stormwater control (Str), restoration (Res), or programmatic (Prog). No restoration BMP opportunities were identified in the Turkey Creek watershed.

Table 3-4. Candidate Sites for Watershed Improvement Opportunities

Watershed	Parcel Number	Owner	Description	Opportunity	BMP ID
Sulphur Spring Branch	222 020A	Clarke County School District	W.R. Coile Middle School	Rain garden	SS-Str-01
Sulphur Spring Branch	274 008	Canwood Corporation Inc	Stream crossing - Sulphur Spring Branch at Charlie Bolton Road	Remove concrete dam	SS-Prog-01

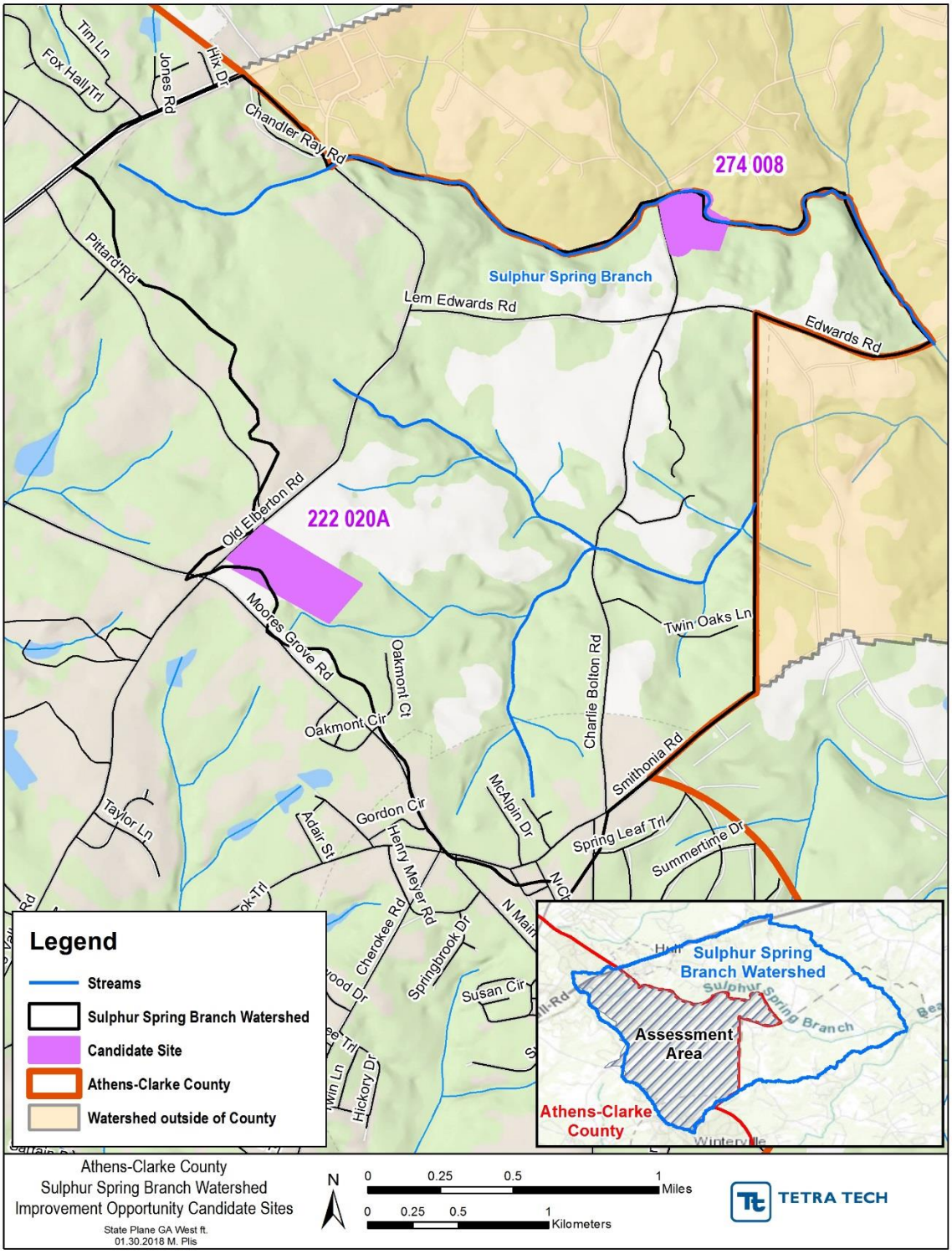

Figure 3-3 Sulphur Spring Branch Watershed Improvement Opportunity Sites

Programmatic watershed improvement opportunities were identified through the GIS analysis and field assessments. These programmatic opportunities include measures such as the development or modification of standard operating procedures for vegetation management, review of inspection and maintenance programs, development of education programs, creation of incentives for stormwater management retrofits, encouragement of green infrastructure and low impact development practices, and the development of a more comprehensive stormwater inventory. A full list of programmatic management opportunities that are not parcel-specific is provided in Table 3-5.

Table 3-5. Programmatic Watershed Improvement Opportunities (not parcel-specific)

Measure	Description
Bacterial Source Tracking	Bacterial source tracking (BST) may help identify the source (e.g., human, dog, goose, or deer) of FC bacteria in the watershed. Specific sampling locations may be selected based on anecdotal evidence to help determine the type of management measures that will be most effective at reducing FC levels.
Vegetated Stream Buffers	Educate Department of Leisure Services and contractor personnel not to mow within the 75-ft buffer along perennial streams. Allow limited mowing once or twice a year in specific areas to limit growth of woody vegetation. Leave as tall as possible. Educate landscape companies, farmers, golf courses, and homeowners to leave a vegetated buffer along streams. Fliers and/or in-person meetings with farmers about federal programs that provide funding to move feeding operations away from streams.
Mowing Maintenance Practices[a]	Develop standard operating procedures for ACC departments and contractors mowing ACC and ACC School District properties about landscaping BMPs for protection of water resources. Mowing height should be at least 2 inches.
Bank Stabilization[a]	Use site-specific measures to stabilize eroding banks, using vegetation and natural materials that will provide wildlife habitat where feasible.
Retrofit Incentives	Increase incentives to retrofit older developments that have no stormwater management so they provide it, possibly through utility fee credit.
New and Redevelopment Inspections[a]	Continue NPDES inspections of new and redevelopment sites for compliance with required erosion and sediment control practices.
Linear Infrastructure BMPs	For linear projects such as transportation, sanitary sewer, or stormwater sewer improvements, assist in reducing sediment and pollutant loading in streams through inspections and education.
Cisterns on Public Buildings	Assess the need for harvested rainwater. Does ACC currently use potable water for irrigation, dust control, or other needs? Use cisterns at ACC facilities to reduce cost, increase infiltration, recharge the groundwater, and reduce runoff from impervious surfaces, thereby helping protect the county's streams. Filtration may be needed/considered for specific sites.
GIS Stormwater Inventory	Develop a more comprehensive stormwater inventory, including a complete inventory of structures, conveyances, outfalls, stormwater ponds, and runoff reduction BMPs. This watershed improvement opportunity will help the Transportation and Public Works Department analyze the stormwater system

Measure	Description
	capacity, determine BMP inspection schedules, and assist in future development plans.
Green Infrastructure / Low Impact Development	Include in development and redevelopment an assessment of opportunities for runoff reduction through green infrastructure and low impact development practices, including permeable pavement, cisterns, bioretention, and green roofs. This could be incorporated into plan review or ordinance revisions.
Coordination with Jackson County on Stormwater Management	Determine if stormwater management at the J&J Flea Market could improve hydrology in the tributary to Sandy Creek that runs along the southern edge of Sandy Creek Park.

Note:
a Some of these measures may already be partially addressed by programs from other departments. Similar BMPs are listed in Table 2-1 of the 2016-2017 ACC Watershed Protection Plan Public Utilities Department Annual Report.

3.3.4 BMP Modeling and Optimization

Potential watershed improvement measures identified in the Sulphur Spring Branch watershed include stormwater control measures, restoration measures, and programmatic measures (structural BMPs). Stormwater control measures are stormwater best management practices (BMPs) that store and/or infiltrate stormwater runoff. These measures address both water quality and water quantity concerns. BMP simulation and optimization modeling was performed on site-specific stormwater control measures to evaluate BMP effectiveness at reducing flows and pollutant loads and to optimize the BMPs to identify the best size to achieve the greatest benefit for the least cost. Modeling results were then used to help develop cost estimates, and to help score and rank potential projects.

Proposed BMPs were modeled using the Stormwater Management Optimization Tool (Opti-Tool) developed by Tetra Tech for EPA Region 1.

After the model was used to optimize the size of BMPs, engineers estimates of probable cost were developed for each BMP. Without detailed engineering data, these costs are assumed to be accurate within plus 50 percent to minus 30 percent of actual implementation costs. Each cost estimate is comprised of construction costs, mobilization, and design. Land acquisition costs were not incorporated into the cost estimates and need to be considered should any of the proposed structural measures be selected for implementation.

The construction costs were estimated with RSMeans CostWorks software, using construction cost data for the Athens area. The unit rate cost assumptions are shown in the final cost opinions in appendix J. Design and engineering costs were assumed to be 25 percent of the construction cost. Table 3-6 provides a summary of the runoff volume and peak flow reductions and estimated total cost for each of the modeled structural BMPs in the Sulphur Spring Branch watershed.

Table 3-6. Modeling Results and Cost Estimate of Stormwater Control BMP in the Sulphur Spring Branch Watershed

Parcel Number	Project Name	BMP ID	Drainage Area (ac)	BMP Area (ac)	Runoff Volume % Reduction	Runoff Peak Flow % Reduction	Total Cost
222 020A	W.R. Coile Middle School Rain Garden	SS-Str-01	0.73	0.04	83%	11%	$69,000

3.3.5 Evaluation and Prioritization of Stormwater Control and Restoration BMPs

A meeting was held with Tetra Tech, Arcadis, and ACC to discuss the identified watershed improvement opportunities. Tetra Tech and ACC staff visited several sites to discuss potential improvement measures and to see examples of current management practices that appear to be working well. Feedback from this meeting was used to develop a list of attributes for prioritizing projects.

Stormwater control BMPs were evaluated based on 10 attributes and restoration BMPs were evaluated based on 9 attributes:

Stormwater Control BMP Attributes

- Drainage Area
- Ownership
- Education Potential
- Public Amenity Potential
- Constructability/Conflicts
- Maintenance Needs
- Storm Flow Control
- Runoff Reduction
- Overall Impact or Environmental Benefit
- Cost level

Restoration BMP Attributes

- Drainage Area
- Ownership
- Education Potential
- Public Amenity Potential
- Constructability/Conflicts
- Maintenance Needs
- Habitat Enhancement
- Overall Impact or Environmental Benefit
- Cost level

BMPs were evaluated by scoring the attributes for each project, with each attribute receiving a possible score between 0 and 10. The attributes and scoring system were developed in close coordination with ACC so that they reflect the priorities important to ACC.

Some attributes were recognized as having more importance for than others for the purpose of achieving the goals and objectives of the WMP. To account for this relative difference in attribute importance, weighting factors of 0.5, 1, or 2 were applied to each attribute. This was done in such a way that the total the total possible score is 100 points after the weightings are applied, for both stormwater control and restoration projects. Attribute weighting factors for stormwater control and restoration BMPs are shown in Table 3-7.

Table 3-7. BMP Attribute Weighting Factors

BMP Ranking Attribute	*Weighting Factors*	
	Stormwater Control BMPs	Restoration BMPs
Drainage area treated	2	N/A
Stream Size	N/A	2
Ownership	2	2
Education potential	0.5	0.5
Public amenity potential	0.5	0.5
Ease of Constructability	0.5	0.5
Maintenance Needs	0.5	0.5
Storm flow control	1	N/A
Runoff Reduction	1	N/A
Habitat Enhancement	N/A	1
Overall Impact/ Environmental Benefit	1	2
Cost Level	1	1

Once all projects were evaluated and scored, they could be ranked from highest to lowest score. Higher ranking projects represent higher priority projects for ACC. A complete description of the methodology used to evaluate and prioritize projects is provided in appendix H, including a detailed description of the scoring criteria for each BMP attribute. A prioritized list of stormwater control and restoration projects for the Sulphur Spring Branch watershed is provided in Table 3-8.

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Table 3-8. Scoring and Prioritization for Stormwater Control and Restoration Projects in the Sulphur Spring Branch Watershed

Parcel Number	BMP ID	Drainage Area/Stream Size	Ownership	Education Potential	Public Amenity Potential	Constructability/ Conflicts	Maintenance Needs	Storm Flow Control	Runoff Reduction	Habitat Enhancement	Overall Impact or Environmental Benefit	Cost Level	Total Weighted Score
		Attribute Score											
222 020A	SS-Str-01	6	7.5	10	0	5	5	0	10	N/A	0	7.5	54.5

3.4 Recommended Management Measures

Stormwater control and programmatic management measures have been selected for ACC to serve as the basis for this WMP, which is tailored to the county's watershed goals and objectives. The selection of site-specific opportunities was based on a comprehensive prioritization using remote spatial data, on-site review of opportunities and constraints, and modeling.

3.4.1 Stormwater Control Management Recommendations

Stormwater control BMPs can be very effective at improving watershed health by reducing storm flows and harmful pollutants in stormwater runoff, or they can address a particular watershed concern. This WMP prioritized project opportunities that target multiple objectives in the Sulphur Spring Branch watershed. A recommended stormwater control project is identified in Table 3-9. A concept plan sheet for this project is provided in appendix I and a planning level cost estimate is provided in appendix J. The design of structural BMPs should follow guidelines set forth in the *2016 Georgia Stormwater Management Manual* (ARC 2016).

Table 3-9. Recommended Stormwater Control Measures

BMP ID	Project Description
SS-Str-01	**W.R. Coile Middle School Rain Garden** This project involves the construction of rain gardens in the open areas adjacent to the building to treat roof runoff. Benefits include nutrient uptake, sediment removal, and beautification.

3.4.1 Programmatic Management Recommendations

General programmatic recommendations for watershed improvement are listed in Table 3-5. In addition, one site-specific programmatic management measure was identified through observations made during the on-site field assessments of potential BMP opportunities. Concept plan sheets for two of the general programmatic measures (mowing maintenance practices and bank stabilization) and the recommended site-specific programmatic measure is provided in appendix I. The site-specific programmatic measure is identified in Table 3-10. Pollutant load reductions are expected from the recommended programmatic measures, but cannot be accurately quantified.

Table 3-10. Recommended Site-Specific Programmatic Measures

BMP ID	Project Description
SS-Prog-01	**Sulphur Spring Branch Concrete Dam Removal** This project involves removing a small concrete bag dam that has been constructed below the road culvert. PVC pipes lead to an impounded area apparently created by a landower wanting to use the water for irrigation or some other purpose. Remove the dam to restore fish passage and natural hydrology. Benefits include improved stream function.

4 Plan Implementation and Evaluation

4.1 Implementation Schedule

Scheduling the implementation of management measures is crucial to the success of the WMP. The challenge in creating a realistic schedule is balancing the WMP objectives with the different components that dictate the timeline of their required tasks, such as securing funding, stakeholder approval and participation, and public involvement. The WMP schedule should be adaptable and easily revised by ACC according to shifting priorities, unexpected constraints and delays, and new opportunities as they appear. Table 4-1 proposes a WMP implementation schedule that ensures that watershed conditions are assessed regularly and that ACC will continue implementing watershed management measures.

Table 4-1. WMP Implementation Schedule

Time Frame	Watershed Management Measure
Annually	Review the recommended projects from each of the ACC WMPs and determine which projects will be implemented in ACC over the next 1–3 years. Coordinate with other ACC departments as necessary on the planning and design stages of structural and restoration projects. Develop a plan for implementing selected programmatic measures.
Annually	Develop a monitoring and maintenance plan for stormwater improvement projects under construction.
Annually	Monitor and maintain all ACC-managed BMPs according to the monitoring and maintenance schedule. Maintain a database of records of monitoring and maintenance events, including BMP monitoring checklists.
Annually	Review water quality data from the previous year and flag or highlight measurements that exceed state water quality standards or ACC benchmark values.
Annually	Document progress such as monitoring, maintenance, and project implementation in the annual report to GaEPD.
Every 3–5 Years	Review water trends and identify areas of improvement or degradation. If the monitoring results indicate water quality degradation, ACC should: o Try to identify point sources of any degradation; o Attempt to identify the cause of the degradation; o Evaluate the current BMPs established; and o Propose additional BMPs that might address the cause of the degradation.
Every 3-5 Years	Review the long-term monitoring program. Plan which watersheds will be monitored over the next 3 years as part of the rotating schedule. Determine if there should be any changes to monitoring station locations.
Every 5-10 Years	Conduct stream assessments in the watershed to identify areas of erosion, maintenance needs, and opportunities for bank stabilization or stream restoration.
Every 5-10 Years	Update the WMP to reflect changes in the watershed, updated stream assessment and water quality data, BMPs that were implemented (remove from the list), and new watershed management opportunities.

4.2 Monitoring and Maintenance

Regular monitoring and maintenance will need to be conducted for any site-specific management measures that are implemented. Visual assessments should be conducted regularly to ensure that measures are functioning properly and in good repair, and that the vegetation is healthy and well maintained. Structural measures should be monitored at least quarterly during the first 2 years after construction and annually thereafter. Additionally, they should be inspected after the first couple of large rain events following construction to assess their performance following storm events.

Regular monitoring events should include an assessment of general site conditions, notes on areas of failure or instability, a vegetation assessment, photographic documentation, and identification of any maintenance needs or adaptive management measures that might be required. BMP monitoring checklists are provided for numerous types of BMPs in the *2016 Georgia Stormwater Management Manual* (ARC 2016).

4.3 Potential Funding Sources

The implementation costs for both programmatic and structural BMPs can be restrictive for local governments when budgeting for projects across several departments. Fortunately, a number of programs exist to help fund projects to achieve water resource management goals. The following list summarizes the most relevant funding opportunities for ACC:

- **USEPA Clean Water Act Nonpoint Source Grant (Section 319 Grants):** Funded by USEPA through the Clean Water Act and administered by GAEPD, these grants provide funding for best management practices (BMPs) and other water quality improvement efforts. They require a 40% non-federal match that can be met through local funds, in-kind services, or other non-federal sources. Applications are typically due in the fall of each year, and awards are announced in the spring.
  https://epd.georgia.gov/section-319h-georgias-nonpoint-source-implementation-grant

- **USEPA Clean Water State Revolving Fund (CWSRF):** Administered by the Georgia Environmental Finance Authority, the CWSRF provides low-interest loans for a variety of pollution prevention projects, including: water quality and water conservation; repairing and replacing stormwater control projects; and implementing water conservation projects and programs. Loans are available at a low interest rate for a maximum of 30 years. http://gefa.georgia.gov/clean-water-state-revolving-fund

- **U.S. Department of Transportation (USDOT) Transportation Alternatives Set-Aside:** The Transportation Alternatives Set-Aside provides funding for many activities relating to highways, including stormwater management, control, and water pollution prevention or abatement related to highway construction or due to highway runoff. Projects involving streetscaping and corridor landscaping may also be eligible. Transportation projects funded under this grant program must originate through a competitive grant project selection process in consultation

with Georgia DOT. Most awards require a 20% state or local match. http://www.fhwa.dot.gov/environment/transportation_alternatives/

4.4 Milestones and Evaluation Criteria

The achievement of any plan requires evaluation criteria and measures of success. Milestones met relative to this WMP (such as completion of a management action from the implementation schedule) will be noted in appropriate sections of the annual report.

Short-term and long-term evaluation criteria listed in this section can be used to determine the level of success of WMP implementation.

4.4.1 Short-Term Criteria

- Have BMPs been monitored according to schedule? Are records up to date?
- Has water quality monitoring been conducted as scheduled? Are records up to date?
- Have stream assessments been conducted as scheduled? Are records up to date?
- Have watershed improvement projects been implemented as planned?

4.4.2 Long-Term Criteria

- Does water quality monitoring indicate an improvement in water quality?
- Have BMPs implemented as part of the Impaired Waters Monitoring Plan made progress towards addressing stream impairments? This can be measured through BMP monitoring or through documenting the utilization of ACC programs (i.e. attendance at educational workshops or use of pet waste stations).

4.5 Adaptive Management

This WMP was developed based on the best available information at the time. As changes occur in the watershed, or additional water quality data become available, or as funding opportunities change, watershed management needs and management opportunities might change. Sometimes the best opportunities are those that take advantage of other planned projects or situations of the time such as a planned transportation or infrastructure project in which stormwater improvement measures could be incorporated cost effectively, or the presence of a strong advocate or partner such as a school superintendent who wants to use green infrastructure as an educational opportunity for the school system. Therefore, this WMP should be revisited regularly and revised as needed to ensure that the watershed continues to be managed effectively into the future.

5 References

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