City of Birmingham, Alabama | 2022
710 North 20th Street
202 City Hall Birmingham, AL 35203

PUTTING PEOPLE FIRST

MUNICIPAL SEPARATE STORM SEWER SYSTEM
NPDES PERMIT NUMBER: ALS000032
FISCAL YEAR 2021-2022

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) 2022 ANNUAL REPORT

PERMIT YEAR
OCTOBER 1, 2021-SEPTEMBER 30, 2022

JANUARY 31ST, 2023

City of Birmingham
Stormwater Management

TABLE OF CONTENTS

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete.

Signature:	
Name:	Kelly J. Dunn, PE & PLS
Title:	Chief Civil Watershed Engineer
Date:	January 31, 2023

Signature:	
Name:	Randall L. Woodfin
Title:	Mayor, City of Birmingham
Date:	January 31, 2023

List of Contacts & Responsible Contributors

Agency	Name	Telephone No.	Title
City of Birmingham Planning, Engineering, & Permits	Agard, Darius	(205) 254-2279	Civil Engineer
City of Birmingham Planning, Engineering, & Permits	Brown, Alexcia	(205) 297-8301	Stormwater Specialist
City of Birmingham Planning, Engineering, & Permits	Brown, Michael D.	(205) 250-7540	Fire Inspector I
City of Birmingham Planning, Engineering, & Permits	Clayton, Chris	(205) 254-8274	Stormwater Inspector
City of Birmingham Planning, Engineering, & Permits	Cooper, Direcus	(205) 254-7771	Stormwater Program Manager
City of Birmingham Public Works	Davis, Terry	(205) 254-2504	Deputy Director Public Works
City of Birmingham Planning, Engineering, & Permits	Dunn, Kelly	(205) 254-2822	Chief Civil Engineer Watersheds
City of Birmingham Planning, Engineering, & Permits	Eddington, Mike	(205) 254-2354	Deputy Director City Engineer
City of Birmingham Planning, Engineering, & Permits	Fowler. Eddie	(205) 254-8165	Principal Soil Erosion Engineering Inspector
City of Birmingham Planning, Engineering, & Permits	Hayes, Tracey	(205) 254-2544	Deputy Director Planning, Urban Design and Watershed Management
City of Birmingham Planning, Engineering, & Permits	Johnson, Jerone	(205) 297-8168	Principal Civil Construction Engineering Inspector
City of Birmingham Planning, Engineering, & Permits	McClaney, Sade	(205) 254-6335	Senior Administrative Analyst
City of Birmingham Planning, Engineering, & Permits	Moten, Angelica	(205) 297-8917	Senior Planner

AGENCY	NAME	TELEPHONE NO.	TITLE
CITY OF BIRMINGHAM PLANNING, ENGINEERING, & PERMITS	PEARSON, TYLER	(205) 297-8143	CAPITAL PROJECTS PROJECT MANAGER
CITY OF BIRMINGHAM PLANNING, ENGINEERING, & PERMITS	PERRY, TROY	(205) 254-2499	STORMWATER SPECIALIST
UNIVERSITY OF ALABAMA AT BIRMINGHAM	PILLAY, BRIAN	(205) 996-5797	PROFESSOR AND CHAIR, DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING
CITY OF BIRMINGHAM PLANNING, ENGINEERING, & PERMITS	RASPBERRY, GLORIA	(205) 254-7755	NATURAL HAZARDS ADMINISTRATOR
CITY OF BIRMINGHAM PLANNING, ENGINEERING, & PERMITS	RILES, TERRANCE	(205)-297-8170	PARTY CHIEF
VILLAGE CREEK HUMAN & ENVIRONMENTAL JUSTICE SOCIETY, INC	ROBERTS, MARILYN	(205) 798-0087	EXECUTIVE DIRECTOR VILLAGE CREEK SOCIETY
JEFFERSON COUNTY ENVIRONMENTAL SERVICE DEPARTMENT	ROHLING, BRIAN	(205) 521-7512	CHIEF CIVIL ENGINEER JEFFERSON COUNTY ENVIRONMENTAL SERVICES
JEFFERSON COUNTY STORMWATER MANAGEMENT	STORMWATER STAFF	(205) 325-8741	STORMWATER MANAGEMENT
CITY OF BIRMINGHAM PLANNING, ENGINEERING, & PERMITS	THOMAS, KATRINA	(205) 254-2288	DIRECTOR
CITY OF BIRMINGHAM PLANNING, ENGINEERING, & PERMITS	WARD, MICHAEL	(205) 254-7709	PRINCIPAL PLANNER
CITY OF BIRMINGHAM PUBLIC WORKS	YATES, JOSHUA	(205) 254-6500	DIRECTOR OF PUBLIC WORKS

STORMWATER MANAGEMENT PROGRAM EVALUATION

Program Objective: The Clean Water Act is a comprehensive set of programs and requirements designed to address the complex problems caused by a wide variety of pollution sources. A cornerstone of the Act is the National Pollutant Discharge Elimination System (NPDES), regulating the discharge of pollutants into waters of the U.S. The City of Birmingham has been issued a NPDES Phase I Municipal Separate Storm Sewer System (MS4) Permit (No. ALS000032), dated March 1, 2018, for the operation of its MS4. That permit, which became effective on March 1, 2018, and expires February 28, 2023, outlines several controls and activities to effectively prohibit the discharge of non-stormwater into the MS4 and reduce the discharge of pollutants from the MS4 to the maximum extent practicable. Today, within the City of Birmingham, some water resource segments do not meet beneficial use requirements. As a result, they have been placed on the State's Section 303(d) list of impaired water bodies and either have or are scheduled to have total maximum daily loads (TMDLs) established to further control pollutants from being discharged into City waterbodies. To achieve overall water quality improvement for those water resources within watersheds of the City of Birmingham, the following objectives are foundational:

1. Development of a strong partnership with the State of Alabama, Department of Environmental Management.
2. Facilitate achievement of established TMDLs for streams and creeks within the jurisdictional purview of the City of Birmingham that will ultimately lead to removal of these resources from the impaired waters list.
3. Reduce discharge weighted total suspended solids concentration during a 5-year permit cycle.
4. By combination of both pollution control and preventative approaches, reduce or remove pollutants to the maximum extent practicable from the MS4.
5. Development and implementation of watershed basin-wide strategies to address water quality and quantity problems in City of Birmingham watersheds.
6. The Implementation of a Stormwater Protection Ordinance to control discharges to and from the City's MS4 by the establishment of a stormwater protection ordinance.
7. The Implementation of a Post Construction Program to meet and exceed permit requirements.

Major Findings

During NPDES Stormwater Permit reporting year 2021-2022, the City of Birmingham identified several major findings, which either did or could have far reaching implications on the City's Watershed Management programs, which are described below.

Frequent High Volume Rainfall Events

Frequent high volume rain events have had a major impact on the water quality and water quantity and have been a challenge for the City of Birmingham Watershed Management. Flooding events have been a danger to Birmingham residents and have had a major impact on City resources. Everything from Birmingham Fire and Rescue and first responders to the Department of Public Works have been affected. During this fiscal year one dynamic rain event on June 8, 2022, during sampling in four of the five City watersheds resulted in high turbidity and E. coli readings.

Stream Erosion and Sedimentation

The associated picture of Village Creek at VIC01.6s, depicts erosion and sedimentation. This is a concern to City maintenance crews and to the public. The Watershed Management Division and Public Works Department is working to address sediment loading in portions of the Village Creek and Valley Creek Watersheds. The U.S. Army Corps of Engineers is developing flood control alternatives in the Valley Creek Watershed that could potentially help with addressing stream sedimentation and stream bank erosion.

Video Operations / Repair Assessment

In 2022 Watershed Management continues to use camera evaluations in areas around the City. The Camera can be lowered into City Storm Drains to assess subsurface conditions when surface observations cannot determine the extent of repairs. This ability to view pipes below street level has had a positive impact on the City of Birmingham's Watershed Management Program, as well as Department of Public Works and Engineering when diagnosing repairs to help prevent flooding and repair infrastructure. The cost savings alone have had a positive impact on City of Birmingham repair operations and Capital Projects determinations.

In some cases, the camera has been used to determine if storm drain piping is blocked, separated, or deteriorated in areas of continued flooding. Sizing and replacement can be determined without using resources to dig up the area resulting in a cost savings to the city.

The camera has also been used to determine the extent of sinkholes, collapsing roads and drainage complaints.

REAL-TIME QUALITY/QUANTITY MONITORS

During 2020 Watershed Management was assessing the use of continued water quality monitoring for identification of illicit discharges within the City's Watersheds.

A location (VC0.1s) was selected because of the continuous issues in this location with intermittent illicit discharges. The monitor selected included continuous turbidity sensor, as well as other water quality parameter sensors to help identify times when illicit discharges are occurring within the watershed.

This technology has been used during FY 2022 and is currently being evaluated by Watershed Management Staff.

WATER QUALITY MONITORING

This reporting period includes more than nine-full years of water quality monitoring in Birmingham's creeks with an emphasis on the last five-year rolling average used for historical data. The foundation of the City's instream water quality monitoring program has been to identify instream peak concentrations of specific conductivity as an indicator of changes in stream conditions throughout all Watersheds. If a change in Specific Conductivity is recorded, then upstream and in some cases downstream data and field observations are reviewed to determine the nature of effects in the general location of such changes. In some cases, this change will reveal conditions that could warrant an IDDE investigation.

Various factors such as rainfall amounts, and illicit discharges continue to be major factors in the Water Quality evaluation of

the five City of Birmingham Watersheds. To demonstrate this, the City compared each Birmingham watersheds for parameters in the form of "Bar-Whisker" charts and line graphs. The comparison was made for a five-year rolling average including the last five-year sampling period starting in 2017-2021 to the current FY 2022. This approach was done in order to evaluate more recent data sets and observe more current changes compared to historical data which may dilute data and not reflect current changes in the watersheds within the City if Birmingham. The historical data will still be reviewed by Watershed Staff and will be reported in the future reports, if marked changes are observed. Historical data starting in November 2013 was still incorporated in Water Quality evaluations in FY 2022 when determining flow data and rainfall data along with a few other factors that are indicated on each labeled chart included within this report.

Historical data observed up to this point would indicate that gradual to little change has occurred in the City of Birmingham water quality data unless influenced by rainfall or illicit discharges as previously mentioned. This is found in the ***Results and Discussion*** section of Water Quality. ***Anti-degradation Analysis*** is also depicted and reviewed in the Water Quality section for each watershed with the parameters selected from State of Alabama water quality parameters and State water designations. Other evaluations on the Village Creek watershed, such as the ***Village Creek Loading Analysis*** and the ***Village Creek TMDL analysis*** can be also found in the ***Water Quality*** section.

LOCATIONS OF CONCERN

Three locations in the Birmingham area appear to be of concern when evaluating Water Quality Data for this Fiscal Year:

- ★ Valley Creek at VC0.01s an illicit discharge continued but was only observed by staff during the 2/2/2022 and again on 3/2/2022 sampling events. After numerous visits to this site no other intermittent illicit discharges have been observed. Turbidity in both cases did not exceed 50 NYUs and some elevated E. coli levels have been detected during discharge; it was thought that this is associated with some kind of process water that may be entering the storm drain culverts from under the City. This makes investigation difficult at best, with the limited number of access points along the storm culvert and the number of potential sources that could be associated with such a discharge. To date there appears to be little if any effect on aquatic wildlife at this location. Since the duration of the discharge is short lived, only 15-20 minutes and then disappears and visual observation of wildlife shows no effect.
- ★ Village Creek at VIC07.0s Cotton Mill Branch sampling site has continued to render consistent elevated E. coli levels this Fiscal Year compared to

upstream and downstream sample sites along Village Creek. This is at a daylight point which runs through underground culverts from Avondale Lake. This will require more investigation from Watershed Staff to determine a possible source or sources.

- ★ Shades Creek at SC05.5s has continued to indicate elevated E. coli levels during this Fiscal Year at the culvert opening which drains approximately 40 square miles of area consisting of mostly commercial and residential land use. This will require more investigation from Watershed Staff to determine a possible source or sources.

TARGET PARAMETERS

Turbidity: High turbidity was recorded during the June 8, 2022, sampling event at the Cahaba River site CR280 (237 NTUs), Five Mile Creek sites FMC19.5 (244 NTUs) and FMC8.2 (115 NTUs), Shades Creek site SC5.5 (120 NTUs), Valley Creek site VC04.9s (133 NTUs) because of extreme rainfall weather event and high velocity flow at sampling sites. These were the only high turbidity readings during this year's sampling period (>50 NTUs). Except for this one rainfall event, all watershed sampling sites remained below 50 NTUs.

(High Flow at CR280 6/8/2022 shown in picture)

E. coli: Five sampling events along Valley Creek: 12/8/2021, 2/2/2022, 5/4/2022, 6/8/2022 and 9/7/2022 yielded high E. coli sample results. On 12/8/2021 E. coli sample results at VC02.9, VC0.07 and VC0.01s of 1120mpn/100mL, 2419.6mpn/100mL and 2420mpn/100mL, respectively. On 2/2/2022 E. coli levels at VC0.01s were 1410mpn/100ml. during an observed illicit discharge. On 5/4/2022 sampling event, resulting in E. coli results at VC0.07 and VC0.01s of >2419.6mpn/100mL, 1300mpn/100mL, respectively. On 6/8/2022 at VC04.9s, VC0.2.9, VC0.7 and VC0.01s yielded E. coli sample results of >2419.6mpn/100ml during a major rain and flooding event. On 9/7/2022 at VC0.2.9, VC0.7 and VC0.01s yielded high E. coli sample results of 1990mpn/100ml, >2419.6mpn/100mL and 2420mpn/100ml, respectively. Valley Creek had the most occurrences of high E. coli readings compared to other water bodies for FY 2022.

On 12/7/2021 sampling on Village Creek at VIC13.0, VIC09.4, and VIC08.1 revealed E. coli levels of 1200mpn/100ml 2420mpn/100ml, and 1200mpn/100ml, respectively. Again, in Village Creek at sampling site VIC0.07.0s (Cotton Mill Branch), the E. coli reading was 2420mpn/100ml.

On 5/4/2022 sampling Shades Creek at SC05.5s showed an E. coli level of >2419.6mpn/100ml.

All other E. coli levels above >1000mpn/100ml during this year's sampling period occurred on 6/8/2022 with a substantial rainfall event that caused all Creeks to overflow the banks and exceed flood stage. All samples taken on this day were highly contaminated due to flooding and high velocities outside the banks of streams with high turbidity and high TSS levels.

(Photo of flooding on Five Mile Creek at FMC19.5 on June 8, 2022).

Samples for this period were documented and are included and discussed in the Water Quality portion of the report. The highest phosphorus sample result of this sampling period (2021-2022) of 0.45mg/L occurred on 3/1/2022 at VIC07.0s Cotton Mill Branch. This could be a result of a possible sanitary sewer overflow or cross connection. This high phosphorus reading is being compared to sanitary sewer overflows data collected from Jefferson County Environmental Services.

There was no noticeable correlation with water temperature and E. coli levels for this year's data.

pH: The pH of surface water ranged from 6 to 9.3 over the entire study period. USGS studies of ground water in the area indicate pH levels of 7.9 in the ground water at subsurface. ADEM established a pH range of 6 to 8.5 to reduce the effects of highly acidic or highly basic water on fish and wildlife. The pH levels in Birmingham Creeks and Cahaba River during the 2021-2022 fiscal year remained between 6.0 and 8.5.

Village, Five Mile Creek, and Cahaba River are consistent with the State's Anti-degradation level requirements when comparing historical data over the sampling period to the most recent sampling results for FY 2021-2022. An increase of reported sanitary sewer overflows in all watersheds for 2021-2022 as reported by Jefferson County Environmental Services could result in higher pathogen levels in Valley Creek.

Dissolved O2 and Temperature: The dissolved oxygen and temperature levels

did not fall below or exceed state anti-degradation policy at any time during the past nine reporting cycles for any stream within Birmingham.

TSS: Overall, the intent of the City's water quality monitoring program was to broadly determine if a given stream was improving, remaining constant or becoming more polluted with respect to TSS over time and given the preponderance of established BMP controls. Compared with last year's data, the flow-weighted data for TSS was considered similar for the City and considerably lower for Industry. Furthermore, flow weighted TSS concentration for the City was much higher this year when compared with industrial discharges alone. This could possibly be attributed to periods of heavy rainfall during sampling periods. Also, highly erodible soils associated with karst soil types especially in the eastern area of the City.

MAJOR ACCOMPLISHMENTS

ADMINISTRATION

During FY2022, Planning Engineering and Permits Department has undertaken many changes by way of promotions, new hires, and retirements. Watershed Management is working diligently to fill all positions. Please see details below of the Watershed related staff changes that occurred this year:

- ★ Katrina Thomas was promoted to Director of Planning Engineering and Permitting
- ★ Tracey Hayes was promoted to Deputy Director Planning, Urban Design and Watershed Management
- ★ Gloria Raspberry was promoted to Natural Hazards Administrator
- ★ Angelica Moten was promoted to Senior Planner
- ★ Darius Agard was hired as a Civil Engineer
- ★ Angela Moss, former Storm Water Specialist moved to Public Works for the City of Birmingham

PROGRAM OF THE YEAR REWARD

The City of Birmingham continues to strive to be the best Stormwater Program in the State. We take pride in our water quality and knowing that we continuously serve our Citizens to the best of our ability.

PLANS, PROGRAMS & POLICIES

The City of Birmingham continues to accomplish significant advances in planning, implementation of programs, and policy adaptation to improve our program efforts. Please note some of the efforts listed below:

THE WOODFIN WAY

Mayor Randall L. Woodfin was re-elected in 2021 and the entire city staff continues to be dedicated to following the motto of "**Putting People First**" across all of Birmingham's 99 neighborhoods and 23 communities. The implementation of our mission – **building community through servant leadership**. The mayor announced his strategic plan for progress for Birmingham in October 2018. The plan was created from the knowledge

obtained from our residents, employees, and strategic partners.

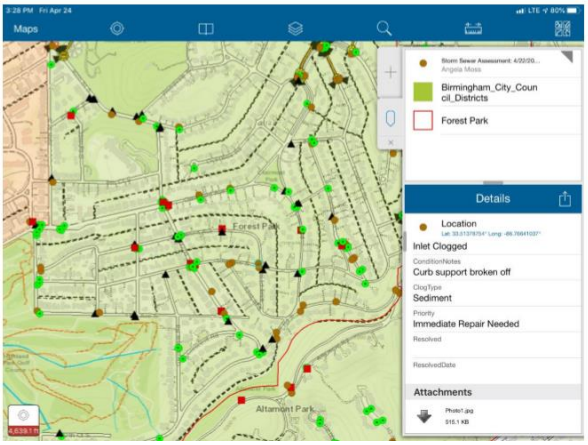
The plan focuses on six goals:

- ★ ***Safe, secure, and sustainable communities***
- ★ ***Healthy, thriving, and diverse neighborhoods.***
- ★ ***High performing "21st Century" education and workforce development systems.***
- ★ ***Innovative and inclusive economy supported, shared, and served by all.***
- ★ ***Highly effective, people first, smart government.***
- ★ ***Global, legacy leadership partner for equity and social justice.***

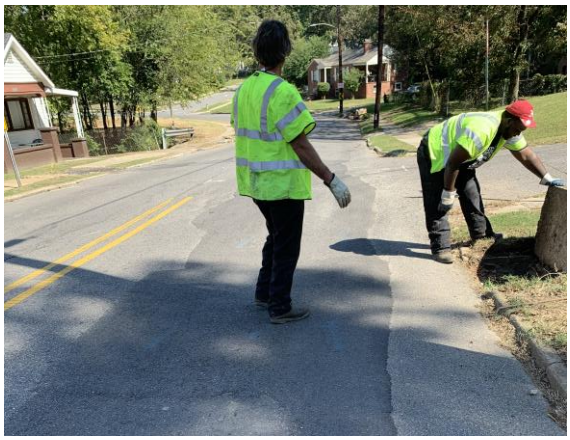
For more on the Woodfin Way visit: https://www.birminghamal.gov/strategy

Stormwater Management has devoted most of its efforts to improving water quality and quantity through an overall watershed approach.

There have been tremendous efforts to improve the program within these areas throughout the years. Some of the ongoing projects that started under the Watershed Management Division are highlighted below:



Citywide Storm Drain Assessment Project: This project involves the physical inspection, mapping, and condition determination of every inlet within every neighborhood. Watershed Management goal is to improve the asset management program this data will assist us with adequate nomenclature that allows staff to be more efficient and effective with storm drain maintenance, IDDE investigation, and preventing localized flooding. Our goal with this system is to become more proactive and not be reactive to situations.



KEEP BIRMINGHAM BEAUTIFUL PROGRAM

Keep Birmingham Beautiful Program continues to be a City strength with numerous ongoing projects during this reporting year, as follows:

D.U.M.M.Y. Campaign: The City of Birmingham launched the D.U.M.M.Y. campaign, to target those who are "Dumping Ugly Mess in My Yard." In 2019 the state of Alabama increased the amount a person can be fined if they are caught illegally dumping. Municipalities can fine offenders up to $500 for the first offense and $1000 for the second, if caught. Illegal dumping is ugly, and not wanted in the city, which is why this initiative was started. The first phase of this multi-phase initiative is to:

- Change behavior
- Catch illegal dumpers
- Encourage residence to report illegal dumping

The D.U.M.M.Y. campaign refocused how residences can report illegal dumping. The City of Birmingham placed dumpsters throughout four quadrants for residents to place their large bulk trash items. In addition, residents also have access to the city's landfills to dispose of trash/ bulk items. To prevent stormwater runoff residents are discouraged from dumping any hazardous waste. The D.U.M.M.Y. campaign also encourages community clean-up projects; while citizens are encouraged to take advantage of the resources available to help Keep Birmingham Beautiful.

City Haul: The city has been working to make the waste management system more effective, efficient, and sustainable. During this permit year the City of Birmingham residents was able to receive 96-gallon trash cans for street garbage pickup.100,000 uniform trash cans equipped with anti-theft chips that allow cans to be tracked if they are stolen. Next steps are to work on getting more garbage trucks and to improve the City's recycling program.

More information about this initiative can be found at: www.birminghamal.gov/cityhaul

SUSTAINABILITY PROGRAM/PLAN

The City of Birmingham Planning, Engineering, and Permits (P.E.P.) Department has been charged with developing a sustainability program/plan during this reporting period. Please see below some of the steps taken to achieve a more sustainable environment for our citizens:

Southeast Sustainability Directors Network: The City continues to work with SSDN to network and develop sustainability approaches to City planning projects.

ICLEI Local Governments for Sustainability: Through the City's membership with ICELI, we have access to Clear Path, and are working to complete a greenhouse gas inventory. Local Governments for Sustainability is the leading global network of more than 1,500 cities, towns and regions committed to building a sustainable future. ICLEI also has created what is known as the Clear Path tool which is the leading online software platform for completing greenhouse gas inventories, forecasts, climate action plans, and monitoring at the community-wide or government-operations scales. This tool can help set a baseline for data for any forthcoming Sustainability Plan and efforts.

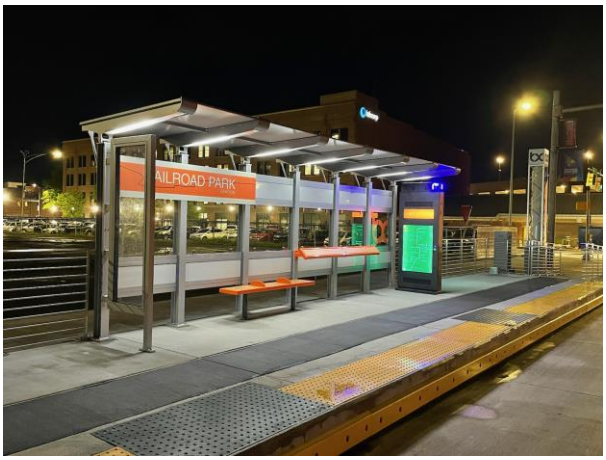
UAB Sustainable Smart Cities: The City and UAB signed a Memorandum of Understanding, and the City continues to collaborate with the UAB Sustainable Smart Cities to educate staff and the public about concepts to improve sustainability within the City. City Staff and UAB Staff have developed a schedule to meet quarterly to collaborate on city-wide sustainability goals. Planning staff is hopeful with engaging subject matter experts and interns from UAB to facilitate the development of a GGI utilizing Clear Path.

Clean Industry Initiative: PEP Staff recognizes that any attempt to revitalize the community must be coupled with opportunities for sustainable growth by utilizing the innovations of green infrastructure, energy efficiency, resource conservation and environmental protection to create a cleaner and resilient community. One area of opportunity is industrial sustainability. The iron and steel industry sector helped to shape and grow Birmingham and was a significant economic driver for the region; however, the challenges associated with the industry's environmental impact was arguably even more significant. Although significant progress has been made to date, the City continues to face the challenge of remediating air, soil, and water quality issues that resulted from industrial manufacturing. In addition, because of national policy trends, the City anticipates a resurgence of industrial activity in the coming years due to rising demand for domestic iron and steel. However, to avoid duplicating the mistakes of the past while capitalizing on the potential economic benefits of this resurgence, the City of Birmingham seeks to incentivize investment and the use of green and cleaner

technologies by heavy industry that encourages green/sustainable buildings and operations. Promoting clean technology practices (the use of less material and/or energy, generates less waste, and causes less environmental damage than alternative technologies), will not only reduce the unintended adverse impacts on environmental quality and public health, but will also fully support the goals of the City's Sustainability Program. Sustainability was identified in the City's Comprehensive Plan as a key short-term goal to be attained within the next 10 years accomplished by providing a blueprint for residents, businesses, and governmental entities to implement sustainability strategies focused on the reduction of greenhouse gas emissions, the development of more energy efficient processes and the improved utilization of water resources.

The expectation is that these strategies will in turn promote the development of Cleaner Industry that will generate community revitalization and economic growth within Birmingham.

LEED for Cities and Communities (formerly the STAR Community Rating System): The City of Birmingham is currently a 3 STAR community under the STAR Community Rating System. In 2018, STAR Communities officially merged with the U.S. Green Building Council. The USGBC is launching a new rating system called LEED for Cities and Communities. The new program is data-driven, and performance based but will include those critical best practices needed to move the needle on local sustainability conditions.



Birmingham Xpress BRT Project: Construction of the $63 million Birmingham Xpress Bus Rapid Transit (BRT) System covers a 10-mile corridor and provides a service to over 25 neighborhoods. A few neighborhoods that the BRT service are located within floodplains such Rising-West Princeton, Arlington-West End, North Titusville and North Avondale. Along the corridor, thirty-two (32) transit stations were constructed to support riders arriving and departing in compliance with the system's 15-to-30-minute headway. Two stations (inbound and outbound) provide access points for residents and riders to ride the system per neighborhood. Within the floodplain, contractors striped dedicated bus lanes and repaved roads that covered 70% of the corridor. This helps with stormwater runoff with new impermeable surfaces stretching from Five Points West (Crossplex) to the Lakeview District (Railroad Park). In addition, the project received help from the City of Birmingham

Public Works Department in cleaning out several curb inlets and repairing drainage slabs for effective flow. The City of Birmingham is pursuing the LEED for Cities designation. This designation will allow the City of Birmingham to track and report progress towards meeting the City's emissions targets and adopt LEED-based strategies that help to reduce energy, water, waste, pollution, and CO^2 at the City scale, and in turn improve air and water quality.

Holy Family-Tuxedo Junction Community Garden: For 2022, operation and maintenance of the Holy Family-Tuxedo Junction Community Garden continued to support nutritional awareness efforts in the Ensley community. This year we grew a variety of vegetables and fruits to introduce new culinary delights to the community. Those vegetables and fruits were curly kale, swiss chard, oakleaf and buttercrunch bibb lettuce, pak choi, red mustard greens, sweet potatoes, and concord grapes. Volunteers from the AmeriCorps VISTA Volunteer Program assisted in building concrete raised beds and elevated raised beds so that flooding wouldn't disrupt garden activities. In addition, our garden managers received assistance from BuildUp Ensley, a nonprofit organization teaching youth trades, in building a gazebo for residents and workers to sit and a rain barrel cistern to catch rainwater. Efforts will be made to expand the community garden in 2023.

City Comprehensive Plan:

Stormwater Management reported on the status of previous efforts to complete and implement the City's first Comprehensive Plan in more than 50-years. Since then, the City has taken significant steps going forward to capitalize on that effort in further significant planning refinements that will

prove to be equally foundational in making Birmingham a more sustainable metropolis.

During this annual report year, four significant efforts continued in the development of Citywide planning controls. Those included continuation of Framework Plans, which are intended to encourage wiser patterns of real estate development and City growth while reducing the demand on existing infrastructure. Secondly, Planning Staff is continuing to develop a "sustainable plan" scope-of-work to assist in preparing development guidelines and standards that will assist the City in its efforts to become more sustainable. This

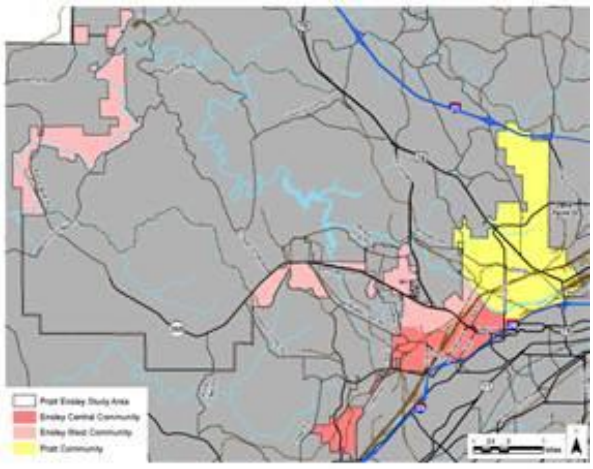
latter effort also requires funding for implementation. The fact that funding has been elusive has contributed to project delay. Finally, the City has fully completed final development of the Village Creek Watershed Improvement Strategy and has begun similar development of a Valley Creek Flood Management and Water Quality Master Plan.

City Framework Plans:

The Framework Plans for the City of Birmingham were initiated after the adoption of the 2013 City Comprehensive Plan. The Framework Plans were established to:

- ★ Identify areas of substandard housing and urban decline that would require City intervention.
- ★ Examine existing land uses and propose revisions that would align with the new Future Land Use Map from the Comprehensive Plan.
- ★ Register deficient quality of life issues (public safety, sanitation, recreation, commerce) that were identified by local stakeholders and provide possible solutions to bring about civic improvement; and
- ★ Create an implementation committee that would drive continued public involvement in making positive change within their communities.

Working in concert with the Regional Planning Commission of Greater Birmingham, six framework plans have been adopted: North Birmingham Community (2015), Titusville Community (2015), Western Area Communities [Smithfield, West End, Five Points West] (2015), Southwest Communities [Southwest, Grasselli, Brownville] (2016), Northeast Communities (Cahaba, Roebuck-South East Lake, Huffman, East Pinson Valley] (2016), and Pratt/Ensley Communities (2018). These six Framework Plans have been annually reported and currently have progressed to the establishment of Implementation Committees that meet on a regular basis to discuss with City officials, local businesses, and other stakeholders how they can best work together on the actions and strategies that have been developed within the existing framework plans. The framework plans for the East Birmingham Communities [Woodlawn, East Lake, East Birmingham, Airport Hills], Northside/Southside Communities, and the Southern Communities [Red Mountain, Crestwood, Crestline] should be adopted by the end of 2023.



Pratt/Ensley Communities Framework Plan: The Pratt/Ensley Communities area (See Figure above) consists of intermittent creeks, which are tributaries to Village Creek and Locust Fork. These creeks often cause flash-flooding during heavy rains. The areas that are prone to inundation by 1% annual-chance flood hazard are referred to as 100-year flood zones and are so designated by the Federal Emergency Management Agency (FEMA). Lands susceptible to inundation by 0.2% annual-chance flood hazard are referred to as 500-year flood zones.

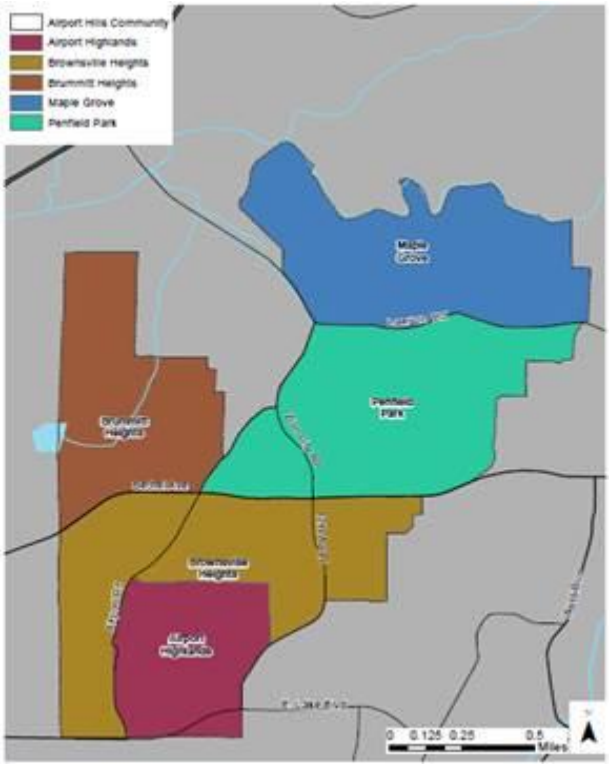
Residential areas along Village Creek, particularly in the Ensley and South Pratt neighborhoods, have been identified as areas containing clusters of hotspots with repetitive loss of properties. With funding support from the U.S. Army Corps of Engineers and the Federal Emergency Management Agency (FEMA), many flood prone properties were purchased, and the flood plain area restored. However, not all flood prone properties have been purchased and as a result have been abandoned, which has encouraged the area to be used as a dumping ground for debris and waste continuously creating a challenge to keep the floodplain clean and clear.

The results of Framework Planning for the Pratt/Ensley Area have established three goals, including:

- ★ Establish more recreational opportunities
- ★ Ensure natural water systems are valued and restored to improve habitat watershed health, especially near Village Creek
- ★ Establishment of a flood recovery and long-term resiliency plan

The following key stormwater related actions were recommended by community leaders:

- ★ Acquire blighted and flood-prone properties to expand recreational opportunities for residents
- ★ Continue working with the Village Creek Society to increase access to recreational facilities for residents
- ★ Provide incentives and education to homeowners for green design
- ★ Encourage the use of Best Management Practices (BMPs) on all new developments during post-construction to control soil erosion and minimize sediment run off.
- ★ Install green systems on blighted or vacant properties to reduce stormwater run-off and flooding in flood prone areas



Eastern Communities Framework Plan: The Eastern Area Framework Plan includes 19 neighborhoods, and more specifically includes the communities of Airport Hills, East Birmingham, East Lake, and Woodlawn. See the figure above. The geographic area encompassed by this Framework Plan is 14.6 square miles and includes nearly 14,000 land parcels. The same three goals established for the Pratt/Ensley Framework Planning area were also identified for the Eastern Communities Framework Planning area. Currently, this plan is complete and being prepared for adoption.

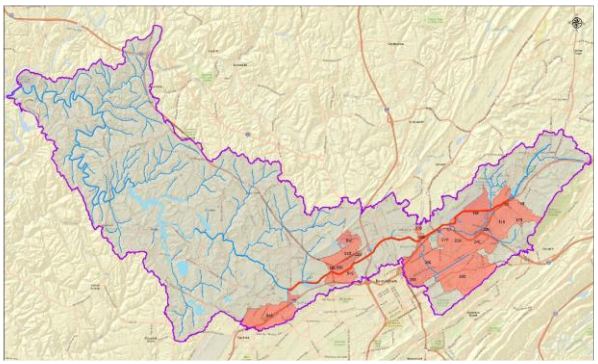
The following key stormwater related actions were recommended by community leaders:

- ★ Install green systems on blighted or vacant properties to reduce stormwater run-off and flooding in flood prone areas
- ★ Develop a system of green systems
- ★ Consider the feasibility of using large blocks of vacant land in Airport Hills, Brummit Heights, and Zion City to plant pine trees to replenish the City of Birmingham's urban forest
- ★ Address issues at East Lake Park
- ★ Prioritize the construction of pocket parks and other green spaces in Woodlawn, Airport Highlands, Zion City, Brownsville Heights, Penfield Park, and Maple Grove

Many of the planning elements related to stormwater management recommended or proposed by these communities were included in and validated through the watershed management planning effort by City staff for Village Creek. That includes also for the previously completed framework plans. Therefore, community action has been verified to provide a measure of improvement in flood protection and water quality improvement in Village Creek, reinforcing the community's recommendations and leading to the incorporation into the final frameworks' plans, implementation.

Northside/Southside Communities Framework Plan: This plan area consists

of two communities and eight different neighborhoods. The first community to highlight within the Northside Southside Area is the Northside Community which consists of five neighborhoods (Norwood, Evergreen, Druid Hills, Fountain Heights, and Central City; while the second community is known as the Southside community which is made up of three neighborhoods (Southside, Five Points South, and Glen Iris. This Framework Plan area spans over 6.5 square miles and includes over 8,386 parcels.



WATERSHED MANAGEMENT PLANS

Village Creek Watershed Improvement Strategy: Building upon existing plans and framework plan development throughout the City in Village Creek, the City completed its first ***Village Creek Watershed Improvement Strategy*** in August 2017. Since then, the City has reviewed and tried to determine a developmental approach to fund and strategize projects. The objectives of the strategy were to improve and protect water quality so that standards for designated uses would be attained, as well as to reduce flooding impacts within Village Creek through implementation of all strategy recommendations.

The report addressed the following controls to achieving attainment:

- ★ Development of a more robust asset management system
- ★ Development of a LID policy and ordinance
- ★ Continued maintenance dredging in accordance with ADEM requirements and turbidity BMP controls in place, in conjunction with sediment monitoring of zinc.
- ★ Continued implementation of trash controls and a more aggressive campaign to eliminate littering throughout the City.
- ★ Mitigation of Repetitive Losses
- ★ Encourage partnerships with other entities to reduce pollutant loading in key sub-basins
- ★ Consider modified riverine flood condition strategies like the reestablishment of bank full benches to better contain flood flows
- ★ Implement key capital improvement project controls to address flooding and water quality
- ★ Develop an Adaptive Management Plan to continuously evaluate the effectiveness of plans, policies, projects, and regulations to make necessary improvements and adjust capital and operating budgets accordingly.
- ★ Develop a SMART storm drainage maintenance program through collaboration with DWP and PEP,

including the adjustment in street sweeping frequency.

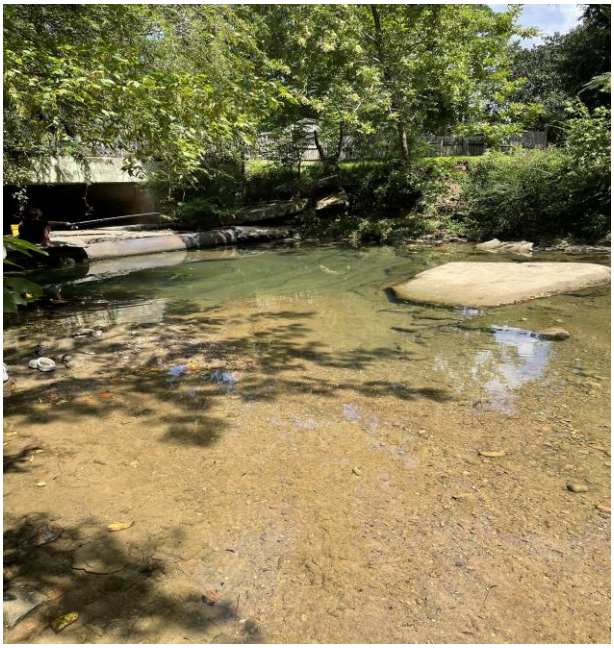
Valley Creek Flood Mitigation Study: The City of Birmingham, City of Bessemer, and Jefferson County Commission are working with the United States Army Corps of Engineers (USACE) in a general information flood mitigation study of Valley Creek. The project extends from the daylighting of the creek near downtown Birmingham through Jefferson County, and Bessemer to Power Plant Road. Jefferson County represents unincorporated Jefferson County and several smaller towns along the creek. Alternatives included in the analysis are off-channel storage; bridge modifications; property buy-outs and relocation; levies; green spaces; and walking trails.

The purpose of the study is to identify flood mitigation alternatives; conduct hydrology and hydraulic (HH) analysis; and conduct a cost benefit analysis to determine flood mitigation alternatives that are financially viable. Consideration of recreation and water quality benefits are also included in the benefit analysis.

The City of Birmingham developed a one-dimensional HEC-RAS model based on the Lidar topographic, ground surveys of the bridge structures, and ground cross section to supplement the Lidar in the channel. The model was further developed by the USACE to a two-dimensional model for evaluation of the flood mitigation effects of the alternatives. A cost benefit analysis is underway to tentatively select a plan.

Now the project is at a funding phase. Once funding and LOI is secured the project will advance.

Shades Creek Watershed Management Planning: The City of Birmingham Stormwater Management Division members joined the Steering and Technical Committee along with other municipalities, to develop a Shades Creek Watershed Management Plan. The purpose of the Shades Creek Watershed Management Plan (WMP) is to guide watershed resource managers, policy makers, community organizations, and citizens to protect the shoreline, water quality and habitat supporting healthy populations of people, wildlife, and fish, and providing recreation and economic opportunities for the greater Birmingham area.



(***Photo of Shades Creek SC05.5s discharge point 9/7/2022).***

The vision of the Shades Creek is a healthy watershed environment by fostering the coordinated effort to protect, restore, and enhance the overall quality of life by preserving and restoring water quality, natural habitats, biological resources, and recreational resources. A watershed is defined as the land area draining to a particular body of water. The project area is made up of the following three watersheds- Upper Shades Creek, Lower Shades Creek and Cooley Creek/ Mud Creek. Birmingham has jurisdiction over a critical part of the stream between Irondale and Mountain Brook.

FLOODPLAIN MANAGEMENT

Floodplain Management continues to be a City strength with numerous ongoing projects during this reporting year, as follows:

FEMA's Community Rating System (Class 5 Designation): The City is a Community's Rating System's Class 5 Community. The City is the only Class 5 Community in the State of Alabama; ranks in the top 17% of CRS Communities in Region 4; and ranks in the top 23% of CRS Communities in the nation. Being the highest-rated Community in Alabama, our flood policyholders will now see a total savings of $15,000 per property over a 30-year mortgage regardless of their individual risk. The City has been a participant in this program since 1993. This program rewards communities for going above and beyond the National Flood Insurance Program's minimum standards. These rewards are provided in the form of 25% flood insurance premium discounts. Education and outreach play a large role in contributing to the City's success with the program.

Program for Public Information: Under the CRS, a Program for Public Information (PPI) was created to continuously inform Birmingham residents about flooding and ways to address potential flood damage to their property. This plan includes map information, tailored outreach projects including website changes and information distribution practices the City utilizes for floodplain properties. The goal is to continue to educate and promote community resilience which is necessary to minimize flood damage. We understand that well-informed people make better decisions, will take steps to protect themselves and their property, and are more likely to support local floodplain management efforts to protect the natural functions of the floodplain. The City's PPI is updated annually and is imperative to maintain the City's CRS Class 5 rating, yielding greater savings to flood insurance policyholders.

Stormwater Program Elements

STRUCTURAL CONTROLS

The City of Birmingham maintains 15 facilities with wet ponds or other structures to help control flooding and water retention or detention. These ponds are depicted on maps, which can be found in the structural control section of this report. These ponds were constructed primarily for flood control and are not designed to achieve maximum pollutant removal efficiencies. However, the ponds are expected to provide pollutant reduction to an extent based on unit process and operational principles.

Load reduction estimates presented herein assume that the City owned wet ponds resemble the design appropriate for stormwater quality control and how each would be expected to respond to the environmental conditions present during each reporting year. Inspection sheets were used to record field observations and all known City of Birmingham Structural Controls and for 2021–2022 these structures are inspected semi-annually by Watershed Management personnel.

Major renovation and redesign of the Eastern Area Landfill was ongoing during this fiscal year. The landfill was opening new cells to start operation for 2023. These new cells designed to accept residential and commercial waste and were being opened on the Pinchgut Creek side of the landfill. This would be on the Northeastern side of the landfill. New sand filters were constructed for all active discharge points associated with both sides of the landfill.

STRUCTURAL CONTROL SUMMARY

Wet ponds are developed to serve two functions in Birmingham, flood control and pollutant removal thereby bringing both stormwater quantity and quality benefits. These ponds fill with stormwater and release most of it over a period of a few days, slowly returning to its normal depth of water. Some stormwater infiltrates into underlying soils. Some is evaporated back into the atmosphere. These latter processes mark a reduction in stormwater quantity to the City's MS4. Wet ponds provide stormwater quality benefits through several mechanisms, including:

- ★ Gravitational settling of suspended particulates
- ★ Biological uptake of pollutants by plants, algae, and bacteria
- ★ Pollutant decomposition

When pollutants enter the pond during a rain event, the pond slows the water movement, allowing heavier pollutants such as suspended solids, sediments, and metals to settle out of the water column and come to rest at the bottom of the pond. This greatly improves overall turbidity, or water clarity. Many of the nutrients are also removed from the water by plant growth. Bacteria can also be depleted within the ponds biological processes. These structural controls are depicted on maps, which may be found at the end of this section. These ponds were constructed primarily for flood control and are not designed to achieve

maximum pollutant removal efficiencies. However, the ponds are expected to provide pollutant reduction to an extent based on unit process and operational principles mentioned earlier. Load reduction estimates presented herein are based on the assumption that the City owned wet ponds resemble the design appropriate for stormwater quality control and how each would be expected to respond to the environmental conditions present during each reporting year. The Structural Controls will be inspected semi-annually be Stormwater Management personnel. The wet ponds owned and maintained by the City of Birmingham includes:

1801 14th Street, SW (Lat. 33.47795N, Long. -86.84743W): This facility is located in the Southwest portion of Birmingham adjacent to a residential area behind a church with a large impermeable parking lot. This was designed as a detention pond but has become a retention area due to accumulation of organic matter over time. Birmingham Public Work Department is responsible for the maintenance of this site. The structure accepts drainage from approximately 0.005 square miles and discharges into an old abandoned commercial site that has become a wetland. The wetland discharges through a culvert into Valley Creek.

Avondale Springs (Lat. 33.43352N, Long.-86.77222W): This facility is located at 5th Avenue South and 41st Street. The City of Birmingham Park and Recreation is tasked with the maintenance responsibilities at this location.

The lake is approximately 1.5 acres and is stocked with fish and provides an environment for waterfowl and various aquatic species. Avondale Lake is fed by a natural spring and has been sampled for water quality. The overflow of Avondale Lake feeds into Cotton Mill Branch a tributary to Village Creek.

Birmingham Botanical Gardens (Lat. 33.48661N, Long. -86.77519W): This facility is located at 2612 Lane Park Road in Birmingham and has multiple small retention ponds incorporated into the landscape as small water features. The Water features drain approximately o.3 square miles' upland from the Gardens. Two larger drainage features in the Gardens, Sonat Pond and Sunset Pond Japanese Garden slow water flow through the park allowing sediments and other pollutants to settle out. All water features are cleaned out by Garden Staff on an as needed time frame. Most of the drainage basin is considered

residential and open space. The drainage in this area drains through a system of culverts and open ditches to Shades Creek.

Birmingham Zoo (Lat. 33.48492N, long -86.78181W)**:** This facility is located at 2630 Cahaba Road, Birmingham and has numerous small water features along with open space and permeable areas for rainwater absorption. The property drains to a large retention pond south of the Zoo and collects surface drainage from surrounding neighborhoods as well. The retention pond, during heavy rainfall events, discharges into Shades Creek. Animal waste is collected in a separate area and is not allowed to discharge into the watershed. The facility is maintained by Zoo personnel and Public Works.

Tom Bradford Park (Lat. 33.66180N, Long. -86.65486W): This facility is located at 1701 Edwards Lake Road, Birmingham. The park has a large retention pond, approximately 1.0 acre, at the south end of the park that accepts surface drainage from the open area of the park and the surrounding forested area that is approximately 0.001 square miles. The City of Birmingham Park and Recreation staff is responsible for maintenance on the park structures. The retention pond discharges through a gated spillway into a tributary that feeds the Cahaba River.

CrossPlex (Lat.33.49647N, Long.-86.86900W)**:** This facility is located at 2331 Bessemer Road, Birmingham. This area has a large retention pond that discharges into Valley Creek. Large amounts of concrete surface area have been removed from this facility to promote pervious areas for rainwater to infiltrate.

Approximately 0.43 square miles of residential, commercial, and open area will drain to this retention pond. Birmingham Park and Recreation staff is responsible for maintaining this structure.

Eastern Area Landfill (Lat. 33.59426N, Long. -86.63446W): This Landfill that was previously closed for updating for

compliance with ADEM requirements, and is accepting residential and commercial waste. New cells were designed for proper waste disposal.

This facility has four separate retention ponds located south and south-west of the landfill and one detention pond on the northern section of the landfill that drains to a fifth large retention pond on adjoining property next to the City of Birmingham's Shooting Range. During inspections at the detention pond next to the Shooting Range, it was noted that the dam had some structural problems with erosions on the back side of the dam. Department of Public Works was notified of these problems. The drainage from the landfill moves in two different directions, with the retention ponds to the south and west draining into the Stinking Creek water shed.

The remaining northern most retention and detention area releases water into the Pinchgut Creek watershed.

The western most retention pond was equipped with a sand filter system that was replaced during the 2019 - 2020 reporting year. The northern retention pond is designed to discharges through a new sand filter system which was installed during (FY 2020-2021) reporting period.

The sand filter media is replaced when necessary (approximately every 5 years). Maintenance at this facility is the responsibility of City of Birmingham Public Works Department. This facility drains approximately 3.9 square miles total of open area consisting of reclaimed landfill. The two watersheds were combined for calculation purposes. Stormwater Management staff conducted inspections on all structures on a semi-annual basis. Since the Landfill drains in two different directions with multiple retention detention structures, inspections are conducted as two smaller drainage basins. All drainage eventually leads to the Cahaba River and is part of the Cahaba River Watershed.

Eastlake Park (Lat 33.57050N, long. -86.72592W): This facility is a 27-acre retention lake created by damming part of the tributary to Village Creek at Roebuck Springs. Eastlake Park is located at 4th Avenue North and 82nd Street North, Birmingham. Eastlake Park is maintained by Birmingham Park and Recreation and is home to numerous aquatic species along with an island that is a protected nesting site waterfowl. The water collected in the pond discharges directly into Village Creek. This facility accepts drainage from an area dominated by residential, commercial, and open space approximately 6.0 square miles in area.

Greenwood Park (Lat. 33.55037N, long.-86.78373W): The facility was designed to control local area flooding and along Village Creek directly west-southwest of the Birmingham International Airport at 1632 Tallapoosa Street, Birmingham. The area consists of a large detention/retention area with gates that will automatically lift or close based on the water level flowing into the structure. When the water level reaches a high level, pumps are used to pump the excess water into pre-detention which then flows into three separate bio-swale structures that discharge into Village Creek ***(please see operational information in Appendix-A).*** Birmingham Park and Recreation staff is responsible for maintenance of the structural controls.

Highland Golf Facility (Lat. 33.51141N, long. -8677778W): This facility has a retention pond associated as a water feature (water hazard) approaching the green on the 10th hole of Highland Golf Course at 3300 Highland Avenue, Birmingham. The Lake is approximately 3 acres in size and accepts drainage from approximately 0.3 square miles from the golf course and surrounding residential neighborhoods. The pond discharges into the City of Birmingham's MS4 and finds its way to Village Creek. Highland Golf Course is maintained by City of Birmingham Park and Recreation staff and Troon Golf a golf management company.

New Georgia Landfill (Lat. 33.59399N, long. -86.81027W): This facility was the primary solid waste disposal site for the City of Birmingham and is located at 47th Avenue and Lewisburg Road, directly north of Birmingham. This facility is currently not accepting solid waste. The facility is planning an upgrade to meet ADEM requirements. Waste operations for The City of Birmingham has been switched over to the Eastern Area Landfill. Prior to compliant upgrades the facility is currently using a 0.5-acre retention pond to control drainage from the landfill on the north end of the facility.

The retention pond then discharges into a smaller approximately 0.1-acre retention pond before entering Five Mile Creek. Heavy siltation in the first retention area occurs because of the lack of vegetation due to active landfill operations. The silt is continually removed from the retention pond to increase capacity and the material is hauled away for approved disposal. The retention pond accepts approximately 0.1 square miles of runoff from the landfill. City of Birmingham Public Works staff is responsible for Maintenance and siltation removal.

Oxmoor Community Center (Lat. 33.42220N, Long. -86.85373W): This facility is located at 1992 Wenonah Oxmoor Road, Birmingham. The Community Center sits on a hill above a large retention pond that accepts water from surrounding commercial properties and forested areas with some open space. The drainage sub-basin has an area of approximately 0.1 miles and the lake outfalls towards Shades Creek. The lake is approximately 1.0 acre and is maintained by City of Birmingham Public Works staff.

Patton Park Lake (Lat. 33.54505N, Long. -86.78214W): This facility is located at 3969 14th Avenue North, Birmingham. A large 7.1-acre retention lake is used to maintain water quality at this location.

The lake discharges into the City of Birmingham MS4 close to Village Creek and accepts storm runoff from surrounding areas including residential, commercial, industrial and open space. The facility is maintained by Birmingham Park and Recreation staff.

Railroad Park (Lat. 33.51017N, Long. -86.80895): This facility is located at 1700 1st Avenue South, Birmingham. Railroad Park is a 19-acre park with several water features

scatter across the area flowing to the west at 14th street was a pump system recirculates the water back to the east of the park. Irrigation is also used to maintain plants through dry periods. The water features discharge into the City of Birmingham's MS4 at the 14th street point and continues to Valley Creek. The facility is maintained by Birmingham Park and Recreation staff along with Railroad Park organization that manages events at this location.

Roebuck Springs (Lat. 33.58378 N, Long. -86.71044 W): This location is perhaps most notably known as the location where the endangered Darter species are located in the City limits.

This facility is located at 8920 Roebuck Boulevard, Birmingham, and is next to the parking area for the Roebuck Recreation Center and Don Hawkins Golf Course. This location is part of the headwaters for Village Creek and is spring feed into a retention area approximately 1.0 acre in area. City of Birmingham Park and Recreation staff maintain the area. The surface drainage in this area is .037 square miles comes from commercial, institutional, residential, and open space surrounding land use categories.

During FY 2021-2022 a decrease in water level at this site is being monitored by Watershed Management Staff. This was first observed by Fish and Wildlife Management Staff. Alabama Geological Survey will be monitoring this site through FY2023.

The City of Birmingham maintains Structural Controls and has no maintenance agreements with outside or private contractor. The Zoo is a separate entity that maintains the facility. Highland Golf Course is maintained by a golf management company.

Semi-Annual Inspection Schedule for 2021-2022

FACILITY	*INSPECTION DATES*		*ADDITIONAL (IF NESSASSARY)*
Avondale Park	1/14/2022	6/22/2022	
Birmingham Botanical Gardens	3/9/2022	8/18/2022	
Birmingham Zoo	2/23/2022	8/16/2022	
Bradford Park	12/22/2021	5/31/2022	
Eastern Area Landfill / 2 sections	3/22/2022	8/11/2022	
East Lake Park	12/28/2021	8/1/2022	
Fair Park / Crossplex	1/24/2022	8/4/2022	
Greenwood Park	12/20/2021	8/2/2022	
Hawkins Park/Roebuck Golf Course	2/17/2022	7/27/2022	
Highland Golf Course	3/22/2022	8/30/2022	
New Georgia Landfill	3/14/2022	8/10/2022	
Oxmoor Community Center	2/8/2022	6/24/2022	
Patton Park	12/20/2021	8/2/2022	
Railroad Park	2/11/2022	8/10/2022	
1801 14th St. S. W. / Putman	12/28/2021	6/9/2022	

30 inspections were conducted on City Controlled Structural Controls for 2021-2022 period for permit ALS000032.

Additional Inspections may be warranted, as necessary.

MAJOR FINDINGS:

Overall impact of structural controls predominately using wet ponds for water quality purposes, that are on properties controlled or owned by the City of Birmingham, have had a positive effect to reduce the overall annual levels of total suspended solids by approximately 191 tons, total Nitrogen by 1.2 tons and total phosphorus by 0.2 tons. Approximately 3.4 tons of floatable litter was removed from City Park and Recreation ponds. Total trash removal for all facilities with structural controls was approximately 22.3 tons during the 2021 – 2022 fiscal year. 60 tons of sediment was removed from Avondale Lake. The Birmingham Botanical Gardens which recorded the removal of 5 tons of sediment from various structures around the park. DPW is working to record maintenance activities on a spread sheet with the location and type of work done. No significant maintenance activities were recorded for other structural controls for this reporting period.

The Eastern Area Landfill Pinch Gut Creek Pond next to the Birmingham Police firing range has accumulated high levels of sedimentation. This has resulted in the overtopping of the dam at the lake which has caused erosion rills on the backside of the dam. Department of Public Works has been notified and will work to complete repairs as soon as possible.

MAJOR ACCOMPLISHMENTS:

The City of Birmingham Botanical Gardens: Smaller structural control components were cleaned as part of the annual maintenance conducted by Botanical Garden staff. The smaller structural controls are drained, and manual and equipment removal of sediment was conducted yielding approximately 5 tons form all structures.

Greenwood Park: Continuing inspections, as a part of the City's routine biannual structural controls inspection program was conducted to try and resolve structural components issues. This park maintains a sophisticated complex of structural and non-structural flood control and water quality components before discharging directly into Village Creek. The structural flood control component includes diversion weirs and electric pumps to divert water to adjacent bioswales before discharging directly into Village Creek. The inspections reveal the structural flood control components (i.e. weirs, pumps, electrical component main board, etc.) were not functioning at all. Attempts to locate repair parts, so that the components may be repaired has led to incomplete repairs. Research by Park and Recreation has indicated that the company that was responsible for maintaining repair components has gone out of business. To this date Parks and Recreation have not been able to locate the parts needed to properly operate the control components.

Parks and Recreation will continue to address facility maintenance requirements with resources available. All bioswales have been cleared of all noxious, non-native plant species and all woody plant materials have been removed and the stumps treated to prevent regrowth. All sedimentation will also be removed and properly disposed of in a City landfill. A copy of the maintenance and operations manual for the gate and pumps for the structural Control is available upon request.

Eastern Area and New Georgia Landfill: New Georgia landfill will upgrade Structural Controls. Eastern Area Landfill is now in operation and is handing solid waste for the City of Birmingham. Sand filters have been added to both discharge points of both sub-basins on each side of the Landfill. This should help maintain a higher level of water quality from Landfill property.

New Georgia is currently not accepting solid waste and is awaiting upgrades to meet ADEM requirements.

PROGRAM STRENGTHS/WEAKNESSES:

Providing semi-annual inspections on all structural controls at City of Birmingham facilities have allowed for another layer of oversight at facilities that are sometimes the responsibilities of more than one City Department. This oversight helps to foster communication between Departments and allows the City to coordinate and utilize resources to better maintain these control structures. Inspections allow the City of Birmingham to better meet Permit conditions related to the MS4 and Stormwater Management.

The strength of providing these annual inspections allows the City of Birmingham to estimate the reduction of pollutant loads by using properly designed Structural Controls. The pollutant load reduction in the overall watersheds may not be as significant as the overall pollutant load, but it does help to see the need for more structural controls to reduce the pollutant load on the various Creeks and Rivers in the City of Birmingham's watersheds. Additional Structural Controls whenever possible should be utilized more frequently. The amount of actual sediment and floatable trash removed from City owned structural controls was tracked by City Personnel to determine the actual effectiveness of structural controls.

FUTURE DIRECTION:

A significant amount of pollutant load from respective drainage basins was estimated to be reduced by the City owned wet ponds, assuming the ponds resemble a wet pond design. Literature has published a wide range of performance levels for pollutants controlled by wet ponds; literature published median performance levels were employed in estimating pollutant load reduction by City owned wet ponds. It may be expected that a well-designed or retrofitted wet pond for water quality protection will further reduce pollutant loads beyond the reductions estimated and presented in this Section of the SWMPP, meeting even higher performance levels

than otherwise found in published literature. For more discussion on this subject the reader is invited to see "***Post Development Water Quality Treatment Controls"*** in the SWMPP. The amount of actual sediment and floatable trash removed from City owned structural controls will be tracked to determine the actual effectiveness of structural controls and a record of maintenance for structural control activities will be maintained to help (DPW) Department of Public Works and Parks and Recreation in scheduling regular maintenance.

The City of Birmingham has included requirements during the permitting process to recognize and identify structural controls on all privately-owned properties. This tracking will help identify locations of such controls, so a follow-up inspection program may be implemented, if necessary, in the future.

Description of BMP	ACTIVITY SCHEDULE				COMMENTS
	Measurable Goal	Complied With	Activities Accomplished		
			2020-2021	2021 - 2022	
Storm Drain Inlets Cleaned (#)	1,500 annually	Yes	**3,927**	**6,776**	
Storm Sewer Lines Cleaned (Lin Ft)	90,000 annually	Yes	**263,040**	**241,921**	
Litter Cleared (Blocks)	30,000 annually	No	**7,230**	**3,729**	Shortage of Personnel and resources
Pipe Repaired / Replaced (Lin Ft)	500 annually	No	**919 ft.**	**255 ft.**	Shortage of Personnel and resources
Inlet Constructed (#)	100 annually	No	**16**	**27**	Shortage of Personnel and resources
Curb & Gutter Const. (Lin Ft)	900 annually	Yes	**220**	**997**	
Storm Sewer Tops Made (#)	350 annually	Yes	**772**	**473**	
Storm Sewer Tops Set (#)	4, 000 annually	No	**3,927**	**1,482**	Shortage of Personnel and resources
Inventory of Storm Sewer System	Completed	Yes	**806** outfalls total. No new outfalls have been discovered	**806** outfalls total. No new outfalls have been discovered	
Streets Swept (curb miles)	2500 miles annually	Yes	**151,137**	**147,337**	
Trash collected from City Parks (Tons)	10 tons annually	Yes	**19,231.62 Tons**	**38,250.29 Tons**	

Structural Control Inspection Checklist

Retention/Detention Basin Inspection Form

Site:	Inspector:	Date:
Basin I.D:	Responsible Party:	Date Delivered:

CRITERIA	SAT/UNSAT/NA	COMMENTS
1. FOREBAY:>50% filled with sediment = UNSAT and note ATTN REQUIRED		
2. INLETS: Note signs of erosion and/or low spots		
3. OUTLET: Note signs of erosion and/or low spots		
4. PRINCIPAL SPILLWAY: Note signs of erosion, obstructions, seeping.		
5. EMERGENCY SPILLWAY: Note signs of erosion, obstruction.		
6. BASIN BOTTOM AND SIDE SLOPES: Note erosion, ground cover woody vegetation.		
7. SAFETY DEVICES: Fences, gates, locks, etc.		
8. EMBANKMENTS: Note adequate ground cover, signs of erosion, woody vegetation, low spots, ,cracking, animal burrows, signs of instability.		
9. STRUCTURAL COMPONENTS: Note signs of settling, cracking, bulging, misalignment, or deterioration.		
10. ROUTINE MAINTENANCE: Does facility require mowing, trash pickup?		
11. CONDITION OF AQUATIC ENVIRONMENT: Note excessive algae, dominance of one vegetative type, evidence of non-storm water discharges of fish kill.		
12. VEGETATION: Is vegetation healthy and providing appropriate cover? Note presence of unwanted vegetation.		
13. STORAGE VOLUME: Note evidence of conditions that significantly reduce storage volume.		
14. DEBRIS / SEDIMENT ACCUMULATION: Note evidence of trash, floating/floatable debris, or sediment accumulation not otherwise noted. Note location.		
15.STANDING WATER: Is there standing water in appropriate areas? Inappropriate areas?		

City of Birmingham Stormwater Management Last Modified: 3/1/2018

16. SAFETY AND AQUATIC BENCH		
17. SIDE SLOPE VEGETATION		
18. OTHER		

PHOTOGRAPHIC LOG

Project: City of Birmingham MS4 Program Structural Controls Inspections:	Location: Creek	

ADDITIONAL NOTES

(If needed attach additional pages to properly document the inspection.)

RE-INSPECTION REQUIRED	YES	NO

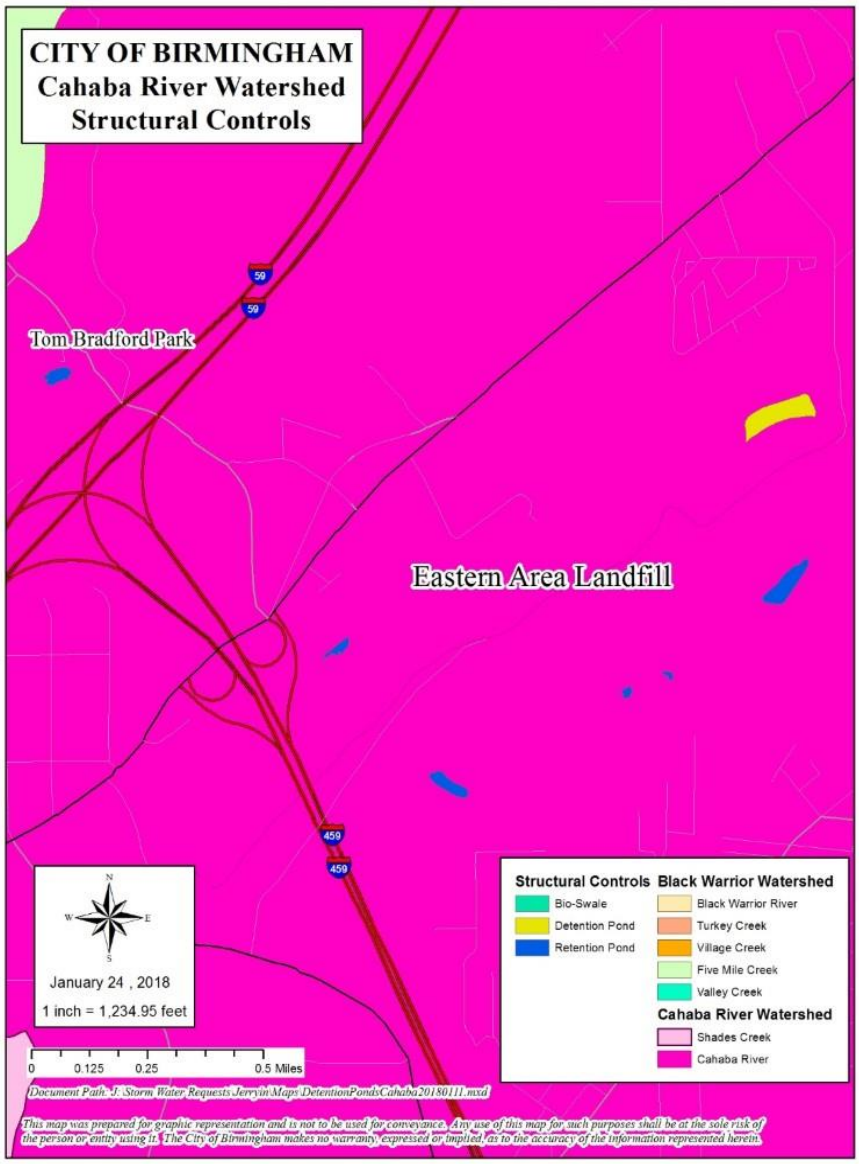
Signature and Date of Person Completing the Inspection

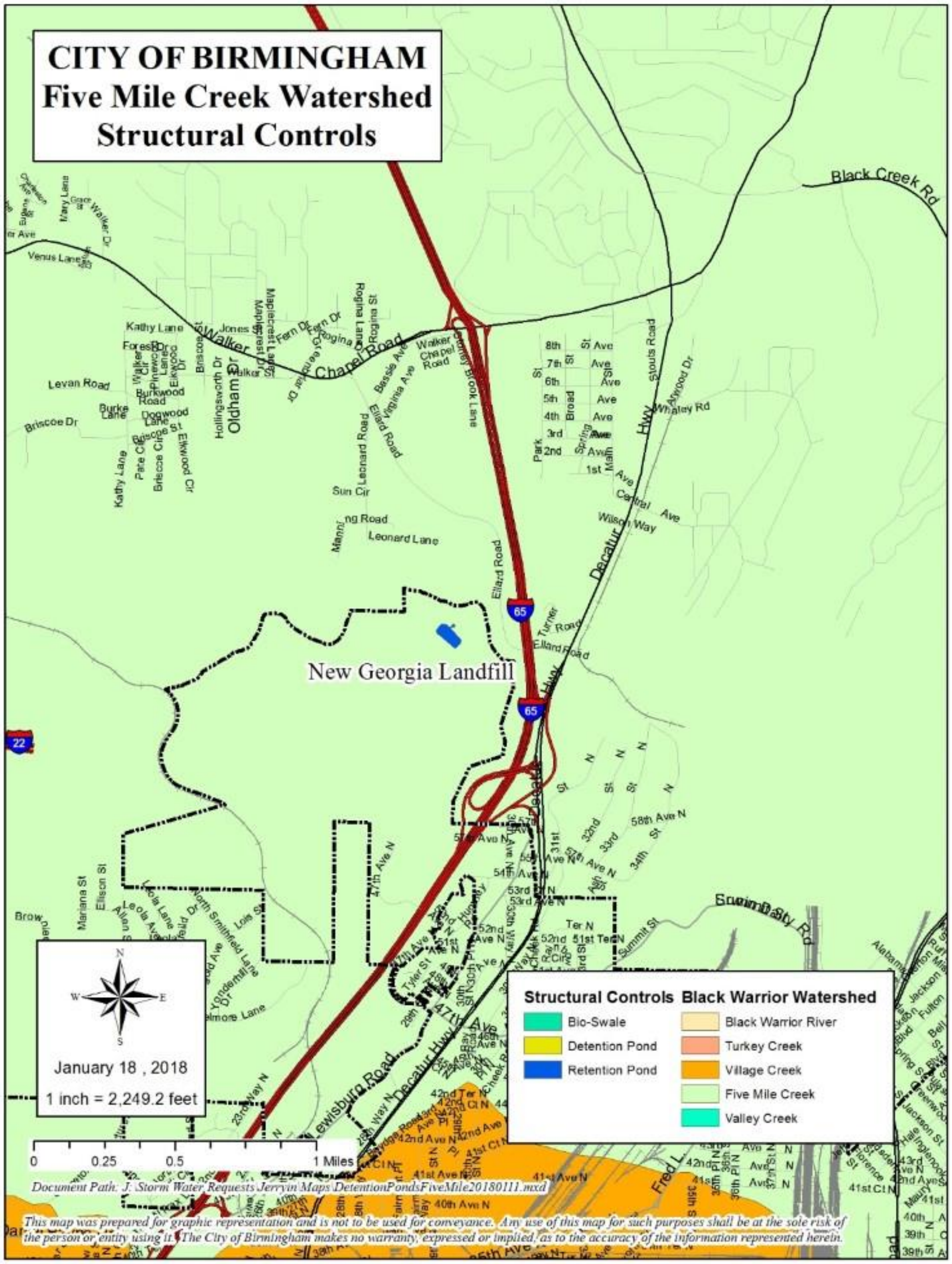
All repairs to be completed within 30 days of notification.

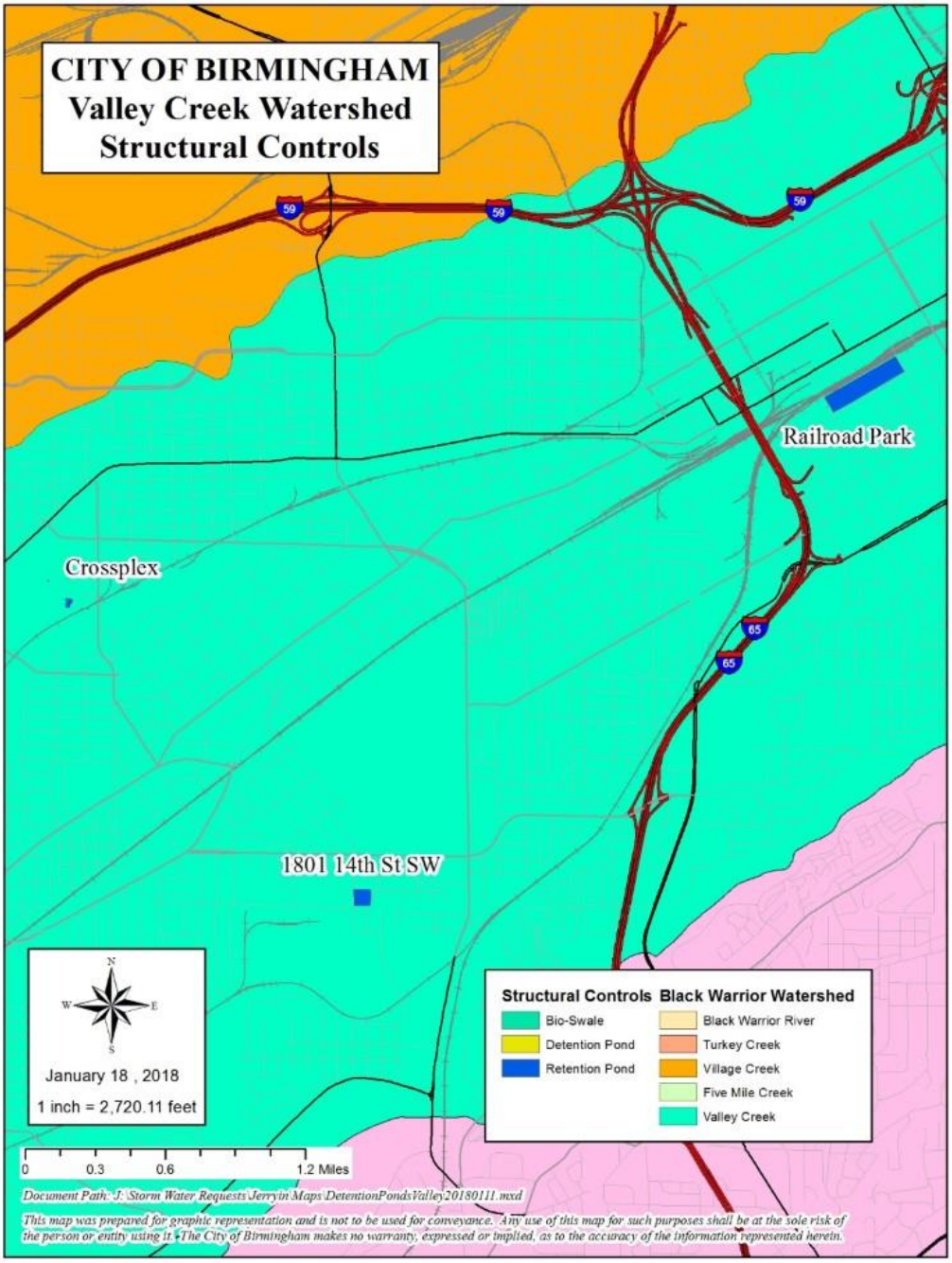
Responsible Party:	NAME:	DATE:

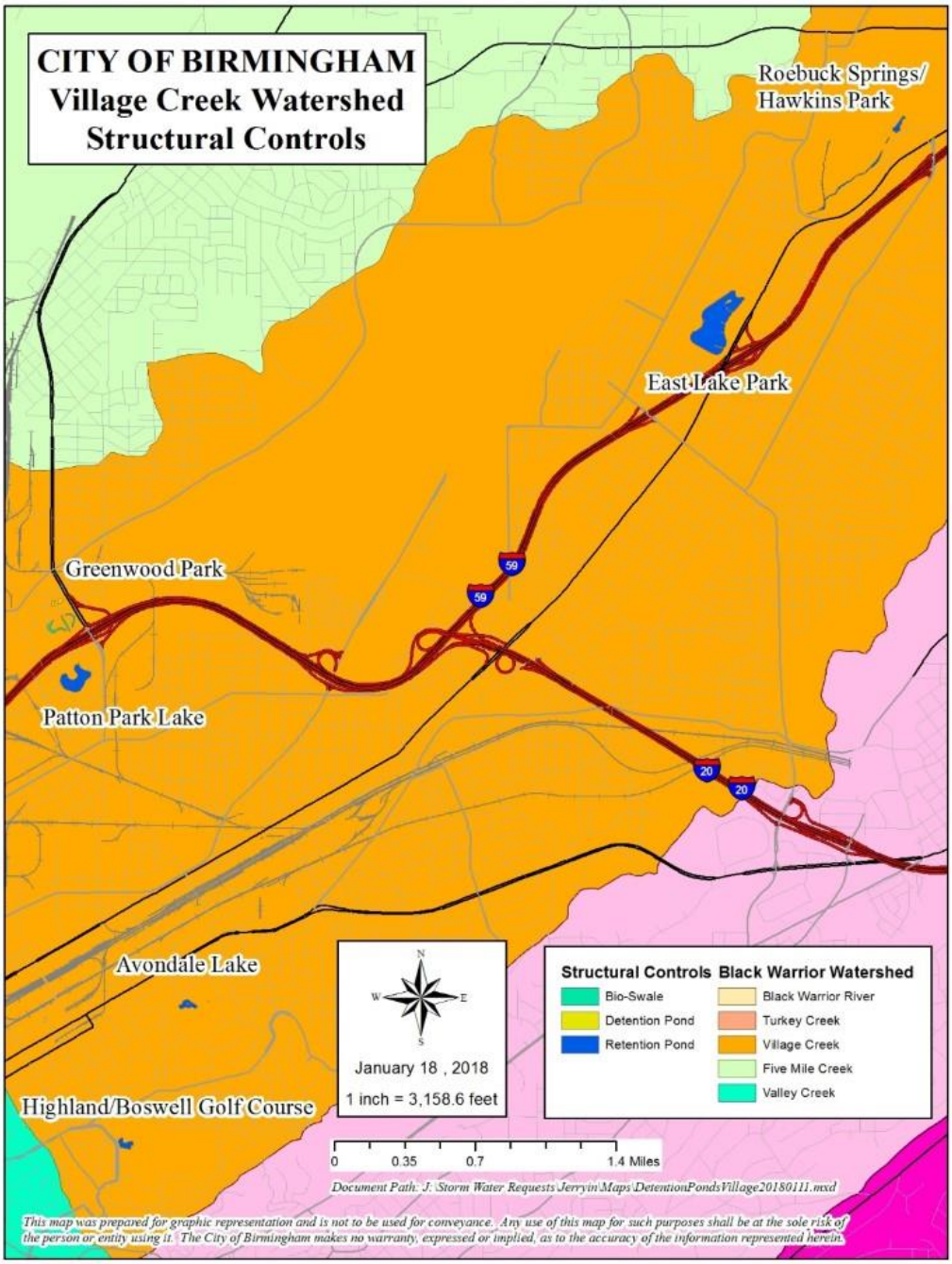
City of Birmingham Stormwater Management Last Modified: 3/1/2018

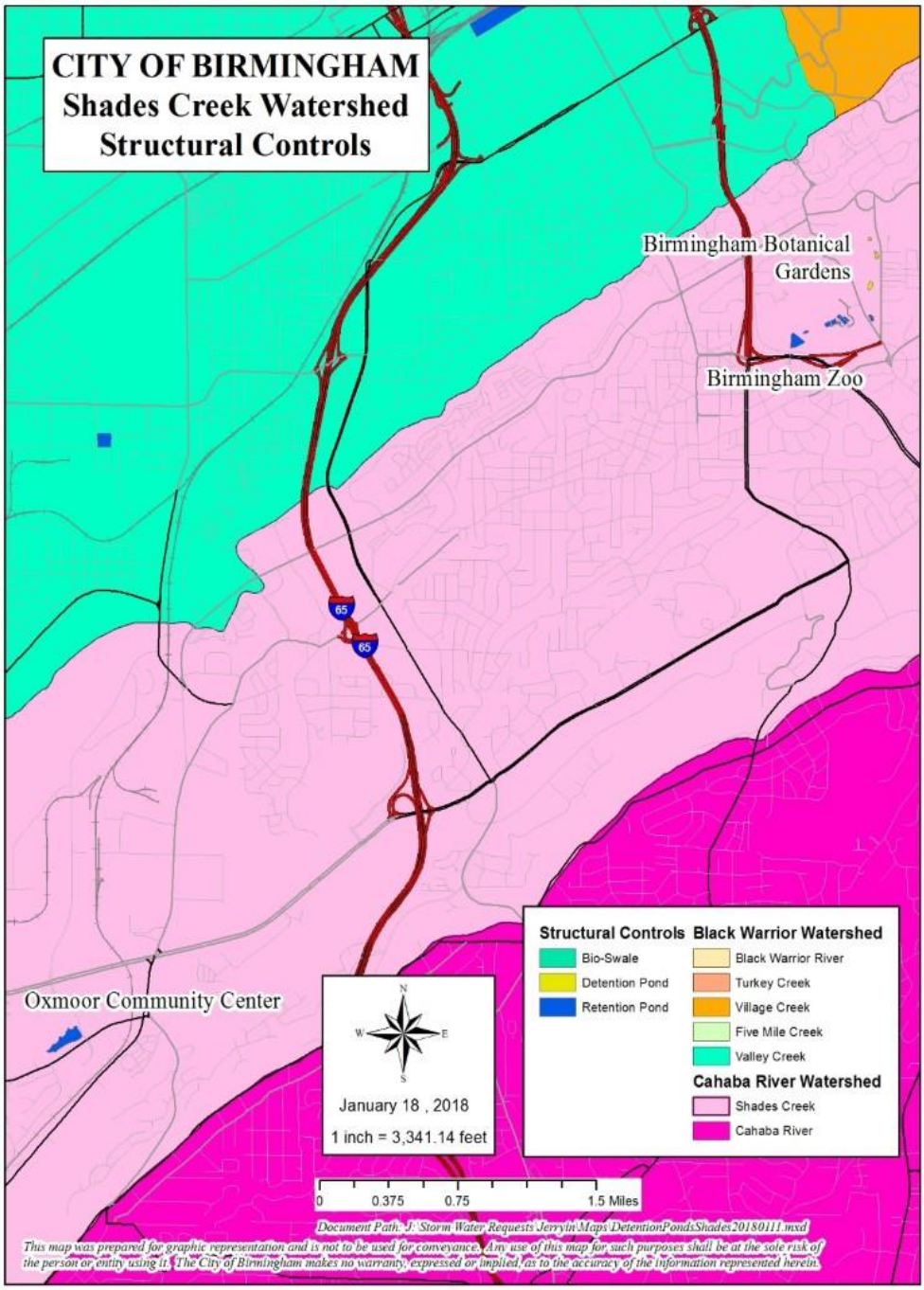
Maps of Structural Controls by Drainage Basins




CITY OF BIRMINGHAM
Five Mile Creek Watershed
Structural Controls
New Georgia Landfill
January 18 , 2018
1 inch = 2,249.2 feet
0 0.25 0.5 1 Miles
Structural Controls
Bio-Swale
Detention Pond
Retention Pond
Black Warrior Watershed
Black Warrior River
Turkey Creek
Village Creek
Five Mile Creek
Valley Creek
Black Creek Rd
Walker Chapel Road
Decatur Hwy
Lewisburg Road
This map was prepared for graphic representation and is not to be used for conveyance. Any use of this map for such purposes shall be at the sole risk of the person or entity using it. The City of Birmingham makes no warranty, expressed or implied, as to the accuracy of the information represented herein.


CITY OF BIRMINGHAM
Valley Creek Watershed
Structural Controls
Railroad Park
Crossplex
1801 14th St SW
59
65
N
W
E
S
January 18 , 2018
1 inch = 2,720.11 feet
0 0.3 0.6 1.2 Miles
Structural Controls
Bio-Swale
Detention Pond
Retention Pond
Black Warrior Watershed
Black Warrior River
Turkey Creek
Village Creek
Five Mile Creek
Valley Creek
Document Path: J:\Storm Water Requests\Jerry\in Maps\DetentionPondsValley20180111.mxd
This map was prepared for graphic representation and is not to be used for conveyance. Any use of this map for such purposes shall be at the sole risk of the person or entity using it. The City of Birmingham makes no warranty, expressed or implied, as to the accuracy of the information represented herein.


CITY OF BIRMINGHAM
Village Creek Watershed
Structural Controls
Roebuck Springs/
Hawkins Park
East Lake Park
Greenwood Park
Patton Park Lake
Avondale Lake
Highland/Boswell Golf Course
59
20
N
W
E
S
January 18 , 2018
1 inch = 3,158.6 feet
0
0.35
0.7
1.4 Miles
Structural Controls
Bio-Swale
Detention Pond
Retention Pond
Black Warrior Watershed
Black Warrior River
Turkey Creek
Village Creek
Five Mile Creek
Valley Creek
Document Path: J:\Storm Water Requests\Jerryin\Maps\DetentionPondsVillage20180111.mxd
This map was prepared for graphic representation and is not to be used for conveyance. Any use of this map for such purposes shall be at the sole risk of the person or entity using it. The City of Birmingham makes no warranty, expressed or implied, as to the accuracy of the information represented herein.


CITY OF BIRMINGHAM
Shades Creek Watershed
Structural Controls
Birmingham Botanical Gardens
Birmingham Zoo
Oxmoor Community Center
65
65
N
W
E
S
January 18 , 2018
1 inch = 3,341.14 feet
0
0.375
0.75
1.5 Miles
Structural Controls
Bio-Swale
Detention Pond
Retention Pond
Black Warrior Watershed
Black Warrior River
Turkey Creek
Village Creek
Five Mile Creek
Valley Creek
Cahaba River Watershed
Shades Creek
Cahaba River
Document Path: J:\Storm Water Requests\Jerry\n\Maps\DetentionPonds\Shades20180111.mxd
This map was prepared for graphic representation and is not to be used for conveyance. Any use of this map for such purposes shall be at the sole risk of the person or entity using it. The City of Birmingham makes no warranty, expressed or implied, as to the accuracy of the information represented herein.

INTENTIONALLY LEFT BLANK

PUBLIC EDUCATION AND PUBLIC INVOLVEMENT

EDUCATION OPPORTUNITIES:

Watershed Management interacted with over 4000 individuals in the City of Birmingham over the course of the pervious twelve months on ***"ALL-THINGS's STORMWATER"***. A total of 300 hours were spent administering, leading, or aiding program across the city! The City's education and outreach program range from pre-K to adults for most events and program. In addition, we reached our main goal of aiding in or leading a program for all our member communities throughout the year- meeting both Public Participation & Involvement and Public Outreach & Education MS4 Minimum Measures. The City reached all 99 neighborhoods and 23 communities, a total of 30 programs, events, and meetings.

2022
BIRMINGHAM, USA

In the 2022 reporting season the city of Birmingham hosted the 2022 World Games. The World Games is an extraordinary, international sports event held every four years, in the year following each Summer Olympic Games. Staged over 11 days, The Games represents the pinnacle of competition for 3,600 of the world's best athletes in 30+ unique, multi-disciplinary sports.

Education program focused community initiatives that engaged COB residents to on various community activities took a focus in getting citizens to "***Take pride where they reside"***, focusing on the area where they live.

This year's educational themes included the water cycle, litter/trash, pet waste, lawn waste, fertilizer/pesticides, household waste, and vehicle pollutants. In Birmingham Stormwater Department, we get to look at our City through a unique lens—water. Perhaps more so than most other City Departments, this work necessitates collaboration with partners that stretch across political boundaries. Stormwater drainage paths, rivers, and streams do not begin and end at our City limits.

To meet all educational and outreach goals outlined in the COB (MS4) permit, our closest partnership is with Keep Birmingham Beautiful, Jefferson County, Jefferson County Health Department, City of Bessemer, and Jefferson County Conservation District. Year-to-year we share resources to educate on water stewardship, complete inspection duties, and conduct water quality monitoring. Partnering for these efforts creates a more holistic approach to water resource management in the County.

Stormwater Calendar: A 12-month printed 2022 Stormwater Calendar was created in partnership with Jefferson County Stormwater to provide a cost-effective way to educate and inform all Jefferson County residents regarding stormwater program elements such as non-point source pollution, proper disposal of HHW, illicit discharges, and various Low Impact Development (LID)/Green Infrastructure (GI) practices that assist with the reduction of stormwater leaving a site during a rain event. Each month, a Stormwater Program element or a LID/GI practice has been highlighted and emphasizes proper disposal, water conservation, and the use of various features to collect, store and filter the rain into the ground to prevent runoff. A poster, created by the Environment America Research and Policy Center, was used for the centerfold of the calendar that highlights an infographic showing how investments in stormwater practices can help protect our local waterways. These investments include items that homeowners can install such as rain gardens, constructed wetlands, vegetative buffers, and the use of native plants. The intent of this Stormwater Calendar is to encourage people to use the various LID/GI techniques to reduce the volume and velocity of stormwater runoff as well as protect our local creeks and streams from pollution. A total of 7,000 Stormwater Calendars were printed and distributed.

Surveys: Two surveys were launched on December 16, 2021 and remained open through September 30, 2022. The purpose of the ten question General Behavioral Survey was to assess the public's knowledge of and behavior regarding stormwater impacts. The purpose of the ten question Littering Behavior Survey was to assess the public's knowledge of the impacts of littering on stormwater quality and their behavior regarding littering. The surveys were promoted to County residents on Jefferson County's social media platforms, by Alabama Cooperative Extension System, Jefferson County Conservation District, Jefferson County 4-H, and Friends

Birmingham Botanical Gardens. The surveys also are available to the public at the DDS webpage of Jefferson County's website and via the JeffCo H_2O newsletter. During the current reporting period, 128 residents responded to the General Behavior Survey and 103 residents responded to the Littering Behavior Survey.

ANNUAL REPORT CLEAN UPS:

In 2022 Watershed Management helped lead an aggressive clean-up campaign that was initiated by Mayor Randall L. Woodfin to address overgrown lots, litter, missing street signs and more. With an investment of over 3.5M on updating the collection on municipal Solid Waste. Expanding on the City Haul pilot project started in 2019. The monumental investment will help eliminate trash and improve water quality throughout the city of Birmingham.

The goal of Stormwater Department across the City is to improve and preserve water quality for the benefit of humans and in aquatic life. In Birmingham, these goals cannot be met for our watershed without the stewardship of the entire community.

The stormwater program learned a unique way to recruit volunteers after maneuvering our way through the COVID-19, as we focused on partnerships. As the country continues to deal with the pandemic, it is as important as ever to help end litter across the city. This year's clean up initiative resulted in over 3,564 Volunteer and 5,582 bags of Litter collected.

In continuing the opportunity to engage with the community though outreach

Stormwater Management partnered with the local media radio station for the 3rd Annual Summer Neighborhood/Park Clean up held May 1, 2022 through August 2, 2022 to further encourage citizens to do their part to only use the city storm drains for rain and Just say no to litter. This initiative resulted in over 850 Volunteers and 1,250 bags (30-gallon Bags) of Litter collected. We look forward to the upcoming year.

GREAT AMERICAN CLEANUP:

The Great American Cleanup prompts individuals to take greater responsibility for their local environment by conducting grassroots community service projects that engage volunteers, local businesses, and civic leaders. A successful Great American Cleanup project must fulfill the needs of the local community; that's why we work with local community and business leaders, as well as other key stakeholders to gain knowledge about the community's needs and carefully select and execute appropriate projects.

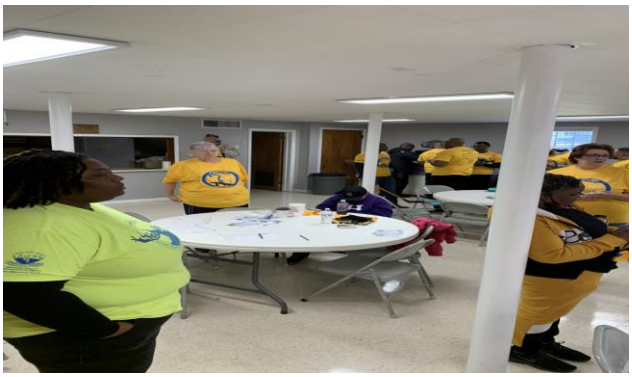
This reporting period under the "Great American Cleanup" Campaign computed 60 neighborhood cleanups, collecting over bags of trash and 1000 bags of recyclables, utilizing around 3000 volunteers.

Valley Creek Cleanup: In conjunction with the Renew Our Rivers Program, a total of 6 cleanups were held along Valley Creek with 175 volunteers removing roughly 56 tons of debris and tires. The volunteer lead cleanups were held on March 13, 2022, March 21, 2022, and August 15, 2022 with two prior municipal workdays to remove the heavier items on March 11, 2022, and August 12, 2022. These biannual cleanups focused on public awareness and trash removal throughout the Valley Creek Watershed. The cleanups were coordinated by the municipalities throughout the watershed, various agencies, and a coalition of local citizens and businesses.

Village Creek Cleanup: A total of nine cleanups were held along Village Creek resulting in 286 volunteers removing 32 tons of debris and tires. All cleanups were held in partnership with the Village Creek Human and Environmental Justice Society, City of Birmingham, and Jefferson County Commission.

The Mulga Loop Road cleanups were coordinated by a working committee to include additional partners which are listed in the details below. Items collected were removed by the City of Birmingham Public Works Department or the County's R&TD. Details from each event is listed below.

On January 18, 2022, as part of the United Way Hands on Birmingham Martin Luther King Jr. Day of Service Litter Cleanup Project, 80 people came together and removed a total of 18.25 tons of material. The items collected were picked up and disposed of by the County's R&TD. This project consisted of 8 hosting/supporting organizations, two volunteer registration locations (Mulga Mines and Edgewater B) which came together to pick up litter along roadways and ditches in the Village Creek Watershed. This project was coordinated by a working committee with representatives from United Way Hands on Birmingham, Jefferson County Commission, and Village Creek Human and Environmental Justice Society.



Mulga Loop Road: The first event was spearheaded by the Minor Community which was held on October 17, 2022 The second event was in partnership with University of Alabama Birmingham (UAB) Into the Streets service organization and held on October 23, 2022. The last fall cleanup event volunteers from a LINK Program spearheaded by a local organization in the Minor Community, Next Step Storm, joined members of the Minor Community, Town of Maytown and Town of Mulga along with staff from the City of Birmingham and the Jefferson County Commission to pick up litter from along Mulga Loop Road from Bayview Bridge back to Minor Parkway. In total 105 people picked up 6.33 tons of litter and debris during these three fall projects.

These cleanup projects were spearheaded by the Village Creek Human and Environmental Justice Society in conjunction with the University of Alabama's into the Streets program and Alabama Power Renew Our Rivers. It was coordinated by a working committee with representatives from the Alabama People

Against a Littered State (AL PALS), Black Warrior Riverkeepers, City of Birmingham, Freshwater Land Trust, Heritage Coffee, Jefferson County Conservation District, Jefferson County Commission, Jefferson County communities of Minor Heights, Edgewater B and Mulga Mines, Jefferson County Department of Health Watershed Protection Program, Keep Birmingham Beautiful, Next Step Storm, Storm Water Management Authority, Inc., Town of Maytown, Town of Mulga, University of Alabama Birmingham, along with the faith based community organizations such as Bayview United Methodist, Edgewater United Methodist, First Baptist East Mulga, FOAM Ministries, Midway United Methodist, Open Door, Shady Grove Baptist, St. John's Baptist and Westmont Churches. A logo seal used on all the materials was created in FY 2020 by the working committee. The seal incorporates the local waterways (Village Creek and Bayview Lake) to educate the local communities about how these two waterways connect and flow. As part of the Renew Our Rivers Program, the Village Creek Fall Cleanup was held on November 7, 2022, Reports indicate that 22 volunteers picked up 0.55tons of litter.

The 7th Annual Spring Mulga Loop Road Cleanup took place along two days. This project consisted of two volunteer registration locations, 5 communities, 3 faith-based organizations, and four jurisdictions coming together to pick up litter along roadways, ditches and creek banks along Mulga Loop Road and Bayview Bridge protecting the Village Creek On March 27, 2022, a community lead cleanup was held in the Minor Community and the City of Birmingham. A total of 82 people removed 1 tons of material. The County's R&TD picked up and removed the items that were collected.

EDUCATION OPPORTUNITIES

Rain Barrel Workshop: A total of 34 people participated in the 2022 Virtual Rain Barrel Workshop which took place on June 18, 2022. All participants were able to pick up their barrels at scheduled times after the event. Through a working Rain Barrel Workshop Committee, the Alabama Cooperative Extension System, Friends of Birmingham Botanical Gardens, Jefferson County Stromwater, City of Bessemer, City of Leeds, Jefferson County Department of Health, Jefferson County Soil and Water Conservation District, Jefferson County DDS, Keep Birmingham Beautiful, and Storm Water Management Authority hosted the event and provided instruction, materials, and rain barrel assembly assistance for participants.

Backpacks featuring the Litter Quitters logo and website were distributed to all workshop attendees. They contained information on watersheds, runoff and how to report stormwater pollution, 2022 Stormwater Calendars along with information on Jefferson County's Household Oil and Grease Recycling Program, the Jefferson County Soil and Water Conservation District, and the Birmingham Botanical Gardens Library.

Fishing Rodeo: On June 11, 2022, the Clean Water Awareness Campaign posters were displayed at a booth along with a fun interactive activity for children at an event that was free and open to the public. Trash bags and information on the volunteer litter cleanup events were distributed. A visual display showcased how used motor oil and used cooking oil and grease can impact the environment when not disposed of

properly. In addition, a glass jar containing various common pollutants rainwater carries to local waterways during rain events was displayed and available for patrons to examine and shake to mix the contents. Cooking oil and grease recycling containers were distributed along with other printed materials on Jefferson County's Household Oil and Grease Recycling Program along with a current list of all the local Recycling Centers. Stormwater Program staff and the City of Birmingham Stormwater Program staff shared this booth and assisted in the kid's water blot painting activity. In addition to creating attractive artwork, the painting activity also taught children the properties of oil and water which reinforced the visual display showing that oil and water do not mix. It was reported that close to 250 people attended this annual event held at the East Lake Park.

Brown Bag Lunch and Learn Seminars: Brown Bag Lunch and Learn Seminars. 14 seminars were scheduled during this reporting period. The seminars, normally held in person at the Birmingham Botanical Gardens, were updated in 2020 to a digital zoom platform and were open to all residents of Jefferson County. The seminars were promoted in the JeffCo H_2O Newsletters, blogs, County and partner websites, and flyers were distributed at community events and meetings. Instructors from varying organizations were chosen for each topic. The topics, intended to be of practical application to homeowners, included the stormwater benefits of low impact landscape designs, proper planting and gardening techniques, and prudent use of fertilizers and pesticides. Reports indicate 876 participants viewed the seminars of which 500 participants attended the live Zoom presentations and 376 participants viewed the recordings on YouTube as of September 30, 2022. A link for participants to fill out surveys was sent out to class participants along with a copy of the presentation and a link to view the presentation again. For those that signed up for the seminar but did not log on to watch during the set time, a follow up email was sent with a link to watch the recording. The topics were: "Planting Veggies", March 23; "Planning for Success", April 6; "Herb Appeal", April 20; "E-Waste", May 4; "Azaleas and Boxwoods", May 18; "Container Vegetables", June 1; "Mature Tree Care", June 15, "Gardening on a Slope", June 29; "Managing Stormwater", July 15; "Cultivating Garlic", July 27; "Container Flower Bulbs", August 10; "Cultivating Citrus", August 24; "Yard Art for Curb

Appeal", September 7; "and "Ask the Experts", September 21, 2022.

Litter Quitters: Litter Quitters is an anti-litter, stormwater protection, community outreach and public awareness campaign to encourage everyone to stop littering, especially young drivers. The first part of the campaign focuses on educating high school students in Jefferson County about litter and its negative impacts on waterways and the environment. The second part is to encourage these students to share their newly learned knowledge to others by tasking them to produce and submit a 60-second anti-litter video during a 12-day competition among other high schools in their watershed.

The videos with the most 'likes' in each watershed win cash prizes. Keeping the video competition on a local level and students focused on their local watersheds, the 30 public high schools were divided into our three major watershed basins: Locust Fork, Valley Creek, and the Cahaba.

The third and last part of the Litter Quitters Campaign focuses on expanding the ani-litter message to a broader audience with the use of professionally produced messages / public service announcements (PSA). Schools that participated in the video competition were invited to send one student representative to take part in the television PSA. Radio and billboard PSAs are also part of the mass media campaign. The radio PSAs are professionally created using the voices of select students from the television PSA. The billboards consist of two images that remind drivers how to properly dispose of their trash while driving at home and in public spaces. All PSAs run concurrently at the same time for a bigger impact. The media campaign and the prizes are funded by members of the Committee and annual sponsors.

The Litter Quitters website, https://www.litterquitters.org, created during FY 2019, houses the PSAs from the annual media campaigns, as well as information on our watersheds and effects of polluted runoff such as litter has on our waterways. This website also houses the videos that were entered into the competition and a listing of local volunteer litter cleanups.

Litter Quitters is spearheaded by the Jefferson County Conservation District in partnership with members from the Alabama Cooperative Extension System, City of Birmingham, City of Bessemer, City of Hoover, City of Leeds, Creative Directions, Inc., Freshwater Land Trust, Jefferson County Commission, Jefferson County Department of Health, Keep Birmingham Beautiful, and Storm Water Management Authority, Inc.

Litter Gitter:

City of Birmingham and other Jefferson County Litter Quitter Committee members partnered with Freshwater Land Trust and were awarded a $500,000 EPA Trash Free Waters Program Grant over a three-year period. This year the grant wrapped up to complete the 3-year run. The major goal of the funded project is to remove trash in the waterways, local creeks, and rivers in the greater Birmingham area. This EPA grant will also supplement the existing Litter Quitters Anti- Litter Video Competition education program. The Valley Creek Pilot Litter Gitter along with five other sites will have the device installed.

Billions of pounds of trash become marine debris, which pollutes our waterways and oceans. Plastics in the aquatic environment are persistent and have a negative effect on the environment, wildlife, and human health. More information can find the up-to-date Litter Gitter list and map of our current litter gitters on our website here: https://freshwaterlandtrust.org/litter-gitters/. Further, Osprey has a map on their website with data you can view at each site: https://osprey.world/sites

Household Hazardous Waste Recycle: On April 9, 2022, three concurrent Household Hazardous Waste Collections Events were made available for the residents of Jefferson County to drop off their items for proper disposal at no charge. The event sites were strategically located in cities throughout Jefferson County, making them more accessible for all residents to attend. The events were funded by the Jefferson County Commission, Jefferson County Department of Health, Stormwater Management Authority, Inc. in partnership with the cities of Bessemer, Gardendale, and Irondale. The partnering jurisdictions assisted with managing their sites logistics including coordinating the vendors and obtaining volunteers. Educational brochures on illicit discharges and proper vehicle maintenance along with other stormwater information was distributed to the vehicles that participated in these events at the Bessemer location. Intake surveys were administered at each site. The results not only aid in allocating resources next year; they also reveal areas where additional promotion should be focused to yield greater participation for future events.

Reports show 923 participants collectively brought a total of 35.65 tons of paint and paint related items, 1.10 tons of aerosols, 2.70 tons of pesticides and 0.22 tons of used household cooking oil and grease. While all partnering agencies promoted these events, Jefferson County's Public Information Office send press releases to the County Commissioners and to the local news media. Jefferson County had paid sponsor advertisements in Facebook, Twitter, and LinkedIn which promoted the event and the reasons to want to dispose of your household hazardous waste properly.

Electronic Take Back A combined total of 25.01 tons of electronics were collected from four Electronics Free Drop-off Day events held for residents of Jefferson County. Reports show that 914 households participated in these events which were sponsored by the Jefferson County

Commission in partnership with Alabama Cooperative Extension System, City of Bessemer, City of Birmingham, City of Leeds, Jefferson County Soil and Water Conservation District, Jefferson County Department of Health, Keep Birmingham Beautiful, Nucor Steel Birmingham, Inc., Protec Recycling, and Storm Water Management Authority, Inc. Intake surveys were administered, and all participants received a reusable car trash bag, or a litter quitters backpack filled with educational materials from all the partners. Materials that were distributed included current Stormwater Calendars, Jefferson County's Household Oil and Grease Recycling Program site locations flyer and a program promotional item (can lid, gripper, sponge, or scraper), Fat Free Sewers brochure, flyers listing upcoming events and workshops (Electronic Drop-Off Days, HHW, Rain Barrel Workshop, Brown Bag Lunch and Learn Seminars, etc.), and items promoting the Litter Quitters Anti-Litter Campaign, and the hotline number for reporting suspected water pollution in the unincorporated areas of Jefferson County. Hardee's Corporation sponsored sausage biscuits for the volunteers at each event while Village Creek Society or Keep Birmingham Beautiful supplied the bottled water. These events were held in areas prone to illegal dumping to proactively circumvent the improper disposal of electronics. Events were promoted by all partners and other local agencies. Details from each event are listed below.

- On October 9, 2021, an event was held along short 20th Steet between Birmingham City Hall and Linn Park. Intake forms were collected from 120 vehicles representing 138 households located within 19 local jurisdictions from 32 unique zip codes. A total of 3.42 tons of electronics were collected.
- On February 19, 2022, an event was held at The Birmingham Zoo parking lot. Intake forms were collected from 399 vehicles representing 440 households located within 25 local jurisdictions from 50 unique zip codes. A total of 12.37 tons of electronics were collected.
- On May 14, 2022, an event was held at the Jefferson County Center Point satellite courthouse parking lot. Intake form information was collected from 190 vehicles representing 226 households located within 19 jurisdictions in 35 unique zip codes. A total of 22 volunteers from partnering agencies along with the Village Creek Society assisted with the unloading of vehicles. A total

of 5.64 tons of electronics were collected.

- ★ On June 11, 2022, an event was held at the Jefferson County Valley Creek Water Reclamation Facility – Bessemer. Intake forms were collected from 99 vehicles representing 111 households located within 15 jurisdictions in 32 unique zip codes. A total of 25 volunteers from partnering agencies assisted with the unloading of vehicles. A total of 3.59 tons of electronics were collected.

Doggy Doo Dah Day: Since 1980 Do Dah Day in Birmingham has been the South's largest Dog and Animal Festival. City did not participate in this year event at its normal capacity but plans to attend in its normal capacity at next year's event.

Urban Forestry Fair, and Water Festival was cancelled given at the time of the event there was an uptick in COVID-19 infections.

Earth Day at the Gardens: On April 23, 2022, Stormwater Program staff displayed Clean Water Awareness Campaign posters, held a fun interactive children's' activity, and distributed stormwater materials at a booth during a free event held at the Birmingham Botanical Gardens. The visual display showcased how used motor and cooking oil and grease can negatively impact the environment when not disposed of properly. Information on the County's Household Oil and Grease Recycling Program, new recycling containers and other printed stormwater materials were distributed to participants. Jefferson County shared this booth with the City of Birmingham who assisted in the children's water painting activity. The activity allowed the participants to create attractive artwork which reinforced the visual display showing that the properties of oil and water do not allow them to mix. It was reported that

close to 400 people attended this annual event.

Although the COVID pandemic prevented the Urban Forestry & Water Festival from being Held in its usual timeframe. The city continued to achieve its sustainability goals, as the city celebrates 30 years of being recognized as a tree city. The cites and it partners planted and distributed over 700 trees too plant throughout the city of Birmingham. In addition, serving over 151 5th grade students in April of 2022

Other Outreach Events

Additional Outreach event Television stations. Financing for this message was provided by Freshwater Land Trust, Drummond Company, Inc, Keep Alabama Beautiful, American Cast Iron Pipe Company, City of Bessemer, City of Birmingham, City of Hoover, City of Leeds, and the Jefferson County Department of Health Watershed Protection Program. The anti-litter commercial, featuring students from 11 participating schools, was professionally produced as an in-kind donation from WBRC and aired on FOX6, ABC33/40, MY68 and CW21 between May 3, 2021, and June 27, 2022. This same paid message was aired as no charge messages on each of these broadcast television stations. The air schedules included highly viewed programs including morning and evening news. It was reported that WBRC-TV FOX 6 delivered 3,894,500 impressions, WBMA-TV ABC 33/40 delivered 1,069,400 impressions, and while the PSA commercial aired on MABM-TV My 68 and WTTO-TV CW21 there were no impressions reported.

Since roadway litter comes from trash being intentionally tossed out of vehicles, a billboard campaign along major roadways were launched to bring about awareness that litter is, well, stupid! One image was of an in-stream litter collection device that can be found in ten various locations around Jefferson County featured the tag line: Don't feed the Litter Gitter, Be a Litter Quitter! in an effort to bring about an awareness of these collection devices which were recently installed in waterways to trap the litter that gets washed by rain from nearby roads. The other image was to promote the proper way

Stormwater 101: Only Rain Down the Drain Presentations: During the last two reporting period City of Birmingham Stormwater Management Staff Presented "Only Rain Down the Drain" to over 358

Birmingham City Students ranging from k-12th graders over several different events. Staff also presented "Only Rain Down the Drain" to over 550 adults at several different events during this reporting period. "Only Rain Down the Drain" presentation concept was developed by staff to explain Stormwater Management to all ages. Instilling and providing City residents with good environmental qualities and stewardship will help to keep Birmingham beautiful. Reaching out to our children will help to guide the next generation of Birmingham residents with the need to continue to improve City water resources into the future.

Stormwater 101 Surveys: During this reporting period Stormwater Management Staff survey to go along with the "Stormwater 101" education to quantify knowledge and information retained. The figure below shows the responses from three events with adults and students that were asked, "What are some of the items we discussed today that are not allowed in the storm drain?"

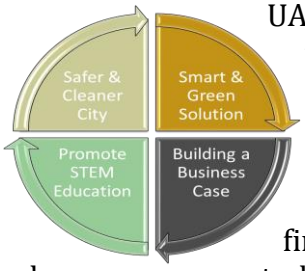
Stormwater 102: Field Water Quality Analysis: City of Birmingham Stormwater Management Staff developed "Stormwater 102." We use this program to teach and train citizens about the importance of clean water. We allow them to use our equipment to perform water quality analysis in the field. We use this technique to encourage scientific reasoning as well as teach basic stormwater management techniques.

Public Outreach Materials: The Birmingham Stormwater Management program developed and distributed many Educational Items to help get the message out to our citizens. The goal was to make a brand for Stormwater Management. "Only Rain Down the Drain" pencils, cups, Frisbees, bumper stickers and wristbands were distributed throughout the City with the message, as well as, Stormwater Calendars. A City of Birmingham Stormwater Banner, and tablecloth was purchased to advertise the message. Plans to increase the stormwater awareness and advocacy through public education are expected to expand throughout upcoming years.

Stormwater Management Website: During the annual report year, Stormwater Management has a fully functional working website for stormwater information to be located. The website can be found at: www.birminghamal.gov/stormwatermanagement.

The website contains a Home, Public Education, Annual Report, FAQs, Contact, and Related Link sections. The Home Page gives a brief description about stormwater and how citizens can help reduce pollution in their community. It also helps inform the citizens about watersheds in Birmingham, native plants for stormwater management practices, recreational uses, the City of Birmingham Soil Erosion Control Program, & etc.

Put a Lid On It: As part of a City of Birmingham project, the City has partnered with UAB to develop and produce an inlet top redesign. During this reporting period UAB has studied and tested many different composite material combinations and designs to be considered as the final product. There was also a study done on the current material and process used to make the standard concrete tops used today. Initiation of the video study in four frequently damaged areas process has begun.



Staff has worked through a preliminary portion of the pilot project and is close to completing the pilot project. UAB has requested that the project be extended for one additional year.

Program Overview

Please see the following chart to demonstrate the education program pollution control measures verses each education program element. The goal is to maximize each opportunity we must educate.

Major Accomplishments:

- ★ Stormwater Website and Facebook page improvements
- ★ Litter Quitter campaign improvement
- ★ Partnering with KBB

Program Strengths:

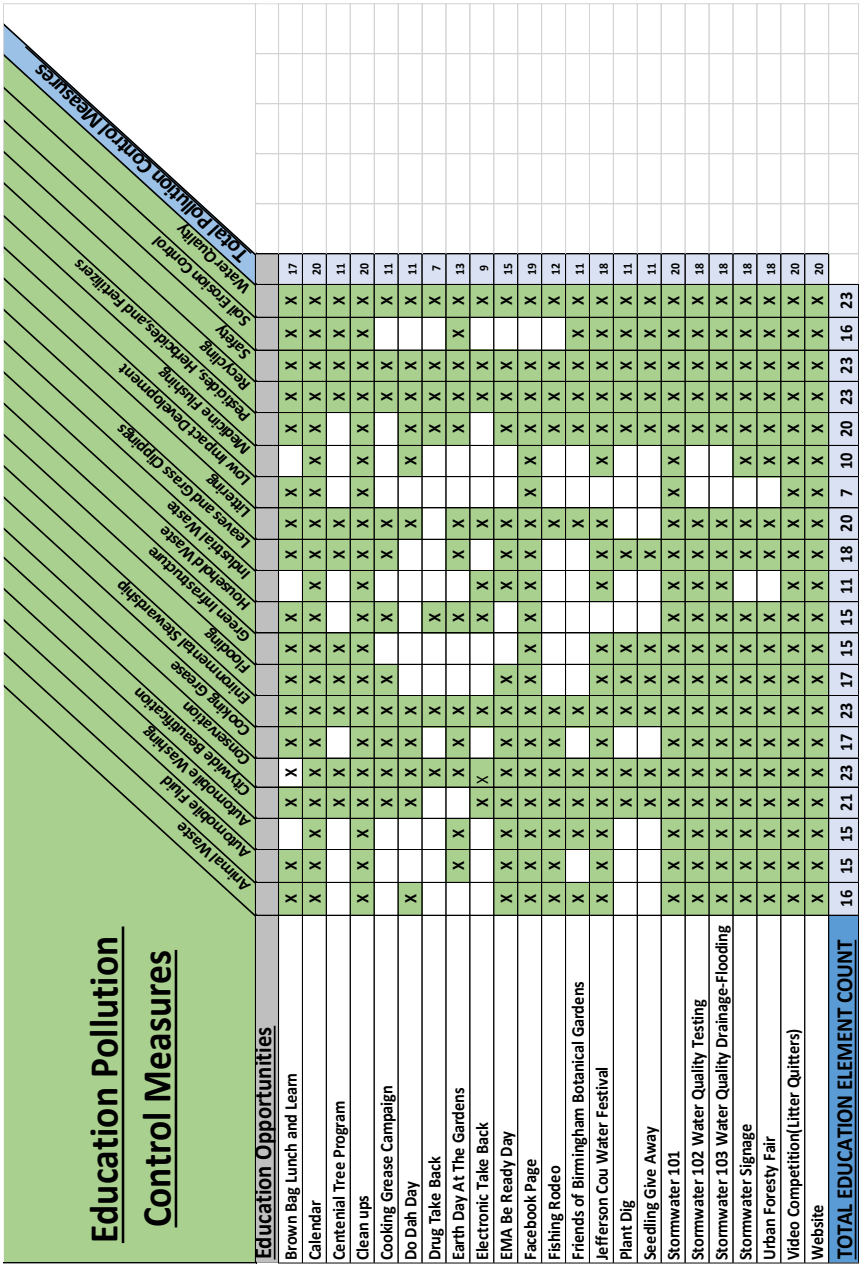
- ★ Stormwater 101
- ★ Partnerships
- ★ Webpage & Facebook
- ★ Stormwater Calendar
- ★ Litter Quitter initiative
- ★ Volunteer participation

Program Weaknesses:

- ★ Overcoming COVID 19 Adversities
- ★ 100% Participation in Roadside Cleanups (all 23 communities)
- ★ Need for additional Outreach and Education
- ★ Illegal Dumping
- ★ Recycling

Future Direction:

- ★ Set guidance for evaluating the effectiveness of public education and outreach programs:
- ★ COB will determine what types of Stormwater problems are amenable to, and best addressed by, behavior change efforts. A decision support tool, and guidance to evaluate effectiveness will be developed
- ★ Ditch Maintenance for Water Quality Study: COB will conduct a study in roadside ditches on the effectiveness of different reshaping techniques and planting plans to reduce long-term costs associated with maintenance, water quality, and storm low conveyance.
- ★ Expand Partnership Opportunities



Education Opportunities	Animal Waste	Automobile Fluid	Automobile Washing	Citywide Beautification	Conservation	Cooking Grease	Environmental Stewardship	Flooding	Green Infrastructure	Household Waste	Industrial Waste	Leaves and Grass Clippings	Litter	Low Impact Development	Medicine Flushing	Pesticides, Herbicides and Fertilizers	Recycling	Safety	Soil Erosion Control	Water Quality	Total Pollution Control Measures
Brown Bag Lunch and Learn	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17	
Calendar	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	20	
Centenial Tree Program			X	X		X	X	X	X	X	X	X	X			X	X	X	X	11	
Clean ups	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	20	
Cooking Grease Campaign				X	X	X	X	X	X	X	X	X	X			X	X	X	X	11	
Do Dah Day	X			X	X	X	X		X			X	X	X	X	X	X	X	X	11	
Drug Take Back					X			X							X	X	X	X	X	7	
Earth Day At The Gardens		X	X		X	X	X		X	X	X	X	X		X	X	X	X	X	13	
Electronic Take Back				X	X		X		X	X		X	X			X	X	X	X	9	
EMA Be Ready Day	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X	15	
Facebook Page	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	19	
Fishing Rodeo	X	X	X	X	X	X	X					X	X		X	X	X	X	X	12	
Friends of Birmingham Botanical Gardens	X		X	X	X	X	X					X	X		X	X	X	X	X	11	
Jefferson Cou Water Festival	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	18	
Plant Dig				X	X	X	X					X	X		X	X	X	X	X	11	
Seedling Give Away				X	X	X	X					X	X		X	X	X	X	X	11	
Stormwater 101	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	20	
Stormwater 102 Water Quality Testing	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	18	
Stormwater 103 Water Quality Drainage-Flooding	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	18	
Stormwater Signage	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X	18	
Urban Foresty Fair	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X	18	
Video Competition(Litter Quitters)	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	20	
Website	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	20	
TOTAL EDUCATION ELEMENT COUNT	16	15	15	21	23	17	23	15	17	15	11	18	20	7	10	20	23	23	16	23	

INTENTIONALLY LEFT BLANK

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDD&E)

The City of Birmingham is required by the Federal Clean Water Act (section 402(p)) through the National Pollutant Discharge Elimination System (NPDES), Municipal Separate Storm Sewer System (MS4) Phase I permit to implement an ongoing program to detect and eliminate illicit discharges into the MS4, to the maximum extent practicable (MEP).

This program, at a minimum, consists of procedures for:

- ★ Dry weather screening to identify IDD&E sources.
- ★ Tracing and eliminating the suspected source of illicit discharge.
- ★ Notifying the Alabama Department of Environmental Management (ADEM) of suspicious discharges from permitted facilities and/or other MS4 facilities.
- ★ (4) public notification mechanism for reporting illicit discharges.
- ★ A training program for training city staff in the administration of the program element.

During this year's reporting period, city staff addressed a total of **20**-illicit discharges: **9**-on-going; **8**–were detected and eliminated, and **3** were referred to another Agency. (***Table 1-1***)

TABLE 1-1 ILLICIT DISCHARGES/FACILITIES OBSERVED DURING 2021 -2022			
DISCHARGE/FACILITY TO MS4	**NON-COMPLIANCE NOTICE**	**NOTICE OF VIOLATION**	**ON-GOING/RESOLVED**
DIRECT DISCHARGE			
★ **VALLEY CREEK (VC-0.1S)**			*On-going*
★ ***FLORA JOHNSON NATURE PARK (ELDER STREET)***			*On-going*
★ **SUNOCO TANK FARM AT 28TH ST. S.W.**			*Resolved*
INDIRECT DISCHARGE			
★ ***NEW IDEAL BUILDING CONSTRUCTION***			*Resolved*
★ ***COOK'S 1ST CLASS MOBILE AND DETAIL***			*On-going*
★ ***2668 TALLEY AVENUE***			*On-going*
★ ***MAVIS TIRES AND BRAKES***			*On-going*
★ ***WYATT BUILDERS RED CROSS BUILDING***			*Resolved*
★ ***RIMTYME MOBILE CAR WASH***			*On-going*
★ ***MORRISON LAND CONTRACTING/ FLAGSTAR***			*Resolved*
★ ***MUGSHOTS UPTOWN GREASE***			*On-going*
★ ***BROWN-MARX TOWER***			*Resolved*
★ ***RESIDENCE 412 FULTON AVE.***			*Resolved*
★ ***RESIDENCE 7853 RUGBY CT.***			*Resolved*
★ ***THE FAMILY LOUNGE***			*On-going*
★ ***EARTHWORK LANSCAPE COMPANY***			*Resolved*
★ ***THE WASH CAR AND DETAIL***			*On-going*
★ ***KARAM'S RESTAURANT***			*Resolved*
★ ***AT&T /STARR CONTRACTING***			*Resolved*
★ ***RISE REAL ESTATE COMPANY***			*Resolved*

Stormwater Management addressed numerous complaints this reporting year and partnered with a city-wide Coordinated Code Enforcement team that deals with various violations pertaining to property, vehicles, zoning/use of property, licensing, animal control, condemnable structures, and other public nuisances. The goal is to implement better processes and business practices that allow code enforcement efforts across the city to be better coordinated and compliance driven

from the point of violation assessment through notification of violation to final resolution of violation via compliance through an appeals board, city council, and/or municipal court. The court hears environmental, misdemeanor criminal and traffic cases at the David J. Vann Municipal Justice Center, located at 801 17th St North in downtown Birmingham. A summary of each investigation is listed below:

- **SUNOCO Tank Farm2511 28th Street S.W.** Emergency Response from Jefferson County Emergency Management involving EPA Region VI, ADEM, and City of Birmingham Watershed Management regarding the seeping of petroleum product from subsurface into nearby tributary to Valley Creek. Drainage was cleared by DPW crews and hydraulic pressure was relieved on what appeared to be petroleum product from a previous spill from 2016. Complaint was turned over to ADEM ground water for further evaluation.
- **Flora Johnson Nature Park (Elder Street)** Intermittent white colored discharge at the beginning of rain events observed by staff. Complaint from Cahaba River Keeper alerted staff to possible contamination. Staff continues to monitor this location.
- **Valley Creek (VC0.1s)** As stated in previous reports, during dry weather screening field personnel continue to observe intermittent discoloration to the creek, and IDDE staff continuously work with Public Works and Jefferson County Environmental Services. The City of Birmingham continues to use FloodCon (a monitoring company that provides real-time data on turbidity, conductivity, temperature, dissolved oxygen, and flow) to assist with identifying the intermittent discharges observed within Valley Creek.

This device has been beneficial in helping identify times of discharges, it has still been a challenge in identifying a direct source due Valley Creek's origin underneath the city. Staff will continue to research all options available. Discharge has not been observed by staff since April of 2022.

- **New Ideal Construction Site 1801 2nd Ave. N.** Staff observed sheetrock and dust stain leading to a storm drain from the

construction site. Hallmark Construction was onsite and agreed to address the problem with the subcontractors. Verbal warning was issued to Hallmark Building Company.

- **7509 Crestwood Blvd (Cook's 1st Class Mobile & Detail)** During last year's reporting period, staff received complaint via the City's 3-1-1 CRM complaint system and this reporting period via ADEM concerning a mobile carwash in the parking lot of a local shopping plaza with runoff entering the City's MS4. Staff performed an inspection; however, no runoff was observed at time of inspection. Staff will continue to monitor for runoff.
- **Construction Complaint (2668 Talley Ave)** Compliant via citizen concerning a neighbor observed dumping dirt and concrete material down a ravine and entering a nearby creek. SEC staff were notified and performed an inspection, as well as spoke with the owner of the property.
- **Mavis Tire and Brakes 3200 6th Ave. S.** Received a complaint from ADEM about used oil tank behind the facility was leaking into the alley. Staff visited the site and found evidence of oil stain in alley not reaching the storm drain. Verbal warning was given to Mavis to correct and eliminate any illicit discharges in the future. Site inspection was conducted.
- **Wyatt Builders Old Red Cross Building 2225 3rd Ave. N.** Received a complaint from ADEM about a dark colored discharge with odor in the alley behind the old Red Cross building renovation. Staff contacted Wyatt Builders and saw evidence of discharge in the alley. Investigation revealed rain accumulation on roof had leaked down into the building along with striping chemicals mixed with oil from elevator shafts. The mixture was collected in the basement of the building and discharged into the alley with ground water pumps. Corrective action was taken, and discharge was eliminated.
- **Rimtyme Car Wash 9213 Parkway East** Received a complaint from ADEM about an illegal card wash operated at this location. Staff visited this site but found no evidence of a car wash or illicit discharge. Staff will continue to monitor this site.
- **Morrison Land Contracting / Flagstar Development Gun Club Road** Received a complaint from Cahaba River Society about illicit discharge in Shades Creek in Irondale. Traced discharge to land clearing operation on Gun Club Road. No BMPs were in place before land clearing started.

Sedimentation was occurring at the time of inspection. Notify Morrison Land Contracting and Flagstar Development of need for BMPs. Turned over to Soil Erosion Control (SEC) Staff.

- **Mugshots Uptown Location 2311 Richard Arrington Jr. Blvd.** Investigated improper grease disposal complaint behind Mugshots Restaurant drain for walkway. The drain discharged into vegetation at the back of the property staining the sidewalk. Turned over to Jefferson Grease Program and the Jefferson County Department of Health.
- **Brown-Marx Tower 2008 1st Ave. North** Staff complaint from observing oily discharge into the storm drain at 20th St. and 1st Ave. N. Investigation revealed that water was leaking through the wall from Birmingham water Works water supply line and was collected in the basement with contaminants and then pumped into the storm drain. This was referred to the City Legal Department and a warning letter was issued to owners and operators.
- **412 Fulton Ave. (Flooding)** Complaint from ADEM involving sewage in yard of homeowner. Heavy rains and flooding resulted in sanitary sewer overflow. This was turned over to Jefferson County Environmental Services.
- **Brown-Marx Tower 2008 1st Ave. North** Staff complaint from observing oily discharge into the storm drain at 20th St. and 1st Ave. N. Investigation revealed that water was leaking through the wall from Birmingham Water Works water supply line and was collected in the basement with contaminants and then pumped to the storm drain. Warning letter was issued by the Legal Department to owners and operators.
- **7853 Rugby Ct. (Residential car repair)** Complaint via SeeClickFix system about motor oils running in gutter. Staff investigated and found resident doing an oil change not using oil collection pan during car oil change. Verbal warning to resident.
- **The Family Lounge (3427 27th Street)** Complaint via City staff regarding citizen pouring cooking grease into gutter on weekends. Staff performed a site visit and observed grease stains and dead vegetation. Attempted to locate business owner and property owner with no luck. Staff will continue to monitor and address accordingly.
- **Earthwork Landscape Supply Co. 2839 Shannon Oxmoor Rd.** Complaint via ADEM regarding

mud running off a lot and into nearby storm drains. Site visit was performed, and SEC staff notified.

- **The Wash Car and Detail 200 1st Ave. N.** Complaint from ADEM about a mobile car wash operating washing into storm drain. Staff investigated with no operation at this location. Staff will continue to monitor.
- **Karem's Restaurant 715 18th St. N.** Improper disposal of grease complaint investigated by Staff. Grease container not being maintained. Turned over to the Grease Control Program.
- **AT&T / Starr Contracting 1053 Brooklane** Complaint via ADEM about hydraulic fluid leaking onto roadway. Staff contacted AT&T and Starr Contracting to cleanup stains from hydraulic fluid. Closed complaint.
- **RISE Real Estate Development** Received a complaint from another jurisdiction about stormwater runoff into tributary after a heavy rain event. Staff investigated and traced the source to a development on Red Mountain. BMP's were in place at the time of inspection. Maintenance of BMPs was conducted and SEC staff was notified.

The process of the City's Stormwater Protection Ordinance (***Ordinance No. 14-198***) is to focus on preventing, locating, and correcting illicit discharges on non-NPDES facilities while working alongside ADEM and the USEPA for NPDES permitted facilities. Any person receiving a NOV may appeal to the Appeal's Board within ten (10) days of receiving the violation to the City clerk's office. In the adoption of the Storm Water Protection Ordinance, the Council authorized a Storm Water Appeals Board as part of the enforcement process. ***Please see appendix for ordinance and resolutions.***

During this year's reporting period, the Board met virtually due to COVID-19.

MAPPING OF OUTFALLS:

Stormwater Management continues its ongoing efforts to update and maintain the data contained in the City's GIS system to map major outfalls in the City, however, there were no new outfalls identified during this year's reporting period.

PUBLIC NOTIFICATION MECHANISM (3-1-1):

The City has a complaint system to which citizens can make a phone call regarding stormwater related issues. The complaint system is also available online for citizens to report non-emergency issues through the City's website: https://www.birminghamal.gov/311-portal. The 3-1-1 call center serves as the liaison with various City departments by routing and tracking citizens' non-emergency related requests and concerns for follow-up. 311 information is available on request.

CONSTRUCTION SITE STORM WATER RUNOFF CONTROL

STORMWATER CONSTRUCTION PROGRAM (SEC)

The management of the Construction Stormwater management program is within the Planning, Engineering and Permit Department, Watershed Division. The soil erosion program is mandated by the NPDES MS4 Permit issued by the State of Alabama and City Ordinance number 99-131. Permit applications, plans reviews and site inspections are tracked using the Tidemark permitting system. The ordinance is posted to the following link:

https://www.birminghamal.gov/wpcontent/uploads/2018/11/PEPSWINF_SwmpEspcAppDCobSoilErosionSedimentControlOrdinance1118.pdf

The review of the soil erosion control best management construction plans (BMP) and the inspection of the construction sites for erosion control were previously under the

supervision of Mr. George Putman P. E., and currently headed by Mr. Kelly Dunn, P. E. Mr. Eddie Fowler, CSI, QCI, assists with Civil plan reviews, reviews Soil Erosion plans, signs off on applications for approval, and schedules site inspections. Mr. Chris Clayton, QCI, provides plan review support, and assists with the site inspections for the larger sites, and for priority sites throughout the City of Birmingham. Other engineering inspectors assist with residential project inspections during peak construction periods. All site inspection reviews are performed in accordance with the "Alabama Manual for Soil Erosion and Sediment Controls". Site inspection and Enforcement standards are in accordance with the City of Birmingham "Construction Stormwater Inspection and Enforcement Standard Operating Procedures Manual".

During this reporting year FY22, staff training remained a priority. Between October 1, 2021, and September 30, 2022, most of the Construction Stormwater staff received erosion control continuing education training. Three renewed certifications as qualified credentialed inspectors (QCI). Other Stormwater staff have also received erosion and sediment control training to provide cross-training and backup as may be needed. In addition, Eddie Fowler and Chris Clayton continue to implement their FEMA Damage Assessment training by expanding their contribution to the City's flood hazard assessment and mitigation effort. Eddie Fowler also assists Kelly Dunn and Gloria Raspberry with preparing hydrology models for flood mitigation.

During 2022, there have been (232) Land Disturbance Permits issued by the City of Birmingham which brought the total number of active permits to (210), (166) of cases were closed, and (2844) site inspections were conducted, of which (346) were on qualifying sites. One hundred ninety – one (191) site inspections failed, and corrective actions taken by the permittees to bring the site into compliance. All failed site inspections were given verbal or written warnings and all sites were brought into compliance.

All Stormwater personnel routinely follow up on complaints through the City 311 complaint reporting system. One hundred fifty - three (153) citizen complaints were received. All complaints were investigated and either closed, or the citizens were notified of our findings and possible solutions.

A list of projects meeting the 1 acre and above criteria, along with the number of inspections following:

2022 SEC INSPECTIONS-PROJECTS 1 ACRE OR GREATER

Project	Address	SEC #	Inspections
1	801 Titusville Blvd. – Titusville Villas	2019-00005	13
2	5900 Messer Airport Hwy – Fire Station	2019-00286	7
3	3560 Grandview Pkwy - Apartments	2019-00303	34
4	1617 Finley Blvd - Speedway	2020-00016	12
5	7901 Crestwood Blvd - VA	2020-00021	1
6	3196 Hwy 280 – ATT Apartments	2020-00024	24
7	1201 3rd Ave S – The Marshall	2020-00091	9
8	4241 3rd AVE S – Axel Row	2020-00093	7
9	3680 Grandview Pkwy – POB II	2020-00126	21
10	7600 Crestwood Blvd - Amazon	2020-00128	1
11	811 Tom Martin Dr – Oxmoor Grove	2020-00162	25
12	800 Montclair Rd – Arbor Terrace	2021-00031	9
13	4930 Messer Airport Hwy – Church of the Highlands	2021-00057	12
14	3196 Hwy 280 – Senior Apartments	2021-00059	24
15	422 Industrial Dr – Buffalo Rock	2021-00099	17
16	2601 Venice Rd - Verizon	2021-00119	25
17	2800 Goss St – Grand of Oxmoor	2021-00127	22
18	9125 Parkway East – Advance Auto	2021-00216	13
19	4200 Eastlake Blvd. – Phoenix Metals	2021-00219	18
20	3144 Brook Highland Pkwy – The Whitby	2021-00240	7
21	419 Republic St - Warehouse	2021-00247	4
22	2400 1st Ave N – The Tracks	2022-00004	2
23	3900 Messer Airport Hwy. -Dunn Office	2022-00020	13

2022 SEC INSPECTIONS-PROJECTS 1 ACRE OR GREATER (continued)

Project	Address	SEC #	Inspections
24	501 Eagan Rd - Warehouse	2022-00021	6
25	4432 Montevallo Rd – The Legacy	2022-00022	2
26	2722 5th Ave S – Artisan Flats	2022-00023	5
27	3030 12th Ave N – Shell	2022-00024	13
	1 AC OR GREATER ONLY	TOTAL INSPECTIONS	346

POST-CONSTRUCTION STORMWATER MANAGEMENT IN QUALIFYING NEW AND RE-DEVELOPMENT

It is a policy of the City of Birmingham to promote safe, secure and sustainable communities. State and City policy also provides for the prevention, abatement, and control of new or existing water pollution (Alabama Code:22-22-2). Post-Construction Stormwater Management refers to the activities that take place after construction occurs and includes structural and non-structural controls including low impact development (LID) and green infrastructure (GI) practices, water quality and flood control practices to obtain permanent stormwater management over life of the property's use.

Post-Construction Stormwater Manual and Ordinance: The City of Birmingham Stormwater Ordinance and Manual address both NPDES MS4 permit requirements and flood control and drainage needs.

The program included the development of the post-construction storm water ordinance and related policies, processes, and procedures with integration of watershed master planning and GI/LID program strategies. Development of post-construction storm water design criteria and specifications, focusing first on GI/LID, then on traditional storm water treatment methods, and including supporting design and plan submittal/site inspection tools. If GID/LID is not practical, then 80% TSS removal is required as the best measure practical.

The development has included an extensive stakeholder's involvement program including city staff, the development community, and the citizens of Birmingham and neighboring MS4 partners.

The Post-Construction Stormwater Design Manual, Maintenance Manual, Ordinance and stakeholder comments and City responses are available on the City Web Site at the following link:

https://www.birminghamal.gov/storm-water-management/post-construction/

The Pre-Concept Sketch and Conference:
The *City of Birmingham Post Construction Storm Water Ordinance* requires the submittal of the pre-concept sketch and attendance at the pre-concept conference. This process does not require design calculations or analyses, nor does it result in a plan approval. Rather, the process is used to characterize the hydrologic aspects of the property in its existing condition. The objectives of the process are to optimize the future on-site storm water system design and plan review process and identify opportunities for natural storm water management using LID. The intent of the process is to evaluate information about site hydrology (and potentially other environmental issues) in a collaborative way that can ultimately be beneficial to the overall project.

The applicant is required to prepare a pre-concept sketch in accordance with the checklist provided in the *Post-Construction Stormwater Design Manual*. The checklist provides a complete inventory of the desired contents of the sketch. As many of the checklist elements as possible should be provided, based on the availability of data. Those elements that are not applicable to the project or not available must be indicated as such on the checklist. Proper use of the checklist will facilitate a more meaningful and efficient pre-concept conference.

Preparation of a pre-concept sketch includes the identification and location of features of the development that are important for effective stormwater management. These features include, but are not limited to, land cover, hydrologic soil groups, streams, steep slopes, sinkholes, floodplains, bedrock, and existing on-site and adjacent manmade features or storm water systems, environmentally impaired waters and environmentally sensitive areas (e.g., due to the presence of threatened or endangered species) will also be included.

The pre-concept sketch is required early in the site planning process, ideally before a site design is created for a future land development and before clearing, grading, and construction begins. During the reporting year, the City has performed 52 Pre-Concept conferences and reviews, these conferences included:

- ★ AMPHITHEATER
- ★ R&L CARRIERS
- ★ THE WHITBY
- ★ ARBOR TERRACE
- ★ CLAIRMONT APARTMENTS
- ★ PRIORITY WIRE
- ★ CRST-FLATBED
- ★ CROSSROADS COMMERCE CENTER
- ★ WASTE TRANSFER STATION

Post Construction Structural Controls Installed and Inspected: During the reported year, the City of Birmingham has permitted 58 structural controls. These controls are included on Table 1, below. Table 2 below indicates Detention Systems Installed & Inspected, 38 listed.

Summary of Enforcement Actions: No actions have been enforced during the reporting year.

Table 1: CNS Permit Issued 2021-2022			
CNS# 2021-20222	Site Location	Project Type	Project
21-53	3144- Brook Highland Pkwy	New Development	1
21-54	900- 13th Street South	Chilled Water/Steam Line	2
21-55	4017- Avenue I	Street Improvements	3
21-56	1584- 16th Avenue South	Street Improvements	4
21-57	419- Republic Street	New Development	5
21-58	1515- 6th Avenue South	Redevelopment	6
22-01	1625- 2nd Avenue South	Redevelopment	7
22-02	1510- 5th Avenue North	Redevelopment	8
22-03	2400- 1st Avenue South	Redevelopment	9
22-04	9345- Parkway East	Redevelopment	10
22-05	1700-7th Avenue South	Storm Sewer Installation	11
22-06	121- Roebuck Plaza Drive	Redevelopment	12
22-07	1215- 23rd Street South	Redevelopment	13
22-08	5620- 1st Avenue North	Football Stadium	14
22-09	3900- Messer Airport Hwy	Bldg. Expansion	15
22-10	501- Eagon Road	New Development	16
22-11	4432- Montevallo Road	Redevelopment	17
22-12	2722- 5th Avenue South	Redevelopment	18
22-13	3600- 2nd Avenue South	Public Plaza/Walking Trail	19
22-14	3030- 12th Avenue North	Redevelopment	20
22-15	2053- Venice Road	COB Storm Sewer Installation	21
22-16	517- Huffman Road	Bldg. Renovation	22
22-17	3201- Rev. Abraham Woods Jr. Blvd.	Bldg. Renovation	23
22-18	140- Resource Center Pkwy	Bldg. Renovation	24
22-19	225- Daniel Payne Drive	New Development	25
22-20	428- Industrial Lane	Storm Drainage	26
22-21	1600- 4th Avenue South	Chilled Water/Steam Line	27
22-22	1600- 6th Avenue South	Chilled Water/Steam Line	28
22-23	3580- Grandview Pkwy	New Development	29
22-24	1518- 3rd Avenue North	Redevelopment	30
22-25	1700-7th Avenue South	New Development	31

22-26	501- 19th Street Ensley	Redevelopment	32
22-27	4425- 3rd Avenue South	Bldg. Renovation	33
22-28	2234- Magnolia Avenue	Street Improvements	34
22-29	798- Montclair Road	New Development	35
22-30	4741 -Powell Avenue	Redevelopment	36
22-31	4831- Powell Avenue	Redevelopment	37
22-32	4838- 1st Avenue South	Redevelopment	38
22-33	4927- 1st Avenue South	Redevelopment	39
22-34	433- 6th Avenue South	Bldg. Addition	40
22-35	5050- Cahaba River Road	Detention Pond Improvement	41
22-36	6601-1st Avenue North	Redevelopment	42
22-37	225- Daniel Payne Drive	New Roadway/Infrastructure	43
22-38	2630- Cahaba Road	Storm Water Improvements	44
22-39	#2- Xavier Circle	Bldg. Renovation	45
22-40	200- Leaf Lake Pkwy	New Development	46
22-41	1709-1st Avenue North	Bldg. Renovation	47
22-42	4308- Morris Avenue	New Development	48
22-43	4550- Overton Road	New Development	49
22-44	101- Leaf Lake Pkwy	Storm Sewer Installation	50
22-45	7724- Crestwood Blvd	Redevelopment	51
22-46	1716- 9th Avenue South	Redevelopment	52
22-47	633- Tuscaloosa Avenue	Bldg. Renovation	53
22-48	1701- University Blvd.	Storm Sewer Installation	54
22-49	2501- University Blvd.	Storm Sewer Installation	55
22-50	5336- Messer Airport Hwy.	Redevelopment	56
22-51	701- 19th Street South	Storm Sewer Installation	57
22-52	5100- Cahaba River Road	Redevelopment	58

Table 2: Detention Systems Installed & Inspected 2021-2022				
CNS	Description of work	BMP Detail	Inspection/Maintenance	Project Name
20-06	New Bldg. and Parking Lot	Underground Detention/water quality	Inspected	VA Birmingham
20-08	Multifamily Development	Wet pond	Inspected	AT&T 280
20-13	New Batch Plant	Dry Detention Basin	Inspected	Cement Plant
20-23	New Retail Store	Dry Detention Basin	Inspected	DG#22129
20-27	Bldg. Redevelopment	Bioretention (Rain Garden)	Inspected	Stonewall Bldg.
20-30	New Bldg.	Underground Detention/water quality	Inspected	The Marshall
20-31	Multifamily Development	Underground Detention/water quality	Inspected	Axel Row (Site B)
20-32	New Distribution Faculty	Detention Basin	Inspected	FedEx Ground
20-35	Multifamily Development	Underground Detention/water quality	Inspected	Axel Row (Site A)
20-49	new Bldg.	Underground Detention/water quality		Grandview POB II
20-41	New Development	Dry Detention Basin	Inspected	Jones Valley Teaching Farm
18-15	New Development	Dry Detention Basin	Inspected	Lakeshore Publix
21-05	Redevelopment	Underground Detention/water quality	Under Construction	Arbor Terrace

21-08	New Development	Dry Detention Basin	Inspected	GSMB Church
21-09	Redevelopment	Dry Detention Basin	Inspected	Priority Wire
21-13	Redevelopment	Dry Detention Basin	Inspected	COTH/Woodlawn
21-19	Redevelopment	Dry Detention Basin	Under Construction	Iron and Oak Apt.
21-22	New Development	Underground Detention/water quality	Under Construction	Eastern Rail Parking Lot
21-23	New Development	Dry Detention Basin	Under Construction	CRST Flatbed
21-24	New Development	Dry Detention Basin	Inspected	Crossroads
21-28	Redevelopment	Dry Detention Basin	Inspected	MAPCO. 7554
21-29	New Development	Dry Detention Basin	Under Construction	Precision Alloy
21-31	New Subdivision	Dry Detention Basin	Under Construction	The Grand of Oxmoor
21-34	Redevelopment	Underground Detention/water quality	Under Construction	Park Heaven
21-38	New Development	Dry Detention Basin	Under Construction	Cottages at 119
21-40	New Development	Underground Detention/water quality	Under Construction	Wedding Venue
21-45	Redevelopment	Dry Detention Basin	Inspected	Phoenix Metal
21-53	New Development	Dry Detention Basin	Under Construction	The Whitby
21-57	New Development	Dry Detention Basin	Under Construction	Payne Warehouse

22-03	Redevelopment	Underground Detention/water quality	Under Construction	The Tracks
22-07	Redevelopment	Underground Detention/water quality	Under Construction	Maiden Heights
22-08	Redevelopment	Underground Detention/water quality	Under Construction	Woodlawn Stadium
22-10	New Development	Dry Detention Basin	Under Construction	Crossroads Parking Lot
22-12	Redevelopment	Underground Detention/water quality	Under Construction	Artisan Flats
22-16	Bldg. Redevelopment	Dry Detention Basin	Under Construction	Huffman Middle School
22-19	New Development	Dry Detention Basin	Under Construction	Center State Log.
22-24	Redevelopment	Underground Detention/water quality	Under Construction	Nextec
22-35	Site Improvements	Dry Detention Basin	Inspected	Crowne at Cahaba River

SPILL PREVENTION AND RESPONSE

The primary purpose of the Spill Prevention and Response program is to prevent, contain, and respond to spill occurrences that have the potential to discharge into the City's MS4. The City has implemented this program in compliance with the requirements of its National Pollutant Discharge Elimination System (NPDES) permit, including development of a hotline for reporting spills, identifying response staff roles and responsibilities and providing spill reporting information on the City's Stormwater Management website. This document summarizes the City's spill response for this reporting year.

SPILLS/HAZMAT INCIDENTS OBSERVED:

AGENCY	NUMBER OF INCIDENTS
JEFFERSON COUNTY EMA	*4*
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT	*3*
CITY OF BIRMINGHAM STORMWATER	*5*
BIRMINGHAM FIRE & RESCUE (HAZMAT RELATED)	*Available Upon Request*
BIRMINGHAM FIRE & RESCUE (ENVIRONMENTAL/STORMWATER RELATED)	*Available Upon Request*

Spills are reported in various ways and because of such there is a need to document how various spill types are handled. In all cases, the Birmingham Fire and Rescue Department (BFD) has primary responsibility for responding to spills that occur in City limits. The Birmingham Fire and Rescue Service is dispatched to contain the spill to prevent any threats to human health and life. As necessary, the BFD coordinates its efforts with the Jefferson County Emergency Management Agency (JCEMA) as well as with pertinent City staff for both hazardous and non-hazardous

spills. When spills that may directly or indirectly impact the receiving waters occur, the staff responsible for the management of the stormwater program is alerted to direct all necessary stormwater related field response work. When a spill is reported, the City staff will assess the situation with concern to the City's MS4 and receiving water pollution. The Fire Department prepares incident reports, and those reports are forwarded to the JCEMA.

TRAINING PROGRAM ELEMENT: The Birmingham Fire Department maintains a comprehensive program of ongoing training for HazMat team members. To maintain this level of training, HazMat team members are required to obtain training (along with drill exercises) that covers the following topics:

- HazMat Readiness Drill/Deployment Exercise
- HZ 15 – How to Use The ERG
- HZ 02 – HazMat Multi Company Training
- HZ 03 – Hazardous Materials Technician
- HZ 04 – Sampling/Collections Techniques
- HZ 06 – Decontamination Procedures
- HZ 09 – Tanker Transport (Tanker Transport Safety)
- HZ 10 – HazMat Apparatus Day
- HZ13 – HazMat Equipment Familiarization
- HZ14 – Air Monitor Calibration/Familiarization
- IG_HM-03 – Hazardous Materials Identification-Info Resources
- IG_HM-04 – Haz Mat Recognition

During this year's reporting period HazMat team members received training using a computer-based software requiring login credentials Upon completion, each team member received a certificate of completion. ***Additional information available upon request.***

.

POLLUTION PREVENTION/ GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

In accordance with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, issued on March 1, 2018, the City shall further develop or revise, implement, and maintain a program that will prevent or reduce the discharge of pollutants in storm water run-off from municipal operations to the MEP. The program shall include at a minimum, the following elements:

- ★ Inventory all municipal facilities having the potential to discharge pollutants via stormwater runoff.
- ★ Develop and implement a short and long-term strategy and program for the removal of trash from the waterways and tributaries in the permitted area in such a manner to quantify the removal of trash per year, which shall be included in the annual report and SWMPP.
- ★ Require certain measures to be implemented in the public ROW for any event or wherever it is anticipated that substantial quantities of trash or litter may be generated.
- ★ Ensure that trash receptacles or similar trash capturing devices are provided and maintained in areas identified as high trash generated areas.
- ★ Provide standard operating procedures detailing good housekeeping practices to be employed at appropriate municipal facilities and during municipal operations that may include, but not limited to:
  - ✓ Equipment washing
  - ✓ Street sweeping
  - ✓ Municipal road maintenance
  - ✓ Chemical and waste storage and disposal
  - ✓ Vegetation control, cutting, removal, and disposal
  - ✓ Vehicle fleet/equipment maintenance and repair
  - ✓ External building maintenance
  - ✓ Materials storage facilities and yards
- ★ Program for inspecting municipal facilities to include municipal maintenance shops and equipment yards for good housekeeping practices, including BMPs. The program shall include checklists and procedures for correcting deficiencies.
- ★ A training program for municipality staff in good housekeeping practices.
- ★ Assess water quality impacts for those flood management projects owned, operated or the responsibility of the City. Feasibility

of retrofitting existing structural control devised to provide additional pollutant removal from the stormwater shall be evaluated.

MUNICIPAL FACILITIES:

The City of Birmingham provides a wide range of services to its citizens by various City Departments and facilities located throughout the City. The City maintains approximately 125 facilities that consists of parks, ball fields and building grounds. A list of the City facilities is attached in ***(Good Housekeeping Appendix)***.

Stormwater Management inspected 41 facilities during 2021-2022 reporting period.

Facility	Location	Dates
Sloss Museum Site	Valley Creek	10/22/21
Sloss Museum Site (new)	Valley Creek	10/22/21
Avondale Library	Village Creek	9/13/22
Central Library & Linn-Henley Library	Valley Creek	9/13/22
East Ensley Library	Village Creek	9/13/22
Five Points West Library	Valley Creek	9/13/22
Inglenook Library	Village Creek	9/13/22
North Avondale Library	Village Creek	9/13/22
North Birmingham Library	Village Creek	9/13/22
Pratt City Library	Village Creek	9/13/22
Smithfield Library	Valley Creek	9/13/22
Southside Library	Valley Creek	9/13/22
Titusville Library	Valley Creek	9/13/22
West End Library	Valley Creek	9/13/22

Woodlawn Library	Village Creek	9/13/22
BFS #11	Valley Creek	9/14/22
BFS #13	Village Creek	9/14/22
BFS #15	Valley Creek	9/14/22
BFS #16	Village Creek	9/14/22
BFS #17	Village Creek	9/14/22
BFS #18	Village Creek	9/14/22
BFS #25	Valley Creek	9/14/22
BFS #9	Valley Creek	9/14/22
BFS #23	Village Creek	9/15/22
BFS #28	Five Mile Creek	9/15/22
BFS #29	Five Mile Creek	9/15/22
BFS #31	Cahaba River	9/15/22
BFS #32	Cahaba River	9/15/22
East Lake Library	Village Creek	9/28/22
Arlington Antebellum Museum	Valley Creek	9/29/22
Art Museum	Valley Creek	9/29/22
Civil Rights Institute	Valley Creek	9/29/22
Jazz Hall of Fame	Valley Creek	9/29/22
Municipal Justice Center	Valley Creek	9/29/22
Municipal Services Bldg.	Valley Creek	9/29/22

Southern Museum of Flight	Village Creek	9/29/22
Swank Bldg	Valley Creek	9/29/22
Bruno Bldg	Valley Creek	9/30/22
Butler Bldg	Valley Creek	9/30/22
Comer Bldg	Valley Creek	9/30/22
Div. of Youth Service (Old Al Power Credit Union)	Valley Creek	9/30/22

STANDARD OPERATING PROCEDURES

The City of Birmingham has developed Standard Operating Procedures (SOPs) for various activities requires for implementing Pollution Prevention and Good Housekeeping Program. SOPs may include but not limited to the following:

- ★ Equipment washing
- ★ Street sweeping
- ★ Maintenance of municipal roads owned, operated, or under the responsibility of the Permittee
- ★ Storage and disposal of chemicals and waste materials
- ★ Vegetation control, cutting, removal, and disposal of cuttings
- ★ Vehicle fleets/equipment maintenance and repair
- ★ External Building maintenance
- ★ Materials storage facilities and storage yards (see ***Good Housekeeping Appendix)***
- ★ Facility SOP's are in place to prevent floatable (none to report for this permit year***)***

FACILITY INSPECTION PLAN AND PROCEDURE

The City of Birmingham Stormwater Management has implemented a Municipal Facility inspection program for all City of Birmingham facilities. A Municipal Facility Inspection form has been developed and 125 facilities owned or operated by the City have been identified to this date. The inspection of all facilities within this permit period will continue by Stormwater Management staff, and employee training will be reviewed during facility inspections. These inspections include the identification of facilities that are more likely to have the potential to discharge into the watershed and storage of chemicals or operational procedures that could adversely impact surrounding water bodies or any watershed. Any inspected facility that has the potential to impact the surrounding watershed will be

inspected on a more frequent basis. A list of City of Birmingham Facilities and a Municipal Facility Inspection form are found in ***(Good Housekeeping Appendix).***

a) Qualified personnel shall conduct periodic routine facility inspections to determine the effectiveness of the Pollution Prevention Measures and Controls.

b) All City facilities inspections will be performed at least once throughout a permit cycle, if deficiencies are observed additional inspections may be performed.

c) An increased inspection schedule at Municipal facilities that perform operations more likely to create potential discharges into the MS4 will be conducted as necessary. Some examples include maintenance shops, equipment yards, and/or storage facilities will be inspected for good housekeeping practices including BMPs

d) The inspector shall document the findings of each routine facility inspections performed and the facility should be informed via verbal and/or electronic communication about any deficiencies.

e) The inspections must be documented with a checklist that is developed to include each of the controls and measures that are evaluated.

f) When deficiencies are noted the operator of the facility will be notified, a cased opened and followed-up correspondence until corrected.

TRAINING PROGRAM ELEMENT

The City of Birmingham Stormwater Management Program has developed a Quarterly Leadership Meeting with City staff that work with stormwater related issues, such as Department of Public Work, Park and Recreation, and Fire. The purpose of the meetings is to discuss recent or ongoing stormwater issues and collectively coming up with ideas to resolve stormwater issues and tailor them to fit each facility, department, or operation. Training is planned for four times a year and may include discussions of the following topics:

- ★ Stormwater Management Plan (SWMP)
- ★ Structural Controls
- ★ Good Housekeeping and Spill Prevention
- ★ Spill Control and Response
- ★ Equipment washing
- ★ Street sweeping

- ★ Maintenance of municipal roads owned, operated, or under the responsibility of the Permittee
- ★ Storage and disposal of chemicals and waste materials
- ★ Vegetation control, cutting, removal, and disposal of cuttings
- ★ Vehicle fleets/equipment maintenance and repair
- ★ External Building maintenance
- ★ Materials storage facilities and storage yards
- ★ As part of the training program, City staff will review existing SOPs and are informed about any changes or updates to the SOPs. By participating in the training, City staff acknowledges that they have read and will implement SOPs.
- ★ A sign-in sheet shall be used to document City employees that have received training. All training material is available upon request.

CITY OF BIRMINGHAM FACILITY INSPECTIONS: The City of Birmingham Stormwater Management has implemented a Municipal Facility inspection program for all City of Birmingham facilities. A Municipal Facility Inspection form has been developed and 125 facilities owned or operated by the City have been identified to this date. The inspection of all facilities within this permit period will continue by Stormwater Management staff, and employee training will be reviewed during facility inspections. These inspections include the identification of facilities that are more likely to have the potential to discharge into the watershed and storage of chemicals or operational procedures that could adversely impact surrounding water bodies or any watershed. Any inspected facility that has the potential to impact the surrounding watershed will be inspected on a more frequent basis. A list of City of Birmingham Facilities and a Municipal Facility Inspection form are found on the next pages**.** All inspection records are available upon request.

Municipal Facility Inspection Form

	Inspector:	Date:
Basin I.D:	Responsible Party:	Date Delivered:

CRITERIA	SAT/UNSAT/NA	COMMENTS
1. Are activity-specific BMPs in place?		
2. Are employees/contractors adhering to the minimum BMPs when possible?		
3. Is the facility reasonably clean and free of litter and debris?		
4. Is landscaped area irrigation contained within the landscape area?		
5. Are pesticides/herbicides/fertilizers minimized where feasible? Is storage of these materials adequate?		
6. Are stormwater drains stenciled?		
7. Are storm drains free and clear of debris? If cleaning is required, please note estimated weight and of material.		
8. Is area absent of any evidence of discharges, spills or leaks?		
9. Area storage and trash areas reasonably clean and uncluttered?		
10. Are garbage cans and bins kept covered emptied or maintained?		
11. Is the number and placement of trash bins sufficient for the facility?		
12. Are fueling areas clean and spill free?		
13. Is a stocked spill kit or dry spill method of cleanup at the fueling location?		
14. Are vehicle maintenance areas reasonably clean and maintenance activities contained in designated areas?		
15. Area bulk hazardous materials stored inside of secondary containment?		
16. Is water from surrounding areas prevented from reaching material storage areas?		
17. Are all BMPs installed and maintained properly?		
18. Are employees properly trained in preventative spill and cleanup techniques?		

City of Birmingham Stormwater Management Last Modified: 1/15/2020

PHOTOGRAPHIC LOG		
Project: **City of Birmingham MS4 Program** **Structural Controls Inspections:**	**Location:** **Creek**	

ADDITIONAL NOTES

(If needed attach additional pages to properly document the inspection.)

RE-INSPECTION REQUIRED	YES	NO

Signature and Date of Person Completing the Inspection

All repairs to be completed within 30 days of notification.

Responsible Party:	NAME:	DATE:

APPLICATION OF PESTICIDES, HERBICIDES, AND FERTILIZERS (PHF'S)

In accordance with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, issued on March 1, 2018 the City is required to implement controls to reduce, to the MEP, the discharge of pollutants related to the storage and application of PHFs applied by employees or contractors, to public rights of way, parks, and other public property. The City shall implement programs to encourage the reduction of the discharge of pollutants related to application and distribution of PHFs. For those controls implemented, the City will obtain coverage and maintain compliance with ADEM NPDES Pesticide General Permit ALG870000, if applicable, or other applicable NPDES permits.

The City of Birmingham shall address priorities to include the following elements:

- ★ Identify all areas known to receive high applications of PHFs; develop a program to detect improper usage, and prioritize problem areas
- ★ Require evidence of proper certification and licensing of all applicators contracted to apply pesticides and/or herbicides on municipal property; require that applicators contracted to apply fertilizer are qualified in utilizing proper nutrient management practices. Furthermore, applicator contracts are required to include a copy of this Stormwater Management Program Plan and all contractors are to be made aware of its provisions as a condition of contract acceptance and work at all designated City venues
- ★ Maintain an inventory of on-hand PHFs with information about the formulations of various products, including how to recognize the chemical constituents from the label, their respective uses, directions, and precautions for applicators that explain if products should be diluted, mixed or only used alone, and proper storage of products
- ★ Equipment use and maintenance
- ★ Training in safe use, storage, and disposal of PHFs
- ★ Inspection and monitoring of facilities where PHFs are stored
- ★ Record keeping

The U.S. Environmental Protection Agency (EPA) regulates the sale, distribution, and use of pesticides in the USA under the statutory framework of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to ensure that when used in conformance with FIFRA labeling directions, pesticides will not pose unreasonable risks to human health and the environment. When EPA approves a pesticide for a

particular use, the Agency imposes restrictions through labeling requirements governing such use. The restrictions are intended to ensure that the pesticide serves an intended purpose and avoids unreasonable adverse effect. It is illegal under Section 12(a)(2) (G) FIFRA to use a registered pesticide in a manner inconsistent with its labeling.

Application and use of pesticides, herbicides, and fertilizers are within the purview of the City of Birmingham Departments of Public Works and Parks and Recreation. The goal of the City's Pesticide, Herbicide, and Fertilizer Program is to:

- ★ Provide for safe public use surfaces throughout the City
- ★ Ensure compliance with all federal and state applicators laws and requirements
- ★ Ensure employees quarterly attend Core Leadership meetings and annually attend stormwater pollution prevention training
- ★ Employees performing the procedures in the standard operating procedure manual should read and refer to the materials in the SWMPP
- ★ Use the least amount of product(s) necessary
- ★ Reduce or eliminate species resistance to the application of targeted products
- ★ Pesticide application must be done only under the supervision of a Certified Pesticide Applicator or qualified Supervisor.
- ★ All employees who handle or apply pesticides, herbicides or pesticides should be trained on the most recent Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS).

The discharge of pesticides (both Biological and Chemical) by the City of Birmingham is limited primarily to mosquito and other flying insect pest controls, weed and algae controls as described below. The City does not operate any treatment controls for animal pests or forest canopy pests in any general sense.

All PHF documents are available upon request.

OILS, TOXICS, AND HOUSEHOLD HAZARDOUS WASTE CONTROL

PERMIT PART II B.9.

HAZARDOUS HOUSEHOLD WASTE EVENTS

Electronic take back Events for FY 2022*:* Watershed Management participated in three electronic take back recycling events for the citizens of the City of Birmingham and residents of Jefferson County.

Along with the Jefferson County Stormwater Program. Watershed Management collected computers, TVs, batteries, and other electronic devices at three locations on March 6, 2021, May 15, 2021 and again on June 12, 2021. The March 6, 2021 event at the Birmingham Zoo collected 24,073 lbs. of electronic equipment. The May 15th event at the Center Point Courthouse collected 5670 lbs. of electronic equipment. The June 12, 2021 event at the Jefferson County Water Reclamation Center collected 5268 lbs. of electronic equipment. Approximately 17.5 tons of material were recycled, preventing the materials from being disposed of in landfills. Other organizations participating included KBB, Village Creek Society, and Protech Recycling. Metrics and information were collected from participants including types of items and information for the future planning of other HHW events.

Materials that were distributed at the three events including flyers on upcoming events and workshops, brochures on proper disposal of pet waste and household used cooking oil and grease, vehicle and maintenance, illegal dumping and how to report pollution, and copies of the Clean Water Awareness Posters that explain how the storm drain system works and the common pollutants that enter this system from people's daily actions. 2021 Stormwater calendars were also given out along with Jefferson County Household Oil and Grease Containers. These events were held in areas prone to illegal dumping as a way to proactively circumvent the improper disposal.

Household Hazardous Waste Day event

Watershed Management participated in a Household Hazardous Waste collection day on April 24, 2021. The Jefferson County Commission funded the collection event at three different locations, Gardendale, Irondale and Bessemer for residents of Jefferson County. This event accepted several household hazardous waste items including electronics, batteries, tires, prescription drugs, PHF's, paint, oil, grease, and white goods along with other items

Watershed Management partnered with Jefferson County Stormwater Program, Jefferson County Department of Health, Jefferson County Commission, KBB, along with other organizations and commercial companies. If the Jefferson County Commission continues to fund this event, Watershed Management hopes to participate on an annual basis.

EDUCATION AND TRAINING PROGRAM ELEMENT

The City will from time to time will partner with other agencies to conduct HHW Day recycling and disposal events. The City has updated its website with a list of local businesses that conduct the recycling, reuse or collection of HHW materials. Information to the public is also provided regarding the proper disposal of HHW products. Also, the City maintains and updates this content from time to time as new information related to the proper handling and disposal of hazardous household waste is discovered. In addition, the City has partnered with Jefferson County Environmental Services and added six locations within the city limits that accept used edible grease at recycling stations. Locations of Household Cooking Oil and Grease Recycling Centers can be found at Environmental Service's website www.jeffcoes.org and a link to this

site will be provided on City of Birmingham Stormwater website. These Grease recycling stations provide empty edible grease containers that can be filled with grease and returned by the public to the stations. The City will from time to time will partner with other agencies to conduct HHW Day recycling and disposal events.

Continue to collaborate and develop new partnerships with partners that recycle and reuse various household waste products.

Identify and increase the number of household grease container collection sites within the City of Birmingham municipal limits. Identify surrounding collection sites convenient to City of Birmingham residents. Provide this information to the public.

Develop a matrix of free disposal locations of HHW materials for the public and provide this information to the public.

Quantities of HHW and used oil collected will be tracked for the annual report

Develop a summary of all materials able to be recycled throughout existing Birmingham industries at no cost to the Public and advertise on social media, the Stormwater Website and PIO.

Jefferson County Environmental Services educate Birmingham citizens on proper grease disposal

Continue Core Leadership training to all employees on the proper way to handle spills of oils, toxics and other Hazardous Waste. (Please see ***Pollution Prevention/Good House Keeping for Municipal Operations section of SWMPP)***

Meetings will be recorded with dated attendance sheets and titles of presentations.

Cooking Grease Campaign: Jefferson County's Environmental Services Department (ESD) administers a county-wide household cooking oil and grease recycling program to reduce the amount of cooking oil that enters the sanitary sewer system, thereby reducing sewer overflows. This is a free service to all the citizens of Jefferson County. Collection bins are located at several sites around the county with free plastic containers for residents to take home. Once a container is filled, it can be returned to the collection bin and exchanged for a clean container. The containers are collected weekly by the Grease Control Program inspectors and the oil is picked up at the Shades Valley Wastewater Treatment Plant by local rendering companies. Grease and oil accumulate in the sewer system and require diligent maintenance to prevent sanitary sewer overflows. ESD developed this program in the ongoing

effort to the prevent overflows and protect the water resources.

The bins were constructed by the County's General Services shop and are 4' wide by 4' tall and 2' deep and sit on legs 6" off the ground. The bins sit in a hard, durable plastic tray which provides a liquid retention barrier should a container leak or spill. There are currently 23 drop-off points that accept filled containers for recycling. There are currently 6 sites within the City of Birmingham for grease collection. This is an increase of one site from the previous year.

A total of 3,913 gallons were collected between October 1, 2021, and September 30, 2022, in Jefferson County. In the City limits of Birmingham 6 sites collected 357 gallons. This is a significate decrease in the over 700 gallons that were collected last year in the City of Birmingham. The County's Environmental Services Department (ESD) distributed 3,500 flyers to residential complexes and provided bilingual program materials that were both displayed throughout the complexes and distributed to residents. Jefferson County Environmental Services presented 3 educational events to promote the Oil and Grease Recycling Program. The City Watershed Management Program staff continues to promote this program and distributes materials, containers, and scrapers at various events.

Conclusion:

Household Hazardous Waste can be removed from the waste stream for the City of Birmingham if efforts from Watershed Management and its partners can give residents alternative methods of disposal through recycling or reusing these materials.

Increasing opportunities for residents to take ownership in their community and by providing more convenient locations for these disposal sites, allow the City of Birmingham to reduce the handling of HHW and reduce the need for expensive solutions such as HHW disposal events.

Eventually, the City of Birmingham, with leadership from Watershed Management, hopes to reduce HHW levels to near zero through partnerships, education, and alternate opportunities for disposal.

INDUSTRIAL STORM WATER RUNOFF

The City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) requires that the City implement a program to inspect, monitor and control pollutants in storm water runoff to the MS4 from municipal waste landfills, hazardous waste treatment, storage, disposal and recovery facilities, and industrial facilities and high-risk commercial facilities. Facilities to be addressed under this program include facilities that have reported under the requirements of the Emergency Planning and Community Right to Know Act (EPCRA) Title III, Section 313 and any other industrial or commercial discharge that the City determines is contributing substantial pollutants loading to the MS4 ("high risk facilities").

INDUSTRIAL STORM WATER RUNOFF PROGRAM SUMMARY

INDUSTRIAL & HIGH-RISK FACILITY/RUNOFF INSPECTIONS & ENFORCEMENT ACTIONS (AVAILABLE UPON REQUEST)	
TIER II REPORTING FACILITIES	*Available upon request*
TIER II PRE-INCIDENT PLANS	*Available upon request*
PIP INSPECTIONS	*1*
HAZMAT/INDUSTRIAL INSPECTIONS	*17*
HAZ/MAT/INDUSTRIAL INSPECTION RECHECKS	*2*
ENFORCEMENTS	*0*
CORRECTIVE ACTIONS	*1*

The City's Industrial and High-Risk Runoff Program, per the requirements of the NPDES Permit, identifies industries and high-risk runoff facilities within the City political boundaries not already subject to State NPDES regulations and State NPDES regulations with appropriate Standard Industrial Classification (SIC) or the North American Industry Classification System (NAICS) codes. The City is currently inspecting selected industrial sites for stormwater pollution. These have been

isolated as needed to illicit discharge inspection efforts by the IDD&E inspection team. COVID-19 and staff change, and supply shortages had a major impact on compliance activities. Staff had limited resources access and information which had a significant impact on inspectors and when inspections took place.

WATER QUALITY MONITORING AND REPORTING

Highlights:

This reporting year represents the ninth full year of monitoring water quality using the water quality monitoring strategy that was implemented by Watershed Management on November 20, 2013. The water quality monitoring strategy was intended to identify existing pollution sources, the variability of the pollutant or pollutants being discharged into waters of the state, and where appropriate, the effect of effluent on receiving waters that may have an opportunity to cause there to be an exceedance of a narrative or numerical water quality standard as defined in Alabama code. The location of the City's monitoring stations in each watershed, both instream and screening sites, outfall locations, and the certified data collected to date since ADEM approved the new water quality monitoring strategy is provided with this report in ***(Water Quality Appendix)***. During this period, several overarching activities have dominated Stormwater Management's water quality monitoring program, including:

- ★ During this reporting period, Watershed Management continued to contract with Birmingham Water Works Board (BWWB) EnviroLab to provide analytical services.
- ★ Watershed Management continues to maintain a contract with USGS to use their stream gaging stations along Village Creek and Valley Creek, which include variable combinations of stream elevation, discharge, water quality and rainfall. These stations can be found on the USGS Website as:
  - ✓ Station 02458148; Village Creek @ 86th Street
  - ✓ Station 02458502; Village Creek Near Pratt City
  - ✓ Station 02458190; Village Creek @ 50th Street
  - ✓ Station 02458350; Village Creek @ 24th Street
  - ✓ Station 02458450; Village Creek @ Avenue W, Ensley
  - ✓ Station 02461130; Valley Creek @ Center Street
  - ✓ Station 02461192; Valley Creek @ Avenue W, Ensley
  - ✓ Station 02423571, Shades Creek @ Elder Street Bridge
- ★ Field reconnaissance of the Valley Creek outfall during this period at VC0.1s continues as staff conducts IDDE evaluation. (***see Major Findings*** section).
- ★ Cotton Mill Branch on Village Creek at the VIC07.0s screening site continues to be monitored. The headwater is located at Avondale Lake. Watershed Management suspects this location as the source of

elevated TSS readings based on dry weather screening at that instream peaking location within the receiving stream segment

- ★ 2021-2022 *Summary of Unpermitted Discharges* report prepared by Jefferson County Environmental Services for Birmingham ***(Water Quality Appendix)***, approximately 2,392,430 gallons of sewage gallons of sanitary waste (sewage) was discharged into Birmingham creeks and streams. Compared to last year's (2021-2022) 364,371 gallons discharged into all watersheds within the City of Birmingham, this was a more than a 2-million-gallon increase in the amount of sanitary waste discharged within the City limits of Birmingham. The City continues to work with Jefferson County Environmental Services to address sanitary sewer overflows when discovered.
- ★ Freshwater Land Trust continues with the implementation of the installation of "Litters Gitters" program in locations within some watersheds in Birmingham. This partnership is a litter collection system that skims the water surface to collect floatable waste within the Creeks in and around Birmingham. Osprey maintains these Litter Gitter devices and separates, speciates and weighs the collected material.
- ★ Finally, for purposes of reporting water quality data, in this year's report, a 6-year period is included to provide a better understanding of trends and water quality developments being observed. Watershed Management will average the previous 5 year's data and compare it to the current permit year's data for individual streams, as has been done before but again this year because of the size of the data set, Watershed Management is narrowing its focus on more resent changes observed in the data collection and field observations. Therefore, a 5-year rolling average period of water quality analysis is provided along with water quality data observed during this reporting year. Overarching data review and reporting will be done for all streams, excluding screening sites, for all dates.

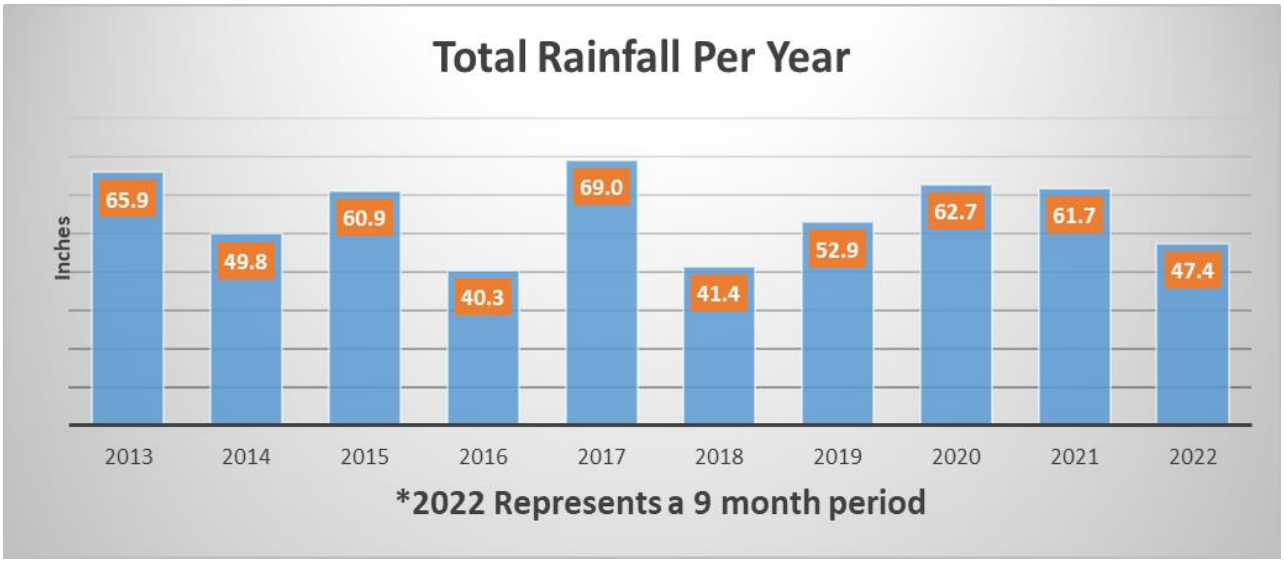
The City of Birmingham is in the lower Appalachian Mountains in Jefferson County in central Alabama. Its corporate limits are bisected by the Appalachian Plateau (Cumberland Plateau) and the Valley and Ridge geophysical regions. The Valley and Ridge province in this area is characterized by limestone valleys and resistant sandstone ridges that run parallel from northeast to southwest. Birmingham is in Jones Valley, which is dominated by limestone derived carboniferous soils and karst topography having numerous natural springs. Village Creek, as well as other creeks and tributaries, originate from naturally occurring springs. Village Creek originates in the Roebuck area of

Birmingham. The western part of Birmingham is partially located in the Appalachian Plateau and is characterized by hard sandstone shale and limestone at depth.

Soils in the Valley and Village Creek drainage basins in Jones Valley are in large part associated with limestone derived soils. Many of these carbonate soils have higher percentages of chert such as Bodine and Fullerton type soils (See USDA, NRCS. Web Soil Survey). The carbonate soils of this type have a higher percentage of chert and the soils lack structure and are not very well consolidated. Erodible soils such as these wash more readily during a rain event and are more difficult for vegetation to become established on hard siliceous cherty soils.

On slopes, these soils wash down into the tributaries, drainage-ways and creeks to deposit silt and chert into the MS4 and on, into the creeks. See the adjacent picture of Village Creek at VIC07.0s (Cotton Mill Branch at the former McWane Steel Facility) for examples of the sedimentation occurring because of erosive velocities and deposition in association with rainfall.

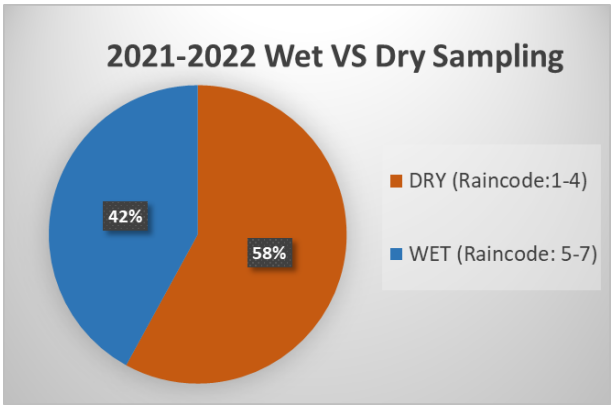
Even though carbonate soils of this nature can be found throughout the Greater Birmingham area they are more prevalent in the eastern part of Birmingham.



Rainfall:

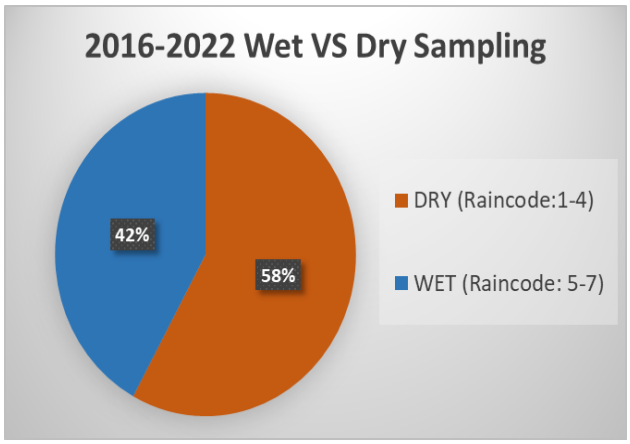
The chart above shows rainfall ranged between an annual low of 40.3" in 2016 to a high of 69.0" in 2017. The average annual rainfall during this 10-year period was 54.6" with 2022 data only representing a 9-month period. Two of the past seven years, 2016 and the most resent 2018, have represented periods of drought conditions during part of the year. During 2017, 2020, and 2021 represent higher rainfall amounts. 2022 represents a nine-month period with rainfall amounts 47.38". All annual rainfall data is taken from reported rainfall at the Birmingham Shuttlesworth International Airport for consistency, since local site data can vary to a large amount across an area.

During this reporting period (FY 2021-2022) the total rainfall was 55.01", with the highest rainfall during the month of March 2022 at 10.98". As depicted in the cart sampling occurred during wet periods 42% of the reporting year.



Recalling the *City of Birmingham Water Quality Monitoring Strategy for Alabama Department of Environmental Management (October 4, 2013; Pg. 14)* the sampling focus was intended to be during periods of dry weather flow, especially where stream segments had known impairments and outfalls greater than 36". For the purpose of water quality monitoring by Watershed Management instream team, dry weather

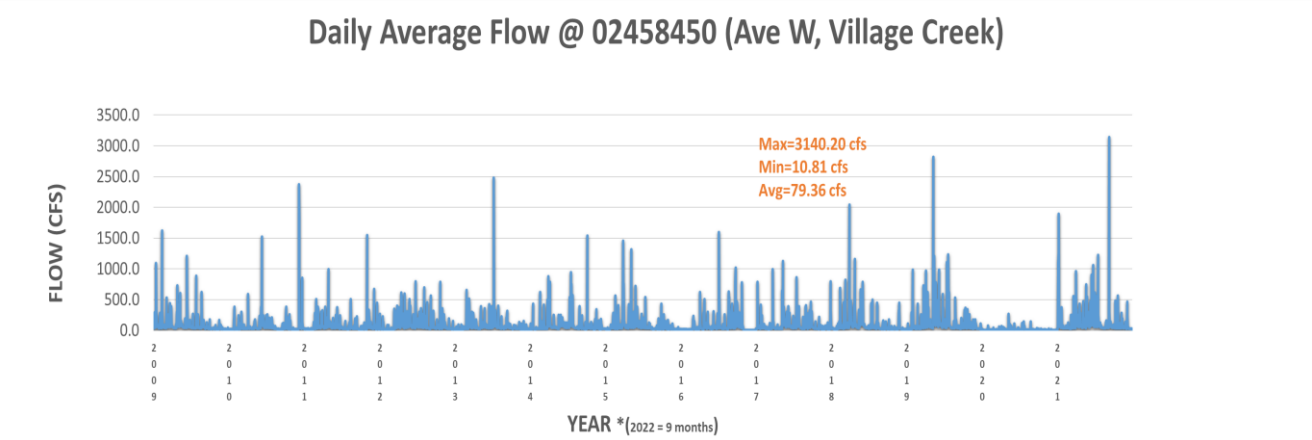
reporting is represented as less than 0.10" of rainfall preceded by 72 hours of antecedent dry conditions. All other rainfall conditions greater than 0.10" are considered wet. Classifying: rain codes: 1-3(dry) and 4-7 (wet). This rain code is also described on our field sheet within the SWMPP.



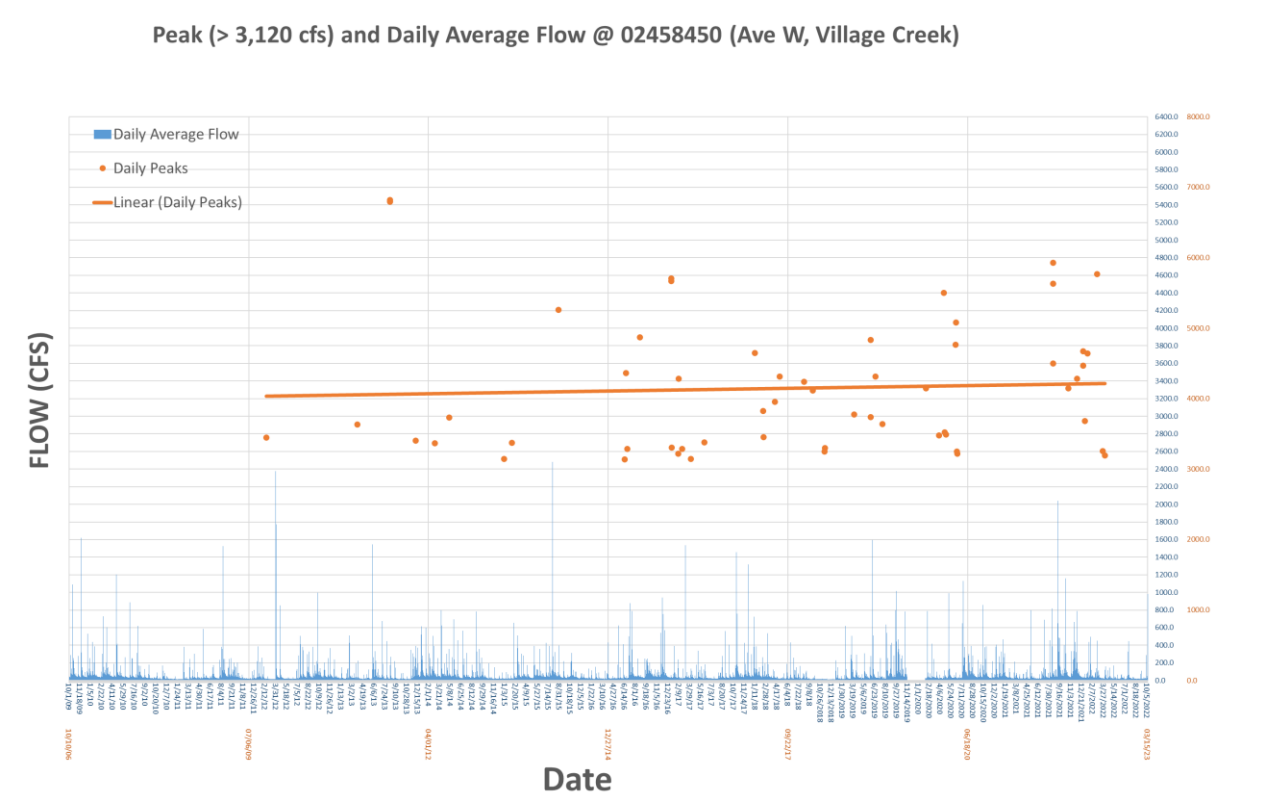
By contrast rainfall during the entire 6-year study period represented almost equal sampling between wet and dry conditions trending eight-percentage points towards dry. Please see the pie chart for complete sampling period percentage results from 2016-2022.

Flow:

The Alabama Department of Environmental Management, Water Quality Branch, published in 2005 its Final Total Maximum Daily Loads (TMDL) for Village Creek[i]. That document reported Maximum Daily average flows at Avenue "W" to be 3,040cfs. Minimum daily flows were 9.3cfs and average daily flows were 79.2cfs. These measurements were taken during the period between 1988 and 2001

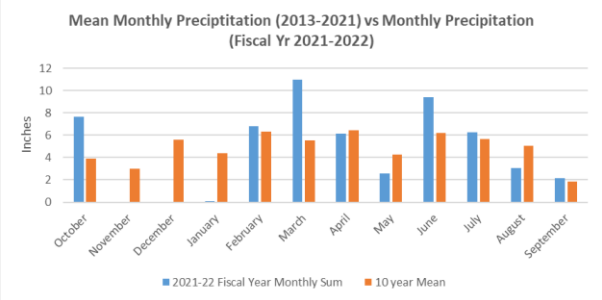


Please note the figure above. During the period between 2009 and 2022 daily average flow measurements reported by the USGS at Avenue W", Ensley were strikingly similar to the daily average flow data earlier reported by ADEM. Referencing the figure above from data provided by the USGS for the same location, maximum daily flows averaged 3140.2cfs. Minimum flows were 10.81cfs and the average daily flow measurement was 79.36cfs. Village Creek flows continue to be mostly consistent with other observations by ADEM and by the USGS.



Depicted in the chart above is daily average flow data provided by the USGS at gage #02458450 – Village Creek @ Avenue W, Ensley. The flow record begins approximately on October 1, 2009 and extends past September 30, 2022. Included on this chart in Orange Points are peak flows greater than 3,120cfs, which in reference to the TMDL for siltation (ADEM, 2005) represents the 13-year period for peak discharge.[ii] All recurrent flow events that exceeded a peak discharge of 3,120cfs are also included in the chart above along with its associated trend line. The upward trend line depicts an increase in extreme flows during the period 2010-2022. This increase in the peak flows during this study period is in response to the rainfall conditions throughout recent years. This increase flow is created by frequent intense rainfall events.

The mean monthly precipitation (2013-2021) verses monthly precipitation for (FY 2021-2022) depicted that little rainfall accrued during November-January during this reporting year. The other months of the year illustrated close to or more rainfall as the average monthly precipitation.



Water Quality:

Data collection methods used during this study for water quality were based on the ADEM approved 2013 Water Quality Monitoring Strategy. Surface-Water samples have been collected since 2013 six times yearly. (i.e., usually in 2-month intervals) at water quality monitoring sites described earlier. For this Fiscal Year Water Quality Monitoring will be compared on a rolling 6-year average. The historical data, which is data collected before the 2016-2017 fiscal year will be archived and used for comparison when needed. For this report current 2021-2022 fiscal year data will be compared to previous year's data starting with the 2016-2017 fiscal year data, ***(Water Quality Appendix)***.

VIC07.0s (Cotton Mill Branch) continues to be monitored bimonthly due to instream peaking conditions observed at VIC07.0 during periods of dry weather screening. All water quality stations conform to a nomenclature requirement with screening sites adding an "**s**" to the mileage destination with upstream being the smallest number and downstream being the largest. Each surface-water grab sample was measured in the field by a Hydrolab® Multimeter, which measured: Temperature, pH, Dissolved Oxygen and Percent Dissolved Oxygen, Barometric pressure, conductivity, ORP, and TDS. All other Water Quality parameters were measured by Envirolab at the Birmingham Water Works Board or other field devices (e.g., Oakton T100 turbidity meter, Stormwater Test Kit, and test strips) **see Water Quality SOP for more detailed information**.

This section also includes data analysis and review for water quality found in ***Results and Discussion***. Specific methods used to interpret the data include graphical tools and statistical methods. Graphical tools include bar, scatter, and line charts, which depict the total analytical period of history since 2016 and the most recent data period (i.e., 2021-2022) in contrast. Bar-whisker plots are used to display the variability of select constituents over time. Included on each bar-whisker plot is a median line, **X** indicates the mean, the 1st and 3rd quartile data range, and a maximum and minimum reasonable value. Reasonable values are generally accepted as the statistical 50% of the data set when the 3rd quartile is subtracted from the 1st quartile and the difference is multiplied by 1.5 to establish the upper and lower reasonable value fences for considered stream constituents. The data includes both instream and ORI data collected during the study. This data does not include outlier data beyond the statistical data fence boundaries. The data also does not reflect discrete flow or rainfall conditions.

The chemistry of surface waters is based on the interactions between rainfall, groundwater, rock, and soil conditions within each watershed. For the most part concentrations are reported in mg/L. Stream water chemistry varies with flow and rainfall conditions, which can vary in each watershed and under differing stream flow conditions. Stream water base flow is predominately from ground water flows and active industrial process during low flow periods. During and after a storm event stream water is a mixture of rainwater and nonpoint source surface runoff, shallow subsurface flow, industrial discharge water, and groundwater discharge. Precipitation tends to dilute the major ion composition while human activity can further alter a streams water chemistry, including elevated levels above background.

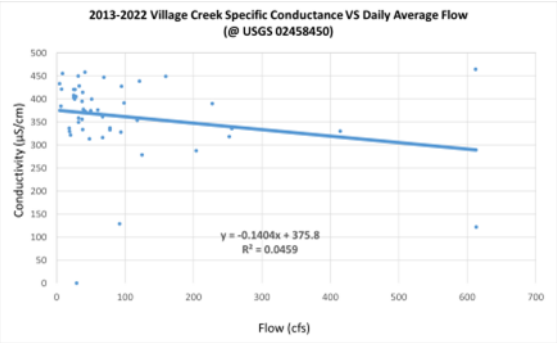
Results and Discussion:

The certified data record of Birmingham's Monitoring program is included in ***(Water Quality Appendix)***.

This section will describe the overarching water quality in all City watersheds, followed by individual creek analysis.

During the analysis of the historic data collected during the more than nine-year study and more recent data collected for 2016-2022 (six years), the City of Birmingham Watershed Management Section has relied upon specific conductivity as a measure of stream variability and potential sources for impact.

The figure depicts individual stream variability, which includes the maximum reasonable value, median, mean, minimum reasonable value, and the 1st and 3rd quartile data. The overall specific conductivity mean concentration for all four creeks and the Cahaba River is generally within the range of 200 to 600 (µS/cm), with the Cahaba River having lower specific conductivity than the four creeks. Valley Creek appeared to have the greatest mean concentration. Village Creek appeared to have the least data variability among all City watersheds. However, there are a few exceptions of data outside the normal range previously mentioned. The complete range of reading runs from 35.6 to 795 (µS/cm). These extremes generally are infrequent and are usually associated with a rare illicit discharge or other influence during sampling.



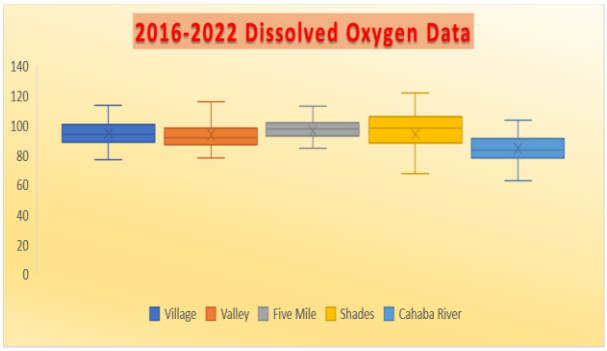
Based on the associated Flow vs Conductance graph, the overall specific conductivity dataset demonstrated an inverse correlation, having R^2 value of 0.046. The data included here represents flow collected at USGS 02458502 and specific conductivity throughout the watershed.

The water quality data includes instream water quality specific conductivity data at VIC14.0 during nine-years since 2013.

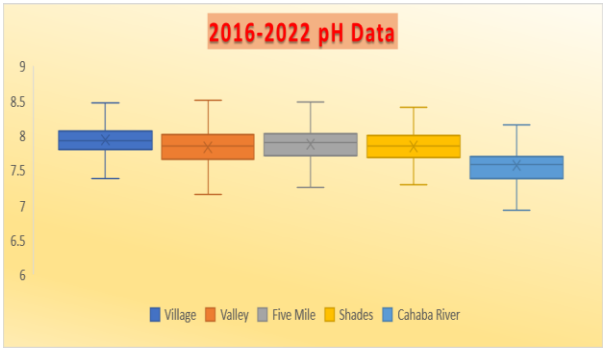
Dry period is represented as rain codes: 1-3 and wet period is represented as rain codes: 4-7. During the 6-year data set, the highest conductivity at VIC14.0 records: 465µS/cm during wet periods, and 458.7µS/cm. during the dry periods.

The highest average yearly conductivity recorded during this period was 372.5µS/cm which was 24.6µS/cm higher than the lowest yearly average specific conductivity was 347.9µS/cm.

Therefore, and based on the period of record since 2016, instream specific conductivity at Village Creek appears stable and only slightly lower as flow conditions increase due largely to rainfall conditions. Therefore, inflow deviations from the instream condition should be considered as an illicit discharge when concentrations of specific conductivity in the illicit discharge are increased beyond background levels in each creek.



The associated Bar-Whisker Chart documents that the Dissolved Oxygen concentrations for each watershed tended to be similar. The difference between the 1st and 3rd quartile appeared similar and tightly grouped around the median for all watersheds. All dissolved oxygen samples tested within acceptable levels.

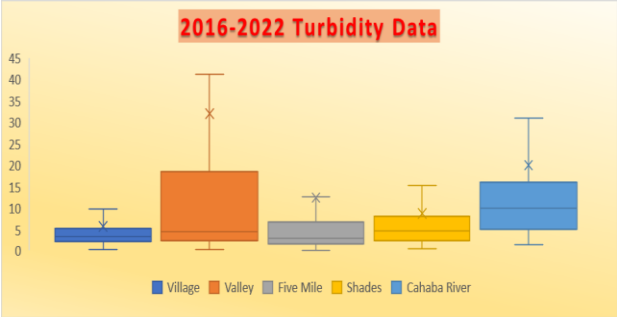


For the 2021-2022 study which will be discussed later in the anti-degradation section all pH units were within acceptable levels.

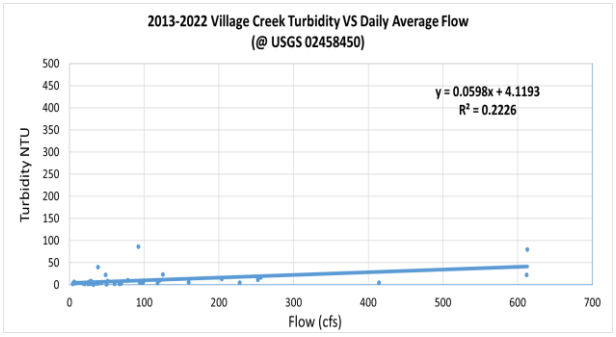
pH reading taken by Watershed Management did not exceed the 8.5 pH

standard. As depicted in the pH Bar Whisker Chart, lower overall pH readings at the Cahaba River could be a result of dilution from higher flows after rain events. All other pH levels in other water bodies (Creeks) were similar in range.

Overall, the pH levels within Birmingham's Creeks throughout the years have been within state limits, with a very few exceptions.



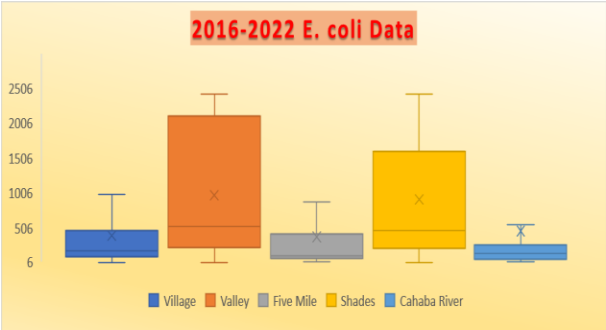
Consistently through this sampling period mean concentrations of Turbidity (NTU) exceeded median concentrations in all cases exceeded the third quartile. In all cases, the mean concentration did not exceed the maximum reasonable value fence, which indicates a considerable number of turbidity values exceeded the statistical 50% of the data. This can be attributed to one factor that is discussed in the summary at the beginning of this report, which can be attributed to heavy storm events.



The Flow vs Turbidity Graph reflects mean daily flow obtained from the USGS at dates concurrent with stream sampling dates in Village Creek. Turbidity data is measured in the field with an Oakton Turbidity Meter. The period of record shown above represents several data points. Most of the Turbidity data fell within a range bounded by <100cfs flow and <50 NTU turbidity.

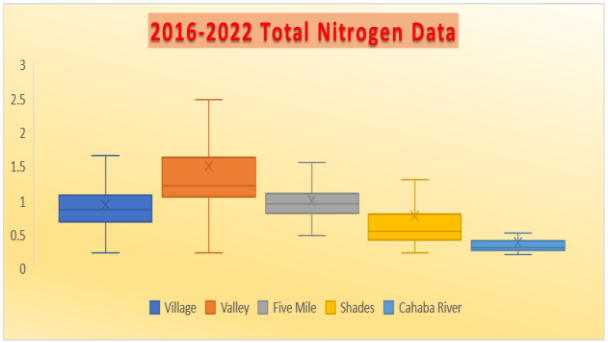
The R^2=0.2226 in the associated Turbidity vs Flow chart depicts a correlation of between flow and turbidity levels. During high flow Turbidity levels increased and during low flow turbidity levels decreased.

The Birmingham Water Works Board (BWWB), Envirolab reports high E. coli concentrations as >2,419.6mpn/100ml under the current analytical methodology. The reader is reminded that high values greater than the maximum reasonable fence are not shown on this chart when E. coli values exceeded the statistical 50% of the data.



Overall E. coli data shows a greater range of concentration values in Valley and Shades Creeks compared to the lower concentration values in Five Mile Creek, Village Creek, and Cahaba River. The average mean concentrations for each stream are reported as greater than the median concentration suggesting that each stream has generally high E. coli concentrations. The higher concentrations of E. coli in Valley and Shades Creeks may be attributed to the outside influences such as sanitary sewer leaks or other illicit discharges.

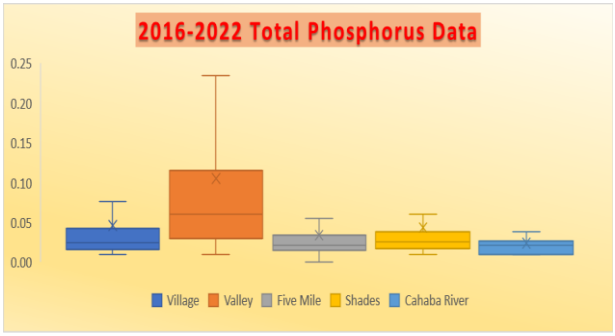
The reader is reminded that Total Nitrogen includes both inorganic and organic constituents. Inorganic Nitrogen is the sum of Ammonia, Nitrite, and Nitrate concentrations. Organic Nitrogen is the difference between Total Nitrogen and Ammonia concentrations. All watershed streams throughout Birmingham can be considered largely inorganic.



Valley Creek has the greatest Total Nitrogen variability.

Illicit discharges during sampling events in areas around Valley Creek show higher variability on the associated Bar-whisker Chart from 2016-2022.

Illicit Discharge in Valley Creek may also explain increased phosphorus levels for data collected from 2016-2022, which is indicated on the associated Phosphorus Data Bar-Whisker Chart.

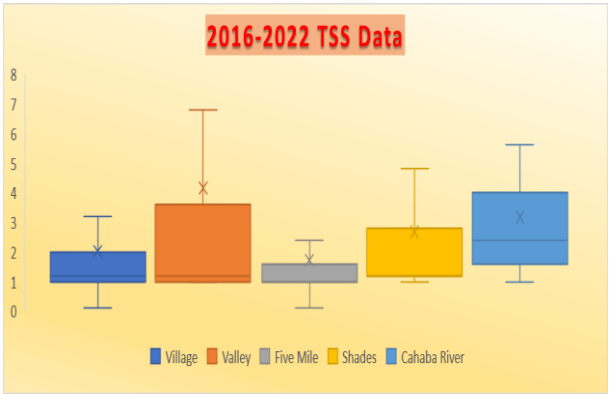


This issue is being evaluated as an IDDE issue.

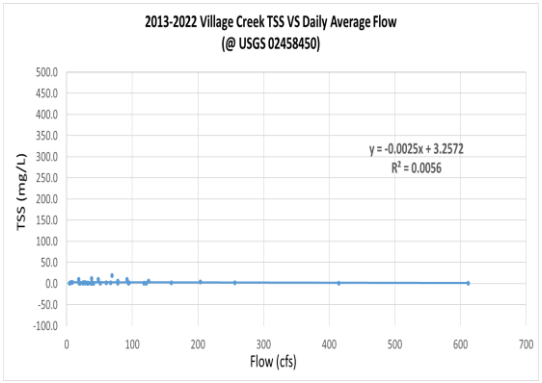
With respect to Total Phosphorus in Valley Creek, the figure on the Chart demonstrates the greatest variability and highest concentrations reported. The data plotted

displays Total Phosphorus in the following Creeks Village, Shades, Five Mile and the Cahaba River, as of low variability. Total Phosphorus average concentration was less than the mean, suggesting either many low phosphorus concentrations or very few high concentrations, but sufficient to increase the median phosphorus concentrations plot.

The figure below denotes the data collected for Total Suspended Solid concentrations (TSS) (mg/L) for all streams in Birmingham. Interestingly, Valley Creek shows the highest reasonable value fence. It is particularly notable that the TSS concentration at the upper end of the reasonable value fence was still < 10.0 mg/L with all City streams having low TSS levels.



During very infrequent rain events as velocity increases turbidity and TSS increases respectively, as seen in field observations and sampling records. This is not only demonstrated in the Turbidity scattered chart for Village Creek; but also demonstrated in the TSS scattered chart. Noting that R^2 =0.0056 would suggest only a slight correlation during sampling between TSS and flow.

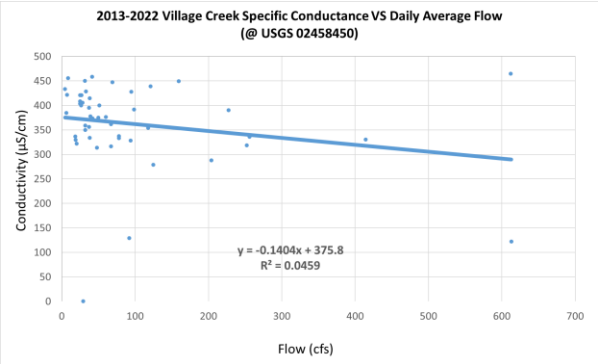


Village Creek:

This reporting period provides the opportunity to consider six years of the full nine years of water quality monitoring in Birmingham's creeks, starting specifically in Village Creek.

The foundation of the City's instream water quality monitoring program has been to identify instream peak concentrations of specific conductivity that would lead one to conclude that in the sampled flowing stream segment(s) there is an influence from another dissimilar water source, whether from an incoming tributary, an outfall discharge, or from a groundwater seepage influence.

The reason for that continues to be foundational to the program since flow and specific conductance are inversely correlated, although weakly so, as evident by the figure following (R^2 value of 0.0459).

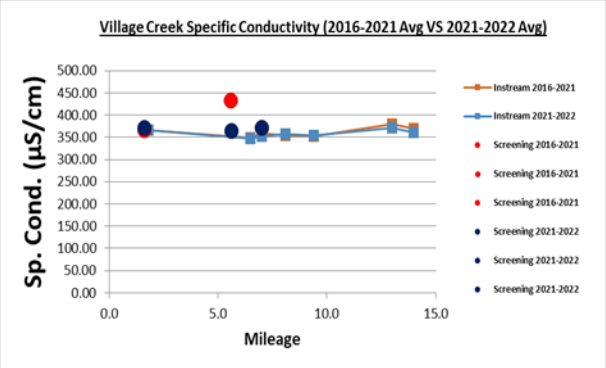


During this six-year period, specific conductivity has consistently averaged 363.9 µS/cm. The highest specific conductance recorded to date was 795µS/cm and was recorded on July 21, 2021, at sampling site VIC05.6s during a moderately high rainfall period. This highest specific conductance appears to be a onetime event that has yielded no additional information but has been flagged as a potential area of concern if additional data warrants an IDDE investigation. Average annual rainfall between October 2016 through and September 2022, inclusive was 53.6". By comparison, during this study period (FY2021-2022), total annual rainfall was 55.03".

During normal rain events last year's report appeared as though lower Specific Conductivity indicated, "A measure of diluted major ion composition as a result of significant rainfall." However, this is not the case in this year's evaluation. More data is needed to determine the correlation between Specific Conductivity and flow. Further evaluation of rainfall vs Specific Conductivity may indicate that sampling during the onset of a heavy rainfall event appears to increase conductivity as the initial first flush is adding material to the stream as samples were collected. As the rainfall event continues, the rainfall begins to dilute the stream and conductivity begins to decrease as dilution of the stream occurs.

During this reporting period, Specific Conductivity was essentially the same as the previous 5-year period. For this year's conductance (FY 2021-2022) in relationship to past average combined years period evaluated (2016-2021) was consistent for each instream location along Village Creek from the headwaters to the downstream stations in the City of Birmingham reflecting

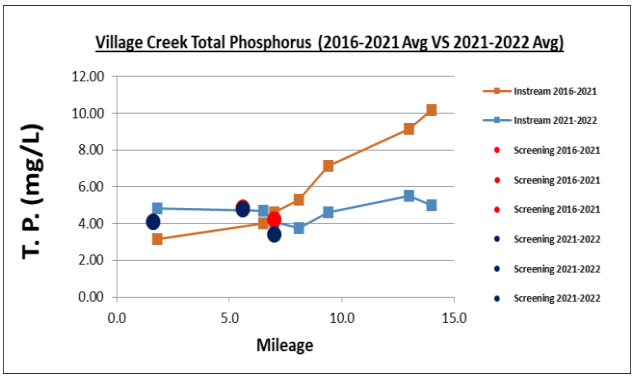
a mirror like approximation. See chart below.



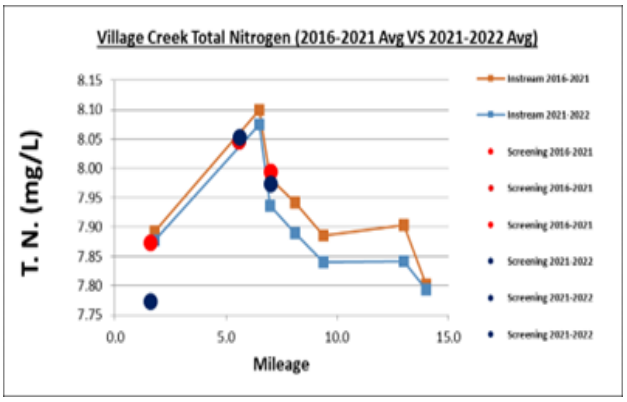
VIC07.0s will continue to be included as a monitoring site. These sites are particularly important for data collection for all parameters including zinc, as this sub-basin has an electro-plating industry within the sub-basin and another electro-plating facility in the sub-basin around VIC05.6s. A slight decrease at VIC05.6s was noted in this year's data compared to the previous 5-year period. It is important to note that sampling for this year, zinc has not been at elevated levels in Village Creek. Zinc data is discussed more in the Anti-Degradation portion of this Report.

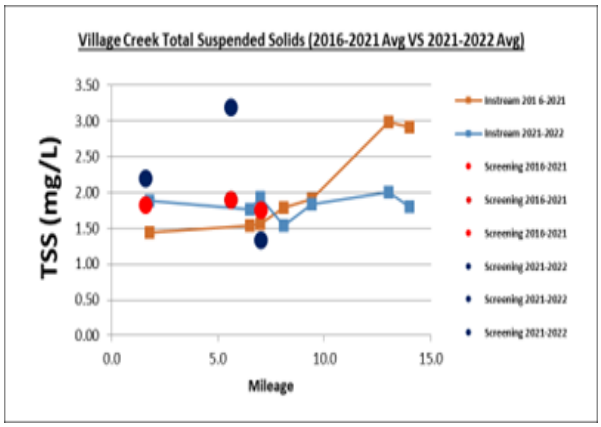
Average annual Total Phosphorus (T.P.) for 2016 -2021 (In **ORANGE**) and for 2021-2022 (In **BLUE**) is shown in the figure below.

During the period 2016-2021 the average phosphorus levels were 0.05mg/L while this year's data (2021-2022) indicated a slight decrease throughout the sampling sites with sample results remaining below 0.04mg/L. It is important to note that all T.P. readings do not exceed 0.10mg/L for the average T.P. for any monitoring period. Annual average

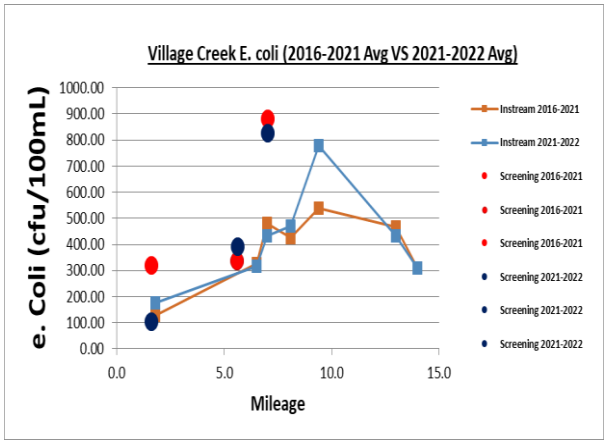


Nitrogen was essentially the same entering the city and leaving the city this year, as well as mirroring the combined five-year average.



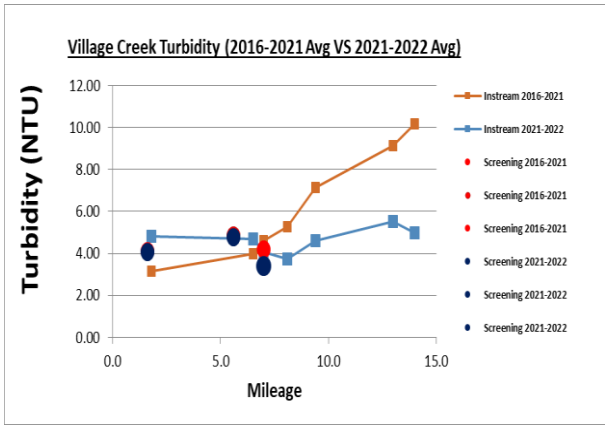


Total Suspended Solids (TSS) in Village Creek were influenced by sub-basin drainage as indicated at screening sites that are depicted in the above chart. This indicates sub-basin influence which may be a result of sedimentation from periods of heavy rainfall events during FY 2021-2022. Note that for sampling periods 2021-2022 and 2016-2021 average, all sample results did not exceed 3.2mg/L TSS.



It is important to note that additional evaluation of the data collected for E. coli at VIC09.4 and VIC07.0s is needed due to increased E. coli levels. Historically these sites have not indicated increased E. coli levels, during FY2016-2021. Watershed Management staff continues to monitor these sites and look for sub-basin influences.

FY2021- 2022 indicated that turbidity overall has improved or remained like historical data FY2016-2021 in Village Creek.



Village Creek Loading Analysis:

Total suspended solids (TSS) mass concentrations were measured from grab samples within Village Creek, placed on ice, and returned to the Birmingham Water Works Board laboratory for analysis. No flow measurements were made during this reporting period in the field; rather City Stormwater Management staff relied on continuous flow measurements afforded by two U.S. Geological Survey gages. One gage is located at 86th Street (USGS #02458148) near Roebuck Springs, the headwaters of Village Creek in Birmingham. The other is located at a railroad trestle near Pratt City (USGS #02458502). The real-time USGS data can be found on the USGS website; USGS Water Watch using the station IDs provided above. The difference between the

load analyses from the two sites represents the net TSS load generated by the City's MS4 and contribution from private point sources.

Industrial point source information is included in this report only to illustrate better the contribution of the City's MS4 on the water quality in Village Creek. Therefore, industry loadings are combined into one measure. Industrial nonpoint stormwater sources may have been included this year as a point source and is delineated also as a point source of water for this report. Otherwise, those industries nonpoint stormwater sources, which may otherwise not be reported would be represented in the public MS4 system data.

Among the numerous NPDES permitted facilities in the Village Creek watershed only those listed in this report were considered for further loading consideration. Industry loading analysis was obtained from the monthly discharge monitoring reports provided to ADEM and assembled from the ADEM e-file website. Those industries included:

- Nucor (Permit #AL0003735)
- ACIPCO (Permit #AL0029378)
- SMI (CMC)(Permit #AL0001554)
- Wade Sand & Gravel (Permit #AL0025194)
- Birmingham Airport (Permit #ALG140453)

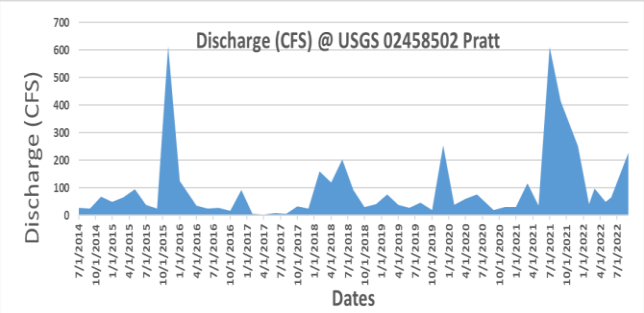
In the City of Birmingham's Water Quality Monitoring Strategy for ADEM, October 2013, the City established a strategy to measure performance. That strategy had its basis in the ability of the City to demonstrate the reduction of annual total suspended solids loadings.[iii] The total suspended solids constituent was selected as the measure of performance due to the fact that sediment loading in Birmingham is a particular stream impairment problem. To focus on reducing instream peak concentrations of total suspended solids was anticipated to result in a load reduction of solids leaving the City of Birmingham and an overall improvement of stream water quality. Similarly, to last year, the following equation represents the formula used to compute the daily load this year:

$Li = Qi \times Ci \times K$

Where for the MS4:

- Li = Average load in metric Tonnes per day based on USGS reported average daily discharge (cfs) and average daily mass concentration (mg/L) of a measured constituent.
- Qi = Average discharge in Cubic Feet per Second (cfs) for discharges occurring concurrent with all sampling dates
- Ci = Average TSS mass concentration in mg/L for all sampling dates
- K = 0.002 correction factor for unit conversion from (ft^3 – mg)/ (sec – L) to metric Tonnes per day

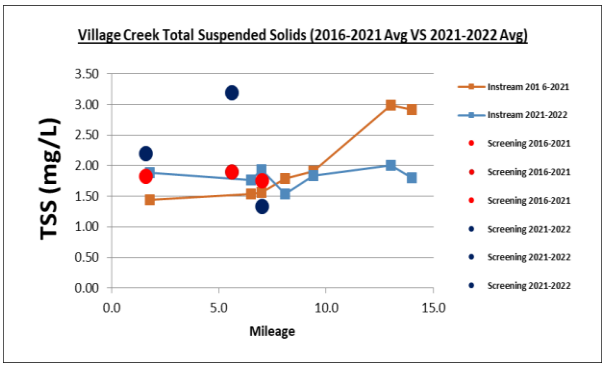
Given the period of record now extends well beyond six-year, the decision was made to report the data as it was captured, as daily data to improve the accuracy of reporting. Furthermore, data collected from State DMR results, when reported by industry in some cases reported their flow in million gallons per day (MGD) and constituent concentrations in pounds per day. In those cases, flow was converted to cfs and constituent concentrations to mg/L and the MS4 loading formula was used. Flow data is recorded starting in 2013 through 2022.



As also can be observed, the flows 2021-2022 has averaged below 100cfs.

As a result, this year it has been determined that there is not a strong correlation using either the Pearson product moment (r=0.14) or the coefficient of correlation (r^2 =0.02) between stream flow and Total Suspended Solids at Station VIC14.0 where stormwater exits the City of Birmingham. With this information it can be concluded that there are many outliers and/or more data needed.

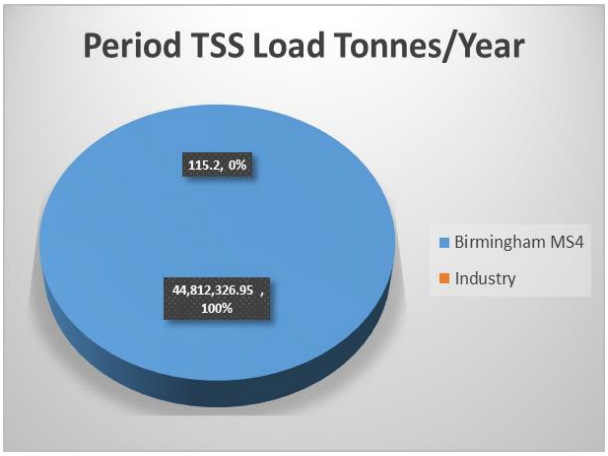
This reporting year TSS concentrations were higher at headwaters of Village Creek but did not show a marked increase exiting the City.



USGS thirty-year discharge average is roughly 17 billion gallons per year at Ave W. The water entering the City from the headwaters at station VIC01.8 and the remainder of the nonpoint sources generated by the very large watershed from Birmingham covering around 30,292 acres.

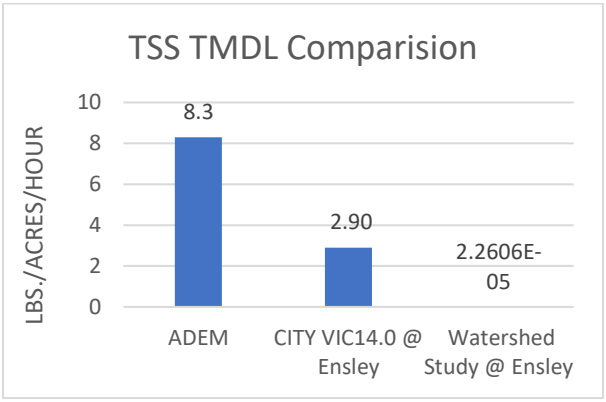
Instream pollutant loadings were computed based on daily flow data collected at Stations VIC01.8 and VIC14.0, by the USGS during the same period as water quality samples were collected. Water quality mass concentration data was also collected at approximately the same sites 6 times per year. As can be seen in the figure below the City's Industry point source contribution to the average daily TSS

load into Village Creek is comparatively less than the nonpoint source contribution.



The net load of Birmingham MS4 TSS data, the difference between the load at VIC14.0 and VIC1.8, was approximately 175.05 tonnes/day. The net TSS load is the contribution from the 30,292-acre drainage basin representing the City of Birmingham's nonpoint source contribution area within Village Creek. The load difference represented by the associated figure, when compared with last year's load is more than that of industry. The contribution from those industries considered in this report, which also provided discharge monitoring reports to ADEM, were combined together for the same time period to represent the total industry load.

Individual contributions from industry are reported herein as the calculation of either average daily flow reported or calculated, and average daily TSS concentrations either reported or calculated from available DMR data. The represented industry contribution contained in this report does not presume these to be the only industries discharging into Village Creek. The contribution from the MS4 was considerably higher this year while the industry contribution was low. Again, it is believed the additional rainfall contribution played a considerable role in these differences, among other observations.

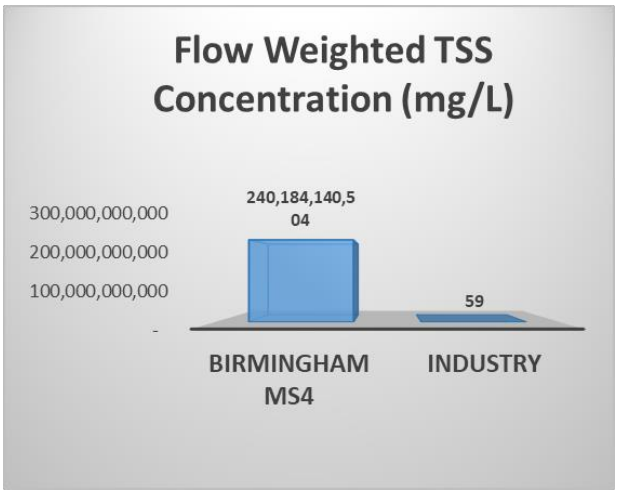


Considering the difference from last year's report wherein it was demonstrated that the MS4 was significantly different and greater than industry, the difference this year may be due to the following suggested reasons:

- The TSS average concentration for the Industry was 115.2tonnes/year while the concentration of TSS contributed by Birmingham's MS4 was reportedly higher at 63,893.25tonnes/year.
- Another way to consider comparative impacts on TSS load is to consider the discharge weighted load. It was demonstrated earlier that there is a relationship, now with more than eight years of data, between TSS and flow. The figure below represents a comparison of

flow weighted TSS concentrations between Birmingham's MS4 and industry.

- ★ Overall, the City flow weighted concertation is considerably greater than that of industry.

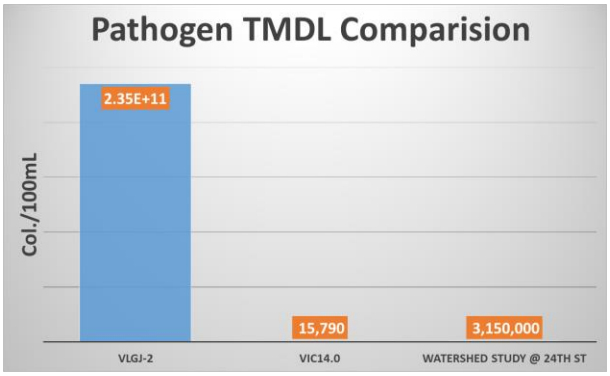


Similarly, the City of Birmingham has also found a relationship, although weak with this year's additional data, between flow and TSS. The City agrees with ADEM that monitoring over the course of a significant rainfall event would produce useful results, if not also a demonstrable improvement and a better understanding of TSS loadings for Village Creek. The City has attempted on more than one occasion to do this analysis, however, the rainfall event failed to adequately meet sampling protocols for sampling or safety issues outweighed the ability to conduct the sampling. In the nine years that the City has been sampling for TSS, Watershed Management staff has not seen the high levels of TSS similar to those levels reported earlier by ADEM unless driven by substantial rainfall events with high velocity flows.

Village Creek TMDL Analysis:

ADEM has established a TMDL for siltation in Village Creek. That document reported the allowable loading for Village Creek by NPDES regulated stormwater discharges, including MS4 discharges, to not exceed 8.3 lbs./acre/hr. This was recorded for Village Creek at Avenue "W" and was based on an area found within the ADEM TMDL of 21,440 acres. During the City's past study, it observed a stormwater load allocation near Avenue "W: at the Pratt City Railroad Trestle (VIC14.0), just one mile away from VIC13.0, of 3.41 lbs./acre/hr. or less than half of the state's allocation allowance. This figure is based on the same area as was computed for ADEM's TMDL allocation allowance. For comparison's sake, the City also compared the observed waste load allocation to that reported in the City's Village Creek Watershed Improvement Strategy for the Village Creek Watershed data reported near Ensley. Please recall that data was generated by a calibrated and verified SWMM Model. That data was more than 500 times less than ADEM's TMDL waste load allocation at approximately 2.3E-5 lbs./acre/hr. As, seen in the chart on *page 105*, depicting TSS TMDL comparison. Decidedly though, ADEM recognizes the difficulty in coming up with one relationship of flow and TSS for Village Creek. The TMDL report contends that the events are so dynamic that it would entail wet weather sampling through an entire hydrograph period to make any defensible correlation. ADEM recognized that there

was evidence from a few samples, which exhibited high TSS concentrations during high peak flow. For the TMDL analysis and in the absence of TSS at peak flows, there was an attempt made to use the available data and derive a relationship between daily average and peak flow.[iv]



In August 2015 ADEM established a total maximum daily load for pathogens in Village Creek. The load allocation for MS4s was identified a 2.35E+11 colonies per day and a reduction requirement of 26%. The single mass loading was established from measurements taken at VLGJ-2, which coincidentally is the same location that the City samples in Village Creek at VIC07.0.

The City computed the geometric mean concentration of E. coli at VIC07.0. The City does not collect flow data from VIC07.0 but does collect flow data near Pratt City at VIC14.0. See associated chart. Therefore, to compute the load for TMDL for comparative purposes, the flow was taken from VIC14.0 and multiplied by the area behind VIC07.0, which was computed by GIS to be 54.7%, and is assumed for this measure to be a draining basin to VIC07.0. Again, for comparison, the numbers used were discrete and not the difference between the tale water flows and the headwater flows thereby matching how the TMDL was prepared by ADEM.

The TMDL number of 2.35E+11 was not to be exceeded. The City waste load for E. coli. was computed to be 1.19E+04 and the results of the City's Watershed Management Plan computed the pathogen load at 24th Street (Approximately 1-Mile Downstream of VIC07.0) to be 3.16E+06. Again, as with the TSS TMDL, the City appears to also be meeting the TMDL requirements for pathogens in Village Creek.

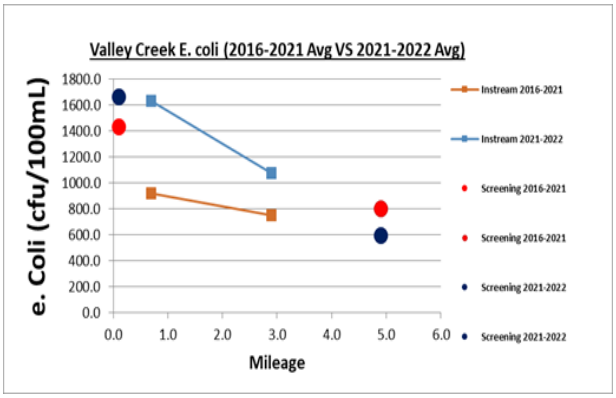
Valley Creek Average Concentrations				
Year	Milage	Sp.Cond.	TSS	e. Coli
16-17	4.9s	310.4	6.3	854.2
	0.1s	352.3	10.1	1873.1
	2.9	333.2	4.7	794.6
	0.7	364.1	4.3	1119.4
17-18	4.9s	391.6	1.5	1123.4
	0.1s	453.5	9.4	1016.5
	2.9	435.1	1.5	329.1
	0.7	468.3	6.2	568.2
18-19	4.9s	378.6	2.1	1060.9
	0.1s	346.7	6.5	1726.5
	2.9	307.3	3.2	1072.0
	0.7	324.6	6.9	1519.1
19-20	4.9s	357.8	3.2	567.8
	0.1s	424.2	4.7	1454.9
	2.9	376.0	2.8	668.4
	0.7	388.3	3.6	594.9
20-21	4.9s	363.0	3.0	803.3
	0.1s	395.6	7.3	1434.4
	2.9	367.8	2.7	752.1
	0.7	383.0	4.8	922.8
21-22	4.9s	390.6	1.5	600.8
	0.1s	417.4	4	1668
	2.9	360.3	2.6	1075.6
	0.7	382.9	5.8	1630.7

Valley Creek:

Valley Creek extends approximately 8.8 miles from the City of Birmingham through another jurisdiction until the Bessemer Super-Highway, just outside of the City of Bessemer. The City monitors between stream segments 0.7 and 2.9. Except for the screening sites at stations 0.1s and 4.9s the remainder of the creek is monitored by the Stormwater Management Authority, Inc. in the downstream portions of Valley Creek outside the City limits.

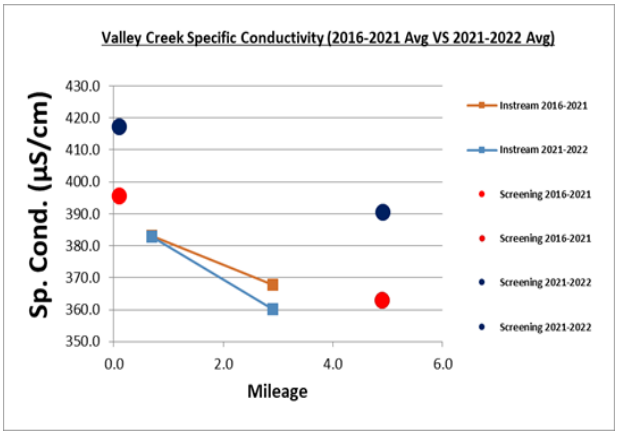
Monitoring results for select key parameters in Valley Creek, both instream and screening sites, are depicted in the adjacent table for each of the last six-years (2016-2022).

The parameters of much concern for Watershed Management in Valley Creek continues to be *Escherichia coli* (*E. coli*) and higher Turbidity readings. The highest levels of E. coli were frequently measured at Station VC0.01s (Jail Branch). The headwaters VC0.0 monitoring site in Valley Creek at the point where the Creek daylights from under the City was discontinued from sampling program at VC0.0 due to concerns related to mixing. This effort was done to improve data consistency.

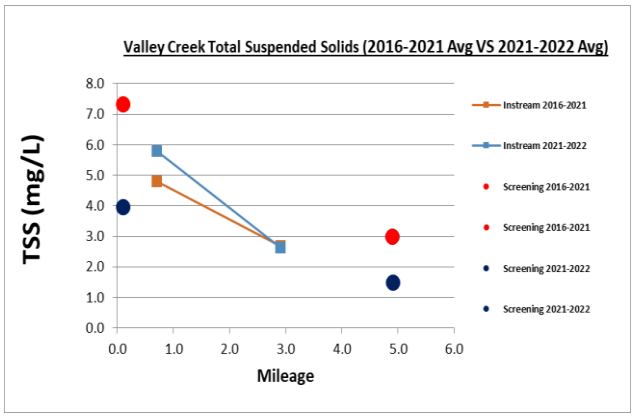


The 2022 data in the associated cart compared to the average 2016-2021 sampling data shows an overall increase in E. coli levels at the sampling locations. As in previous reports from the Watershed Management, VC0.1s continues to show the highest concentration of E. coli. because of

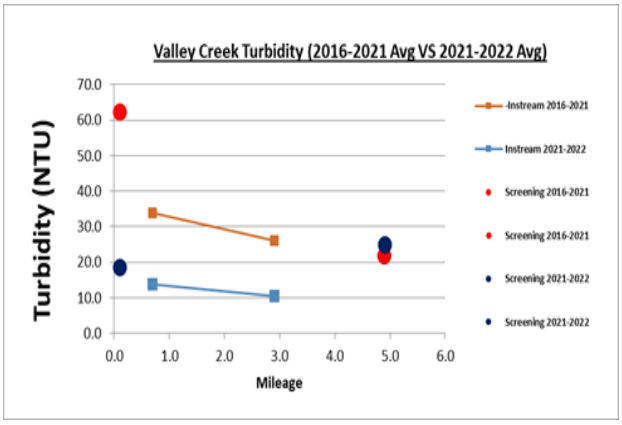
the illicit discharge at this location during sampling events. This may be related to leaking sanitary sewer overflows (SSO's) in the area. ***(Please see IDDE Section of this Report)***. Overall, the data and previous graph indicates that the current year's E. coli concentration has increased. The City has attempted to address the illicit discharge impacts of the homeless population and animal shelters as waste contributors to certain areas of City's MS4 in the Valley Creek watershed. The City has also worked with Jefferson County Environmental Services to address sanitary sewer overflows (SSO's) and will continue to work with Jefferson County to identify opportunities to further reduce E. coli when discovered.



The figure above demonstrates that during the previous six-year study period sampling years (2016-2021) average Specific Conductivity demonstrated virtually a mirror image to the specific conductance of this year with little changes in the reading for this reporting year.



Data collected during 2021-2022 indicated a slight increase of Total Suspended Solid concentrations in instream monitoring comparative to the average Total Suspended Solids concentrations 2016-2021 in Valley Creek for the past six years. However, sampling sites show an actual degrease of TSS concentrations compared to historic average data.

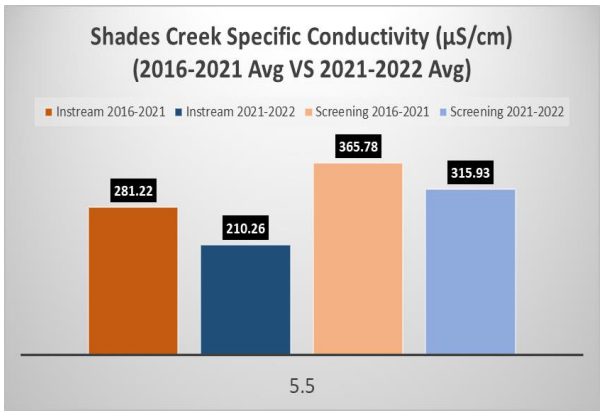


As can be seen on the associated chart the Turbidity for Valley Creek has on average for this year's sampling period 2021-2022 has decreased from the average data collected during 2016-2021 sampling period.

In summary a marked improvement in turbidity and slight improvement in specific conductivity would indicate an improving trend with Valley Creek Watershed, however, other parameters especially E. coli would indicate a negative trend in water quality. Increased sanitary sewer overflows (SSO's) discharging into Valley Creek compared to the previous year's data could be the cause of increased E. coli concentration levels.

Shades Creek:

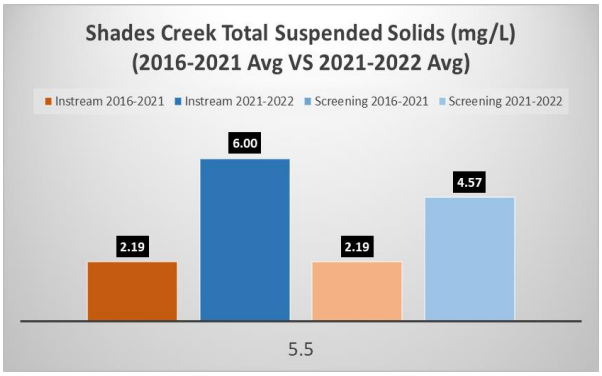
Shades Creek within the City of Birmingham extends approximately 4.5 miles. Shades Creek enters the City of Birmingham at mile 5.0 from Irondale, becoming a shared stream with the Stormwater Management Authority by mile 5.8. Ultimately, Shades Creek leaves the City of Birmingham at mile 7.2.



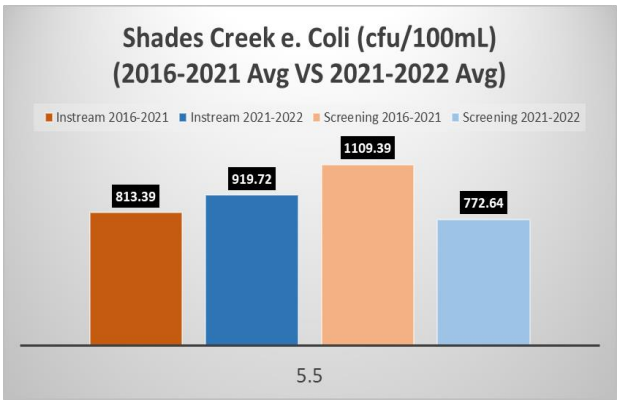
The City of Birmingham only samples Shades Creek at instream mile SC05.5 and at screening site SC05.5s. Average specific conductance at this monitoring site during the past six years is shown. The five-year average of Specific Conductance was 365.8 µS/cm at screening site SC05.5s and 281.22 µS/cm at instream site SC05.5. This year the average specific conductance was 315.93µS/cm at screening site SC05.5s and 210.26µS/cm at instream site SC05.5. This would leave the reader to believe that the main contributor to the increase in Conductance at this site would be from the screening outfall at SC05.5s more than the instream upstream flow at SC05.5.

The screening location SC05.5s can be problematic because this is the main discharge point for approximately 40 square miles of commercial and residential land use with a high percentage of impervious surface areas. The 40 square miles is collected and conveyed subsurface to the SC05.5s discharge point.

Past enforcement activities have occurred upland of the discharge point when commercial properties were observed discharging untreated wastes into the Stormwater's MS4.



This reporting year average total suspended solids (TSS) at both instream and screening sites exceeded the previous years (2016-2021) combined averages, respectfully. This is a result of sampling during heavy rainfall and high flow events, the 2021-2022 reporting year.



Average E. coli levels for this year's average (2021-2022) yielded an increase in instream at SC05.5 and a decrease in screening site SC05.5s compared to previous years combined averages.

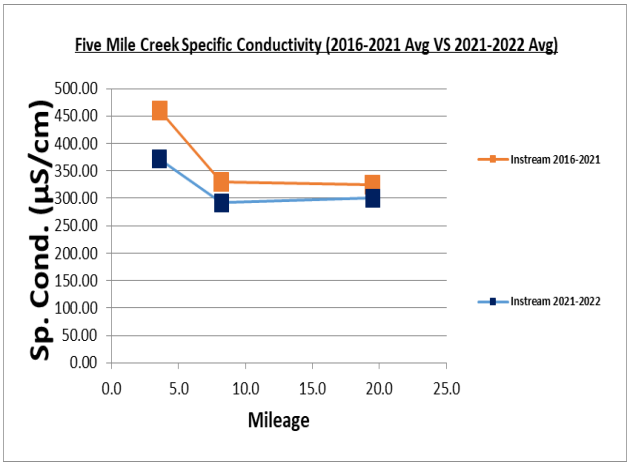
Watershed Management continues to investigate for IDDEs and SSOs. Staff also continues to engage in educational opportunities and public outreach with the community in the general area. This plan of attack should improve pathogen concentrations at this site.

Five Mile Creek

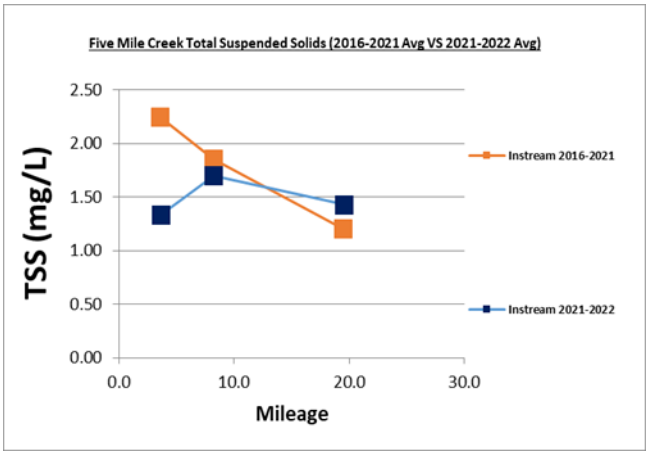
Enters City (Mile Mark)	Exits City (Mile Mark)	Sample Station
3.02	3.32	-
3.59	3.85	3.60
3.91	4.83	-
5.12	5.18	-
5.26	5.29	-
5.73	5.77	-
6.03	8.44	8.20
13.46	14.01	-
14.25	15.13	-
17.21	17.43	-
17.50	19.28	-
19.30	20.64	19.50
21.14	21.19	-

Five Mile Creek runs discontinuously through Birmingham's city limits over the course of 8.84 miles. Monitoring Five Mile Creek is difficult due to the creek locations within the City of Birmingham relative to the points of safe access. The associated table identifies entrance and exit points. This table shows that most of the stream segments within the City of Birmingham are less than one mile in length and of the two that are greater than one mile in length, Birmingham Watershed Management samples one of them at station 8.2 miles. As a result, there are perhaps multiple opportunities for the water quality in Five Mile Creek to be influenced by other jurisdictional inflows into the creek.

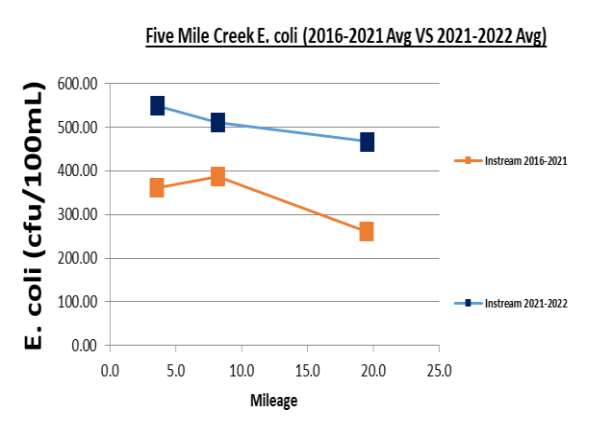
The figure below demonstrates the six-year reporting period for average Specific Conductivity.



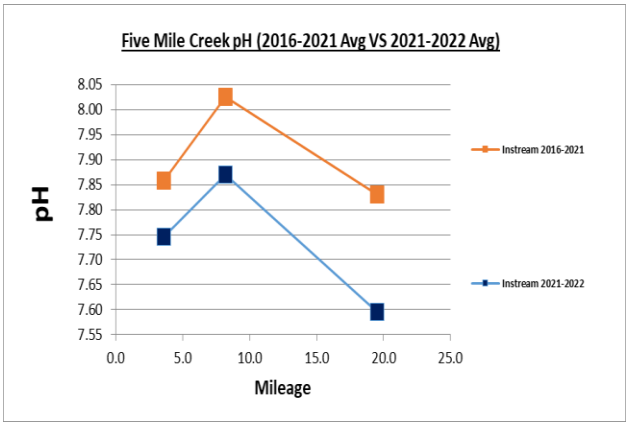
The average specific conductivity during the current reporting period in Five Mile Creek is slightly lower than the prior five-year period. Specific Conductivity trendline is consistent compared to historic data collected starting in 2016.



The corresponding Total Suspended Solids (TSS) graph indicates that although the headwaters average concentration is lower than historic values, the data depicts readings to be slightly elevated before exiting the City. This slight uptick could be a result of sampling during heavy rain events and high flows or influence from surrounding jurisdictions.



Monitoring for pathogens this year (2021-2022) demonstrated an increase over the preceding five-year period. This average increase in E. coli levels could be a result of sampling during flood stage rain events with contamination conditions.



Both current data (2021-2022) and historical data (2016-2021) display a similar trendline. All pH unit levels remain within acceptable ranges for both previous averages and current year averages.

Cahaba River:

The City of Birmingham only samples the Cahaba River just downstream of the confluence of the Cahaba and Little Cahaba Rivers at County Road 280. The rationale for this was reported in the Water Quality Monitoring Strategy report submitted in October 2013[iii]. In that report it was mentioned that former City monitoring stations in the Little Cahaba River and Lake Purdy were being monitored by the Birmingham Water Works Board (BWWB). The adjoining table provides a summary of that data, provided to the City by the BWWB, comparing the average concentrations of select parameters shared in common during the 2016 reporting period.

For the most part, concentrations of representative data being collected by the City at CR280 is like that being collected by the BWWB at 6-sites located throughout the Cahaba and Little Cahaba River systems. The BWWB monitoring locations contained herein include:

- ★ Cahaba Beach Road
- ★ Shepherds Branch
- ★ Sunshine Creek

For as City of Birmingham and BWWB selected water quality sampling location for the Cahaba River it appears that for Nitrate, Nitrite, Total Phosphate and TSS they are comparably the same. As seen in the following table. During this same period E. coli mean concentration collected by the City of Birmingham was slightly elevated compared to BWWB sample results.

Parameter	2021-2022 Geometric Mean Concentration	
	City of Birmingham	Birmingham Water Works Board
Nitrate (mg/L –N)	0.36	0.25
Nitrite (mg/L – N)	<0.3	<0.3
Total Phosphorous (mg/L – P)	<0.02	N/A
TSS (mg/L)	1.77	2.75
E. coli (mpn/100mL)	112.88	90.05

The Birmingham Water Works Board (CCR) reported pH ranged in 2021-2022remained within acceptable ranges. All pH levels recorded during sampling events by the City of Birmingham Watershed Management Staff in the Cahaba River remained well below the maximum allowable level of 8.5 for Outstanding Alabama Water.

Anti-Degradation Table reflects study period 2016-2021 and 2021-2022 annual period.

Stream	D.O. (mg/L) Min/Max	pH Units Min/Max	Temp. F⁰ Geo-mean/Max	*E. coli* mpn/100mL/s Geo-mean/Max	Turbidity NTU Geo-mean/Max	Zinc µg/L Geo-mean/Max
Cahaba	5.48/6.05	6.93/7.12	64.2/60.78	116.05/112.88	9.05/16.64	
Five Mile	3.9/7.7	7.0/7.01	62.8/62.52	134.39/138.24	3.061/6.02	
Village	7.03/4.8	6.9/7.61	64.7/63.1	200.7/220.23	3.4/3.67	14.4/32.02
Valley	5.4/6.99	7.0/7.3	65.1/64.8	576.4/622.09	7.3/6.4	
Shades	0.6/7.16	7.29/7.29	63.7/62.7	523.3/293.19	4.5/12.11	

Anti-degradation Analysis:

The State of Alabama has established use classifications throughout many of the City of Birmingham's stream segments. According to the EPA, a key concept in assigning designated uses is "attainability," or the ability to achieve water quality goals under a given set of natural, anthropogenic, and economic conditions with the overall success of pollution control efforts being dependent on the reliability of the underlying designated uses in water quality standards.[v]

The table above provides the results of Birmingham's sampling efforts this year for five key state Anti-degradation parameters and for zinc in Village Creek alone, including:

- ★ Dissolved Oxygen (D.O.; mg/L)
- ★ pH (Units)
- ★ Temperature (F⁰)
- ★ *Escherichia coli (E. coli; mpn/100mL)*
- ★ Turbidity (NTU)
- ★ Zinc (µg/L) – Village Creek Only

This table represents the level of compliance with the State's Anti-Degradation Policy for all streams within the City of Birmingham. The chart has been color coded to represent stream designated uses. In blue represents

a designated use as an Outstanding Alabama Water; the tan shaded stream represents a swimming/bodily contact use; in green, those streams represent limited warm water fishery use; Valley Creek is not shaded, which is indicative of a stream with no defined designated use (e.g. §303(d) list or in Chapter 335-6-11). However, for reporting purposes the agriculture and industrial water supply designation is used to document compliance with state law. Where two numbers are shown, the first number is the geometric mean concentration of all instream site values starting in 2016, while the second number represents the highest concentration reported during the bimonthly (every two months) sampling period this year 2022.

For each stream: red, green, and yellow color-coded boxes and circles have been added. The color-coded boxes represent the results of sampling during 2021-2022, inclusive. The color-coated circles represent the results of sampling during the period 2016-2021, inclusive. The circles and squares are colored to represent the status of adherence to select parameters defined in Chapter 335-6-10 of the "Alabama Department of Environmental Management Water Division – Water Quality Program, Water Quality Criteria" which represents the regulatory standard condition for each stream use classification. For example, if a green box has been added the regulatory standard condition for that parameter, for that period, was completely met for that stream designated use. A yellow box or circle means that at least a portion of the standard condition was not met for that stream designation during that representative period. A red box or circle added means the standard condition for that parameter was not met during the reporting period for which monitoring was done. The mean for each parameter represents the geometric mean as required by the Anti-Degradation Policy. Zinc levels in Village Creek are represented as the geometric mean and maximum concentration. A green box or circle represents that zinc concentrations did not exceed either the chronic (248µg/L) or acute (246µg/L) aquatic life criteria during that period. A yellow box or circle represents an acute or chronic aquatic life exceedance; the red box or circle represents a chronic or acute aquatic life criteria exceedance.

This year the City has attempted to compare and contrast zinc with the pre-established Administrative Code in Village Creek; other obvious concerns appear needing further discussion. For example:

- ★ City zinc data is collected and reported as total zinc, not recoverable as further defined in Section 335-6-10.07. "Alabama Department of Environmental Management Water Division – Water Quality Program, Water Quality Criteria".
- ★ Hardness is routinely analyzed by the City using test strips, which have obvious sensitivity limitations.
- ★ Hardness data reported by the City using test strips appears higher on average then that reported in

literature for Village Creek. For example, the Geo-mean for City hardness was 256mg/L for the period between 2015–2020 inclusive. According to the Water-Resources Investigations Report 02-4182 for Village Creek, the Geo-mean for hardness was calculated as being 149.8mg/L.

- ★ City is unaware if whether Equation #14 of the State Anti-Degradation Code, which is reported as recoverable, can even be used for total zinc.

For comparative purposes, Anti-degradation policy equation #14 is used to define the freshwater acute aquatic life criteria and equation #15 is used to define the freshwater chronic aquatic life criteria in Village Creek. As these equations are hardness dependent, a geometric mean for hardness of 258mg/L was used to represent the data collected between 2016 and 2021, inclusive. The geometric mean for hardness representing the period between 2021 and 2022, inclusive was 239mg/L.

Zinc was detected in 100% of the study samples collected for FY 2022. The maximum concentration of zinc was 224µg/L at VIC08.1 on December 7, 2021. Concentrations of zinc did not exceed the acute (246 µg/L) and chronic aquatic life criteria (248µg/L) for FY 2022

Overall, the pH of surface water generally ranges from 6 to 9. ADEM established a pH range of 6 to 8.5 to reduce the effects of highly acidic or highly basic water on fish and wildlife. There were no pH values less than 6.0 units or greater than 8.5 in any creeks for FY 2022.

Eschericia. coli. (E. coli) in the Cahaba River, Village and Five Mile Creeks, remained consistent were the geometric mean maximum concentration remained lower than the State Standard and were not exceeded during this Fiscal Year. However, Valley Creek and Shades Creek did exceed the geometric mean during this year's 2021-2022 reporting year.

In Valley Creek this was due to the illicit discharge at VC0.1s as previously discussed in the Water Quality summary.

Shades Creek had elevated geometric mean concentrations E. coli levels due to the June 8, 2022, flooding during a sampling event at SC05.5s and SC5.5. Increased flow from rain a sever rain events did contribute to these higher results.

Overall, Jefferson County Environmental Services for this year's reporting period, estimated that 2,392,430 gallons of untreated sewage made it into the four creeks and Cahaba River watersheds. This information excludes estimated ground absorbed quantities.

This is an increase of over 2 million gallons into surrounding watersheds from last years (FY 2020-2021) reported quantity.

During FY 2021-2022, an estimated 1,870,499 gallons of untreated sewage was discharged into Valley Creek alone, which was the greatest amount discharged into any of the City of Birmingham Watersheds.

This information does not include any discharges outside the City limits that may have been discharged upstream and found their way into the City's various watersheds.

Temperature levels for all creeks, at all locations in Birmingham, did not exceed state Anti-degradation regulations at any time during the study period from 2016 to 2022.

Dissolved Oxygen levels met minimum concentrations during this year's reporting cycle from 2021 to 2022.

Turbidity data remained below 50 NTUs within compliance levels during the 2021 to 2022 reporting cycle except for Five Mile Creek, Valley Creek and Shades Creek and Cahaba River showing high turbidity readings during an extreme rain event with high velocity flow on June 8, 2022.

It is worthy of note that hardness, pH, and recoverable zinc were not dissimilar to the findings reported by the USGS in 2000-2001 study[vi]. Higher pH levels studied during 2000 -2001 along Village Creek by the USGS (USGS 2002) noted that higher pH was indicative of carbonate-based geology in the area. Valley, Village, and Five Mile Creeks originate from limestone and dolomite karst springs, which could explain some higher pH readings when the City of Birmingham conducts its water quality analysis.

Many natural conditions including rainfall, karst geology and carboniferous soils can affect the surface water parameters such as TSS, pH, and zinc, causing an influence on such parameters in the Valley, Village and Five Mile Creek's drainage basins. Studies on how much influence erosion and karst ground water have on TSS, pH, and zinc and the effect on the drainage basins in the Birmingham area is still needed.

Stormwater Operating Budget FISCAL YEAR 2022	
Stormwater Management Fund 048	
Estimated Revenues	
Stormwater Fees (total estimated revenue)	$1,527,577.00
Appropriations	
Stormwater Personnel	$1,075,937.00
General Expenses	$451,640.00
Total Appropriations	$1,527,577.00

The table above depicts the Mayor's FY 2022 fiscal proposed operating budget for Stormwater Management. This represents the total cost for maintenance of the NPDES MS4 Phase I Permit.

COMPARATIVE SUMMARY OF STRENGTHS AND WEAKNESSES

BMP Controls	Strength	Weakness	Why a Weakness?	Future Direction
Structural Maintenance		X	Found examples of failure to document and maintain detention/retention systems and the MS4 by the Departments of Public Works and/or Parks & Recreation.	Perform bi-annually inspections of installed systems and meet quarterly with Leadership to address problems and better coordinate resolution. The City is also considering a SMART Maintenance System through Asset Management.
Development Planning	X			
Roadway Maintenance	X			
Flood Management	X			
Municipal Facilities	X			
PHF	X			
IDDE	X			
Spill	X			
Oil & Hazardous Waste	X			
Sanitary Sewer Seepage		X	Although the City does not have a sanitary sewer system, coordination with Jefferson County to obtain annual reports has been difficult although support with IDD&E requests have been good.	Continue to seek better collaboration with Jefferson County Environmental Services.

COMPARATIVE SUMMARY OF STRENGTHS AND WEAKNESSES

BMP Controls	Strength	Weakness	Why a Weakness?	Future Direction
Industrial Inspection	X			
Construction Planning	X			
Construction Inspection	X			
Education	X			
Monitoring & Screening	X			
TMDL Response	X			
Effectiveness of SWMPP	X			Implementation of SWMPP's have been achieved for Stormwater Management. Further evaluation will be planned to improve the programs

Acronym Appendix

Abbreviation	Name
ACES	Alabama Cooperative Extension System
ADEM	Alabama Department of Environmental Management
AEC	Alabama Environmental Council
AGU	American Geophysical Union
BBG	Birmingham Botanical Gardens
BFD	Birmingham Fire Department
BMP	Best Management Practice
BWWB	Birmingham Water Works Board
CAP	City Action Partners
CCR	consumer confidence report
CFC	Chlorofluorocarbon
CFM	Certified Floodplain Manager
CFR	Code of Federal Regulations
COB or City	City of Birmingham
CRS	Community Rating System
DDS	Jefferson County (DDS?)
DEA	Drug Enforcement Administration
DMR	Data Migration Resources
DPW	Department of Public Works
EPA	Environmental Protection Plan
EPCRA	Emergency Planning and Community Right to know Act
ESC	Erosion and Sedimentation Control
ESD	Environment Services Department
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year

Abbreviation	Name
GGI	Greenhouse Gas Inventory
GI	Green Infrastructure
HBAA	Home Builders of Association Alabama
HEC-RAS	Hydrologic Engineering Center's River Analysis System
HHW	Household Hazardous Waste
ICLEI	International Council for Local Environmental Initiatives
IDD&E (IDDE)	Illicit Discharge Detection and Elimination
JCEMA	Jefferson County Emergency Management Agency
JCSWCD	Jefferson County Soil and Water Conservation District
KBB	Keep Birmingham Beautiful
LEED	Leadership in Environmental and Energy Design
LID	Low Impact Development
MEP	Maximum Extent Practicable
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
MSDS	Material Safety Data Sheet
NAICS	North American Industry Classification
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRDF	National Disaster Response Framework
NTU	Nephelometric Turbidity Units
ORP	Oxidation / Reduction Potential
P.L.	Per Liter
PALS	People Against a Littered State
PEP	City of Birmingham's Planning, Engineering, & Permits Department
PHF	Pesticides-Herbicides-Fertilizers

Abbreviation	Name
PIP	Process Industry Practices
PPI	Program for Public Information
QCI	Qualified Credentialed Inspector
R&TD	Roads and Transportation Department
RLAA	Repetitive Loss Area Analysis
ROWSOPs	Right-of-way Standard Operation Procedures
SARA	Superfund Amendments and Reauthorization Act
SAT	Scholastic Assessment Test
SDS	Safety Data Sheet
SEC	Sediment and Erosion Control
SIC	Standard Industrial Classification
SMART	Specific Measurable Achievable (or attainable) Time-bound
SPCC	Spill Prevention Control and Countermeasure
SPO	Sewer Permit Ordinance
STAR	Sustainable Tools for Accessing & Rating Communities
SWMM	Storm Water Management Model
SWMPP	Stormwater Pollution Prevention Plans
T.P.	Total Phosphorus
TN	Total Nitrogen
TSS	Total Suspended Solids
UAB	University of Alabama at Birmingham
USDA	United States Department of Agriculture
USGBC	The U.S. Green Building Council
USGS	U.S. Geological Survey
WLA	Waste Load Allocation

Annual Report End Notes

[i] Final Village Creek, Zinc, pH, and Siltation TMDL
[ii] IBID. Page 81.
[iii] City of Birmingham. October 4, 2013. *Water Quality Monitoring Strategy for Alabama Department of Environmental Management*.
[iv] Final Village Creek, Zinc, pH, and Siltation TMDL, Page 18
[v] Basic Information: Introduction to UAAs | Use Attainability Analysis | US EPA
[Vi] Geological Survey - Ground Water Availability, Jefferson County. 1990.Page 14-15