

MUNICIPAL SEPARATE STORM SEWER SYSTEM

NPDES PERMIT NUMBER: AL000001

FISCAL YEAR 2014-2015

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) 2015 ANNUAL REPORT

PERMIT YEAR (ADMINISTRATIVE EXTENSION)

OCTOBER 1, 2014-SEPTEMBER 30, 2015

DECEMBER 2015



BIRMINGHAM
— FORWARD —
MAYOR WILLIAM A. BELL, SR.





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City of Birmingham, 2015
Alabama
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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. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____

Name: Thomas H. Miller

Title: Stormwater Administrator

Date: _____





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LIST OF CONTACTS & RESPONSIBLE PARTIES

AGENCY	NAME	TELEPHONE NO.	RESPONSIBILITY
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CITY OF BIRMINGHAM PLANNING, ENGINEERING, & PERMITS	WILLIAMS, BARRY	(205) 254-2345	GIS PROGRAMMER ANALYST



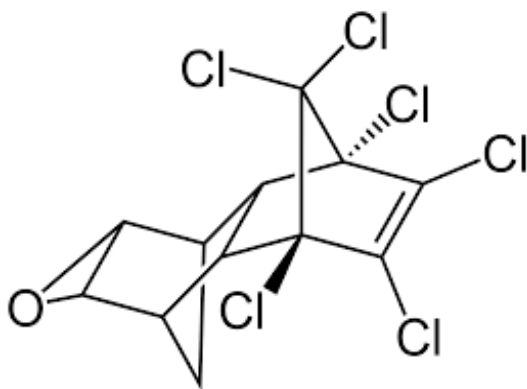
STORMWATER MANAGEMENT PROGRAM EVALUATION

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 Stormwater Management Permit (No. ALS000001), dated October 12, 2001, for the operation of its municipal separate storm sewer system (MS4). That permit, which became effective on November 1, 2001, outlines a number of 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 are several water resource segments that presently 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 pollution to these waterbodies. To achieve overall water quality improvements 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 and 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.*
2. *By 2017, reduce pollutant loadings from each of the City's major streams by a minimum of 10% from the levels to be established in 2014.*
3. *By combination of both pollution control and preventative approaches, reduce or remove pollutants from both*
the MS4 and Birmingham's creeks and streams.
4. *Development and implementation of watershed basin-wide strategies to address water quality and quantity problems in City of Birmingham watersheds, initiating a watershed management plan for Village Creek in 2014.*
5. *Ensure legal authority exists to control discharges to and from the City's MS4 by the establishment of a stormwater protection ordinance.*

MAJOR FINDINGS

During NPDES Stormwater Permit reporting year 2014-2015, the City of Birmingham identified numerous major findings having contributed to significant programmatic impacts, which will be listed below. Some of the below listed items may be further discussed in later sections of this report and are so *noted*.



DIELDRIN: In October 1997 an accidental spill of the pesticide Dursban® washed into Village Creek while attempting to extinguish a fire at Industrial Distribution Services Warehouse, Inc. Subsequent to that event, the U.S. Geological Survey (USGS) did an extensive water quality study in Village Creek in 2000-2001 that ultimately led ADEM to list Village Creek as impaired for Dieldrin. The City, after years of sampling for Dieldrin has reported no findings of Dieldrin in Village Creek and requested consideration for delisting. Furthermore, records from ADEM demonstrated that all of the 48-samples collected in 2012 were below the MDL of 0.0028 µg/L and fish tissue samples were likewise well below the qualifying action level of 0.3 µg/g (Appendix A). However, the U.S. Environmental Protection Agency (USEPA) would not concur with ADEM's request

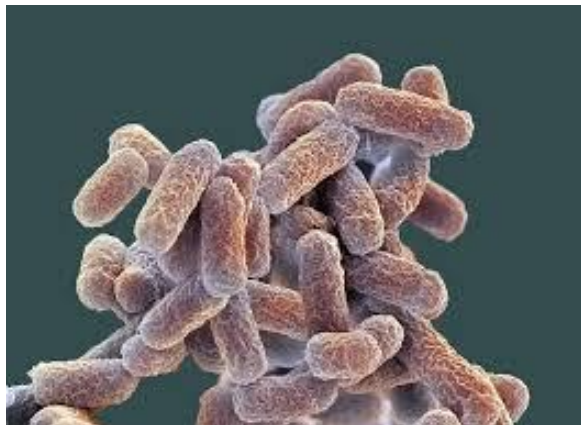
to delist the two segments of Village Creek for Dieldrin. Subsequently, ADEM has released its final §303(d) list in 2014 noting that the City's request to remove Dieldrin from the impaired waters list had been withdrawn. The reason for USEPA's lack of concurrence was based on concerns for the detection levels used in sample analysis. The method used to determine the Dieldrin levels by both the City and ADEM was greater than the criteria needed to demonstrate that water and fish tissue quality levels were protective of human health.

Therefore, in collaboration with ADEM and the City, the USEPA Water Protection Division (WPD) requested the Science and Ecosystem Support Division (SESD) to collect and analyze surface water samples for Dieldrin to assist in the possible removal of Village Creek from the 303(d) list of impaired waters. A quality assurance project plan (QAPP) was prepared in May 2015 and surface water samples were collected on June 3, 2015. The final report concluded that concentrations of Dieldrin measured in Village Creek surface waters exceeded the human health criterion in Alabama and that the WPD would be responsible for any decisions regarding Village Creek based on the data provided in that report (Appendix A).

The USEPA has developed a monitoring strategy for the collection of water, sediment, and fish tissue, which included funding to implement the monitoring. As of this date, the USEPA and ADEM are considering what next steps will be needed and the extent of cooperation that will be accommodated.

Until further direction is provided by ADEM, the City has discontinued Dieldrin monitoring in Village Creek as of March 2014 and will discontinue any further efforts in this regard given

WPD's expression of responsibility for this issue going forward.



PATHOGEN TMDL: Two segments of Village Creek are currently listed on Alabama's §303(d) impaired waters list for pathogens. The impaired segments span a total of 16.64 miles, draining 52.2 square miles. The two segments, AL03160111-0408-102 (Second Creek to Woodlawn Bridge) and AL03160111-0408-103 (Woodlawn Bridge to its source) have been on this list since 2006 for pathogens. In 2014, ADEM collected additional water quality data using the newly adopted pathogen impairment criteria, with *Escherichia coli* (E.Coli) serving as the primary pathogen indicator. Based on the TMDL analysis, it was determined that a 26% reduction in E.coli. loading from municipal separate storm sewer systems (MS4s) would be necessary to achieve compliance with applicable water quality standards. Leaking collection systems were excluded from any requirement beyond a reduction to the maximum extent practicable (See Appendix A).

The City of Birmingham provided comments to this TMDL on August 5, 2015, which expressed concerns for the flow measurement data collected at VLGJ-2, with cause, and why that particular site was selected as representative of an elevated nonpoint source when in close proximity to a large

sanitary sewer chimney and directed flow from Cotton Mill Branch at the same sampling site location. Furthermore, the City questioned why no waste load allocation was determined to be necessary for the sanitary sewer collection system.

ADEM provided a response to the City's concerns on October 19th, which is appended to this report in Appendix B.



MUNICIPAL TRUCKS WASH: The City of Birmingham operates a household solid waste collection program that is regulated by the State Department of Health, in accordance with Administrative Code Chapter 420-3-5. As such, the City is obligated to obtain a permit from the local Department of Health to operate the solid waste collection and garbage transport program, which must be accompanied by documentation of the method by which the collection and transportation equipment containing garbage will be flushed, cleaned and maintained (Chapter 420-3-5-.11(1)(c)2.). Furthermore all vehicles and equipment used for the collection or transport of solid waste containing garbage must be operated and maintained to prevent a public health nuisance. Wastewater resulting from the flushing or cleaning of equipment used to transport garbage must also be approved by the permit. The City has the requisite permits to operate its garbage collection program and to flush and clean all trucks transporting garbage on a permitted

frequency. During this period though, Stormwater Management identified that the trucks were being washed in close proximity to stormwater inlets with direct discharge to the municipal separate storm sewer system (MS4) without treatment controls or BMPs in place. Given the City operates its fleet of garbage trucks in four distinct areas of the City and maintains its fleet in similar fashion, a solution to eliminate improper flushing of the City's garbage truck fleet is needed. The City is at this time considering development of a new truck wash facility to be located at the New Georgia Landfill, which will recycle truck wash water and dispose of any excess water in compliance with a new NPDES permit to operate the facility. Funding is being obtained at this time. Development of engineering plans has already begun.



WATER QUALITY MONITORING: During this report cycle flow measurements were discontinued due to equipment failure and the need for replacement. The Stormwater

Administrator is reconsidering how best to proceed with that effort and is presently considering other options.

Additionally, the City stepped up the identification of outfalls in portions of Village Creek in conjunction with its watershed planning effort and physical assessment of stream condition. In doing so City staff visited numerous outfall locations to better understand ownership and discharge status of those properties. Thanks to this effort a significant addition to this year's report is included for a more extensive discussion of pollutant loadings in Village Creek. That will be discussed in more detail in the ***Major Accomplishments*** section of this report. Lastly, this report will also begin to address *Escherichia coli* (*E.coli.*) problems evident in many of the City Streams, but for none more importantly than in Valley Creek. Given the persistent high levels of *E.coli.* in Valley Creek, the City is considering a more comprehensive approach to addressing this problem and doing so in conjunction with Jefferson County Environmental Services, among other partners. This too will be discussed more in more detail in the ***Major Accomplishments*** and ***Future Program Direction*** sections of this report.

OUTFALL RECONNAISSANCE: During the past two annual report cycles the City has recognized a weakness in mapping the City's municipal separate storm sewer system (MS4). Although the City retained professional services to assist in determining and mapping certain flood prone areas, mapping the full extent of the City's MS4 continues to be a weakness. Furthermore the City also documented in last year's annual report more than 800 outfalls existed and have been mapped within the City's major stream basins; however ownership (i.e. City MS4 or private) of those outfalls has yet to be determined. Since the City has been unable to adequately document ownership and given Stormwater Management's

need to understand the source of any dry weather flows, it was determined this year to address this issue through other methods, including performance of a stream assessment project and looking into existing State NPDES permits and physically inspecting outfalls to help resolve this dilemma.

During this reporting period the City began a concerted effort to identify the ownership of all storm sewer infrastructure to those creeks within City limits, commencing with Village Creek first. From ADEM's website Stormwater Management was able to identify a total of 71 facilities in the Village Creek watershed, which had a range of from one to six outfalls. However, not all of the permitted facilities from ADEM's website included outfall location information. The City was only able to identify outfall location information from either reported notices of intent to file (NOI) for a general NPDES operating permit or in those cases where a permit was posted to ADEM's eFile System, only those having also the NOI attached included outfall locations. As a result, Stormwater Management has been unable to identify the full extent of outfall locations from ADEM's eFile System. Additionally, many of the reported outfall locations from ADEM's eFile system did not report discrete outfall locations but used the same latitude/longitude location information for each outfall posted where more than one outfall did exist. As a result, Stormwater Staff are now going to each outfall location at the property from which drainage originates and speaking with each property owner about their associated property use to determine the origin of water being discharged (i.e. nonpoint stormwater or process water). This effort is being accomplished on an "as time permits" basis given the significant work load on current staffing levels.

UTILITY FEE: In April 2014 the Governor signed into law Alabama Act 2014-439, which provided

further direction to local governments how stormwater utility fees were to be assessed and collected. Although the City already had the authority to collect fees and had begun many of the activities to define and implement a program to comply with its existing NPDES MS4 Permit, the new law changed the previous funding structure and further defined limitations for the City's local program. As a result of those changes the City of Birmingham entered into a contract with ARCADIS-US, Inc. to re-examine the City's current stormwater utility fee process with requirements to:

- Determine the feasibility of creating a stormwater utility as allowed by law
- Determine the impact on the City's stormwater management program plan
- Develop a defensible and sustainable rate policy and structure
- Establish a City ordinance to enable the stormwater utility to implement the City's comprehensive stormwater management program

From the City's last annual report the City currently generates approximately \$740,000 annually in stormwater utility revenues. Although it was anticipated that this new law would generate somewhat greater revenues, closer scrutiny of the existing collection system under current law suggested limitations having the potential to significantly reduce revenues when implementing the new law unless changes were made. Furthermore, renewal of the City's current NPDES MS4 Permit is anticipated to further impact the current City Stormwater Management Program, which could further impact the City's stormwater program budget.

At present the City's consultant is preparing a stormwater utility master account file tool for the



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Jefferson County and Shelby County Tax Assessors, based on impervious area, which will be used by each Assessor's Office to generate and deliver customer bills along with property taxes. These files are anticipated to be completed in October for review and equity certification by the Jefferson and Shelby County's Boards of Equalization and Tax Assessor's Offices. Billing is anticipated for the FY2016 tax year. For the FY2015 tax year, billing will be as previous years with the exception that 5% of all generated fees will be placed into escrow for the State Department of Revenue, as provided for in Alabama Act 2014-439.



MAJOR ACCOMPLISHMENTS

During NPDES Stormwater Permit reporting year 2014-2015, two administrative changes occurred:

1. One position (Water Pollution Control Technician) was vacated, leaving a significant loss in the “in-stream” monitoring portion of the Program. In the interim, the Stormwater Administrator Position filled the positional duties in sampling while the other position picked up additional administrative duties. This position is anticipated to become filled early in 2016.
2. A new Senior Engineering Position was added to the Program to facilitate Construction Site Plan review and Post-Construction Planning, in anticipation of the new City NPDES permit. This position is also anticipated to oversee changes to the Soil Erosion Control Program anticipated in 2016.

The City of Birmingham has also accomplished a number of significant programmatic efforts related to development controls. These include efforts associated with:

- **Planning Controls**
- **Policy Controls**
- **Project Controls**
- **Regulatory Controls**

DEVELOPMENT CONTROLS:

The federal Water Pollution Control Act P.L. 107-303, November 27, 2002 established requirements to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and

system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants.ⁱ Consistent with the provision of federal law the Storm Water Regulations (40 CFR Part 122.26) further delineated the need for large municipal separate storm sewer system dischargers to have a comprehensive planning process, which involves public participation and where necessary intergovernmental coordination, to reduce the discharge of pollutants to the maximum extent practicable using appropriate and delineated controls.ⁱⁱ

The original NPDES MS4 Permit (ALS000001), effective November 1, 2001, required in Part II.A.2. that for areas of new development and significant redevelopment a comprehensive master planning process (or equivalent) to develop, implement, and enforce controls to minimize the discharge of pollutants from areas of new development and significant redevelopment after construction be completed. In order to accomplish the permitted development objectives four development controls are used by the City for new development and significant redevelopment. These controls span *planning*, *project*, *policy*, and *regulatory controls* and are applied to the aforementioned areas based on environmental classification.

Planning controls for example are employed in Birmingham through implementation of comprehensive planning policies and objectives that are consistent with the goals of the Phase I NPDES MS4 program. Generally, they are applied to all areas regardless of environmental classification. Project controls are generally corrective as well as restorative in application, and are primarily applied to environmentally impaired and sensitive areas. Primary project controls include brownfields reclamation, floodplain property acquisition, parkland and open space

creation, environmental/stream restoration, and drainage infrastructure repair and replacement projects. Policy controls are generally preventive in intent and are primarily applied to environmentally sensitive and impaired areas. An example of a City policy control is best represented by the City's Engineering Design Guidelines for Subdivisions or Commercial Developments. Regulatory controls used by the City include subdivision regulations, sediment and soil erosion control regulations, the zoning ordinance, and the City's new stormwater protection ordinance, which was approved by the City Council in December 2014. Regulatory controls are applied across all environmental classifications (i.e. in all areas of new development or significant redevelopment) and will be discussed in more detail later in this report.



PLANNING CONTROLS:

Although Stormwater Management has reported approval of the City Comprehensive Plan, the first in more than 50-years, last year; further developments have occurred in FY2015. Since last year's report the City has received National recognition by the Alabama Chapter of the American Planning Association's 2013 Outstanding Planning Award for a Comprehensive Plan. 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. The Comprehensive Plan's recommendations were broken down into five parts, including: Green

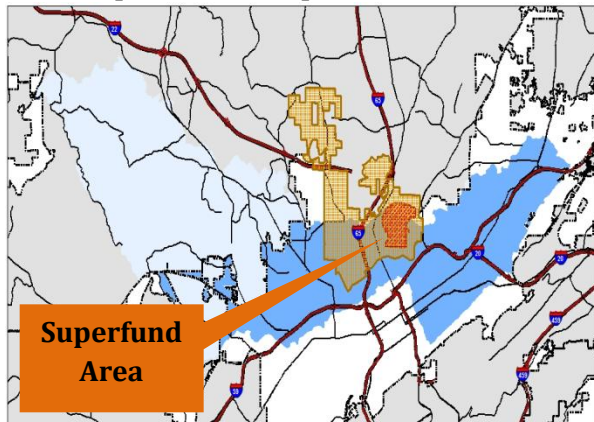
Systems; Neighborhoods, Housing & Community Renewal; Prosperity & Opportunity; Strengthening City Systems & Networks; and, from Plan to Action.

Of particular interest is the Green Systems element of the Comprehensive Plan. That element included several goals, which among them is meeting clean water standards. To that end, the Mayor has requested the Birmingham Chapter of the American Institute of Architects to recommend an award be created to recognize new buildings and building renovations/additions that are designed and constructed as high performing, sustainable buildings. The "Green Building Award" will highlight buildings that respond sensitively to the numerous and varied environmental influences in the region. Among the seven initiatives proposed the award program establishes "Leadership in Energy and Environmental Design" (LEED) as the minimum threshold for award. The award program also requires the identification of critical environmental issues for the Birmingham area and those specific responses to these issues be addressed. The intended outcome of this and a new Framework Planning effort is intended to encourage wiser patterns of real estate development and City growth while reducing the demand for growth on existing infrastructure, including storm sewers. In addition, Planning Staff is developing 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.

Where development of a city comprehensive plan is best considered a "macro-evaluation" of existing and future city development through goals, policies, and objectives, framework plans are a more "micro-evaluation" of sub-regions of the City at the community or neighborhoods level.

FRAMEWORK PLANS:

The goal of framework plans, working closely with and in conjunction with individual community areas, is to establish a guide and set of policies to better align resources and improve the quality of life for residents and businesses residing within the framework planning area. Presently three framework plans were developed in the City of Birmingham and have been adopted. The three plans included North Birmingham (Adopted February 18, 2015), Titusville (Adopted February 4, 2015), and the Western Area (Adopted May 6, 2015). These Framework Plans update land use plans and regulations to provide area specific development controls and include several categories ranging from high intensity development like industrial to parks and open space and similar low intensity uses. The other Framework Plans (i.e. Northeastern and Southwestern Framework Plans) are anticipated to be completed in 2016.



Those communities making up the North Birmingham Framework planning area were evaluated first, in measure because of the presence of a portion of the area being designated as a federal superfund area. See the figure above. A copy of the North Birmingham Framework Plan is included in Appendix C. The plan has established

SHORT-TERM ACTIONS

LONG-TERM ACTIONS

Request ACOE Technical Assistance	Complete Village Creek Watershed Management Plan
Partner with USEPA & others through watershed planning	Apply for federal/state funding support for flood control, watershed protection projects
Map drainage basins & fully assess 10 flood prone areas	Initiate Five Mile Creek watershed planning effort
Identify preliminary solution alternatives based on scale of problem within the watershed management plan for Village Creek	Review and amend land development regulations to facilitate green infrastructure projects
Complete calibration of existing conditions model for Village Creek	Continue coordination efforts partners, public, others
Complete Village Creek flood model assessment project	
Develop conceptual reuse options for previously acquired flood prone areas	
Identify FEMA/ACOE acquired properties and submit request for reuse	
Evaluate & recommend enhancement to Village Creek flood warning system	
Amend flood protection ordinance to reduce blight causing conditions	

three primary goals with action strategies for housing, commercial revitalization, and health, which the community believes will lead to positive change. Within the context of the North Birmingham Framework Plan includes an interagency work group for environmental justice that is charged with developing strategies related to infrastructure. The strategies being considered to improve the quality of life in the North Birmingham Area are presented in the table on the previous page.

Furthermore, the U.S. Environmental Protection Agency (EPA) is evaluating the environmental condition of the North Birmingham area because of current and historical industrial activity, which may have affected the environment in area communities. In 2009 the EPA began a national screening survey of air toxics concentrations at area schools. The results of those screenings indicated the need for more sampling and over an extended duration. Although the assessments found that the shared long-term risks for the North Birmingham communities were acceptable for air toxics, the risks were at the upper end of the range. With community support, the EPA and Jefferson County Department of Health have worked collaboratively to improve air quality beyond existing regulation. Furthermore, since these communities are spread over two

watersheds, Village Creek and Five Mile Creek and are considered impaired for water quality by the Alabama Department of Environmental Management (ADEM), the EPA and ADEM continue to work with the City to improve area water quality and restore the beneficial use of these streams.ⁱⁱⁱ

The Western Area Framework Planning area makes up the second planning area now also being considered. This area consists of three communities; Five Points West, Smithfield, and West End, shown in Figure 1. A copy of the draft Western Area Framework Plan may be found in Appendix C. Predominant features of this community are defined by Enon Ridge, which runs along the northern boundary of the Western area, the broad Jones Valley to the south, and the Birmingham skyline to the east. Jones Valley is drained by Valley Creek and its tributaries. After extensive public and interagency participation, five community goals were identified for focus by the City of Birmingham. These included: (1) Community renewal, (2) Green Systems, (3) Economic Development, (4) Transportation and Infrastructure, and (5) Future land use. With respect to the management of stormwater, the Western Area Community Action Plan was similar to the North Birmingham Framework Plan in that it too required the installation of green systems to reduce stormwater run-off and flooding in flood prone areas. The plan further suggested the creation of open space and recreational opportunities in flood prone areas, enhancement of the area's urban forest, and development of a system of green streets.

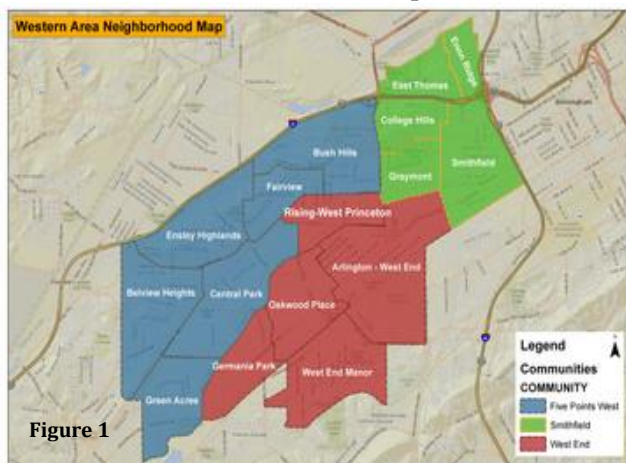


Figure 1



Finally, a Titusville Community Framework Plan, which contains the neighborhoods of North Titusville, South Titusville, and Woodland Park, has also been developed. The area is located immediately west of downtown Birmingham and is separated by Interstate 65 and an active freight rail line, the Louisiana and Nashville railroad. To the north, another active freight rail line, the Alabama Great Southern Railroad and along the west boundary is the West End Community. The Southwest Community adjoins the Titusville Community at its southernmost corner.

Along the extreme southwest boundary is the Southwest Community that includes the neighborhoods of Riley, Jones Valley, Garden Highlands, Powderly, Mason City, and Oxmoor.

Throughout the public involvement portions of plan development, the communities established a series of goals and implementation strategies centered on key targeted areas of effort, including:

- Community Renewal
- Green Systems
- Economic Vitality
- Transportation
- Future Land Use

The detailed implementation strategy is attached in Appendix C. Of particular importance to Stormwater Management is the implementation strategy described on the previous page.

As mentioned above, preventive measures, property protection, structural projects, and natural resource protection strategies include recommended action items that have direct stormwater quality implications.

In addition, the recommended actions associated with this plan will impact all three environmental classifications.

POLICY CONTROLS:

City Stream Maintenance Policy: Since 2012

Goals	Strategies	Actions
Our active and green community	Expand recreational opportunities for residents	<i>Acquire blighted properties to expand recreational opportunities for residents</i> <i>Convert blighted properties into recreational amenities</i>
	Ensure parks and recreational facilities are safe and well-maintained	<i>Adopt CPTED principles for the design of parks, greenways, and recreational facilities</i> <i>Dedicate adequate funding for park maintenance and for capital improvements</i>
Our environmentally friendly community	Incorporate green systems to support stormwater management and mitigate flooding	<i>Conduct hydrologic and hydraulic (H&H) modeling to assess and refine the impact that recommended green systems have on flood reduction</i> <i>Install green systems on blighted properties to reduce storm water runoff and loading in flood prone areas</i> <i>Retrofit existing rights-of-way with green systems to reduce stormwater runoff</i>
Our pedestrian-oriented community	Build a multimodal transportation network	<i>Build out the Red Rock Ridge and Valley Trail System</i>
	Incorporate green systems	<i>Develop a system of green streets</i> <i>Implement an alleyway cleanup program</i>
Our well-maintained community	Investing on our transportation system	<i>Develop a capital maintenance and infrastructure system</i>

Stormwater Management has observed a need to improve overall stream maintenance activities throughout the City. The improvements needed include:

- **Keeping water from work areas**
- **Reducing the potential for soil becoming waterborne or airborne**
- **Providing filter/ perimeter protection**
- **Reducing settling**
- **Reducing water velocity/ erosive forces**
- **Improving containment**
- **Providing habitat protection/ maintenance**
- **Reducing the potential for contaminants falling into the water**

To address these issues, Stormwater Management created in draft a new City ***Waterway Maintenance Best Management Practices (BMP) Manual*** to provide guidance for preventing or minimizing the related problems of erosion, sediment and diminished stormwater quality while conducting creek maintenance activities. The primary objective of the manual is compliance with the Clean Water Act, which aims to “restore and maintain the chemical, physical, and biological integrity of the Nation’s water.” (CWA § 101(a)). The secondary objective of this manual is to alleviate the City from having to obtain a permit every time stream maintenance is needed. Instead, the City hopes to gain permission from ADEM and the Army Corps of Engineers to conduct maintenance activities with permission granted so long as the approved BMP Manual is followed.

Additionally, the BMP manual will be used as a tool to adhere to the standards set by Alabama Department of Environmental Management Water Division - Water Quality Program (Volume 1) regarding water quality parameters such as dissolved oxygen (DO) and turbidity. These water quality parameters are of importance because they

are directly related to disturbances that could be caused by creek maintenance activities; when turbidity increases, dissolved oxygen decreases, thus degrading the water quality of the creek.

The manual, which has been developed in draft has been derived from a combination of Best Management Practices from the Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and the Urban Areas (Volumes 1 and 2) and the Washington State Department of Transportation Best Management Practices Field Guide. This adaptation best provides a manual that pertains specifically to the City of Birmingham’s waterways. The manual is going through further revision at this time to also include a standard operating procedure for aerial fogging for mosquito control throughout the City where spraying may be in proximity to City streams and protected habitat areas. Subsequent to that, the City anticipates making arrangements for review by ADEM and the U.S. Army Corps of Engineers (ACOE) to obtain the needed permissions to perform stream maintenance without the need for subsequent environmental resource permits. Those meetings are anticipated to be concluded early in 2016 calendar year, with implementation of the new policy directives to go into effect immediately upon regulatory agency approval.

Also the City has established the Birmingham Land Bank Authority (BLBA) this reporting year. The mission of the Birmingham Land Bank Authority is to serve the citizens of Birmingham by working collaboratively and transparently with Community stakeholders and the City of Birmingham to steward vacant, abandoned, and tax delinquent properties and dispose of them to the best use as defined by the needs of the community to reduce community blight, stabilize neighborhoods, facilitate community, civic, and commercial redevelopment, and to increase

community and overall City of Birmingham property values while returning such properties back to the tax rolls. The BLBA can acquire the tax deed to properties located within the city limits of Birmingham, which have been tax-delinquent for at least five (5) years. Once the tax deed is acquired, the BLBA may file a quiet title action to clear the title and return the property to productive use. At this time no properties have been acquired or demolished. However this City anticipates that within the next reporting period about 300 properties will be demolished, removing all impervious area during demolition. More than approximately 75 of those properties are in the process of being transferred to neighboring residents in ownership.

REGULATORY CONTROLS:

Stormwater Protection Ordinance (SPO): The SPO was discussed in last year's report in detail. On December 9, 2014, the City Council approved the ordinance. At this time City Stormwater Management staff is working to create and staff the Stormwater Appeals Board. This will be discussed more in the ***Major Accomplishment*** section.

Zoning Ordinance: The Zoning Ordinance is designed to implement the goals and objectives of The Plan: City of Birmingham Comprehensive Plan (Comprehensive Plan), as adopted by the Birmingham Planning Commission (Commission), October 2, 2013. A diverse range of zoning districts are created by this Ordinance which establish appropriate land uses and associated standards for development needed to implement the land use policies of the Comprehensive Plan. In conjunction with the Ordinance an official zoning map assigns an appropriate zoning classification to all properties to which the Ordinance is applicable. Also established by this Ordinance are special overlay districts, including

Flood Plain Overlay, U.S. Highway 280 Overlay District and Highland Park Neighborhood Form Based District, which are intended to address specific aspects of land use control or design not easily accomplished by conventional zoning techniques. The Ordinance further establishes land use standards which are designed to protect the value and integrity of neighboring properties, enhance the general character and appearance of the community, reinforce the central business district, lessen congestion, provide adequate privacy, light and air, protect landowners from adverse impacts of adjoining developments, and provide a reasonable balance between efficient utilization of land and protection of public interest and environmental resources.

One of the primary implementation items from the comprehensive plan is a rewrite of the zoning ordinance. The rewrite will accomplish several goals including: align the land use goals of the Comprehensive plan with the Zoning Ordinance and the Framework Plan areas, provide clarity to potential developers, introduce green development incentives and create low to moderate income housing incentives. With regard to updating the City's Zoning Ordinance the Comprehensive Plan states the following:

Zoning ordinances and development regulations need reorganizing and updating from time to time. Incremental amendments can introduce inconsistencies, ambiguity, and confusion—and produce disappointing outcomes. As communities change, so does their land use goals. Unanticipated consequences of previous decisions need to be corrected. The current Birmingham Zoning Ordinance is based on a 1962 ordinance, modified with major changes and readopted by the City Council in 1990. Additional amendments have changed the code since 1990. After the adoption of a new Comprehensive Plan, it is usually necessary to either modify an existing zoning ordinance to

reflect the comprehensive plan, or to completely rewrite it. A modern zoning code is based on planning goals and principles, is user-friendly and precise about what is and is not permitted, and provides clear standards for high quality and sustainable development. As a result, modern codes make it possible for most development projects to proceed without lengthy delays and reviews, because developers and communities know what to expect and what is expected. Many communities have opted to create a “unified development code” that gathers into one document zoning, subdivision regulations, thoroughfare regulations, development standards, environmental regulations, sign regulations, historic preservation regulations, permits, and annexation regulations.

Over the course of the last year, planning staff prepared zoning ordinance amendments to align the city’s zoning ordinance with the recommendations of the city’s comprehensive plan. Once the draft was prepared, planning staff established a review group made up of local planners, architects, engineers, developers, landowners and neighborhood representatives to review and receive comment on the proposed changes. Likewise, staff provided draft copies of the amendments to members of the Birmingham Planning Commission and City Council. After several weeks spent reviewing the amendments, meetings were held with each group to receive comments on the amendments as proposed. To further facilitate public participation, planning staff presented the proposed amendments to the Citizens Advisory Board, and notified the public through several newspaper advertisements that the City will hold four open houses to receive public comment on the proposed amendments to the zoning ordinance (two in May and two in June). Next steps include a Birmingham Planning Commission public hearing in June to consider a

recommendation to the City Council, and a City Council public hearing in July to consider adoption of the amendments. The amendments were adopted by City Council on September 15, 2015.

The short term goal for the rewrite of the City’s Zoning Ordinance is to address the following:

- Create mixed use districts,
- User friendly organization and clear language,
- Inclusion of tables that make it easier for the user to quickly determine what uses are allowed by right or with conditions in each district,
- Inclusion of development standards that encourage sustainable development such as natural drainage systems, pervious pavement, green roofs and solar,
- Inclusion of incentives for low income housing, use of conservation subdivisions in environmentally sensitive areas and cottage developments,
- Modifying rules to allow flexibility with an eye towards reducing variance requests,
- Inclusion of a flow chart that describes the procedure for approval that includes all possible regulatory actions that may be necessary,
- Connect the new ordinance to the comp plan by rezoning framework plan areas as they are approved.

WATER QUALITY MONITORING:

This reporting year represents the second full year of monitoring water quality using the new water quality monitoring strategy that was implemented by Stormwater Management on November 20, 2013. The certified water quality data from this

report period is contained within Appendix A₁. That water quality monitoring strategy was intended to identify existing pollution source controls, the variability of the pollutant or pollutants being discharged into waters of the state, and where appropriate, the dilution effect of effluent into receiving waters that may have an opportunity to cause there to be an exceedence 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 data collected to date since ADEM approved the new water quality monitoring strategy is provided with this report in Appendix A₂. During this period several overarching activities have dominated Stormwater Management's water quality monitoring program, including::

- Identification of the ownership status of jurisdictional outfalls in Village Creek
- Completed the Village Creek stream assessment to locate major areas of bank erosion and stream sedimentation
- Field reconnaissance of Village Creek discharges in the specific conductance peaking areas of Village Creek (VIC 6.5 – VIC 8.1)
- Assisting Alabama Water Watch volunteer in Birmingham to clarify water quality data calibration and reporting
- Discontinuance of flow meter operation due to meter service problems
- USEPA monitoring of Dieldrin in Village Creek (See Major Findings)
- Continued operation of 5-USGS data collection stations, including 2-gage height/discharge/water quality stations and 3-rainfall gage stations. These stations can be found on the USGS Website as:
 - ✓ Station 02458148
 - ✓ Station 02458502
 - ✓ Station 02458190

✓ Station 02458350

✓ Station 02458450

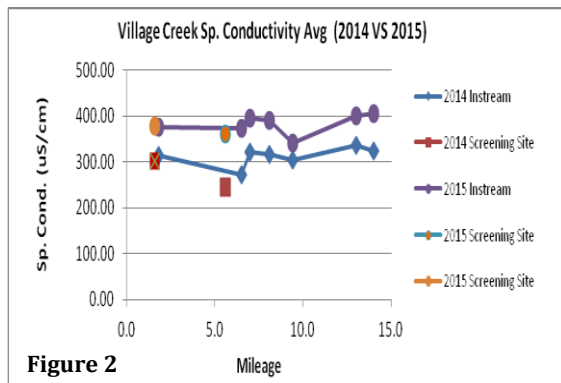
■ As did occur last year, the City's Stormwater Management Program again lost another staff member of the instream water quality monitoring team in September, 2015. Ms. Alisha Sledge accepted a career advancement opportunity more in line with her career goals and aspirations in North Carolina. A replacement is not available at the time of this report submittal, pending staffing level decisions that are presently ongoing.

■ During this reporting period, Stormwater Management Staff had considerable difficulty measuring stream, which has largely been discontinued using the Pygmy Flow Meter. The City is in the process of considering replacement options that would be more suitable short of installing additional USGS field stations, which may still be considered in future stream watershed planning efforts. Although no scheduled water quality sampling dates were missed in 2014-2015, the lack of a complete compliment of instream monitoring staff has dealt a minor setback to the program.

Finally, for purposes of reporting water quality data in this year's report, a longer period than just what is required annually by the permit is included to provide a better estimation of trends and water quality developments being observed. Therefore, whenever possible, a longer period of water quality analysis is provided along with water quality data observed only during this reporting year.

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 at least in that 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. This reporting period now provides also the opportunity to consider two-full years of water quality monitoring in Birmingham's creeks, specifically in Village Creek. The best example of the comparative two-year trend in specific conductivity can be readily seen in the annual average specific conductivity for Village Creek depicted in the figure below. Specific conductivity has consistently averaged during this two-year period <450 $\mu\text{S}/\text{cm}$ and throughout the stream length, was higher in 2015 than was apparent in 2014 by nearly 15% on average. The highest specific conductance recorded to date was 428.1 $\mu\text{S}/\text{cm}$ and was recorded on March 24, 2015 at station 14.0 during a relatively high rainfall period. The lowest specific conductivity was recorded at station 9.4 on November 18, 2014 and was recorded as being 135.4 $\mu\text{S}/\text{cm}$. Collection on that day was also collected during a high rainfall period. Rainfall condition is based on the 72-hour period preceding the data at time of water quality field data collection.



In an attempt to better understand the significance of the persistent increase in specific conductance

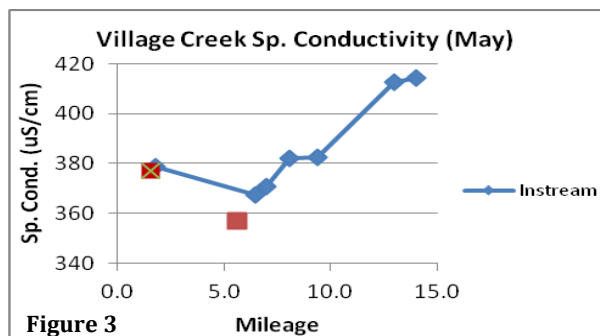
in central portions of upper Village Creek, Stormwater Management Staff walked this entire creek section in conjunction with the Village Creek Stream Assessment effort and visited those industries within the area of water quality monitoring stations between mile markers 6.5 and 8.1. Within this area are several known industries that have permitted process and/or stormwater discharges. They include:

- **Altec Industries (~7.26 Mile Mark)** – Nonpoint source stormwater discharge from a metal fabrication & equipment parking area (33.544783, -86.796272)
- **Birmingham-Shuttlesworth International Airport (~4.2 Mile Mark)** – Nonpoint source stormwater discharge pump stations (33.559444, -86.752222) (See Appendix A for storm sewer map of all airport infrastructure)
- **Brothers Recycling Company (~7.15 Mile Mark)** – Nonpoint source stormwater discharge from an auto recycling & salvage yard (33.544028, -86.794583)
- **Estes Express Lines (~6.7 Mile Mark)** – Nonpoint source stormwater parking lot discharge from freight company (33.545672, -86.786725; 33.545569, -86.787136; 33.545464, -86.787517; 33.545369, -86.787897; 33.545225, -86.788197; 33.545061, -86.788564; 33.544892, -86.788897)
- **Nucor Steel, Birmingham (~7.76 & 7.98 Mile Mark)** – Recycled stormwater & treated process water discharge from a fabricated metal industry (33.544861, -86.809083; 33.544167, -86.805)

All of these outfall locations discharge nonpoint source stormwater draining from the site. Only Nucor Steel also discharges recycled stormwater

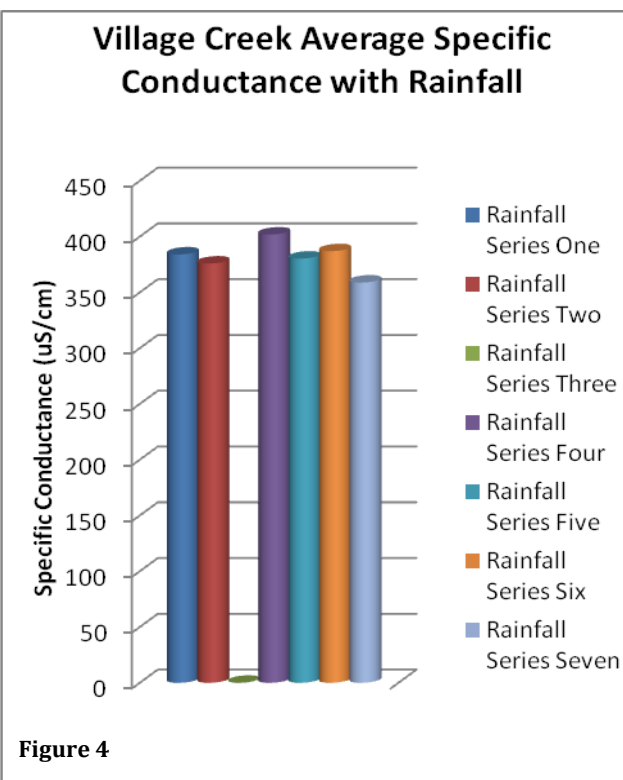
used for fabricated metal processing and is treated for pH and filtered to remove sediments before being discharged into Village Creek.¹ Specific conductance is not monitored by Nucor Steel. The average discharge rate according to Nucor Steel's discharge monitoring report for May 1, 2015 was approximately 0.06 MGD.² That flow may or may not be representative of typical flows from this site.

Stream assessment and outfall reconnaissance in the area of stations 6.5 to 8.1 was completed on May 21, 2015 and June 5, 2015, respectively. On May 27, 2015 when the City collected water quality data from this stream reach the 72-hour preceding average rainfall was considered heavy (0.05" – 1.00") by City standards (See Appendix A, City of Birmingham Field Worksheet, Rainfall Code System for an explanation of the City metrics being used). No water quality measurements were taken by Stormwater Management from Village Creek in June 2015. Specific conductivity data collected in May though



was particularly interesting as Figure 3 above depicts. Not only was there an increase in specific conductivity between stations 6.5 and 8.1, there was also an increase between stations 9.4 and 14.0, which ranged from a low of 382.7

µS/cm at station 9.4 to a high of 414.3 µS/cm. The increase in specific conductance does not readily appear related to rainfall though. (Figure 4). Plotting specific conductance against the City's rainfall metric, specific conductance remains relatively unchanged but for the slight change from a high of 402 µS/cm during light rainfall events (0.10-0.15") to a low of 359 µS/cm during very heavy rainfall events (≥1.01"). However, this may still be an artifact of the paucity of data being used to describe the relationship between rainfall and specific conductance. As can be seen, the series three rainfall of "0" only means that to date no rainfall condition three (0.06" – 0.09") has been observed.



¹ Personal Discussion with Steve Messier, NUCOR Steel

² [May 2015 ADEM eFile DMR](#)

There would appear then to be some other influencing factor working to demonstrate an apparent influence in the water quality in these

areas. Between water quality monitoring stations 9.4 and 14.0 are two additional industries that have been identified. They are:

- **American Cast Iron Pipe Co. (~9.9 Mile Mark)** – Recycled stormwater used in metal fabrication (33.532692, -86.835217).
- **Wade Sand & Gravel (~13.2 Mile Mark)** – Combination stormwater management and mining dewatering (33.524722, -86855; 33.524722, -86.854444; 33.526944, -86.865556)

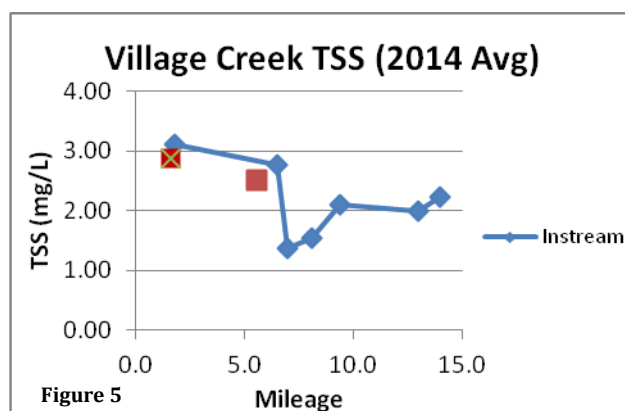
During the month of May, 2015, in accordance with submitted discharge monitoring reports provided to ADEM, both ACIPCO and Wade Sand & Gravel had documented discharges. Wade Sand & Gravel documented a discharge (7.3 MGD) on May 27, 2015 concurrent with City staff's routine monitoring. ACIPCO only reported a monthly maximum (7.2 MGD) and a monthly average (1.3 MGD). No daily reporting was provided to ADEM. While ACIPCO recycles stormwater, Wade Sand & Gravel dewateres ground water seepage, stormwater, and seepage from Village Creek,³ which collects in the quarry. To implement a material dredging operation within the quarry, the quarry must periodically collect and pump discharge accumulated ground water from within the quarry work area, which discharges directly into Village Creek.

The amount of minerals associated with ground water, which may be found in deeper ground water layers tends to be more mineralized in Alabama. Specifically within the Valley & Ridge System, which underlies much of Birmingham in Jefferson County, the water ranges from hard to very hard, representing more highly mineralized water.⁴

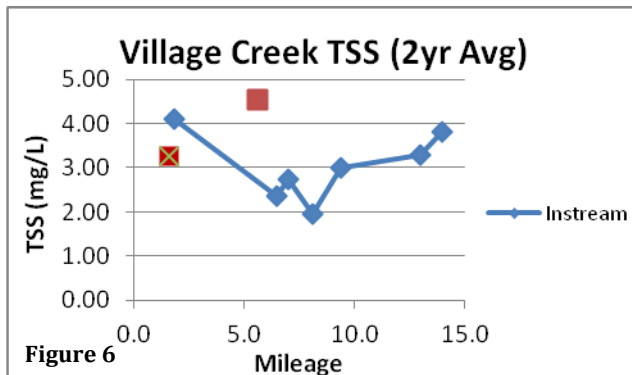
³ Personal Communication with Robin Wade, November 9, 2015.

⁴ [Hydrology & Vulnerability to Contamination of Major Aquifers in Alabama. 2005. Page 29](#)

That could explain then the higher specific conductivities, which appear to exist even during other sampling months (i.e. November, March, and May) and may be contributing to the similar, albeit lesser trend depicted in the average annual specific conductivity levels in Village Creek. It is important here to remind the reader that specific conductance is **NOT** a measure of pollution; rather specific conductance is only a means to discover and explain what may be influencing the water quality characteristics within any given stream segment.



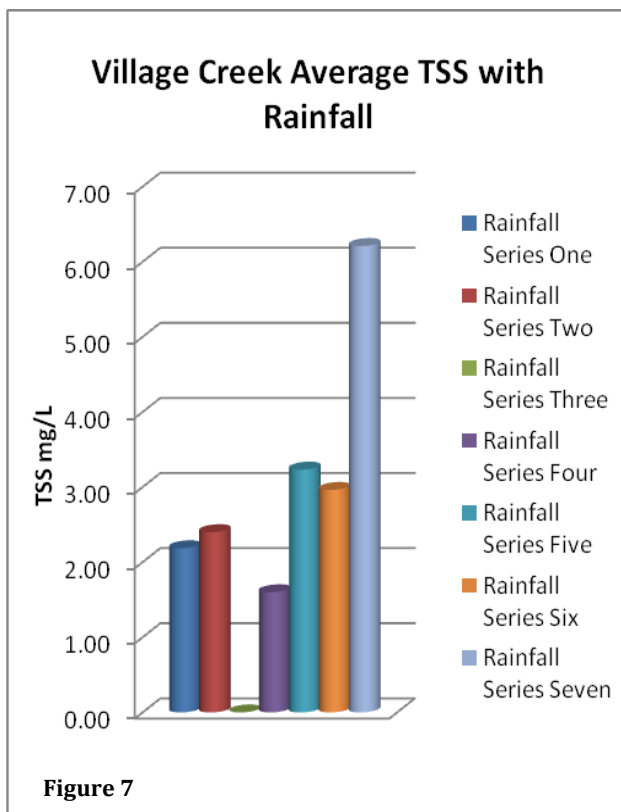
Please recall from the City's "Water Quality Monitoring Strategy for Alabama Department of Environmental Management Approval", submitted in October 2013, the City identified total suspended solids as the water quality focus (See Appendix A). In the City's 2014 Annual Report, total suspended solids was observed lower throughout the Creek between Mile Marker 6.5 and 7.0. See Figure 5, above. The two year average total suspended solids levels demonstrated a more dramatic fall in levels between stations 1.8 and 6.5, which were apparently unrelated to any observed increase from the screening site, Station 5.6 (See Figure 6). That screening site discharges just upstream of instream station 6.5. Again



though, there appears to be an observable pattern of obviously lower total suspended solids levels at stations 6.5 to 9.4 stream mile mark where earlier this area was defined as having a unique influence in water quality from industrial point sources. In this area it has been observed that water quality from NUCOR Steel removes particulate materials before discharging into Village Creek. Wade Sand and Gravel discharges primarily ground water from a pumping facility, which typically is very low in total suspended solids. According to their discharge monitoring reports between the third quarter of 2013 and the second quarter of 2015, TSS concentrations averaged monthly 3.7 mg/L (See Appendix A₁). The only total suspended solids observed by City Stormwater Staff when pumping was commenced was an initial wash-off of solids materials during the start of discharge, which turbidity and total suspended solids levels tend to diminish as pumping continued from the

site outfall. Overall though, total suspended solids levels in Village Creek ranged from a low of less than 1.0 mg/L at stations 6.5 and 14.0 on May 27, 2015 and January 20, 2015, respectively. The sampling period in May was preceded by 72-hours of 0.05" to 1.0" rainfall. The January monitoring event was preceded by 72-hours of no rainfall. Both recorded very low total suspended solids concentrations. The highest level of total suspended solids (18.8 mg/L) recorded during this monitoring period on November 18, 2014 was preceded 72-hours before monitoring by ≥ 1.01 " of rainfall. In this case, the reported level of total suspended solids was still very low, being <20 mg/L and resembling what otherwise could be considered the base flow stream condition for TSS. Although this data may suggest that rainfall doesn't drive total suspended solids, in Village Creek it does have an influence.

During the past two years total suspended solids levels were elevated after the preceding 72-hours when rainfall levels were also elevated. (Figure 7). Total suspended solids nearly doubled when rainfall exceeded 1.0" during the preceding 72-hour period of a water quality sampling event. Zinc concentrations were also sampled but only in Village Creek. During this report period, Zinc levels were ≤ 7.0 $\mu\text{g/L}$, which appears to exceed the state standard for zinc at the freshwater acute aquatic life concentration level of ~ 1.86 $\mu\text{g/L}$ at a hardness concentration of 333.4 mg/L (Equation #14).



Village Creek Loading Analysis: 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.⁵ 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

⁵ City of Birmingham. October 4, 2013. *Water Quality Monitoring Strategy for Alabama Department of Environmental Management*. Pg. 13.

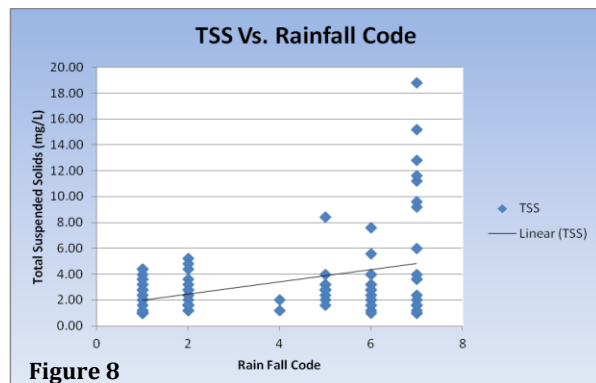
improvement of stream water quality. For purpose of this report and at the time this loading analysis was prepared monitoring in Village Creek in September had not been completed. Therefore the loading analysis contained herein represents the period between July 22, 2014 to July 14, 2015. This same period was also used to compute industry loads from their respective DMR data.

Total suspended solids (TSS) mass concentrations were collected as grab samples from 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 ID's provided above. The difference between the load analyses from the two sites represents the net TSS load generated by the City's MS4 and all industrial dischargers, which may also occur within the Village Creek Watershed and also discharge into Village Creek. Among the numerous NPDES permitted facilities in the Village Creek watershed only those listed earlier 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 efile website.

On average, Birmingham receives approximately 53.7" of rainfall annually. Total annual rainfall in report year 2015 (58.0") was greater than last reporting year in 2014 (47.07) for the period between October and September of each reporting

year.⁶ Therefore, this reporting year can be considered a wetter than usual year. As described earlier, the rainfall condition recorded by Stormwater Management staff is the amount of rain recorded in the 72-hour period preceding a routine stream sampling event.

In Village Creek TSS demonstrated an increase in suspended solids mass concentration as the rainfall condition also increased, although based on the coefficient of correlation that linear relationship is only weak to moderately strong ($r = 0.38$). Figure 8 depicts that relationship where $N = 99$ data points. Considering only the influence of rainfall on TSS at water quality station at VIC 14.0 (13.7) where water leaves the City of Birmingham ($N=11$), this relationship remained similarly strong ($r = 0.40$).



Additionally stream flow was collected by the USGS at two primary stations within Village Creek. Figure 9 shows the flow data collected from the two locations in the City of Birmingham at 86th Street North and from the monitoring station, which leaves the City of Birmingham near Pratt City. Evident in the chart is the fact that generally water flow is greater leaving the City of Birmingham than what actually comes into

Birmingham. The total volume of water leaving the City at Station VIC 14.0 during the year between July 22, 2014 and 2015 was 18.1 billion gallons, which is the combination of what enters into the City from its headwaters (2.1 billion gallons) and the remainder that is otherwise generated by the very large area of the watershed from Birmingham proper (26,766 acres). Furthermore, TSS demonstrated an increasing trend when compared to flow but that trend was much more evident than in association with rainfall. In this case, the coefficient of correlation was considerably stronger ($r = 0.62$), based on $N = 14$ data points. This trend was similar also for the headwaters station at VIC1.8, but not nearly as strong a relationship ($r = 0.22$), based also on $N = 14$ data points.

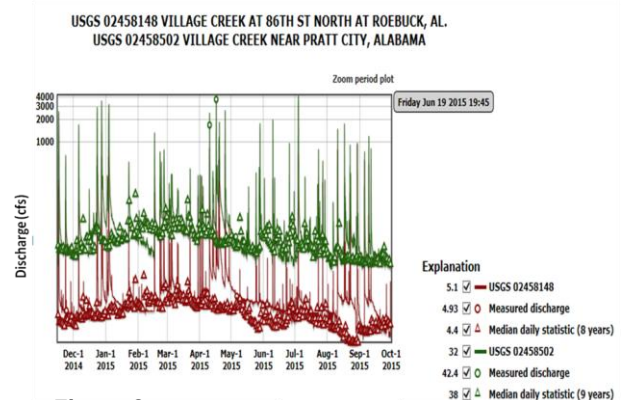
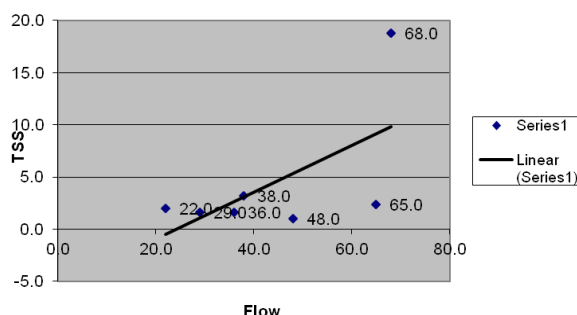


Figure 9

⁶ [Weather History for Birmingham, AL](#) | [Weather Underground](#)

Figure 10 Village Creek TailWater TSS VS. Flow



Overall, the TSS data ranged from a low of 1.0 mg/L (VIC14.0/January 20, 2015) to a high of 18.8 mg/L (VIC14.0/November 18, 2014) during this reporting year. Instream pollutant loadings were computed based on daily flow data collected at Stations 1.8 and 14.0 by the USGS during the same time period. Water quality mass concentration data was also collected at the same

sites bi-monthly (i.e. every two months).

Given the first full year of flow data having been collected, a decision was needed how to report the loading data this year. Three methods were considered. Method #1 considered the full year of daily flow data at Stations VIC14.0 (i.e. leaving Birmingham) and VIC 1.8 (i.e. entering Birmingham) for each day between July 22, 2014 and July 14, 2015 and averaged the TSS mass concentrations between sampling events to create daily TSS mass concentrations (N = 358 data points). Those results are shown in Table 1. Of the 358 data points used, only the flow data were discrete measurements. By contrast, Methods #2 and #3 only used seven data points for TSS, which were discrete sample measurements. Method #2 used corresponding flow data (N = 7) to compute the TSS load. The average discharge and TSS concentration was considerably less than the period discharge and as a result, presumably the TSS load appears to under predict the actual TSS load. Therefore, Method #3 was considered the best approach in that it retains the full complement of measured USGS flow data (N = 358) and the full complement of TSS mass concentration data (N = 7). Similarly to last year, the following equation represents the formula used to compute the annual load this year:

$$Li = Qi \times Ci \times K$$

Where:

Li = Instantaneous load in metric Tonnes per year based on USGS reported daily discharge (cfs) and average mass concentration (mg/L) of measured total suspended solids.

Qi = Total period discharge in cubic feet per second

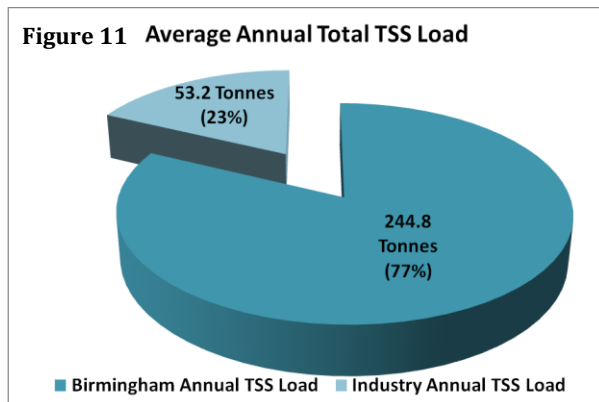
Ci = Average TSS mass concentration in mg/L for the period of record

Table 1 Method	Daily Average		
	Flow (cfs)	TSS (mg/L)	Load (Tonnes/yr)
VIC 14.0 (Pratt City)			
Method 1	79	4.5	312.3
Method 2	44	4.4	170.5
Method 3	79	4.1	278.7
VIC 1.8 (86th Street)			
Method 1	9	4.6	35.5
Method 2	6	4.2	23.4
Method 3	9	4.2	33.9

$K = 0.00278$ Correction factor for unit conversion from $(\text{ft}^3 - \text{mg})/(\text{sec} - \text{L})$ to metric tonnes per year

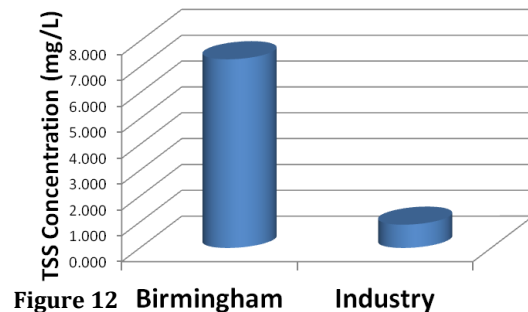
This year Stormwater Management also introduced the loading effects from those industries that discharged stormwater or process water into Village Creek. As can be seen in Figure 11 below, industry contributed approximately 23% of the total load of TSS into Village Creek through direct discharge in accordance with its entity NPDES General Permit; the City contributed the remainder 77%, which represents the net load of TSS load leaving Birmingham at Station VIC 14.0, reduced by the TSS load entering the City at Station VIC 1.8. The net TSS load is the contribution from the 26,766 acre drainage basin representing the City of Birmingham's MS4. The contribution from those industries considered in this report, which also provided discharge monitoring reports to ADEM were combined together to represent the industry load. Individual contributions were calculated based on monthly average flow and TSS concentrations when reported. The represented industry contribution contained in this report does not presume these to be the only industries discharging into Village Creek.

Figure 11 Average Annual Total TSS Load



Another way to consider the comparative impacts on TSS load is to consider the weighted load based on flow. It was demonstrated earlier that there is a moderate to strong relationship between TSS and flow. Figure 12 represents a comparison of flow-weighted TSS loads between Birmingham and industry.

Flow Weighted TSS Concentration



Evident by this figure depicts the flow-weighted TSS concentration for Birmingham, being approximately seven times greater than the flow-weighted concentration for industry during the same period. The Birmingham flow-weighted concentration for TSS is 7.3 mg/L; the TSS flow-weighted concentration represented for industry is 0.9 mg/L. When 2014 (22 mg/L) and 2015 (7.3 mg/L) TSS flow-weighted concentrations are compared, rainfall does not appear to be the primary reason for the difference. Recall from earlier, the rainfall in 2014 was 56.5", which was greater than observed in 2015 (49.6"). Rainfall in 2015 was approximately 12% lower than was reported for 2014. However the difference in flow-weighted concentrations between 2014 and 2015 represent a difference of approximately 67%. Therefore, some other factor besides rainfall appears to be contributing to the high flow-weighted TSS loads in Village Creek.

ADEM has established a TMDL for siltation in Village Creek. Decidedly though, ADEM recognizes the difficulty in coming up with one

relationship of flow and TSS for Village Creek. The report contends that the events are so dynamic that it would entail wet weather sampling through an entire hydrograph period to make any defensible relation. ADEM recognized that there was evidence by 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.⁷

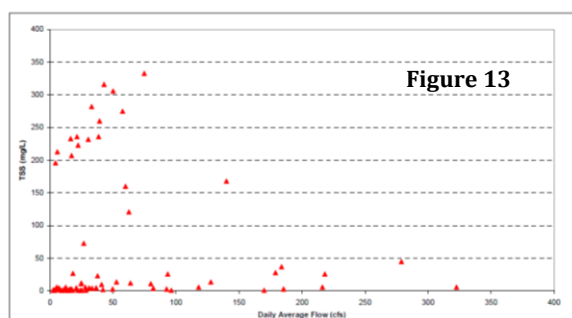


Figure 3-10 Daily Average Flow versus Suspended Sediment Concentration (1997 – 2000).

Similarly, the City of Birmingham also found a relationship between flow and TSS and agrees with ADEM that monitoring over the course of a significant rainfall event would produce interesting results, if not also a demonstrable improvement in TSS loadings for Village Creek since 2000. In the two years that the City has been sampling for TSS, Stormwater Management staffs have not seen the high levels of TSS similar to those levels reported earlier by ADEM. See Figure 13, above. Note that high and low levels of TSS were reported by ADEM when flows were mostly less than 100 cfs.

In ADEM's "Final Total Maximum Daily Loads (TMDL) For Metals (Zinc), pH, and Siltation in the Village Creek Watershed" report, ADEM

reported a waste load allocation (WLA) requirement for Village Creek to not exceed 8.3 lbs/acre/hr.⁸ During this annual report period, the WLA demonstrated by Birmingham was approximately 0.002 lbs/acre/hr; considerably lower than the WLA requirement established by ADEM. The TMDL was intended to address stormwater discharges from all MS4's, among other activities. As more wet weather data is collected by Birmingham over time, this relationship between flow and rainfall is expected to become more readily apparent. Until then though, the City is considering modifying its pollutant load objective in favor of flow-weighted concentration derivation of TSS pollutant loading. Over time, that measure may be more important in demonstrating improved water quality in Village Creek from its overall MS4-BMP program than pollutant loadings alone. Input in this regard would be welcome as this objective is considered for change.

Valley Creek: Valley Creek extends a distance of 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 0.0 and 2.9. With the exception of the screening site at station 4.9 the remainder of the creek is monitored by the Stormwater

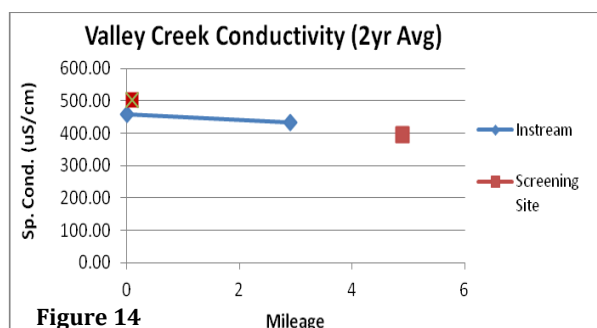


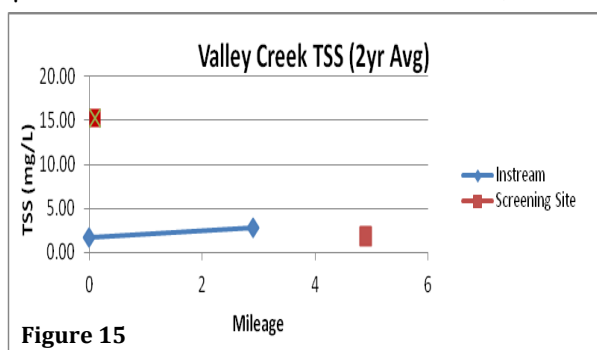
Figure 14

⁷ Final Village Creek, Zinc, pH, and Siltation TMDL, Page 18

⁸ IBID, Page 38

Management Authority, Inc. in the downstream portions of Valley Creek. (See Appendix A)

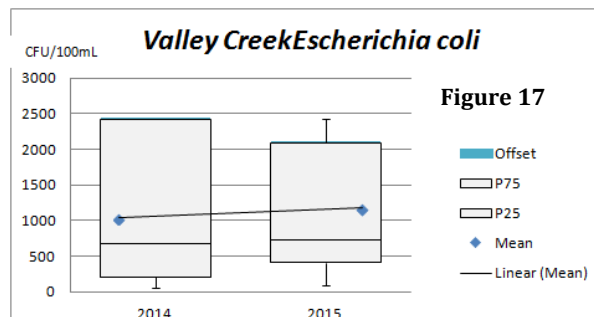
Average specific conductivity (Figure 14) in Valley Creek within the City of Birmingham has demonstrated a slight decrease during the past two years from an average low of 395 $\mu\text{S}/\text{cm}$ at station VC #4.9s to an average two year high of 503 $\mu\text{S}/\text{cm}$ at station VC #0.1s. In contrast, the two



year average concentration for TSS slightly increased (See Figure 15). The highest concentration of TSS measured in Valley Creek was measured at station #VC0.6s on November 19, 2014 to be 21.2 mg/L. Total suspended solids mass concentrations though remain very low.

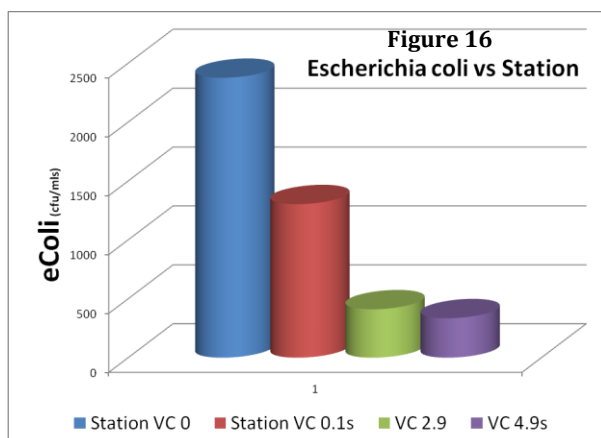
The parameter of much concern for Stormwater Management in Valley Creek continues to be for *Escherichia coli* (*e.coli*) levels. Stormwater Management only collects from four monitoring stations in Valley Creek, two from in stream (Stations VC 0 and VC 2.9) and the other two from screening sites (VC 0.1s and VC 4.9s). As Figure 16 depicts, the highest levels of *E.coli* are frequently measured at Station VC 0, the headwaters monitoring station in Valley Creek at that point where the Creek daylights out from under the downtown City of Birmingham. During the past two years, the average *E.coli* levels have been greater than 1,000 cfu/100mls with most of the high coliforms represented in the upper 75th percentile of all data influenced mainly by the two

headwater stations (i.e. VC 0 and VC 0.1s) (Figure 17).



In stream monitoring station VC 0 day lights from under the City of Birmingham at the intersection of 5th Avenue and 7th Street North. The box culvert has been determined to drain approximately 3,600 acres of downtown Birmingham, west of the northeast/southwest traversing railroad lines coursing through the downtown area. The remaining area of Downtown Birmingham, between Red Mountain westerly to the railroad lines, drains to the City's screening site at Station VC 0.1s, downstream of the aforementioned culvert system.

In June 2014 it was brought to the attention of Jefferson County Environmental Services by a third-party concern over the apparent presence of "sewage" in Valley Creek. By December, 2014,

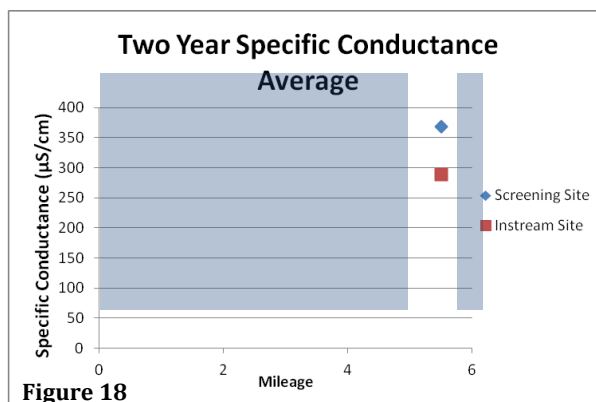


Jefferson County requested help from the City of Birmingham, Stormwater Management Program to consider whether or not an illicit discharge of sewage was coming from Valley Creek at VC 0. Working with Jefferson County Environmental Services and Jefferson County Stormwater Management the City collected 10-water quality samples from within its MS4 and Jefferson County Environmental Services provided the analytical results. See Appendix A for the sample locations. The samples were collected after 72-hours of antecedent dry weather conditions. The results were reported as “Most Probable Number” (MPN). Of the ten samples collected, the lowest MPN (0 MPN) was recorded at the 1900 block of Rev. Abraham Woods Blvd. behind the Boutwell Auditorium near City Hall and at the 1800 block of 5th Avenue North. The highest count (461 MPN) was obtained from the left culvert box outfall, facing upstream in Valley Creek, which drains from the western portions of the City. Three of the City’s MS4 collection points were dry and had no water. As a result of this preliminary investigation, it was determined that an illicit discharge was not evident, although all agreed that more detailed effort would be needed.

The City of Birmingham has made a decision to address the apparent persistent *E.coli.* problem more directly and to do so city-wide. Based on the 2014-2015 *Summary of Unpermitted Discharges* report prepared by Jefferson County Environmental Services for Birmingham (See Appendix A), more than 11.6 million gallons of sanitary waste was discharged into Valley Creek. Given the significant unpermitted sanitary flows into Valley Creek and its effects on the Creek water quality, the City is in the process of developing a water quality monitoring strategy of the MS4 portions of Valley Creek, under the City of Birmingham. Working with Jefferson County Environmental Services, a complete map of the sanitary sewer collection system is being

completed. When that is complete, the City anticipates partnering with Drs. Shawn Levy, Ph.D. (HudsonAlpha Institute for Biotechnology) and Dr. Bruce Korf, M.D., Ph.D. (UAB Center for Genetics & Genomics Research) to create a Genome “heat-map” of *E.coli.*, which will further Jefferson County’s efforts to smoke test smaller regions of the City for illicit connections and/or discharges. This effort will also be considered for ADEM funding to implement. This will be discussed later in the *Future Program Direction* section.

Shades Creek: Shades Creek within the City of



Birmingham extends approximately 4.5 miles (See Appendix A₂). 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 5.5 and at a screening site at the same location (5.5s). Average specific conductance at this monitoring site during the past two years is shown in Figure 18, which depicts a two year average of 367.6 µS/cm screening site SC05.5s and 288.7 µS/cm at instream site SC05.5. Due to other priorities, this screening site could not be investigated during this reporting year.

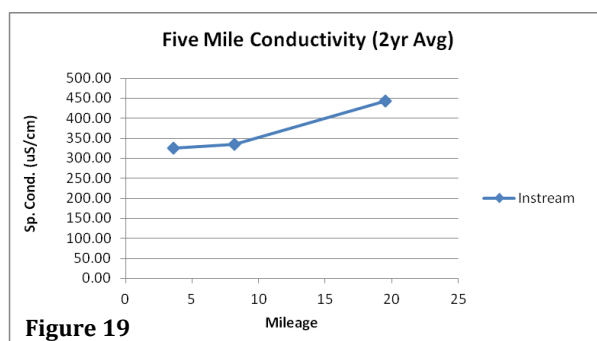
Total suspended solids did not exceed 16.0 mg/L with higher concentrations being at the screening site. During this study period, averaged total nitrogen was 0.43 mg/L at the screening site and 0.50 mg/L instream. Average total phosphorus was essentially the same at the screening and instream sites, being 0.02 mg/L and 0.03 mg/L respectively. *Escherichia coli* was also high on several occasions during this reporting year. That will be presented in more detail later in the **Antidegradation Section** of this report.

TABLE 2

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	-

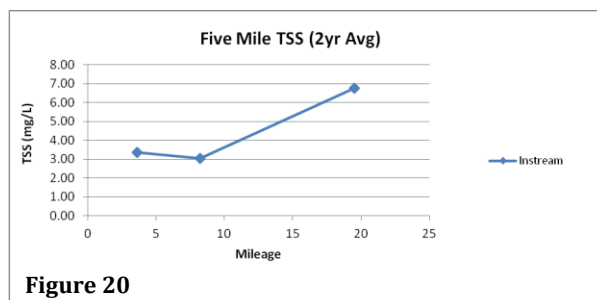
Five Mile Creek: Five Mile Creek runs discontinuously through Birmingham's city limits over the course of 8.4 miles (See Appendix A₂). Monitoring Five Mile Creek is difficult due to the creek locations within the City of Birmingham relative to the points of safe access. The table above relates those 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 Stormwater 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 but cannot be safely



accessed for monitoring purposes.

Figure 19 demonstrates that during the two year reporting period the average conductivity in Five Mile Creek tended to increase through the City of Birmingham. This same trend was similarly represented for TSS as well (Figure 20). TSS concentrations though were very low throughout the stream. As was reported last year, Stormwater Management had intended to investigate further those outfalls that discharge into the stream segment between miles 3.6 and 8.2 to determine if any dry weather flows may be contributing to the elevated TSS and specific conductance. However, given the need for further, unanticipated stream assessment in Village Creek, this needed to be



postponed. In addition, the U.S. Environmental Protection Agency continues to express an interest in developing a comprehensive watershed management plan for Five Mile Creek, as is being done now in Village Creek

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 (See Appendix A). The rationale for this was reported in the Water Quality Monitoring Strategy report submitted in October 2013. In that report was mentioned that former City monitoring stations in the Little Cahaba River and Lake Purdy were being monitored by the Birmingham Water Works Board (BWVB). The table below provides a summary of that data, provided to the City by the BWVB, comparing the average concentrations of select parameters shared in common during the 2015 reporting period.

TABLE 3 Parameter	Geometric Mean Concentration	
	City of Birmingham	Birmingham Water Works Board
Nitrate (mg/L – N)	0.24	0.31
Nitrite (mg/L – N)	0.30	0.30
Orthophosphate (mg.L – P)	0.02	0.29
TSS (mg/L)	4.5	5.3
E.coli (CFU/100mls)	119.0	54.7

For the most part, concentrations of representative data being collected by the City at C.R. 280 is

similar to that being collected by the BWVB at 6-sites located throughout the Cahaba and Little Cahaba River systems. The BWVB monitoring locations contained herein include:

- CR 280
- Cahaba Beach Road
- I-20 East
- Shepherds Branch
- Sunshine Creek
- Watson’s Branch

Comparatively, orthophosphate was considerably elevated among all parameters measured. The average concentration of orthophosphate was high due to the BWVB’s monitoring in March, 2015. All orthophosphate data, excluding the March data averaged only 0.42 mg/L. The March data at all sites measured by the BWVB averaged 2.0 in March, which was responsible for the elevated orthophosphate data in the Cahaba River.

Otherwise, the other parameters were similar with the exception of *E. coli* concentrations, which was less as collected by the BWVB by more than half. However *E.coli.* collected by the BWVB on November 19, 2014 was 816.4 from monitoring station C.R. 280. According to the State of Alabama’s Antidegradation Policy for outstanding Alabama waters, *E. coli.* levels should not exceed a geometric mean of 126 colonies/100 mLs nor exceed a maximum of 235 colonies/100 mLs. Although coliform levels did not exceed the geometric mean, whether sampled by the BWVB or the City, the maximum coliform level was exceeded at C.R. 280 on 11/19/2014 (816.4 cfu/100mLs), in July 2014 (517.2 cfu/100mLs), and on May 28, 2014 (290.9 cfu/100mLs). The BWVB also monitored high coliform levels at Sunshine Creek (344.8 cfu/100mLs) and at Watson Branch (343.3 cfu/100mLs), both on March 10, 2015. It is not readily apparent the

cause for the higher coliform levels at C.R. 280 aside from the fact that the City's site represents a location having considerable public access and sampling is not being conducted in mid-stream but from a distinct public access structure on the north embankment of the Cahaba River.

Antidegradation 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.⁹ The table on this page provides the results of Birmingham's sampling efforts during the two year reporting period (November 2013 to July 2015) for five key state Antidegradation parameters and for zinc in Village Creek alone:

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

The table at right represents compliance with the State's Antidegradation Policy. The chart has been color coded to represent stream designated use. In blue represents a designated use as an

Stream	D.O. (mg/L) Mean/Max	pH Units Mean/Max	Temp. F° Mean/Max	<i>E. coli</i> CFU/100 mls Mean/Max	Turbidity NTU Mean/Max	Zinc µg/L Mean/Max
Cahaba	10.5/16.8	8.1/8.5	60.5/76.8	119.4/816.4	6.2/18.6	T A B L E 4
Five Mile	10.5/16.2	8.1/8.6	62.4/79.1	>213.4/>2,419.6	6.2/57.0	
Village	9.8/16.6	8.2/9.0	62.7/76.7	>112.7/>2,419.6	4.3/<50.0	
Valley	9.5/15.0	8.1/8.7	64.1/79.2	>604.1/>2,419.6	2.3/43.6	
Shades	9.2/18.0	8.0/9.2	61.8/75.6	202.2/770.1	4.1/16.9	

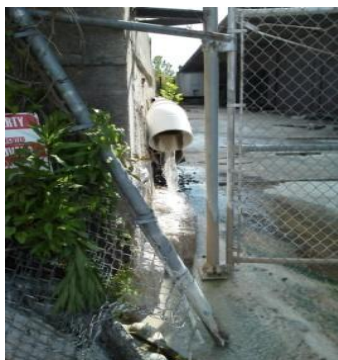
Outstanding Alabama Water; the tan shaded stream represents a swimming/bodily contact use; in green, those streams represent limited warm water fishery use; Valley Creek is not shaded, which is indicative of a stream with no defined designated use (e.g. §303(d) list or in Chapter 335-6-11). However, 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 and screening site values while the second number is the highest concentration reported during the bimonthly (every two months) reporting period between November 2013 and July 2015.

For each stream red, green, and yellow color coded boxes have been added. The color coded boxes represent the status of adherence to select parameters defined in Chapter 335-6-10, which represents the regulatory standard condition for each stream use. For example, if a green box has been added the regulatory standard condition for that parameter was completely met for that stream designated use. A yellow box means that at least a

⁹ [Basic Information: Introduction to UAAs | Use Attainability Analysis | US EPA](#)

portion of the standard condition was not met for that stream designation. A red box added means the standard condition for that parameter was not met at all during the course of this reporting period for which monitoring had been done. The mean for each parameter represents the geometric mean as required by the Antidegradation Policy.

The obvious difference between this year's report and last year's report is in the water quality of Shades Creek (pH), Five Mile Creek (turbidity), and the Cahaba River for *E.coli*. The Cahaba River showed an apparent improvement in *E.coli*, however that change is an artifact of additional data now used to compute the new geometric mean concentration, which arguably is also true for the Cahaba River and Shades Creek. The primary difference is demonstrated improvement in the Cahaba coliform levels while Shades Creek and Five Mile Creek took an apparent down turn relative to State Antidegradation level requirements. Overall dissolved oxygen and temperature levels did not exceed State Antidegradation Policy at any time during the past two reporting cycles for any stream within Birmingham. Conversely, each stream exceeded State Antidegradation Policy for pH, *E.coli*, and turbidity. After consideration of hardness concentrations in Village Creek, zinc also appears to exceed State Antidegradation Policy levels.



IDD&E
Stormwater
Protection
Ordinance:

Since the adoption of the Stormwater Protection Ordinance (SPO), the City has begun program implementation. The process (Appendix

on Non-NPDES facilities and work alongside ADEM with facilities that have NPDES permits. Upon receiving a complaint or observing a violation (prior verification of business license, NPDES permit, and SIC/NAICS code is obtained) staff notifies owner/operator of deficiencies if it is a non-permitted business/facility, otherwise notifies ADEM.

Stormwater staff has begun to work with several businesses within the City limits to comply with the newly adopted ordinance by presenting business owners in violation a copy of Ordinance No. 14-198. Staff verbally notified business owners of the noted deficiencies and allowed the owners to submit a corrective action plan in writing. While some deficiencies required an extended amount of time for correction, others were corrected within 30 – 60 days. Issues addressed were hand carwash discharges into the MS4 system, businesses dumping oil and grease onto sidewalks, and dog shelters potentially discharging solid waste into the storm sewer system (MS4). Stormwater Management is aware of at least 52 carwashes and addressing solutions to eliminate non-point source discharge. However, because we do not yet have a required appeals board in place by ordinance, the Law Department has advised staff to not process any further actions until a Stormwater Appeals Board has been created. That is anticipated to happen in 2016.

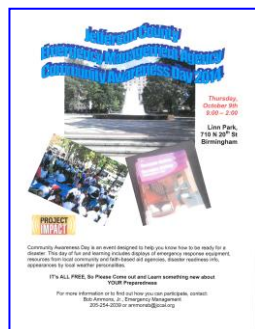
An application along with qualifications for the Appeals Board was developed and went before the Public Improvements & Beautification Committee (PIC) on September 8, 2015. The Committee approved the application along with qualifications to be publicly announced at the weekly City Council Meeting. Stormwater is currently in the process of accepting applications to serve on the Appeals Board.

B) for the City's Stormwater Ordinance is to focus

Public Education:

<i>Neighborhood</i>	<i>Date of Cleanup</i>	<i>Tonnage</i>	<i>Volunteers</i>
"MLK" Service Day	1/19/2015	1.18	300
Shannon Ross Bridge	2/21/2015	.48	10
Sicard Hollow	3/21/2015	4.31	100
Avondale	4/25/2015	0.12	32
Kilough Springs	5/9/2015	0.3	9
Village Creek Spring Cleanup	5/9/2015	2.26	200
Grants Mill	7/11/2015	3.38	55
East Lake Park	7/18/2015	0.12	35
Sherman Heights	8/8/2015	0.75	40
Valley Creek	8/20/2015	10.32	300
	-		
	8/22/2015		
Village Creek Fall Cleanup	9/17/2015	8.27	371
	9/19/2015		
Shannon Ross Bridge	11/1/2015	1.03	N/A

Creek and Neighborhood Cleanups: The City of Birmingham Stormwater Management Program, Public Works, and the Departments of Fire and Police actively planned, trained, facilitated, and participated in two Village Creek cleanup events. Together 31.49 tons of materials were removed from Village Creek, their banks, and surrounding neighborhoods with roughly 1452 volunteers.



Community Awareness Day:

On October 9, 2014 an estimated 1,800 people attended this event, including approximately 700 students, from various area schools, attended this event as a field day trip. This annual event allows

the City of Birmingham Stormwater Management and Floodplain Management and Disaster Mitigation Services staff along with other municipalities within Jefferson County, emergency workers, volunteers and faith-based organizations to share and distribute information to youths and adults on how to prepare for disasters and other environmentally related issues.



Fishing Rodeo:

The Fishing Rodeo is an Annual Event held at Eastlake Park. This event allows citizens of Birmingham to

enjoy a day of fishing and fun. It also provides the City of Birmingham staff along with other companies, municipalities, industries, residents and others from across the State of Alabama and surrounding States to share and distribute information to thousands of people on how to prepare for disasters, developing in environmentally sensitive areas and the importance of water resources. During this event:

City of Birmingham Floodplain Management and Disaster Mitigation Services distributed brochures, flyers, advice and other watershed protection related information to attendees.

City of Birmingham Stormwater Management Department presented The Village Creek Watershed Implementation Approach preference boards. This public outreach process was intended to gain additional support from the public about the watershed management planning effort in Village Creek and to understand their preferences for projects, in their neighborhood which are now being contemplated for implementation in 2016.



Bi-annual Soil Erosion & Sediment Control Workshop: The City of Birmingham Stormwater Management Department coordinates and co-hosts Erosion and Sedimentation Control (ESC) workshop on an alternating basis with the Jefferson County Department of Health, Jefferson County, and the City of Bessemer. A total of 50 people attended the 2 HBAA ESC workshops held on October 15, 2014 and March 25, 2015. The purpose of these workshops is to provide appropriate education and training measures for construction site operators and municipal staff as required in ALS000001 and to reduce the impact of erosion and sedimentation in waterways. Educational materials were distributed at the workshops.



UAB Storm Drain Stenciling Project: The University of Alabama at Birmingham (UAB)

Department of Occupational Health and Safety (OH&S) and the City of Birmingham Stormwater Management have collaborated on a project to label stormwater drains on the UAB Academic

and Medical Campuses. The project aims to protect the receiving water bodies from pollution and to elevate environmental compliance and awareness at UAB. The stormwater drain inlets are to be labeled with markers that discourage the public from illegally dumping chemicals and trash into stormwater drains. These markers are unique to UAB. The first phase of this project has been completed, and a team of OH&S and City of Birmingham employees have labeled thirty stormwater drains around campus that have been identified as high and medium dumping risks. Planning for the public promotional part of the project took place during this reporting year. The team will start working on labeling the rest of the medium dumping risk drains this year as a part of the project's second phase as well as present the project to the public.



Keep Birmingham Beautiful Commission: The mission of the Keep Birmingham Beautiful Commission is to serve the

citizens of Birmingham by developing and implementing effective public education and community involvement programs, which enhance the quality of life in beautification and environmental concerns. The objective of the Commission is to affect positive change in attitude and behavior regarding natural conservation, littering, recycling and beautification. KBBC and the City of Birmingham collaborated in numerous events within this reporting period. On May 8, 2015 KBBC hosted a Clean Campus Awards Day at Patton Park with about 250 people in attendance including: contest winners, chaperones, and other presenters from the environmental, safety

community. City of Birmingham Stormwater Management entertained the students with Stormwater Jeopardy, as well as handed out stormwater information materials.

Household Hazardous Waste Recycle: The Jefferson County Department of Health, the Jefferson County Commission of Alabama, the Cities of Birmingham and Bessemer, Keep Birmingham Beautiful Commission and the Alabama Environmental Council partnered to host a bi-annually Household Hazardous Waste Collection Day. Planning for the upcoming event took place during this reporting period.

Brown Bag Lunch and Learn Seminars: City of Birmingham and Jefferson County Stormwater Management partnered with the Friends of the Birmingham Botanical Garden to create a series of 12 free informational seminars called The Brown Bag Series, 10 of which were held during this reporting period. The seminars were held at the Birmingham Botanical Gardens; were open to all residents of Jefferson County; were promoted in the JeffCo H2O Newsletters, blogs and partner's 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 to low impact landscape designs, proper planting and gardening techniques, and prudent use of fertilizers and pesticides. There were 306 participants in the first 10 seminars of the 2015 series.



Jefferson County Water Festival: On October 14, 2014, at Samford University. The Water Festivals educated 700 fourth grade students, teachers and parents from 10 schools from across Jefferson County. The purpose of the Water Festival is to educate

students about where drinking water comes from and how to protect and keep it clean for themselves and future generations. Students participate in three hands-on activities and experiments. All the hands-on activities directly correlate with the Alabama Course of Study Science and SAT Objectives for fourth grade. Prior to the festival, students from participating schools submitted artwork depicting the Water Festival theme, *Rain, Rain Don't Run Away*, chosen for this year. The festival committee selected one winner whose artwork was used as the Water Festival logo on t-shirts distributed free to participating students, teachers and volunteers.





Rain Barrel Workshop: City of Birmingham Stormwater Program partnered with Alabama Cooperative Extension System (ACES), Alabama Environmental Council (AEC), Friends of Birmingham Botanical Gardens, Jefferson County, City of Bessemer, Clean Water Partnership, Jefferson County Department of Health, and Storm Water Management Authority to assess their interest in collaborating on developing and offering a rain barrel workshop to residents. A Rain Barrel Workshop committee was created with all entities participating. The committee chose July 25, 2015 as the date for the workshop, identified the resources needed to provide the workshop for attendees with materials available to build 80 rain barrels on site, secured a venue for the workshop, created event flyers, updated the *Rain, Rain Don't Run Away* brochure, and publicized the workshop through committee members' social media, websites, newsletters, and email contacts. Based upon the cost of materials and staff time, the committee determined that a minimum of 10 registrants was needed in order to implement the workshop. Possibly due to an exceptionally rainy summer, only one person registered for the workshop prior to the registration deadline, and the Rain Barrel Workshop was cancelled. The Stormwater Program staff and other committee members plan

to offer the Rain Barrel Workshop to the public in 2016 and thereafter as a yearly event.

Urban Forestry Fair: City of Birmingham Stormwater Program staff was to provide an educational game for nearly 600 5th grade students from various schools within Jefferson County at the annual Urban Forestry Fair originally scheduled on February 19, 2015. Unexpected construction in the park caused the original date to be changed and weather conditions prevented the event from being held on the alternate date. A scaled down version of the original event took place on April 21. Reports show that 203 students attended the event.

Do Dah Day: On May 16, 2015, City of Birmingham and Jefferson County Stormwater staff displayed Clean Water Awareness Campaign posters at a booth during the event. In addition, Stormwater Program staff reached out to residents from the surrounding community to assist with placing *In a Perfect World* and *It's Your "Doody"* posters on over 40 port-a-potties set up for the event. Stormwater staff from the City of Birmingham, with which Jefferson County Commission has a memorandum of understanding (MOU), assisted in distributing materials during the event. The *It's Your "Doody"* flyer along with free pet waste bags were distributed to attendees. The purpose of Stormwater Program staff participation in this event was to bring about awareness of the impacts of pet waste on local water quality and the benefits of pet friendly landscaping to reduce PHF as well as erosion and sedimentation. A fun and interactive poo-toss game was offered to teach people the proper behavior for pet waste disposal. In addition, approximately 100 *Fight the Bite* mosquito prevention kits with information about the proper use, storage and disposal of yard chemicals and other household products as well as information regarding other resources available to residents

were distributed. Approximately 350 pet waste bags and flyers were distributed. The Do Dah Day Board estimated that 10,000 people attended this event.



Stormwater Calendar: A 12 month printed 2015 calendar was created in partnership with Jefferson County Stormwater Management Department to provide a cost effective way to support the Clean Water Awareness posters and related components of the Clean Water Awareness Campaign (See Appendix D). Complaint reporting of pollution and sanitary sewer overflow reporting information was made available along with other local information. The Clean Water Awareness Campaign posters were utilized as the artwork for each month on the calendar addressing the proper use of yard chemicals, proper disposal of pet waste and used cooking oil, proper care and maintenance of vehicles and other machinery, and the impacts litter and trash have on our waterways. A total of 500 calendars were printed and distributed.

Work was completed in partnership with the City of Birmingham and Birmingham Botanical Gardens on a 12 month 2016 calendar which will be printed and distributed during the 2015-2016 Permit Year. The artwork which will be utilized in the calendar was produced by students participating in the Birmingham Cultural Alliance Program during their two weeks of study at the

Birmingham Botanical Gardens. The artwork utilizes botanic and other materials to depict the students' interpretation of the Clean Water Awareness Campaign posters. The artwork was voted on by three judges representing the partnering agencies. The artwork winners will receive a certificate for a free week of *Gross Out Camp* at the Birmingham Botanical Gardens location. Gross Out camp is an award-winning science camp with hands-on science experiments which engage campers in biology, chemistry, and physics. The free week of camp was donated by Fresh Air Family.



Only Rain Down the Drain Presentations:

During the reporting period City of Birmingham Stormwater Management Staff Presented "Only Rain Down the Drain" to over 250 Birmingham City Students ranging from k-9th graders over several different events.

"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.

OVERALL PROGRAM STRENGTHS, WEAKNESSES AND FUTURE PROGRAM COMPONENT DIRECTION:

During NPDES Stormwater Permit reporting year 2014-2015, the City of Birmingham's Stormwater Administrator has identified strengths and weaknesses. Some have already contributed to significant program changes. Others will follow in future years, which have been included this year in this section to maintain context as a *Future Program Direction*.

STRENGTHS

In addition to the strengths reported last year, which included the City's Watershed Management Planning Program and Floodplain Management and Disaster Mitigation Services Program, these continue to be strengths and are updated in this report. The following Stormwater Management Program components are further discussed and include:

Watershed Management Planning: In the City's Annual Report (2014), it was mentioned that the City had begun to institutionalize goals to preserve natural and environmentally sensitive areas and to consistently meet water quality standards through implementation of its first City Comprehensive Plan. In Chapter 13 of that Plan, the City for the first time recognized that in order for stormwater and floodplain management systems to incorporate best management practices, the City needed to pursue comprehensive watershed management planning. Watershed management planning was encouraged to develop best management practices in stormwater runoff treatment, including the use of non-structural solutions where feasible (See Appendix C). As a result, the Village Creek Watershed Management Plan was approved by the City Council in October 2013, a significant

strengthening of the City's Stormwater Management Program.

The final phase of the Village Creek Watershed Management Plan was approved by City Council on September 23, 2014 and included:

- ❖ Water quality model calibration & validation
- ❖ Existing watershed conditions water quality/quantity assessment
- ❖ Public engagement & vision planning
- ❖ Watershed improvements toolbox development
- ❖ Future watershed conditions water quality/quantity assessment
- ❖ Final watershed plan development

The proposed budget for this final phase is \$427,097. The benefits to date have included the creation of an extensive technical agency partnership, which presently includes:

- ❖ U.S. Environmental Protection Agency
- ❖ Alabama Department of Environmental Management
- ❖ The Nature Conservancy
- ❖ Community Leaders
- ❖ Jefferson County Soil & Water Conservation District
- ❖ Jefferson County Stormwater Management
- ❖ Jefferson County Department of Health
- ❖ Jefferson County EMA
- ❖ Regional Planning Commission of Greater Birmingham
- ❖ Freshwater Land Trust
- ❖ Village Creek Society
- ❖ Regional Planning Council of Greater Birmingham
- ❖ Black Warrior River Clean Water Partnership
- ❖ University of Alabama at Birmingham
- ❖ Various City of Birmingham Departments
- ❖ Industry
- ❖ Audubon Society
- ❖ Birmingham Southern College
- ❖ University of Alabama at Birmingham
- ❖ Birmingham Airport Authority

- ❖ **Friends of East Lake Park**
- ❖ **Alabama DOT**
- ❖ **U.S. Army Corps of Engineers**
- ❖ **Alabama University, Water Policy & Law Institute**

The planning objectives of the Village Creek Watershed Management Plan simply include both water quality and stormwater quantity management. The plan assumes the overarching target for water quality is achievement of an appropriate total maximum daily load for Village Creek that is sustainable. In other words, the plan will achieve an ideal water quality, which is the beneficial use condition desired for Village Creek by the State. The watershed planning framework for Village Creek is designed as a tool for offsetting the additional loads brought about by both current and future development to achieve the intended water quality targets. Offsetting the additional loads due to development will be through a triple bottom line process (i.e. Social, Economic, and Water Quality), anticipated to achieve sustainable development within the Village Creek Watershed while also maintaining the desired water quality target in Village Creek (See Figure 20).

During this reporting year development of the watershed management plan for Village Creek

included extensive outreach to the public in general, both industry and residential, and completion of stream assessment to enhance final modeling efforts. The City also opened discussions with the U.S Army Corps of Engineers (ACOE) to become more engaged in this City's watershed planning process.

The Village Creek public outreach process was intended to gain additional support from the public about the watershed management planning effort in Village Creek and to understand their preferences for project implementation, which were identified in previous planning efforts and are now being contemplated for implementation in 2016. In addition to project development opportunities developed by the Village Creek Watershed Management Technical Team (Figure 21), City Stormwater Management staff participated in numerous other events throughout the Village Creek watershed talking with citizens, business and community leaders in conversation about the Village Creek Watershed Implementation Strategy and to obtain their preferences to project ideas and objectives, which may come to their neighborhoods. A summary of the public outreach for preference delineation will be included into the final report, anticipated for completion in January 2016. In addition, City



Figure 20





Stormwater Management Staff gave a presentation before the Birmingham Environmental Professionals Association regarding both the City's Stormwater Management Program and opportunities being considered for project implementation. Added to that presentation, City staff also met with industry leaders in June to consider the Watershed Management Implementation Approach and invited each industry representative to attend the monthly technical team group meetings to help guide and develop the final Watershed Management Implementation Approach. Invited were representatives from:

- ✓ ABC Coke
- ✓ Aerotek
- ✓ Alagasco
- ✓ American USA
- ✓ Amerex-Fire
- ✓ Americhem
- ✓ ARCSEC Technologies
- ✓ Barber Companies
- ✓ Brasfield & Gorrie
- ✓ CMC
- ✓ Cooper Construction
- ✓ Corridor Clean Fuels
- ✓ DLA
- ✓ Drummond Company
- ✓ Eco-Three
- ✓ Enviroaquatics
- ✓ Enviro-Pear
- ✓ Evergreen Tank
- ✓ Holcim
- ✓ Haskin Jones
- ✓ Industrial Chem
- ✓ INOACUSA
- ✓ Kinder Morgan
- ✓ Matrix Design Group
- ✓ McWane
- ✓ McWane Pipe
- ✓ Metal Plate
- ✓ Mh-Valve

- ✓ Michelin
- ✓ MMM
- ✓ Natchem
- ✓ Nexus Energy Center
- ✓ Nucor Birmingham
- ✓ PSC Now
- ✓ Rainforrent
- ✓ Republic Services
- ✓ Resolute fp
- ✓ Southern Companies
- ✓ Southern Metals
- ✓ Tyler Union
- ✓ US Pipe
- ✓ USS
- ✓ Vactor
- ✓ Vulcan Group
- ✓ Wade Sand & Gravel
- ✓ Walter Energy

Many from this group did attend the invitation meeting and have continued to participate in development of the Watershed Management Implementation Approach.

Another major accomplishment during this reporting period was the implementation and development of a Village Creek Stream Assessment and report. The City initiated a 14-mile creek assessment as part of the Village Creek Watershed Management Implementation approach. This effort required an initial automobile assessment to narrow down areas needing physical assessment. Ultimately, 10-assessment sites were selected, representing approximately 7-miles of actual stream assessment with City staff in the field. The stream assessment focused primarily on channel stability, channel scour and sedimentation, riparian habitat conditions, and water appearance. The final report is included as Appendix A.

FLOODPLAIN MANAGEMENT: Floodplain Management continues to be a City strength with numerous ongoing projects during this reporting



year, as follows:

**VILLAGE CREEK FEMA ASSESSMENT STUDY—
ROEBUCK TO PLEASANT HILL ROAD –
COLLEGEVILLE NEIGHBORHOOD BENEFITS
FROM LOMR**

Studies by the Corps of Engineers have suggested that the effective flood elevations for Village Creek may be too high in some areas, especially in the Collegeville Area. On behalf of the neighborhoods, the City of Birmingham tasked a consulting group to evaluate the effective FEMA Flood Insurance Study (FIS) for Village Creek within the residential neighborhoods to determine if benefits may be achieved through revisions to the effective study. As a result, the corrected effective model demonstrates reductions in the base flood elevations through the Collegeville area and indicates that an estimated 143 structures would benefit from updating the study with a Letter of Map Revision (LOMR) submitted to FEMA at a funding cost of \$39,500. A LOMR will remove a large number of properties from the Special Flood Hazard Area within the Collegeville Neighborhood- saving residents the increasing cost of flood insurance and property protection; and for those that remain in the SFHA, the reduction in the base flood elevations may provide some reduction to the flood insurance policy rates and flood protection related costs. The estimated community savings will be \$171,600.

**VILLAGE CREEK STREAM MONITORING
SYSTEM ASSESSMENT & FLOOD FORECAST
IMPLEMENTATION SYSTEM**

The Stream Monitoring System Assessment and Flood Forecast Implementation System for Village Creek Project is currently underway as part of the Silver Jackets Pilot Project in cooperation with the State Office of Water Resources, US Army Corps of Engineers, USGS, and National Weather Service. “Silver Jackets teams in states across the

United States bring together multiple state, federal, and sometimes tribal and local agencies to learn from one another in reducing flood risk and other natural disasters”. Through this team effort, the City of Birmingham is currently in the process of evaluating its existing stream monitoring system along Village Creek throughout Jefferson County and implementing a Flood Forecast System for Village Creek. This assessment will aide in the development and evaluation of the City’s water quality monitoring needs and in the development of a plan for the repair, rehabilitation, and addition of new equipment to make the system fully operational and beneficial to the communities it serves along Village Creek. The funding appropriated for this project is \$33,500 and the benefits of protecting life and property by preparing residents for a flood far outweigh the costs.

**COLLEGEVILLE ACQUISITION AND
RELOCATION GRANT (ANTICIPATED)**

The City of Birmingham’s North Neighborhood Acquisition Project involves the acquisition, demolition and land clearance of 30 Pre-FIRM residential, flood prone properties located in the 100 year floodplain of Village Creek. These properties are centrally located within the southern portion of the Collegeville Neighborhood along the 3100 and 3200 Blocks of 29th Avenue North and 27th Avenue North respectively. This project would mitigate flooding problems in this neighborhood as well as in the Village Creek floodplain by permanently removing 30 repetitively flood damaged properties from the 100 year floodplain, increasing the overall floodplain storage and conveyance capacity, restoring the natural and beneficial functions of this portion of an urban floodplain, and further facilitate the creation of open and recreational spaces to be enjoyed by the non-acquired residences in the overall project area. The estimated project cost is

approximately \$2million dollars; however, the benefits consist of reduced costs in emergency response and rescue, elimination of flood insurance costs and property protection costs associated with an improved structure and potential environmental restoration.

POST DISASTER RECOVERY PLAN

The Post Disaster Recovery Plan will fulfill the City of Birmingham's commitment to effectively and efficiently implement recovery programs while maximizing Federal financial participation. It will incorporate the National Disaster Response Framework (NDRF) as the City standard for emergency recovery operations and establish the overall roles and responsibilities for emergency recovery operations, as well as the concept of operations for the City. The Plan is intended to be used in conjunction with established operational procedures, plans, protocols and planning processes that will allow the City to implement a more efficient recovery program while maximizing federal financial participation for future events. The funding obligation for this project is \$95,000; however, our Post Disaster Recovery Plan gives us an opportunity to achieve a more sustainable and resilient community after a disaster, a benefit which can save millions of dollars in long term recovery efforts.

PROGRAM FOR PUBLIC INFORMATION

The City of Birmingham participates in the National Flood Insurance Program (NFIP) Community Rating System which allows development of a floodplain management program tailored to hazards, character, and goals. Under the CRS, a Program for Public Information (PPI) is a plan created to continuously inform Birmingham residents about flooding and ways to address potential flood damage to their property. This plan will include map information, tailored outreach projects including website changes and

information distribution practices for the City's floodplain properties. The ultimate goal is to educate and promote community resilience which is necessary to minimize flood damage. We understand that well-informed people make better decisions and 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 their Birmingham's floodplain. Having a PPI plan will increase our community class rating in the CRS, which will in turn, provide greater savings to flood insurance policyholders.

VILLAGE CREEK PROPERTY FLOOD RISK REDUCTION ASSESSMENT

The City is funding through the US Army Corps of Engineers Silver Jackets Program. The Silver Jackets program has been a key component to accomplishing the USACE Flood Risk Management Program mission, which emphasizes integration and synchronization of flood risk programs, projects and authorities, internally and in partnership with all flood risk management stakeholders. Responsibility for flood risk management in the United States is a shared responsibility among multiple federal, state and local government agencies, each with a complex set of programs and authorities. These agencies have many programs to assist states and communities in reducing flood damages and promoting sound flood risk management. Silver Jackets teams have demonstrated the effectiveness of a shared responsibility partnership for managing the flood risk life cycle and leveraging available resources at the state level.



The USACE proposes to collect structure inventory data to update the City's existing structure inventory for the Village Creek Watershed Master Planning and modeling efforts and for floodplain non-structural mitigation solutions and alternatives and for regulatory purposes. Each property in the Village Creek Watershed will be characterized and categorized based structure characteristics and structure flood risk information.

FLOODPLAIN OVERLAY DISTRICT

The City's Higher Standards Floodplain Provisions were updated and adopted recently to what is now referenced as "Floodplain Overlay District". The City continues to regulate all development in Special Flood Hazard Areas and employ FEMA acceptable provisions to encourage compliance and minimize the impact of new development or redevelopment in a floodplain. With the new provisions, the City took a few steps forward by adding enclosure regulations and minor 500 year floodplain regulations while focusing on minimizing blight in some of the City's low lying areas.

FLOODPLAIN MANAGEMENT WEBSITE

Recently, the Floodplain Management and Disaster Mitigation Services staff updated its webpage to better cater to property owners currently located in or near the 100 year floodplain. The webpage focuses on many floodplain management related topics such as natural and beneficial functions of floodplains, flooding history, flood insurance, flooding preparedness and planning, mitigation measures, permitting requirements and many more topics.

WEAKNESSES

In addition to the weaknesses reported last year, which included MS4 Mapping & Maintenance, the City Website, Core Leadership Training, and “Put-A-Lid-On-It” programs, these continue to be plagued with difficulty.

MS4 Mapping & Maintenance: The City entered into a contract with STRADA to evaluate approximately 82-flood prone areas throughout the City. Based on that review, STRADA identified a number of issues contributing to the flooding problems in those areas. Among the problems noted were:

- System Maintenance
- Inlet Structure Damage
- Street & ROW grading relative to the storm collection system
- Inlet location & frequency
- Availability of appropriate cleaning equipment and capacity
- Cleaning process for removal of debris from pipelines
- Litter control and trash removal
- Street overlay process and infringement on drainage structures
- Flooding common in a number of underpass locations due to significant limitations of the collection system

The number one issue of concern though was the inability of the system to transport design flows due to inlet and pipe blockages. Although not related directly to flooding, STRADA noted that the storm sewer system had limited number of assets recorded in the City’s GIS system.

Based on the investigation of selected flood prone areas only 1/3rd of the assets are captured in the City’s GIS system. Without accurate mapping, planning, maintenance, implementation of MS4 permit requirements, and budgeting for required capital improvements cannot be effectively conducted. Furthermore, additional GIS layer updates were suggested to enhance the ability of the City to identify assets integration and manage the stormwater program.

Core Leadership Training: Stormwater runoff is one of the only growing sources of water pollution in the U.S. and the regulations to curtail it have grown exponentially in the past few decades. The results of the Environmental Protection Agency’s (EPA’s) 2008 Clean Watersheds Needs Survey illustrate this growing need and estimate the costs to control polluted runoff over the next 20 years at \$42.3 billion.¹⁰ In Birmingham, there is a need to instill better stormwater management practices to meet Clean Water Act and City National Pollutant Discharges Eliminates System (NPDES) Permit requirements. There is an apparent lack of skilled workers who know how to construct, inspect and properly maintain these systems. This is in part due to the speed at which the demand for these practices is increasing, and in part due to the lack of standardized guidance for training programs focused on this topic. Furthermore, the training now being done at the City, en masse for City Departments is not working. Many instances have been observed where stormwater crews are not following stormwater guidance after having been trained on best management practices by Stormwater Management. Therefore, training needs to be reconstituted in favor of a new direction.

¹⁰ [USEPA 2008 Watershed Needs Survey](#)

Stormwater Management, working with partners from Public Works (e.g. ditch crew, storm inlet crew, inlet cover crews, PHF), Occupational Health and Safety, the Fire Department, and Human Resources Department propose to address this need by designing a Clean Water Certification and Workforce Development Program to train a skilled stormwater workforce. With the help of a departmental leadership team, Human Resources and Stormwater Management will translate these training opportunities into an opportunity for career advancement, improved stormwater results, improved awareness, and stewardship of City resources.

Stormwater Management, along with our partners, proposed to address this need by translating training opportunities into actual job advancement opportunities. This program is designed to address the need for standards in training on various clean water practices beginning with stormwater management practice construction, inspection, maintenance, and water quality protection. By establishing a training program framework for the participants to better understand the “big picture”, this will also give City staff participants a better understanding of the related need, such as illicit discharges, stormwater education and outreach, and industrial site inspection practices that will lead to a better understanding of stormwater practices in their everyday jobs.

This new program, now entitled, “Leadership Masters Program” is designed in two phases. The first phase will include the formation of a City Core Leadership Committee to assist with development of stormwater performance measures, develop certification guidelines for select class participants, and select the class participants from applications submitted by interested employees from throughout the City departments. The second phase will include Stormwater Management, working with

participants, to learn about stormwater issues in the context of a core leadership curriculum. The annual participants will then come together and discuss what problems they observed and identify and develop a project to improve stormwater, its protection and management, or sustainability at a cost not to exceed \$50,000, annually.

During this reporting period Stormwater Management staff attempted to develop a training schedule in conjunction with the Department of Human Resources (HR). Due to staff turnover at HR that department decided to eliminate independent staff training and rely on the Jefferson County Personnel Board for future training of City employees. Although a setback, Stormwater Management staff has begun the process of working with the Jefferson County Personnel Board to establish this training program.

Future Direction: The Department of Planning, Engineering, and Permits has already approved this program concept. Stormwater Management will work with the Jefferson County Personnel Board to define the parameters of the new training program. When the training program is complete, it will be rolled out to the Core Leadership Departmental Team, which will be convened and performance measures will be developed. When that has been completed, applications will be made available to all City Departments having best stormwater practices as a component of their daily operations. The Core Leadership Team will select the first annual class of stormwater leaders and the training will commence. It is anticipated that this training program will last 1-year of monthly effort and involve one-on-one training with each “class” member. (See Appendix D)

***Put A Lid On It:***

During last reporting period, the City identified more than 1,000 inlet tops are being manufactured and replaced annually by our Department of

Public Works at an estimated cost of more than \$576,000 per year. Continuous disrepair of inlet tops and blocked drains do not allow stormwater to flow properly, resulting in flooding issues and standing waters. Drains without the proper covering are a public safety concern that is hazardous to the communities and can contribute to neighborhood neglect. The City identified a possible solution to these issues in a partnership with University of Alabama at Birmingham (UAB) to redesign an innovative, state of the art pilot project with the potential to develop an incubator business opportunity with the City of Birmingham. This proposal will improve drainage, enhance public and workers safety, and reduce long term operating and maintenance (O&M) costs. During this reporting period staff has worked through a preliminary portion of the pilot project and has completed a draft pilot project scoping document and a draft interlocal agreement for final execution. The City has also budgeted approximately \$600,000 over the next three years until pilot project completion. City staff anticipates execution of the final agreements and pilot project execution in early 2016.

Future Direction: The City has completed a work scope and draft interlocal agreement, which was acceptable to City and UAB Attorneys. The agreement is being considered by the Alabama Attorney General's Office, a requirement of State Law when universities are involved with municipal governments. Upon either approval or no comment the City will complete the interlocal

agreement for subsequent board/council approvals to proceed to implement the project. Funds have been budgeted and project Phase I will commence in 2016. A copy of the draft interlocal agreement is included in Appendix D.



MAYOR'S PROPOSED OPERATING BUDGET^{IV}	
FISCAL YEAR 2016	
Stormwater Management	
Fund 048	
<u>Estimated Revenues</u>	
Stormwater Fees	<u>\$850,000</u>
Funds Available	<u>\$401,673</u>
Total Estimated Revenues	<u>\$1,251,673</u>
<u>Appropriations</u>	
Planning, Engineering & Permits:	
Stormwater Administrator	\$137,367
Water Pollution Control Technician (4)	\$222,415
Water Pollution Control Aide (2)	\$60,382
Senior Civil Engineer	\$80,373
General & Administrative Expenses	\$751,135
Total Appropriations	<u>\$1,251,673</u>

The table above depicts the Mayor's proposed FY 2016 budget for Stormwater Management. This represents the total cost for maintenance of the NPDES Phase I MS4 Permit. All remaining basic levels of service for the routine operation and maintenance of the City's separate storm sewer system are funded by the general fund and have not been itemized



FUTURE PROGRAM DIRECTION:

During NPDES Stormwater Permit reporting year 2014-2015, the City of Birmingham completed a number of items, which were identified to be done in the previous year's report as a future effort. Below are previous and new program elements that Stormwater Management is considering in FY2015-2016.

Future Program Direction Program Element	Description of Project	Program Element Addressed in FY2015 Why/Why Not?	Anticipated FY 2016 Future Direction
<u>Planning Control:</u> Map revision for properties within the Village Creek flood plain	City working with FEMA to identify floodplain properties inappropriately listed.	Not Completed Ongoing Effort for all watershed. The City completed Shades Creek floodplain and is now focusing on Village Creek floodplain	<ul style="list-style-type: none"> • <i>Identify funds</i> • <i>Obtain City Council approval</i> • <i>Project inventory & assessment kickoff.</i> • <i>Project will be completed in FY2017.</i>
<u>Project Control:</u> Fleet Maintenance Truck Wash	Construct an oil/grease separator and reconnect system to the sanitary collection system	Not Completed <i>Subsequent to finding more than the one truck wash the City has decided to create one new truck wash facility for all four DPW Districts at the New Georgia Landfill and is seeking bond funding approval for the project</i>	<ul style="list-style-type: none"> • <i>Project has been included in the future bond projects request</i> • <i>Approve general obligation bond funding request</i> • <i>Project design already completed</i> • <i>City obtain all project permits</i> • <i>Commence construction</i>
<u>Project Control:</u> "Put-A-Lid-On-It" Project	Develop a new technology that provides innovative design to reduce breakage and O&M	Not Completed <i>Continued negotiations between the City and UAB to develop an</i>	<ul style="list-style-type: none"> • <i>Complete interlocal agreement with UAB (Appendix D)</i> • <i>Initiate phase I of the</i>



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Future Program Direction Program Element	Description of Project	Program Element Addressed in FY2015 Why/Why Not?	Anticipated FY 2016 Future Direction
	costs.	<i>interlocal agreement</i>	<i>pilot project in 2016</i>
<u>Structural Control:</u> Mapping and Maintenance of the MS4		Not Completed <i>For lack of funding & departmental reorganization</i>	<ul style="list-style-type: none"> • <i>City is considering how best to fund the project, which is expected to cost +\$2.0M.</i>
<u>Administration:</u> City Public Education/ Outreach	Educate the public about Stormwater Management within the City of Birmingham	Completed <i>Numerous educational opportunities were completed last year, which far exceeded the previous year.</i>	<ul style="list-style-type: none"> • <i>City continues to seek opportunity to advance public education; this year anticipate greater connection to trash & debris in neighborhoods</i> • <i>Creating stronger alliance with the Village Creek Society, KBBC and other stormwater MS4 partners to clean-up neighborhoods.</i> • <i>Repeat the successful stormwater calendar again in 2016</i>
<u>Policy Control:</u> City of Birmingham Stream/ Lake Maintenance BMP	Compose BMP plan that utilizes chemicals and application procedures with the least amount of environmental impact	Not Completed <i>The new City BMP Plan has been completed in final draft; however the staff project PM leading the effort resigned in September before meetings to accept the</i>	<ul style="list-style-type: none"> • <i>Complete final BMP plan</i> • <i>Schedule review and comment meeting with ADEM & ACOE upon staff replacement</i> • <i>Modify & change BMP plan as needed</i>





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Future Program Direction Program Element	Description of Project	Program Element Addressed in FY2015 Why/Why Not?	Anticipated FY 2016 Future Direction
		<i>new City plan could be established with ADEM and the ACOE. Furthermore, the draft final plan was requested to be modified to address mosquito control as well. New buffer zones are being considered in known endangered species habitat areas</i>	<i>and formally adopt citywide as new policy</i>
<u>Regulatory Control:</u> City of Birmingham new Zoning Ordinance	Create new City ordinance	Completed	<ul style="list-style-type: none"> • See Appendix B
<u>Administration:</u> Stormwater/ GIS Data Integration	Merge all water quality and quantity paper files into GIS for laptop field use to prevent data transcription errors	Not Completed <i>New City laptops were held up by another City department negotiating a new contract for services.</i>	<ul style="list-style-type: none"> • Obtain new laptops in 2016
<u>Administration:</u> Stormwater Website^v	Create stormwater website for public outreach	Completed <i>Stormwater Management is working with the Mayor's Office to have editorial rights to modify and add new content to the existing website.</i>	<ul style="list-style-type: none"> • Stormwater staff now has editorial rights to the City's Stormwater Website. Information will be updated continuously
<u>Administration:</u> Stormwater Core Leadership Program	Improve City staff understanding of stormwater aspects	Not Completed <i>The HR Department</i>	<ul style="list-style-type: none"> • Stormwater staff are working with the Jefferson County





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2015

Future Program Direction Program Element	Description of Project	Program Element Addressed in FY2015 Why/Why Not?	Anticipated FY 2016 Future Direction
	of their positions	<i>was in transition and has now discontinued its training program</i>	<p><i>Personnel Board to develop a training program</i></p> <ul style="list-style-type: none"> <i>Anticipate creating the NPDES Interdepartmental Team to develop performance measures and standard reporting practice s</i>
<u>Monitoring:</u> Instream/Outfall Reconnaissance (ORI)	Monitor instream peak areas for outfall dry weather discharge, between sampling events	<p>Completed</p> <p><i>During this period Stormwater staff, in conjunction with a stream assessment project in Village Creek identified 18 ORI, some flowing during periods of dry.</i></p>	<ul style="list-style-type: none"> <i>ORI monitoring continues to be a very complex undertaking in Birmingham, which continues to be problematic and requiring a better process design.</i> <i>City stormwater staff will continue to pursue improvement of ORI monitoring</i>
<u>Development Control:</u> Regional Sustainability & Environmental Sciences Research Program (RESES)	EPA Office of Research & Development pilot project in Village Creek to supplement data for the National Stormwater Calculator (Appendix E)	<p>Not Completed</p> <p><i>During this period Stormwater staff provided EPA with data needed for the Enviro Atlas. Data for the stormwater calculator has been challenging and not yet complete.</i></p>	<ul style="list-style-type: none"> <i>Continue to work with EPA to finalize the LID cost information EPA needs for the stormwater calculator using Birmingham's experience</i>





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Future Program Direction Program Element	Description of Project	Program Element Addressed in FY2015 Why/Why Not?	Anticipated FY 2016 Future Direction
<u>Development Control:</u> Develop basis for Post-Development control to support new LID ordinance in Birmingham in coordination with the American Society of Civil Engineers, Birmingham Branch and the USEPA.	Project will review relevant requirements and implementation approaches nationwide, update the City's long-term rainfall analysis, review guidance documentation for implementing runoff controls and provide the City with a recommendation for a select method of post-development controls. (See Appendix E)	Not Completed <i>Funding for this project was a primary hurdle that was not identified until late in 2015. Ultimately, this project is now being paid for by the USEPA under an existing contract with Black & Veatch.</i>	<ul style="list-style-type: none"> • <i>ASCE Technical team will review consultant work product and recommend LID direction to the ASCE for approval,</i> • <i>The ASCE final product will be considered by the City for acceptance in January 2016.</i> • <i>Development of a new LID post-development strategy will be considered and a strategy developed in 2016 for incorporation by ordinance into City Code.</i>





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City of Birmingham NPDES (MS4) Permit No. AL000001

PROGRAM ACTIVITIES SUMMARY TABLES

City of Birmingham

710 20th Street North • Birmingham, AL 35203

City of Birmingham NPDES (MS4) Permit No. AL000001

PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
(1) Structural Controls	Storm Drain Inlets Cleaned (#)	3,500 annually	Yes	8,131 inlets	2,881 inlets	No Need
	Storm Sewer Lines Cleaned (Lin Ft)	90,000 annually	Yes	166,733 ft	109,531 ft	No Need
	Litter Cleared (Blks)	30,000 annually	Yes	304,998 blocks	373,970 blocks	During this reporting period the Mayor’s Office initiated a “Litter Campaign” to improve the look of the City. This contributed to the increased litter collection this year
	Pipe Repaired / Replaced (Lin Ft)	1,000 annually	No	484 ft	1,212 ft	
	Inlet Const (#)	100 annually	Yes	24 inlets	16 inlets	City DPW was downsized & construction staffing were reassigned. Construction eliminated

City of Birmingham

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City of Birmingham NPDES (MS4) Permit No. AL000001

PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Curb & Gutter Const (Lin Ft)	900 annually	Yes	1,043 ft	347 ft	City DPW was downsized & construction staffing were reassigned. Construction eliminated
	Storm Sewer Tops Made (#)	350 annually	Yes	562 made	665 made	
	Storm Sewer Tops Set (#)	4, 000 annually	Yes	7,127 set	5,559 set	City DPW was downsized & construction staffing were reassigned. Construction eliminated
	Inventory of Storm Sewer System	Complete by Sept 2015	Yes	806 outfalls total, of which 13 new were identified during this reporting period	806 outfalls total. No new outfalls have been discovered	
(2) Areas of New Development /	Review Subdivision	Complete by	Yes			

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City of Birmingham NPDES (MS4) Permit No. AL000001

PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
Redevelopment	Ordinance and Update	Sept 2012				
	Review and Revise the City’s Engineering Guidelines for Stormwater Management	Complete by Sept 2017	No			Measureable goal was modified by last year’s report. City is working with the Birmingham Chapter of the American Society of Civil Engineers (ASCE) to establish a water quality treatment measure for LID development. Development of a new LID ordinance is anticipated in FY2017
	Continued Implementation of City Flood Mitigation/ SWM Plan, adopted October 2004.	Annually	Yes	Yes	Yes	Silver Jacket’s project underway and remapping of Village Creek floodplain areas will occur by FY2017

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City of Birmingham NPDES (MS4) Permit No. AL000001

PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
(3) Roadway Maintenance	Streets Swept (Curb miles)	100,000 annually	Yes	126, 217 curb miles	78,511 curb miles	Multiple street sweepers were out of commission for an extended period of time during this report period
	Track Litter Index	Annually	Yes	Litter index score: 1.0	Litter index score: 1.0	Litter index score represents very low litter in the selected high traffic areas of the City for evaluation
	Estimate Pollutant Load Reduction from Street Sweeping Practice	Complete by Sept 2014	No	6,479 tons		Data not available with any consistency this year. It will be addressed for consistency in next year’s report.
(5) Pesticide, Herbicide, and Fertilizer Application	Inventory the City PHF Storage Facilities	Complete by Sept 2010	Yes			City has modified staffing and reorganized DPW-PHF. Stormwater Management needs to circle back with PHF and revise Stormwater Program controls

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City of Birmingham NPDES (MS4) Permit No. AL000001

PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Map the City PHF Storage Facilities	Complete by Sept 2010	Yes			City has modified staffing and reorganized DPW-PHF. Stormwater Management needs to circle back with PHF and revise Stormwater Program controls
	Develop PHF Program Documentation to Include Chemical Application Protocols	Complete by Sept 2013	Yes	Yes		City has modified staffing and reorganized DPW-PHF. Stormwater Management needs to circle back with PHF and revise Stormwater Program controls
	Track Inventory of PHF Materials	Monthly	Yes	Yes	Yes	Available Upon Request
	Track Quantity of PHF Materials Applied	Annually	Yes	Yes	Yes	Available Upon Request

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City of Birmingham NPDES (MS4) Permit No. AL000001

PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Document Training for Staff	Annually	Yes	<ul style="list-style-type: none">• Sports Turf Field Day• Birmingham Landscape Expo• Alabama Green Industry Training Center Continuing Education Classes• ALDOT Vegetation Management Training• City of Birmingham SWMD/OHS PHF Training• Alabama Vegetation Management Conference	<ul style="list-style-type: none">• ATA Turf Grass Road Show• Birmingham Landscape Expo• Alabama Green Industry Training Center Continuing Education Classes• Alabama Vegetation Management Conference	

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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Develop and distribute public education materials	Annually	Yes	See <i>Public Education & Outreach Future Program Direction</i> (pg. 37)	See <i>Public Education & Outreach Future Program Direction</i> (pg. 49)	
(6) Illicit Discharge Detection and Elimination	Map the City Outfalls	Complete by Sept 2010	Yes			Appendix A
	Develop IDD&E Program Documentation	Complete by Sept 2010	Yes	<ul style="list-style-type: none">IDDE Ordinance was completed and approved by City Council in December 2014	<ul style="list-style-type: none">City staff is preparing draft IDDE-SOPCity staff have begun investigations for non-complianceCity staff began development of a tracking system	Available Upon Request

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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
					<ul style="list-style-type: none">Anticipate staffing of SPO Appeals Board	
	Track Public Complaints	Annually	Yes	1,331	1,173	Less complaints were documented by 3-1-1
	Track Illicit Discharge Investigations and Resolution	Annually	Yes	26 illicit discharges were reported	19 illicit discharges were reported	Illicit discharge investigations that have been provided to Stormwater Management have included non-IDDE discharges, although inspections were made as needed. This total though represents only those IDDE discharges. Some on these lists are still active pending appeals board staffing with City



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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
						volunteers.
	Update the City Outfall Inventory	Annually	Yes	Yes	No new outfalls added	
	Inspect Instream Peak Outfalls Bimonthly		Yes	See Monitoring Below	Yes	See <i>Major Accomplishments</i>



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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Maintain Hotline	Annually	Yes	Street sweeping: 338 MS4 cleaned: 501 Reset inlet covers: 211 Street flooding: 55 Missing/broken inlet covers: 110 Catch basins repair: 97 Catch basin clogged: 19 (New metric)	Street sweeping: 282 MS4 cleaned: 496 Reset inlet covers: 179 Street flooding: 68 Missing/broken inlet covers: 106 Catch basins repair: 32 Catch basin clogged: 10 (New metric)	
	Implement Pre-Incident Planning (PIP) Program	Annually	Yes	88 PIP Inspections	94 PIP Inspections	
	Track Reported Spills and Investigate Findings	Annually	Yes	EMA: 28 reported spills ADEM: 10 reported spills SWM: 4 reported	EMA: 40 reported spills ADEM: 20 reported spills SWM: 1 reported	

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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
				spills	spills	
	Maintain Stormwater Webpage for Existing City Website	Annually	Yes	During 2015 SWM staff will continue to work with the Mayor’s Office to finalize the website	City SWM staff have been granted stormwater authorship rights to the Stormwater Website	
	Map the City Storm Sewer System	Complete by Sept 2015		No additional storm sewer infrastructure was surveyed or added to the existing maps during this reporting period	No additional storm sewer infrastructure was surveyed or added to the existing maps during this reporting period	
	Maintain Map of SARA Title III Sites and	Annually	Yes	173 facilities	173 facilities	Available upon request

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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Update New Sites					
(8) Industrial and High Risk Runoff	Review SWPPP for Landfills	Complete by Sept 2013	Yes	None	None	Both the New Georgia and Eastern Area Landfill SWPPPs/SPCCs have been updated. Documents available upon request
	Continue Inventory and Map ADEM Permitted Sites	Annually	Yes	No new facilities mapped	No new facilities mapped	
	Train Municipal Staff	Annually	Yes	Trained 20 Landfill employees	No training provided this year	Anticipate Core Leadership Program training in 2016

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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Stormwater Monitoring at City Landfills	Annually	Yes	Eastern Area & New Georgia Landfill DMR's	Eastern Area & New Georgia Landfill DMR's	DMR's available upon request
	Create Inventory of Municipal Facilities and Review Stormwater Management at the facilities	Complete by Sept 2015	Yes (Ongoing)	Not Yet Completed	List of City facilities & properties complete	See Appendix F for list of all City facilities
	Industrial & High Risk Facilities & Runoff Inspections & Enforcement Activities	Annually	Yes	Inspections: 24 Rechecks: 150 Enforcement: 2 Corrective actions: 16	Inspections: 34 Rechecks: 189 Enforcement: 2 Corrective actions: 16	
	Continue BFD Inspection of Tier II Sites	Annually	Yes	Pre-incident inspections: 88	Pre-incident inspections: 94	

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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Review ESC Ordinance	Complete by Sept 2015	Yes	Ongoing	Ongoing	This program is being redirected to Stormwater Management. Staff considering further changes in 2016 to establish a permit deadline for completion and assignment of long-term O&M of detention/retention facilities
	Modify Tidemark to Track All Construction Runoff Permitting Activities (Permits Issued; Permits Closed; Site Inspections; Non- Compliance Incidents; Enforcement Actions; Complaints; Bonds and Letters of Credit Received)	Annually	Yes	Inspected: 182 Checked job sites: 88 Final inspection: 7 Inspections passed: 273 Inspections failed: 0 Violation notices: 0 Compliance orders: 0 Contractor in Default: 0 Bonds collected: 11	Inspected: 159 Checked job sites: 159 Final inspection: 0 Inspections passed: 671 Inspections failed: 0 Violation notices: 0 Compliance orders: 0 Contractor in Default: 0 Bonds collected: 0	This program is being redirected to Stormwater Management.

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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
				Bonds released: 0 Permits issued: 37 Permits closed: 1	Bonds released: 3 Permits issued: 159 Permits closed: 0	
	Land Disturbance Permits Issued in Impaired Watersheds	Annually	Yes	Permits issued in impaired watersheds: 90 Permits closed in impaired watersheds: 1	Permits issued in impaired watersheds: 83 Permits closed in impaired watersheds: 0	
	Conduct at least one Erosion and Sediment Control Workshop for Developers, Builders and Engineers	Annually	Yes	Fall 2013 & Spring 2014: 115	Fall 2014 & Spring 2015: 50	

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PROGRAM ELEMENT	Description of BMP	ACTIVITY SCHEDULE				COMMENTS
		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	Develop and Distribute Public Education Brochures	Annually	Yes	Floodplain brochures distributed at Jefferson County Annual Community Awareness Day: 500	Floodplain & SWM brochures distributed at Jefferson County Annual Community Awareness Day: 3,298	
(10) Public Education	Participate in Creek & Neighborhood Clean Up	Annually	Yes	SWM staff planned, trained, supported and participated in 2 VCS cleanups	SWM staff planned, trained, supported and participated in 13 cleanups	City removed & disposed of more than 32 tons of debris during the cleanup
	Public Education Program Documentation	Complete by June 2013	No	Program educational elements in 2014 included SWPPP & “What is Stormwater”	During this reporting year, the City published and distributed 500 stormwater calendars.	Calendar is done in partnership with Jefferson County Stormwater and Keep Birmingham Beautiful Commission and will distribute more than 1,000 new calendars in 2016. Calendars incorporate



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		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
				Brochure (See Appendix D)	(Appendix D)	artwork from Birmingham City School students (BCAP) and the Botanical Garden.
	Bimonthly Instream & Screening Site Monitoring	19 Sites Bimonthly	Yes	100%	100%	
(11) Monitoring	Bimonthly Instream & Screening Site Monitoring	19 Sites bimonthly	Yes	33%	100%	Outfall reconnaissance was performed in stream peaking segments of Village Creek alone this year in conjunction with the Village Creek Watershed Management Plan stream assessment project. ORI’s were done during dry periods, but no water quality information was
	Outfall Reconnaissance	6-Outfall reconnaissance	No	2	18	



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		Measurable Goal	Complied With	Activities Accomplished		
				2014	2015	
	when Instream Peak Segments are identified	per year				collected, particularly as some were NPDES facilities. In those cases, DMR’s were reviewed and accounted for in the stream loading analysis. See <i>Major Accomplishments</i> section
	Develop Inter- Jurisdictional Agreement for Monitoring	Complete by Sept 2014	No	Ongoing	Ongoing	City is working with Jefferson County to prepare an interlocal agreement for implementation of the Village Creek Watershed Management Plan



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ANNUAL REPORT END NOTES

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- i *Federal Water Pollution Control Act. Sect. 402.(p)(3)(B)(iii). 2002. Pg 195*
 - ii *40 CFR Part 122.26(d)(2)(iv). Page 217*
 - iii *US EPA North Birmingham Environmental Collaboration Project*
 - iv [Mayor's Proposed FY2016 Budget. Page 106](#)
 - v [Storm Water Management Home Page](#)