SIGNATORY REQUIREMENTS

As required by Part VI.H of NPDES Permit MO-0126322, this report is signed by a duly authorized representative for the City Manager, a principal executive officer of the City of Springfield, as submitted in writing.

"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 gathered and evaluated 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 submitted 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 fines and imprisonment for knowing violations."

[Signature]

10/29/18

Errin Kemper, P.E., D.WRE
Director, Department of Environmental Services
City of Springfield, Missouri

Front Cover Photo: School kids on a field trip at Fassnight Creek
# TABLE OF CONTENTS

**SIGNATORY REQUIREMENTS** ........................................................................................................................................2

1.0 Introduction .............................................................................................................................................................4

2.0 Contacts List .............................................................................................................................................................4

3.0 Related Initiatives ....................................................................................................................................................4

   Springfield-Greene County Integrated Plan for the Environment ......................................................................................4

   Missouri Nutrient Reduction Strategy ..........................................................................................................................5

   City Tree Programs ....................................................................................................................................................6

4.0 Minimum Control Measures Summary ..................................................................................................................6

   MCM 1: Public Education and Outreach of Stormwater Impacts .............................................................................6

   MCM 2: Public Involvement and Participation ..........................................................................................................10

   MCM 3: Illicit Discharge Detection and Elimination ..................................................................................................11

   MCM 4: Construction Site Stormwater Runoff Control ...............................................................................................14

   MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment ....................14

   MCM 6: Pollution Prevention and Good Housekeeping for Municipal Operations ....................................................15

   MCM 7: Industrial and High Risk Runoff ....................................................................................................................20

   MCM 8: Flood Control Projects ..................................................................................................................................21

   MCM 9: Monitoring ...................................................................................................................................................22

Appendix
1.0 INTRODUCTION
This report documents the annual activities completed for the City of Springfield’s (City’s) National Pollutant Discharge Elimination System (NPDES) permit MO-0126322 for the City’s Municipal Separate Storm Sewer System (MS4). This annual report covers the period of April 1, 2017 through June 30, 2018. The permit was renewed by the Missouri Department of Natural Resources (MDNR) on April 1, 2017 and allowed 1 year to update the existing Stormwater Management Program (SWMP) plan. An updated SWMP was submitted as required by April 1, 2018. This document reports on the minimum control measures (MCMs) and measurable goals of the updated SWMP for Year 1 (April 1, 2017 – June 30, 2018). The report includes the information required in Part F. of the permit. The City’s Water Quality Division of the Department of Environmental Services compiled this report with input from other City departments and divisions.

2.0 CONTACTS LIST
The following City staff are responsible for ensuring the successful implementation of each minimum control measure in the permit.

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3.0 RELATED INITIATIVES

SPRINGFIELD-GREENE COUNTY INTEGRATED PLAN FOR THE ENVIRONMENT
The City’s MS4 permit recognizes that it is the intent of both the City and MDNR that the City continue its efforts on identifying affordable and cost-effective solutions to address the most significant sources of pollution in accordance with the permittee’s Integrated Plan, which prioritizes investments based on problem significance, community priorities, solution effectiveness, and affordability (Figure 1). The Springfield-Greene County Integrated Plan for the Environment is a joint effort of the City, Greene County, and City Utilities (a City-owned public utility company). Accomplishments in addressing the first three components include completion of an Environmental Priorities Task Force to establish community priorities, a Multiple Criteria Decision Analysis (MCDA) that ranked 16 pollution sources, and a Sustainable Return on Investment (SROI) study that evaluated a first round of solutions. This year, efforts were focused on planning for a second round of SROI analyses which will look at riparian restoration, floatables control, street sweeping, and public education and outreach related to water quality. This round of SROI analyses is anticipated to be complete in 2019.
If we only had ONE DOLLAR to spend, how do we:

- Invest in what matters most to our community.
- While addressing the most significant problems.
- Using the most effective solutions.
- In a way that is affordable to our citizens?

**FIGURE 1. INTEGRATED PLAN APPROACH**

The Integrated Plan also includes a Memorandum of Understanding between the three agencies and MDNR that allows a cooperative, watershed approach to address the impairments of Jordan Creek, Wilsons Creek, and Pearson Creek. Under the MOU, the City, County, and CU will develop an action plan to address the local impairments. One initiative that will be part of the action plan is an education campaign and voluntary recognition program to encourage the use of alternatives to coal tar-based pavement sealants which are a source of polycyclic aromatic hydrocarbons (PAHs). This year, a webpage and print piece were developed for this program and it will be launched in fall 2018. A watershed planning process for Jordan Creek will also begin in fall 2018.

**MISSOURI NUTRIENT REDUCTION STRATEGY**

*Missouri’s Nutrient Loss Reduction Strategy*, published by MDNR in December 2014, aims to improve water quality in Missouri while contributing to reducing nutrients moving downstream to the Gulf of Mexico. The City participated in development of the plan recommendations for urban stormwater and is addressing several of the recommendations, as follows:

- **Reviewing and Enhancing Public Involvement and Education Programs:** In 2018, the “Lawn Steward Soil Testing Program” was debuted for homeowners living within the Springfield city limits as well as portions of the Wilsons Creek watershed. The goal of the Lawn Steward program is to foster responsible fertilization and lawn care practices to avoid excessive nutrient runoff caused by the over-fertilization of urban lawns. A total of 5 soil tests and nutrient management plans were completed this year within the city limits.

- **Structural and Non-Structural BMPs:** The *Flood Control and Water Quality Protection Manual* that was adopted this year contains improved design criteria and standards for both structural and non-structural stormwater control measures (SCMs) that will increase the volume of stormwater treated and encourage green infrastructure approaches. The manual also includes stream buffer requirements that will preserve natural streams and riparian corridors, providing nutrient removal and other benefits.

- **Program Compliance and Maintenance:** The *Flood Control and Water Quality Protection Manual* and post-construction ordinance adopted this year include long-term operation and maintenance requirements that will require a recorded maintenance agreement and annual self-inspections to ensure SCMs are maintained and functioning as designed for reducing stormwater pollutant loads. This year 42 privately-owned and operated detention basins were inspected for long-term operation and maintenance as part of routine inspections or complaint-based inspections. Routine inspection letters were issued for
4 detention basins that required corrective actions. Notices of Violation were issued for 9 detention basins as a result of routine or complaint-based inspections.

- **Monitoring Nutrient Discharges:** The City has been conducting in-stream and MS4 wet weather monitoring that includes nutrients since 2002. Results are summarized under MCM 7 BMP 3 and MCM 9 BMP 1.
- **Demonstration Projects:** Springfield is fortunate to have several highly visible green infrastructure demonstration projects, including both private development projects and public projects such as the City’s Government Plaza parking lot. This year the City installed 30 floating wetlands, totaling 960 square feet, in Sequiota Park Lake as a pilot project to absorb nutrients and reduce algae growth.
- **Voluntary Retrofitting Programs:** As part of the Integrated Plan, a Sustainable Return on Investment (SROI) study was completed on detention basin retrofitting. The City implemented a pilot voluntary detention basin retrofitting program for privately-owned and operated detention basins this year. One retrofit project has been designed and construction will be completed in fall 2018.

**City Tree Programs**

On public grounds, parks, and rights-of-way, the City provides tree care and promotion of community forestry through programs and services provided by the Public Grounds Section of the Public Works Operations Division and the Springfield-Greene County Parks Department. Trees are an important part of the City’s stormwater green infrastructure, reducing storm water runoff and erosion through interception, evapotranspiration, and increased soil infiltration. An inventory completed in December 2013 of City-owned street trees and trees on properties managed by Public Works estimated the stormwater mitigation value of these trees at over $1,000,000 annually, in addition to other environmental, social, and economic benefits. The tree inventory is used to determine tree planting locations and species, and to prioritize tree maintenance and removals. This year, 777 trees were planted on public grounds, street rights-of-way, and parks. Of the 777 trees, 302 trees were planted as part of the NeighborWoods cooperative planting program with citizens and other property owners. Tree preservation on the City’s Capital Improvement Projects has improved in recent years. This year, 1.6 acres of tree canopy were preserved, 2.8 acres of tree canopy were lost and 13.87 acres of canopy were restored (calculated using future growth) as a result of the City’s Tree Canopy Preservation and Restoration Policy. Education on the benefits of trees is included under MCM 1 BMP 1.

**4.0 Minimum Control Measures Summary**

**MCM 1: Public Education and Outreach of Stormwater Impacts**

**BMP 1: General Stormwater Education and Outreach**

**Measurable Goal:** Distribute information through a minimum of 50 activities annually.

The measurable goal of 50 activities was met and exceeded as summarized below in the education and outreach activities accomplished by City staff and partners.

City Water Quality Division staff provided education and outreach on multiple stormwater topics for various audiences including youth, the general public, residents, and stormwater professionals. Staff worked with Hillcrest High School on a year-long rain garden learning opportunity for the HAWK program students. A classroom presentation was provided on stormwater runoff, pollution, and rain gardens. Students went on a field trip to the
City offices to tour rain gardens in the parking lot. Following this field trip, staff led the students on a stormwater walk of the Hillcrest campus to identify potential rain garden locations. The students identified a location for a rain garden and created a planting plan that could be implemented in the future. Staff also worked with two middle school groups and provided a total of three field trip experiences for these groups at Fassnight Creek to learn about stormwater pollution and water quality monitoring. A field trip experience was also provided for elementary students to learn about the water quality benefits of floating wetlands in the Sequiota Park Lake. In addition, 2 more classroom presentations were given on stormwater topics including a presentation to an alternative high school class and a presentation to a college class. In addition to the 9 activities with students summarized above, City staff completed the following education and outreach activities:

- 10 media interviews about proper disposal of yardwaste, green infrastructure, plastic pollution, stormwater benefits of floating wetlands, and other water quality topics;
- 1 field trip for City employees as part of the City Ambassadors Program (CAMP) at the North Branch of Jordan Creek to learn about stormwater pollution and water quality protection;
- 1 conference presentation about the MS4 program to environmental professionals;
- 1 awards presentation to recognize green infrastructure design at the Choose Environmental Excellence Awards Luncheon attended by community organizations;
- 3 tabling events that included handouts with water quality information;
- Over 1900 brochures and informational flyers were distributed on various topics.

James River Basin Partnership provided rain barrel program education/outreach as summarized under BMP 3 including 4 rain barrel-specific presentations, 14 social media posts, 1 e-newsletter, 2 media stories, and 9 tabling events. In March 2018, JRBP presented to approximately 25 members of the Meador Park Homeowners Association on the topics of urban stormwater, rainwater harvesting, and the new “Lawn Steward Soil Testing Program”. Attendees were provided with handouts and brochures on the “Right as Rain” rain barrel rebate program and the Lawn Steward soil testing program. Throughout the year JRBP had an online and social media presence with a focus on educational topics. In addition to the rain barrel outreach, there were 16 posts created on stormwater topics, 7 on soil health, and 6 on trash in the rivers. There were also 7 newsletters that covered stormwater topics, one about soil and two that called attention to keeping our rivers free of trash. Each newsletter was sent to approximately 1,930 recipients. Twitter focused on retweets of topical information with 30 tweets on stormwater information, 20 on soil topics, and 7 on trash in our waters. In addition to the tabling events and presentations previously reported, 3 presentations were also given which covered a broad range of topics but included the rain barrel and soil program information.

Watershed Committee of the Ozarks provides premiere field trip experiences for youth as described under BMP 5. In addition, their educational efforts extend beyond field trips to the Watershed Center. They were involved in 59 different outreach activities that took place off their Watershed Center campus in 2017. These included booths at community events, classroom presentations, and their popular underground tours of Jordan Creek. The Jordan Creek tours are a unique educational experience in which participants are led through the box culvert that runs beneath downtown Springfield. The tour provides an opportunity to clearly see that stormwater is directly connected to our streams, and to learn about the history of the creek and water quality protection.

In April 2018, the City received the Tree City USA designation from the National Arbor Day foundation for the 33rd consecutive year and its 15th Growth Award. In celebration of Arbor Day, the annual 5th grade Arbor Day poster contest focused on the many ways that trees positively impact our health. The theme was “Trees Work for a Healthier Me.” Trees Work is an ongoing campaign by the Missouri Department of Conservation to bring awareness to our forests and the benefits they provide. City staff, Springfield Public Schools staff and the local
Missouri Community Forestry Council talked to 5th grade classes about the importance of trees and the way they influence our health and wellbeing, including the need for clean water. Students created posters on this topic. Nearly 400 posters were submitted from 10 schools and displayed at Missouri State University’s Christopher S. Bond Learning Center. Winners were chosen from each school and a tree was planted at the schools in recognition of the winner as part of Arbor Month Celebrations.

Distributing information through a minimum of 50 activities is an annual measurable goal that is planned to continue for Year 2. A second measurable goal planned for Year 2 is developing an updated stormwater education brochure.

**BMP 2: Environmentally-Responsible Yard Care Program**

**Measurable Goal:** Develop and launch a program to provide lawn soil testing and nutrient management plans.

The measurable goal for this year was completed. In 2018, JRBP debuted the “Lawn Steward Soil Testing Program” for homeowners living within the Springfield city limits as well as portions of the Wilsons Creek watershed. The goal of the Lawn Steward program is to foster responsible fertilization and lawn care practices to avoid excessive nutrient runoff caused by the over-fertilization of urban lawns. Through the program, Springfield residents receive a free soil test and a comprehensive three-year nutrient management plan featuring either chemical or organic fertilizer recommendations. Each nutrient management plan features an interpretation of the homeowner’s soil test results, fertilizer and/or compost topdressing recommendations, and liming recommendations (as needed). Each plan also features recommended practices such as core aeration, over-seeding, and suggested mowing height. The program promotes the use of the City’s MO-POST, a high-quality compost made from yard and garden waste from the City’s Yardwaste Recycling Center. Each plan is also accompanied by informational brochures from the City of Springfield, MU Extension, NRCS, Missouri Stream Team, and JRBP. This year a total of 5 soil tests and nutrient management plans were completed within the city limits. Education and outreach related to the Lawn Steward program and soil health is summarized under BMP 1.

The SWMP includes two measurable goals for this BMP in Year 2. A website will be launched for Yard Ethic, which is the “umbrella” program intended to provide information and incentives on environmentally-responsible yard care, including programs such as Lawn Steward. The second goal is to offer soil testing and nutrient management plans for a minimum of 8 participants.

**BMP 3: Rain Barrel Rebate Program**

**Measurable Goals:** 1) Provide program information through education and outreach activities as part of BMP 1 or through activities specific to the BMP; 2) Offer rebates for a minimum of 2,000 gallons annually.

The measurable goals for this year were completed. The “Right as Rain” rain barrel rebate program continued this year. The program allows Greene County residents to purchase a rain barrel through their chosen vendor and submit payment and installation documentation to receive a rebate of 50 cents per gallon. The rebate is available...
for up to 600 gallons ($300) per household to encourage larger rainwater harvesting systems. The rebate program is funded by the City, Greene County Resource Management, and City Utilities of Springfield. James River Basin Partnership (JRBP) administers the rebate program and provides program promotion and education/outreach. This year, 23 rebates were provided for 4,580 gallons of rainwater harvesting. Some rebates were capped at the maximum amount so the total rainwater harvesting capacity installed was 5,350 gallons. Since 2007, 1,771 rebates have been provided for over 90,000 gallons of rainwater harvesting capacity.

Program promotion and education/outreach by JRBP consisted of social media posts, a dedicated webpage, e-newsletter blast, presentations, media coverage, and other in-person outreach events. Using Facebook and Twitter (with ~2,700 total fans & followers), 14 rain barrel related social media posts were created. The JRBP website (www.JamesRiverBasin.com) hosts a webpage dedicated to rebate program logistics as well as water quality information to explain “why” a citizen may want to consider a rain barrel at their home, along with an installation video and pictures of rain barrel systems installed by previous participants. Additionally, interested participants can fill out an online application form to receive more information. When the form is received, JRBP provides the Homeowners Guide which includes FAQs, Choosing Your System, and Rain Barrel Considerations as well as the application form. During the year, one e-newsletter focusing on the rain barrel program was sent out. The rebate was also featured in a portion of additional emails to the JRBP mailing list, with a button to discover more information on the program.

JRBP staff participated in 9 tabling outreach events. Each event had an opportunity to share a variety of information including a flyer about the rain barrel program. Throughout the year, four full-length rain barrel specific presentations were also given. One of the presentations included a hands-on workshop for how to build a rain barrel. All presentations were well attended. Media coverage included a radio interview and a news story promoting the Right as Rain program.

These are annual measurable goals that are planned to continue for Year 2.

**BMP 4: PROGRAM FOR PUBLIC REPORTING OF ILLICIT DISCHARGES AND WATER QUALITY IMPACTS**

**Measurable Goal:** Facilitate public reporting through the Citizen Resource Center and promote and publicize public reporting through education and outreach activities as part of BMP 1.

The measurable goal for this year was completed. Public reporting continued to be facilitated through the Citizen Resource Center which receives reports via phone and online. Information on how to report stormwater/water pollution through the Citizen Resource Center was featured in 160 brochures and 750 magnets distributed through education and outreach activities under BMP 1. This is an annual measurable goal that is planned to continue for Year 2.

**BMP 5: YOUTH AND TEACHER EDUCATION AND OUTREACH**

**Measurable Goals:** 1) Watershed Committee of the Ozarks will offer a minimum of 100 field trips to the
Watershed Center for schools annually; 2) Project WET will provide education for teachers and schools through a minimum of 10 activities annually.

The measurable goals for this year were completed as described below for Watershed Committee of the Ozarks and Project WET.

The Watershed Center, located at Valley Water Mill Park, is the home base of Watershed Committee of the Ozarks and serves as a destination for school field trips to learn about water quality protection. According to WCO’s annual report, there were 201 Watershed Center field trips in 2017 with 11,131 participants. Of those participants, 5,826 were unique visitors. This field trip program is an invaluable resource for water quality education and has grown exponentially over the years. WCO provided other education and outreach activities summarized under BMP 1.

Missouri Project WET, a partnering organization of the worldwide Project WET Foundation, is a water education program that provides curriculum resources and workshops for teachers and other educators working with K-12 children. Project WET staff assist with the local Envirothon competition which is a problem-solving, natural resource education program for high school students. Students are challenged to answer written questions and conduct hands-on investigation of environmental issues in five categories – Soils/Land Use, Aquatic Ecology, Forestry, Wildlife, and Current Environmental Issues. The Project WET State Coordinator served as the chair of a national Project WET committee working on matching up Project WET activities with the Next Generation Science Standards. This work was completed this year and will be beneficial for local teachers. Other activities by Project WET staff this year included water quality learning activities with 6 local and regional schools, Project WET booths at two events, and 8 workshops, presentations, and assistance activities for educators. Project WET staff also assisted with field trips at the Watershed Center.

These are annual measurable goals that are planned to continue for Year 2.

**MCM 2: PUBLIC INVOLVEMENT AND PARTICIPATION**

**BMP 1: PUBLIC INVOLVEMENT IN SWMP DEVELOPMENT AND RENEWAL APPLICATION**

**Measurable Goal:** Post the proposed SWMP on the City website for a public comment period and provide information to key stakeholder groups.

The measurable goal for this year was completed. The updated draft SWMP was posted on the City website for public comment in March 2018. A presentation was given to the Springfield-Greene County Environmental Advisory Board, a citizen board, to provide them an overview of the SWMP and solicit comments. Information about the public comment period was also provided to members of the Environmental Collaborative of the Community Partnership of the Ozarks, Watershed Committee of the Ozarks, James River Basin Partnership, Ozark Greenways, and Missouri Project WET. Seven comments were received, and changes were made to address the comments as needed. The measurable goal for Year 2 is to form a stormwater technical committee to provide input on the post-construction program for MCM 5 and other related SWMP components.

**BMP 2: ADOPT-A-STREAM PROGRAM**

**Measurable Goals:** 1) Facilitate adoption by volunteers of 8 miles of stream on City-owned property annually and provide supplies and track pickup for cleanups. Track the number of stream cleanups and estimate the amount of trash collected; 2) Organize 1 additional cleanup annually on a priority stream.
The measurable goals for this year were completed. Approximately 10 miles of stream were adopted by 17 volunteer groups this year. Adopt-A-Stream volunteers completed 32 cleanups. The program also provides opportunities for volunteers who aren’t looking to make a commitment to adopt but want to do a one-time cleanup, referred to as auxiliary cleanups. There were 7 auxiliary cleanups this year. James River Basin Partnership (JRBP) also organized a cleanup on Jordan Creek at Mount Vernon street as part of United Way Day of Caring. This section of Jordan Creek is a priority for additional cleanups because of the amount of trash and more challenging accessibility compared to other streams. The City, JRBP, and Watershed Committee of the Ozarks also conducted 5 stream cleanups as part of educational activities, including Jordan Creek tours and field trips to Fassnight Creek and South Creek for students. In total, there were 44 cleanups collecting 564 bags of trash which is estimated to be 62 cubic yards. These are annual measurable goals that are planned to continue for Year 2.

**MCM 3: Illicit Discharge Detection and Elimination**

**BMP 1: Storm Sewer Map**

**Measurable Goals:** 1) Map all constructed outfalls, including updating existing mapped major outfalls as needed; 2) Verify mapped constructed outfalls through the field screening program (BMP 3) or other field surveys to complete verification of all mapped constructed outfalls by Year 5; 3) Update the mapping of the MS4 and post-construction stormwater control measures as new construction plans and as-buils are filed.

Measurable goal 1 has been completed by mapping all constructed outfalls, including updating existing mapping of major outfalls. Constructed outfalls were identified using the existing MS4 mapping in GIS software and identifying points at which the MS4 discharges to classified streams or waters of the state. There are 436 constructed outfalls mapped, including 156 major outfalls.

Measurable goal 2 is ongoing annually to be completed by Year 5. This year, 12 mapped outfalls were verified through the dry weather field screening program (BMP 3). As detailed in BMP 3, the screening locations are being revised to be based on outfalls which will allow more outfalls to be verified through dry weather screening. A planned goal for Year 2 is to verify a minimum of 100 mapped outfalls through dry weather field screening and other field surveys as part of working towards meeting the ongoing measurable goal of verifying all mapped outfalls by Year 5.

For measurable goal 3, a process is in place for routing plans to the GIS Department for mapping. This year, 117 inlets and 2 miles of conveyance system (pipes, box culverts, and channels) were added to the mapping of the MS4 for a total of 18,260 inlets and 699 miles of conveyance system. Post-construction stormwater control measures (SCMs) are also mapped, including those that are part of the MS4 and those that are privately-owned and operated. SCMs include detention basins designed for flood control as well as stormwater control measures designed to meet post-construction water quality requirements under MCM 5. This year, 24 SCMs were mapped for a total of 1,496 SCMs. This is an annual measurable goal that is planned to continue for Year 2.

**BMP 2: Illicit Discharge Investigation, Inspection, and Enforcement**

**Measurable Goals:** 1) Address or investigate as appropriate public reports of illicit discharges and track the number of reports received and enforcement actions; 2) Investigate illicit discharges detected through the dry weather field screening program and track the number of investigations and enforcement actions.
Measurable goal 1 was completed. This year 83 public reports were received and addressed regarding illicit discharges or dumping in the MS4 or other concerns related to water pollution. The most common report received (51 reports this year) is regarding yardwaste (leaves, grass clippings, etc.) blown or dumped into streets or other portions of the MS4. A letter and educational brochure is mailed to the reported address for these complaints. This issue also continues to be the focus of educational activities, including 1 interview with a local TV station and one ad in a local magazine (Figure 4). Other types of reports received included leaking or dumped vehicle fluids, kitchen grease, and wash water. Of the 32 reports received that were not related to yardwaste, 17 reports were not found to be substantiated. The remaining 15 reports were either confirmed or suspected to be an illicit discharge or dumping incident or a potential stormwater pollution concern and were addressed through verbal or written communication with the responsible parties in accordance with standard procedures. For measurable goal 2, no illicit discharges were detected through the dry weather field screening program this year. These are annual measurable goals that are planned to continue for Year 2.

**FIGURE 4. EDUCATIONAL AD FOR LOCAL MAGAZINE**

**BMP 3: DRY WEATHER FIELD SCREENING PROGRAM**

**Measurable Goals:** 1) Update the field screening program; 2) Complete dry weather screening at 50 locations.

Both measurable goals were completed. The field screening program was updated this year using the iterative process criteria from the SWMP which include the following:

1. Are changes in screening locations and procedures needed to improve outcomes (i.e. identification of illicit discharges)?
2. Are there trends in the number and type of illicit discharges over time and are program changes needed based on these trends?

The previous MS4 permit specified a grid system to be used to determine 250 screening locations that resulted in a combination of outfalls and in-system MS4 locations for screening. The previous MS4 permit also required field testing of dry weather flow for chlorine, copper, phenol, and detergents. To update the program, guidance literature was reviewed to determine recommended and common best practices for MS4 dry weather screening programs. In the literature review, screening locations are typically outfalls. For this year, the previous set of screening locations was used. In Year 2, screening locations will be revised based on the outfall mapping completed in BMP 1. Parameters for field testing were updated based on the literature review, past trends, and safety of field testing reagents. The field testing will now include ammonia, conductivity, and chlorine. Thresholds have been established for these as indicators of possible illicit discharges. For ammonia results that exceed the threshold, potassium will be measured to help distinguish between sewage and wash water discharges. In a review of past field screening results, wash water was the only type of illicit discharge found. The number of locations screened annually will continue to be 50 locations as it was under the previous permit. Locations will be grouped based on geographic area for efficiency of screening and groups of 50 locations will be rotated annually.

Dry weather screening was completed at 50 locations this year. Two locations had flow and tested positive for chlorine (Table 1). The protocol for locations that test positive for chlorine at \( \geq 0.1 \text{ mg/l} \) but do not exceed the thresholds for ammonia or conductivity is to report them as potential water line leaks. The measurable goal for Year 2 is to complete dry weather screening at 50 locations.

**TABLE 1. DRY WEATHER SCREENING RESULTS**

<table>
<thead>
<tr>
<th>ID</th>
<th>Location</th>
<th>Flow (cfs)</th>
<th>Conductivity (( \mu \text{S/cm} ))</th>
<th>Ammonia* (mg/l)</th>
<th>Chlorine* (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>161</td>
<td>300 Blk E Kearney</td>
<td>0.76</td>
<td>633</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>186</td>
<td>600 Blk E Kearney</td>
<td>0.05</td>
<td>3.2</td>
<td>0</td>
<td>0.4</td>
</tr>
</tbody>
</table>

* Determined using visual colorimetric test kits in the field for screening purposes only.

**BMP 4: SPILL PREVENTION, CONTAINMENT, AND RESPONSE PROCEDURES**

**Measurable Goal:** Track reports of spills that discharge to the MS4 and any resulting enforcement actions.

This measurable goal was completed and is an annual measurable goal that is planned to continue for Year 2. One report of a spill to the MS4 was received through the public reporting system (BMP 2). Containment and cleanup was done by the responsible party.

**BMP 5: CONTROLS TO LIMIT SANITARY SEWER INFILTRATION TO MS4**

**Measurable Goal:** Conduct illicit discharge investigation, inspection, and enforcement in accordance with BMP 2 and dry weather field screening in accordance with BMP 3 to detect and investigate illicit discharges to the MS4 including sewage.

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No discharges of sewage from municipal sanitary sewers were identified through BMP 2 or BMP 3 this year. One public report of sewage was received and investigated under BMP 2 and was from a private sewer line that was repaired by the responsible party. This is an annual measurable goal that is planned to continue for Year 2.

MCM 4: CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

BMP 1: LAND DISTURBANCE PERMIT PROGRAM

Measurable Goals: 1) Implement the land disturbance permit program and track the number of SWPPPs, inspections, public reporting of complaints, construction site operators trained, and enforcement actions; 2) Conduct a minimum of one education activity annually on land disturbance-related topics for various audiences.

The measurable goals were completed. The Land Disturbance Permit Program requires a land disturbance permit from the City for construction activities that disturb one acre or greater. This year, 58 land disturbance permit applications and accompanying SWPPPs were received and reviewed. A total of 226 meetings and inspections were completed on permitted sites which included the pre-permit meetings, initial BMP inspections, periodic inspections during the life of the project, permit termination inspections, and weekly self-inspections on City projects. Through the citizen service request system, 26 complaints were received related to erosion and sediment control. These complaints were investigated and addressed through inspections or communication with responsible parties. Nine Notices of Violation were issued for land disturbance related violations.

The City provides information and training for construction site operators to assist them in meeting land disturbance permit requirements. Information and handouts are available on the Water Quality Division’s website at springfieldmo.gov/stormwater. Training is provided as part of the pre-permit meeting that permittees/contractors are required to attend to obtain a land disturbance permit. This meeting provides training on how to comply with the land disturbance permit including updating the SWPPP and conducting inspections. This year, 106 individuals attended this training. In addition to training provided through pre-permit meetings, three education activities were completed under measurable goal 2. A sediment basin design webinar was hosted in October 2017 and attended by representatives of the local design community. A lunch and learn session on an erosion control product was hosted in May 2018 and attended by City project managers and engineers. These educational events focused on the use of new technology and BMPs that are appropriately designed for unique site conditions. The third educational activity accomplished this year was a presentation by City land disturbance program staff on working around tree protection zones on construction sites at an event in Northwest Arkansas.

These are annual measurable goals that are planned to continue for Year 2.

MCM 5: POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

BMP 1: STORMWATER PLAN REVIEW

Measurable Goals: 1) Conduct stormwater plan reviews to ensure compliance with the Flood Control and Water Quality Protection Manual; 2) Propose amendments to City Code Chapter 96 Article I to City Council for adoption.

Measurable Goal 1 was completed. Stormwater plan review is conducted to ensure compliance with the Flood Control and Water Quality Protection Manual as described in the SWMP. Stormwater permits are issued upon
approval of stormwater plans. A total of 24 stormwater permits were issued for plans that were required to meet post-construction water quality requirements.

Measurable Goal 2 was completed in April 2018. As described in the SWMP, the Flood Control and Water Quality Protection Manual was adopted by City Council in December 2017 and amendments were needed to City Code Chapter 96 Article I to make the code consistent with the adopted manual and provide updated authority and enforcement provisions. These amendments were adopted by City Council in April 2018.

Measurable Goal 1 is an annual measurable goal that is planned to continue for Year 2. A second measurable goal for Year 2 is forming a stormwater technical committee under BMP 1 of MCM 2.

**BMP 2: LONG-TERM OPERATION AND MAINTENANCE PROGRAM**

**Measurable Goal:** Develop templates for the operation and maintenance plan, agreement, and SCM inspection checklists.

This measurable goal was completed. Templates have been developed and implemented for the operation and maintenance plan, agreement, and SCM inspection checklists. The operation and maintenance plan and agreement are now required as part of stormwater plan review and approval under BMP 1 for all sites required to comply with the post-construction water quality requirements. The operation and maintenance plan template consists of a cover sheet with site-specific information and SCM-specific templates for the operation and maintenance details. The plan is kept on file and can be updated over time as needed. The agreement requires the landowner to maintain the SCMs per the plan and gets recorded with the property. SCM inspection checklists have been developed and will be required for use by property owners to conduct annual self-inspections as required by the operation and maintenance plan. The inspection checklists are also used to inspect City-owned SCMs under MCM 6, BMP 3.

Prior to this year, inspections of privately-owned and operated detention basins have been performed on a complaint-basis. Procedures were developed this year for routine inspections of detention basins. A routine inspection letter with corrective actions is sent for items requiring maintenance, followed by a Notice of Violation if corrective actions are not completed. Notices of Violation may also be issued for complaint-based inspections. This year 42 privately-owned and operated detention basins were inspected for long-term operation and maintenance as part of routine inspections or complaint-based inspections. Routine inspection letters were issued for 4 detention basins that required corrective actions. Notices of Violation were issued for 9 detention basins as a result of routine or complaint-based inspections.

The measurable goal planned for Year 2 is to develop and implement a program to track, inspect, and enforce long-term operation and maintenance of SCMs, including property owner self-inspections and establishment of frequencies and priorities for City inspections.

**MCM 6: POLLUTION PREVENTION AND GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS**

**BMP 1: MUNICIPAL FACILITIES STORMWATER POLLUTION PREVENTION PLAN**

**Measurable Goal:** Conduct facility inspections at the frequency described in the SWPPP and update the SWPPP as needed.
This measurable goal was completed. Municipal facility inspections were completed at the frequency described in the SWPPP which included 9 inspections at 4 facilities. Construction of secondary containment was completed this year for the calcium chloride and beet juice tanks. The SWPPP was updated to reflect these BMP improvements and other updates as described for other BMPs under this MCM. This is an annual measurable goal that is planned to continue for Year 2.

**BMP 2: Employee Training**

**Measurable Goals:** 1) Provide training for employees associated with priority facilities and activities based on potential for discharge of pollutants to the MS4; 2) Establish an appropriate frequency for employee training for each workgroup based on potential for their facilities and activities to discharge pollutants to the MS4.

Measurable Goal 1 was completed with training for a variety of work groups in Public Works and Environmental Services. These work groups include Street Maintenance, Bridge & Waterway Maintenance, Utility Cuts, Public Grounds, Sewer Collection Systems, Service Center Garage Management, and the Traffic Sign Shop. Training was attended by 116 employees from these work groups. Training was targeted to each work group to cover potential pollutants sources and BMPs related to their work. Exit surveys were given to assess the benefits of the training and seek input on how often training should be held. The survey results were very positive with employees requesting to continue to receive training. Training will be conducted annually for priority work groups and every 2 years for work groups that are a lower priority based on potential for their facilities and activities to discharge pollutants to the MS4. In May 2018, an optional follow-up field trip to the Jordan Creek Underground was offered to employees as an opportunity to learn more about water quality and local water resources. A total of 21 employees took this tour led by the Watershed Committee of the Ozarks. The measurable goal for Year 2 is to provide employee training at the established frequency for each work group. Those work groups with an established frequency of annual training will be provided training again in Year 2.

Shop posters were also developed this year as a training tool to serve as a constant reminder of the importance of stormwater pollution prevention on the job. There are two designs in the poster series, one targeted to Parks & Grounds Maintenance and one for Streets & Drainage Maintenance (Figure 5). The Parks & Grounds Maintenance poster covers proper disposal of yard waste, soil management and proper pesticide and herbicide practices. The Streets & Drainage Maintenance poster covers proper handling of trash and chemicals, vehicle fueling and maintenance practices, and how to address leaks and spills. Both posters have contact information for the Water Quality Division and give instructions on how to report pollution. In total, 10 posters (5 of each) were distributed to a variety of municipal locations, including municipal golf courses, Parks Operations, and break rooms used by Public Works and Environmental Services staff.
BMP 3: MS4 Inspection and Maintenance

Measurable Goals: 1) Inspect City-owned SCMs annually and perform maintenance as needed based on inspection results, routine maintenance needs, and citizen service requests; 2) Complete each grated inlet route a minimum of once annually and clean grates as needed on each route and in response to citizen service requests.

For measurable goal 1, the first annual round of inspections was completed in spring/summer 2017 and was reported last year. The annual reporting period for last year and this year overlapped for the period of April-June.
2017 due to the issuance of the new MS4 permit. Of the 97 City-owned SCM inspections reported last year, 74 inspections were completed from April-June 2017. These SCMs included bioretention/rain gardens, detention basins, pervious pavement, constructed wetlands, and vegetated swales. The next round of annual inspections is scheduled for fall 2018. This schedule will provide an opportunity to identify seasonal differences in SCM inspections and maintenance needs. This year, two new crews were hired to perform water-quality related maintenance of SCMs and riparian areas. The Water Quality Grounds Management Crew performs landscape-related tasks for rain gardens, detention basins, and riparian areas including control of invasive plants and weeds, mulching, and other plant-related maintenance and improvements. This year, the crew performed routine landscape-related maintenance at 10 City-owned SCM sites, including 9 bioretention/rain garden sites and 1 detention basin with native plantings. Improvements were made at two rain gardens which included planting new species and adding a debris catchment structure. The majority of City-owned detention basins do not need landscape-related maintenance other than mowing, which is generally performed under contract. This crew also performed routine maintenance of riparian areas along South Creek and Jordan Creek to control invasive plants and maintain native plantings. New plant species were also added along South Creek and the adjacent traffic median native planting. The Water Quality Construction & Maintenance Crew performs sediment removal, structural repairs and other water-quality related maintenance and improvements. This crew removed 108 cubic yards of sediment/debris from City-owned detention basins this year.

Measurable goal 2 was completed. Inlets are organized into 19 groups composed of a total of 83 mapped routes. The number of inlets cleaned per route is recorded. This data collection will allow for improved prioritization of routes. This year, 370 inlet routes were run which included running all routes at least once and some routes multiple times. The number of inlets cleaned was 1,103. The total of inlets inspected was 8,836. On average, 12 percent of inlets were cleaned per route. Bridges, sinkholes, and waterways are also on routes that are run during wet weather periods to remove debris. The Public Grounds Division also has a crew that performs flow clearance which involves debris removal in vegetated waterways. This year, 186 acres of flow line were inspected and cleared if needed. The flow line clearing collected 905 cubic yards of debris.

The measurable goals planned for Year 2 include: 1) an annual inspection of City-owned SCMs in fall 2018 and performing maintenance as needed based on inspection results, routine maintenance needs, and citizen service requests; 2) complete each grated inlet route a minimum of once annually and clean grates as needed on each route and in response to citizen service requests; and 3) evaluate inspection and maintenance needs and priorities and develop an updated plan and schedule.

**BMP 4: Deicing Practices**

**Measurable Goal:** Update the SWPPP to reflect any changes in deicing practices.

No changes in deicing practices were made this year. The existing deicing practices continue to be used to reduce the discharge of pollutants. A new deicing material was considered but its use was not implemented. The SWPPP was updated to add the location used for snow disposal downtown. This is an annual measurable goal that is planned to continue for Year 2.

**BMP 5: Street Sweeping**

**Measurable Goal:** Track and report the number of times sweeper routes are ran and the amount of material collected.
The measurable goal was completed. Public Works sweeps and cleans all curbed streets in the City on a rotating schedule. On average, all curbed streets were inspected and cleaned if needed 3 times this year. During peak leaf season, the street sweepers also clean out ditches along the routes. This year, approximately 7,900 cubic yards of material were collected by the City’s street sweepers. The Missouri Department of Transportation (MoDOT) sweeps state-maintained thoroughfares within the City limits. This is an annual measurable goal that is planned to continue for Year 2.

**BMP 6: STREET DESIGN, CONSTRUCTION, AND MAINTENANCE**

**Measurable Goals:** 1) Provide input on the design of street projects and report the number of post-construction SCMs constructed as part of street projects; 2) Update the SWPPP to reflect any changes in BMPs for street maintenance practices.

Measurable goal 1 was completed. Input was provided on the design of the following street projects this year:

- Division Street – National to Glenstone Roadway Improvements: Post-construction SCM options were considered and resulted in an extended detention basin being included in the design of this project to provide treatment for a portion of the street drainage area. Construction is anticipated to begin next year.
- Kansas Expressway Extension Project: A portion of this project is in the City’s MS4 and the majority of the project area is in Greene County. Input on post-construction SCM design was provided to Greene County, who is managing this project. Review of this project is ongoing.
- Main Avenue Bridge Replacement – Input was provided on the design of the stream channel for water quality protection. Review of this project is ongoing.

No post-construction SCMs were constructed as part of street projects this year.

For measurable goal 2, no updates to the SWPPP were needed for BMPs for street maintenance practices. BMPs for street maintenance practices are included in the municipal facility SWPPP under BMP 1. It includes BMPs for surface treatments of asphalt streets, pavement saw cutting, and erosion and sediment control.

These are annual measurable goals that are planned to continue for Year 2.

**BMP 7: APPLICATION OF PESTICIDES, HERBICIDES, AND FERTILIZERS**

**Measurable Goal:** Report changes in annual work plans and BMPs for the application of pesticides, herbicides, and fertilizers on City right-of-way and municipal facilities to reduce the discharge of pollutants.

For this measurable goal, no changes in annual work plans and BMPs were made this year. The following practices continue to be used to reduce the discharge of pollutants. The Public Grounds Division of Public Works uses herbicides to minimize species that require frequent mowing, particularly on street medians. Fertilizer usage has been replaced with the use of compost to promote reseeded areas and as part of the lawn care program. Organic fertilizer options are being explored for when fertilizer is needed. Annual work plans are based on Integrated Pest Management principles including soil tests to identify soil amendments needed. If chemicals are needed, the annual work plan specifies the chemical types, application rates, and frequencies. Public Grounds uses horticultural vinegar as an alternative to herbicides at the Government Plaza complex. Public Grounds primarily uses non-restricted use pesticides that do not require a pesticide applicator license; however, Public Grounds personnel
responsible for applying or overseeing the application of pesticides are licensed pesticide applicators to ensure best management practices are followed. This is an annual measurable goal that is planned to continue for Year 2.

**MCM 7: INDUSTRIAL AND HIGH RISK RUNOFF**

**BMP 1: IDENTIFICATION OF INDUSTRIAL AND HIGH RISK RUNOFF FACILITIES**

**Measurable Goal:** Update the list of facilities annually.

This measurable goal was completed. The list of facilities with NPDES State Operating Permits for industrial stormwater was updated twice this year, in September 2017 and in March 2018. These updates identify newly permitted facilities. There are currently 94 permitted facilities located within the Springfield city limits. Some of these facilities do not discharge to the City’s MS4. The list of hazardous waste treatment, storage, and disposal (TSD) facilities and Toxics Release Inventory Program (TRI) reporting facilities was updated once this year as required. There is 1 operational TSD-permitted facility and 26 TRI facilities within the Springfield city limits. The majority of these facilities are also on the list of permitted facilities or have a no exposure permit through MDNR. This is an annual measurable goal that is planned to continue for Year 2.

**BMP 2: INSPECTION AND ENFORCEMENT FOR INDUSTRIAL AND HIGH RISK RUNOFF FACILITIES**

**Measurable Goal:** Inspect the list of facilities generated annually based on the priorities described in the SWMP, up to 25 facilities per year. The number of facilities inspected per year may be less than 25 based on the priorities. Track the number of inspections and enforcement actions.

This year, 25 facilities were selected for inspections based on the priorities in the SWMP. One facility was visited but no inspection was needed due to determination that this facility is not an active business. Out of the remaining 24 facilities inspected, 17 facilities had issues that needed to be addressed such as improper materials storage, lack of good housekeeping, and lack of required outfall signage in the field. Inspection letters were sent to these facilities requiring these items to be addressed within a specified time. The inspections also included industrial SWPPP reviews. Of the 24 facilities required to have a SWPPP by their State permit, 8 had adequate SWPPPs, 13 had SWPPPs that needed revisions, and 3 did not have a SWPPP and were notified to develop one and submit it to the City for review within a specified time frame. The City and the MDNR Southwest Regional Office work closely on inspection and enforcement for facilities with NPDES State Operating Permits, with each agency copying the other on inspection reports and working together as needed on compliance issues. Another accomplishment this year was a presentation about the industrial inspection program at a local conference attended by industry professionals.

This is an annual measurable goal that is planned to continue for Year 2 with 25 facilities selected for inspection based on the priorities listed in the SWMP.

**BMP 3: MONITORING PROGRAM FOR INDUSTRIAL AND HIGH RISK RUNOFF**

**Measurable Goals:** 1) Continue the program from the previous SWMP to conduct monitoring at 25 locations, dependent on qualifying rain events; 2) Evaluate the existing monitoring program and update it as needed. Report the updated monitoring program in the Year 1 annual report.

The previous MS4 permit required collection of wet weather samples at 25 locations per year in industrial areas, dependent on qualifying rain events occurring during normal work hours. This monitoring program was continued
this year under Measurable Goal 1. Wet weather samples were collected at 8 locations this year. Due to the limited number of qualifying rain events during normal work hours, the short duration of some rain events, and other program priorities, sampling at 25 locations was not able to be completed. The sampling results for the 8 samples collected are included in the Appendix. Because the sampling is focused on industrial discharges, evaluation of the sample results is generally based on the effluent limitations and benchmarks used in MDNR NPDES industrial permits, benchmarks in EPA’s Multi-Sector General Permit, and best professional judgment. Of the 8 sampled locations, sample results for 2 locations each had 1 parameter that exceeded the benchmarks used to evaluate the data.

The renewed MS4 permit provides flexibility to establish a meaningful number of locations to sample annually and to make other program updates as needed. Therefore, Measurable Goal 2 for this year was to evaluate the existing monitoring program and update it as needed. This measurable goal was completed. As described above, sampling data is evaluated each year based on the effluent limitations and benchmarks used in MDNR NPDES industrial permits, benchmarks in EPA’s Multi-Sector General Permit, and best professional judgment. Based on evaluation of the previous 15 years of data, the list of sampling locations was revised to focus on MS4 locations that have exceeded the benchmarks used to evaluate the data most frequently and MS4 locations that provide geographic coverage of drainage areas for the priority industrial facilities on the list maintained under BMP 1. This evaluation resulted in a list of 40 sampling locations. A new goal has been established to sample 10 locations per year, which will allow completion of sampling at all 40 locations by the end of this permit cycle in Year 5. The previous years of data were also evaluated to determine whether updates to the list of sampling parameters were needed based on what parameters most frequently exceeded the benchmarks used to evaluate the data and are typically associated with industrial sources. Additional parameters not previously included were also considered based on the types of industries that discharge to the MS4. This evaluation resulted in the following updated list of parameters that will be implemented in Year 2: Biochemical Oxygen Demand, Chemical Oxygen Demand, pH, Total Suspended Solids, Total Dissolved Solids, Nitrate + Nitrite, Total Kjeldahl Nitrogen, Total Phosphorus, Oil & Grease, Copper, Lead, Zinc, Aluminum, and Iron. Benchmarks for evaluating the sample results have also been updated based on MDNR NPDES industrial permits and best professional judgement. As described in the SWMP, this monitoring program will be used as one factor in prioritizing facility inspections under BMP 2.

The measurable goal for Year 2 is to implement the updated monitoring program by sampling at 10 locations for the updated list of parameters and reporting the results in the annual report.

**MCM 8: FLOOD CONTROL PROJECTS**

**BMP 1: WATER QUALITY DESIGN IN FLOOD CONTROL PROJECTS**

**Measurable Goal:** Implement the project scoping and plan review procedures for consideration of water quality impacts in the design of flood control projects and report completed projects annually.

This measurable goal was completed. Flood control projects typically consist of stormwater system improvements and/or detention basin improvements to address flooding of streets and neighborhoods. These projects are designed to also provide water quality benefits whenever feasible, such as incorporating extended detention for water quality treatment or using grass channels for conveyance. Project scoping meetings are held to discuss water quality opportunities and other design considerations. A project scoping meeting was held for one flood control project this year for the East Chestnut Expressway Regional Detention. Water quality design opportunities were discussed and will be considered in design. Following project scoping, multiple plan review opportunities are provided which allow for continued input on water quality design considerations. Plan review was ongoing for
several flood control projects this year. Two projects were completed this year: 1) Monroe Terrace Stormwater Improvements; and 2) Swope Street Stormwater Improvements. Both were relatively small projects that required extending the underground storm system with no feasible opportunities to incorporate water quality into the design. Monroe Terrace extended the underground storm system behind some residences to help intercept the runoff from the neighborhood and reduce flooding to several homes. Swope Street replaced a channel between two homes with an underground system due to failing retaining walls and maintenance issues. This is an annual measurable goal that is planned to continue for Year 2.

A related initiative is the City’s floodplain acquisition program. Since 1993, the City has invested over $16 million in the voluntary acquisition of over 200 properties in floodplains, sinkholes, and other flood-prone areas. The purchase and removal of structures removes impervious surfaces and restores green space for flood capacity and water quality improvement. The program has included the acquisition and preservation of over 200 acres of floodplain and riparian corridor along the City’s urban streams. This year the City acquired one residential property in the floodplain of Fassnight Creek and one undeveloped property in the floodplain of Jordan Creek.

BMP 2: RETROFITTING FLOOD CONTROL STRUCTURES

**Measurable Goal:** Evaluate 1 City-owned and operated detention basin annually to determine if retrofitting the basin to provide additional pollutant removal from stormwater is feasible. If the evaluated basin is determined to be feasible to retrofit, establish a schedule for implementation.

This measurable goal was completed. Two City-owned flood control basins were evaluated as potential retrofit candidates. Upstream watershed models were completed for both detention basins. The retrofit method evaluated was converting the flood control basins to extended detention basins for water quality treatment by installing a flow-restricting modification at the outlet structure (i.e. a perforated steel plate). The watershed model for the first basin, located in the 1400 block of S. Weller Ave., showed that retrofitting the outlet structure to provide a reasonable amount of water quality treatment would increase the chances of flooding the nearby neighbors. Therefore, retrofitting this basin was determined not to be feasible. A regional detention basin located in the 1900 block of E. Republic Rd. was also evaluated. The basin was determined to be able to handle the hydraulic modifications of a retrofit. However, the existing conditions of the basin need to be improved before proceeding with any plans for retrofitting and more data on maintenance is needed to determine the potential impacts of a retrofit on maintenance. City maintenance crews removed debris and sediment accumulation which was blocking the existing pipe outlet. There are plans to modify the pipe to reduce the potential for the pipe to clog so the basin can drain as designed. Routine maintenance data will be collected and evaluated to determine if retrofitting is a feasible option for this basin from a maintenance perspective. This is an annual measurable goal that is planned to continue for Year 2.

MCM 9: MONITORING

BMP 1: REPRESENTATIVE MONITORING

**Measurable Goal:** Implement the monitoring plan for each year and report the results in the annual report. Include notification of any changes to the monitoring plan for the next year in the annual report.

This measurable goal was completed. During the previous permit term from 2009-2017, 12 in-stream locations were monitored and the results indicated that the Jordan Creek watershed produced the highest concentrations of nutrients and sediment in first flush stormwater samples compared to the other streams sampled. Therefore, as
described in the SWMP, the monitoring plan for this year focused on representative monitoring in the Jordan Creek watershed as a high priority watershed for further characterization of stormwater discharges. As required by the permit, monitoring was conducted at 6 locations and stormwater samples were collected from a minimum of three storm events occurring at least one month apart and analyzed for the parameters listed in the permit. Four storm events were sampled at some locations. For one storm event, two samples were collected to analyze how concentrations change throughout the storm event. Stage data, although not required, was collected throughout each storm event. The monitoring results are included in the Appendix. Table 2 shows the minimum and maximum results for each monitoring parameter. The in-stream location at Fort Avenue had the highest geometric mean concentrations of total phosphorus (TP) and total suspended solids (TSS) compared to the other five locations (Figures 6-8). The site with the lowest geometric mean concentrations for TP, TSS, and TN was the MS4 channel in the 300 block of N. Main Ave. These sites showed similar trends for other parameters as well. The measurable goal planned for Year 2 is to continue this monitoring program.

**BMP 2: BIOLOGICAL ASSESSMENTS**

There are no measurable goals for this BMP until Years 3 and 4.

**TABLE 2. MINIMUMS AND MAXIMUMS FOR MONITORED PARAMETERS**

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<td>8.3</td>
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FIGURE 6. TOTAL SUSPENDED SOLIDS

FIGURE 7. TOTAL PHOSPHORUS
Note: Total Nitrogen calculated as the sum of Total Kjeldahl Nitrogen and Nitrate + Nitrite.

FIGURE 8. TOTAL NITROGEN
APPENDIX

Industrial Wet Weather Screening Results (MCM 7 BMP 3)

Representative Monitoring Program Results (MCM 9)
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<th>TP (mg/l)</th>
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<th>Hardness (ppm)</th>
<th>CR (mg/l)</th>
<th>CU (mg/l)</th>
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Microtox results are either % effect or %EC50. For % effect, a lower % is more toxic and a negative % effect is called hormesis and indicates non-toxic or low toxicity. If the % effect is above 20%, an EC50 test method is run. For %EC50, a lower % is more toxic.

Parameter Abbreviations: BOD = Biochemical Oxygen Demand; COD = Chemical Oxygen Demand; TSS = Total Suspended Solids; TDS = Total Dissolved Solids; N+N = Nitrate + Nitrite; TKN = Total Kjeldahl Nitrogen; DP = Dissolved Phosphorus; TP = Total Phosphorus; O&G = Oil & Grease; CR = Chromium; Total; CU = Copper; Total; PB = Lead; Total; NI = Nickel; Total; AG = Silver; Total; ZN = Zinc; Total

*Not run due to equipment failure.

*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 gathered and evaluated 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 submitted 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 fines and imprisonment for knowing violations.*

Erin Kemper, P.E., D.WRE
Director, Department of Environmental Services
City of Springfield, Missouri MS4 Permit MO-0126322 Annual Report 2017-2018 Permit Part E.9.a - Representative Monitoring of Stormwater Discharges

<table>
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<th>Time</th>
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<th>pH (std)</th>
<th>Temp (°C)</th>
<th>DO (mg/l)</th>
<th>SC (µS/cm)</th>
<th>TSS (mg/l)</th>
<th>COD (mg/l)</th>
<th>BOD (mg/l)</th>
<th>TKN (mg/l)</th>
<th>N+N (mg/l)</th>
<th>Dis. P (mg/l)</th>
<th>TP (mg/l)</th>
<th>O&amp;G (mg/l)</th>
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Abbreviations: DO = Dissolved Oxygen; SC = Specific Conductivity; TSS = Total Suspended Solids; COD = Chemical Oxygen Demand; BOD = Biological Oxygen Demand; TKN = Total Kjeldahl Nitrogen; N+N = Nitrate + Nitrite; Dis. P = Dissolved Phosphorus; TP = Total Phosphorus; O&G = Oil & Grease.

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