



CITY OF KANSAS CITY, MISSOURI

**National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4) Permit MO-0130516**

Stormwater Management Plan



KANSAS CITY
MISSOURI

April 2022

City of Kansas City, Missouri Stormwater NPDES Permit No. 0130516
2022 Stormwater Management Plan

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ACRONYMS

APWA	American Public Works Association
Archibus	Archibus Environmental & Risk Management System
BMPs	Best Management Practices
City	City of Kansas City, Missouri
EMS	Environmental Management System
GIS	Geographical Information System
HHW	Household Hazardous Waste
I/I	Infiltration and Inflow
MARC	Mid-America Regional Council
MCMs	Minimum Control Measures
MDNR	Missouri Department of Natural Resources
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollution Discharge Elimination System
Permit	MO State Operating Permit MO-0130516
PHFs	Pesticides, herbicides, and fertilizers
SPCC	Spill prevention control and countermeasures
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TSD	Treatment, storage and disposal
USACE	U.S. Army Corp of Engineers

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1. Introduction

The City of Kansas City (City) submitted its Stormwater Management Plan (SWMP) to the Missouri Department of Natural Resources in 2019. The 2019 SWMP was prepared in conjunction with requirements of the City’s Municipal Separate Storm Sewer System (MS4) Discharge Permit as issued by the State in September 2018. It described strategies and practices the City would implement or were implementing to manage the discharge of pollutants from the MS4 to the “maximum extent practicable” (MEP) per the permit requirement and based on local conditions and resources.

The City recognizes the SWMP is a “living document” and it shall be reviewed periodically for continuous improvement. As such, the City is submitting this current 2022 SWMP as a result of its recent evaluation of its last two years’ of implementation practices against the list outlined in the 2019 SWMP. The major changes made in the 2022 SWMP are: (1) the program activities or best management practices (BMPs) for each of the nine Minimum Control Measures (MCMs) are listed in improved alignment with the permit requirements, and (2) the BMPs and associated measurable goals are defined to reflect the City’s continued progress in practices and planning. The changes are intended to make the SWMP a better guide for program implementation and permit compliance. The City will continue to improve its practices to protect water quality and to meet various requirements of the federal, state, and local laws

The 2022 SWMP covers the remaining permit period July 1, 2022 – August 31, 2023. It addresses the nine required MCMs:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management in New Development and Redevelopment
6. Pollution Prevention and Good Housekeeping for Municipal Operations
7. Industrial and High Risk Runoff;
8. Flood Control Projects and Devices, and
9. Monitoring

For each of the MCMs, descriptions of relevant BMPs are included along with appropriate measurable goals and responsible City offices are listed. In addition, an iterative process is presented for continued evaluation of the effectiveness of each BMP.

2. Public Education and Outreach for Stormwater Impacts

2.1 Permit Requirement

- a. The permittee shall implement a public education and outreach program to inform the public about the impacts of stormwater discharges on waterbodies and steps the public can take to reduce pollutants in stormwater runoff. As part of the SWMP, the program shall include the following, at a minimum:
 - i. A description of how the public is targeted based on the specific group's potential to have significant stormwater impacts;
 - ii. A list of pollutants the program is developed to address, including at a minimum:
 - iii. Pollutants associated with the application of pesticides, herbicides, and fertilizers; and
 - iv. Pollutants associated with the management and disposal of used oil and toxic materials.
 - v. A description of education and outreach activities and materials specific to targeted audiences and pollutants;
 - vi. A description of a program to promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges from the MS4.

2.2 Compliance Strategy

- a. The City targets all age groups and different population groups for its stormwater education effort. City's Water Services Department (KC Water) has recently designed an education scheme that aligns its stormwater education with both the Missouri Learning Standard (MLS) and Next Generation Science Standard (NGSS) for science education. For children of every age group from pre-Kindergarten to 12th Grade, a class pertinent to a stormwater-related topic is designed to meet the MLS Science Expanded Expectations. The purpose is to help the children build up their knowledge and enhance their awareness during an important learning phase of their life. In addition, the City also hosts, partners with, or contributes to various educational programs and activities for other age groups and groups of different populations.
- b. The City's public education continues to address common nonpoint source pollutants. The list includes, but is not limited to pesticides, herbicides, fertilizers, used oil and toxic chemicals.
- c. The City will continue to use the established public reporting system to manage illicit discharges or other incidences that source from the MS4 and may impact water quality of the surface waterbodies.
- d. For each BMP implemented, a separate iterative process will continue to be used to evaluate its effectiveness and identify improvement opportunities or replacement options.

2.3 BMP 1 – Utilize Established Communication Venues and Social Media to Disseminate Information

KC Water has two major communication venues to reach out to the public on a regular basis. It sends bill inserts on monthly base and newsletter, *What's on Tap?* on bi-monthly to its 170,000 water customers. Both the bill inserts and the newsletter are used as a tool to disseminate educational messages and information. KC Water maintains and continues to improve its website, which has a dedicated education page: <https://www.kcwater.us/education/>. The page lists various links and resources on water-quality topics.

In addition, KC Water utilizes the following social media accounts and Instagram to provide its educational messages.

<https://www.facebook.com/KCMOWater/>

<https://twitter.com/kcmowater>

<https://www.youtube.com/user/KCMOWater>

<https://www.linkedin.com/company/kcmowater/>

<https://www.instagram.com/kcmowater/>

<https://nextdoor.com/agency-detail/mo/kansas-city/kc-water/>

Measurable Goals:

Years 1-5:

- The stormwater-related education messages are disseminated through available resources. The messages will focus on the subjects of potential pollutants from application of pesticides, herbicides, and fertilizers, as well as from management and disposal of used oil and toxic materials.
- A variety of audiences are targeted for stormwater education.

Responsible Offices:

- The Department of City Communications uses staff designated for KC Water.
- KC Water through Smart Sewer Division uses staff designated for education and outreach.

Iterative Process:

- Evaluate the content of the messages to ensure complete information is provided to the public. For instance, related to used oil, the information needs to list common mishandlings by homeowners, and potential consequences of mishandling, to provide guidance on how to handle used oil properly, and the existing resources for its disposal.
- Track the number of messages delivered and the number of individuals or groups contacted; analyze the number of online views and responses to see which messages are more interesting to the public and develop relevant topics further. For those messages with less public interest, explore other approaches to reach out.

2.4 BMP 2 – Provide Water Quality-related Curriculum for Students and Workshops for Adults

KC Water has developed an education scheme, *Water Education for Kansas City (WE KC Program)*, with individual curricula targeting every grade from pre-Kindergarten through 12th grade. The implementation of the education program is based on a school district partnering strategy. In addition, KC Water provides relevant training sessions to home associations or other groups of adults.

Measurable Goals:

Years 1-5:

- Different grades from pre-Kindergarten through 12th grade will be contacted.
- Numbers of students and adults, and number of classes and workshops.
- Number of training sessions to address pesticides, herbicides, fertilizer, used oil, and toxics materials.

Responsible Office:

KC Water through Smart Sewer Division uses staff designated for education and outreach.

Iterative Process:

Solicit the feedback from both students and adults to assess the effectiveness of the training, and improvement will continue to be made in the content and teaching methodology.

2.5 BMP 3 – Implement Programs through Leadership, Partnership, and Supporting Role

KC Water implements a Water Quality Education Small Grant Program. The program provides funding for organizations (e.g., non-profit organizations, schools, and other partnerships) to develop and implement projects that will protect, enhance, or educate on water quality issues in the City.

The City's KC Green Team, consisting of staff from various departments, will continue to influence the City's policies and organize activities and events to educate staff on green stormwater solutions and sustainability with City operations.

The City will continue to be a key partner for a regional water quality public education effort led by the Mid-America Regional Council (MARC). The program is a comprehensive approach to raising public awareness about watershed issues and water quality in order to change household behaviors that impact water quality in the Kansas City region.

The City will continue to explore opportunities to work across different departments and with outside groups and local citizens to promote water-quality awareness, adopt environmentally sustainable policies, encourage environmentally responsible behavior, and create real positive environmental and social impact.

Measurable Goals:

- Years 1-5:
KC Water will administer and complete at least two rounds of the Water-quality Education Small Grant program within the five-year permit term.
- Years 3-5:
 - 1) The KC Green Team will continue to play a role in shaping the City's policies.
 - 2) The KC Green Team will organize at least three activities or events annually to educate and inspire staff on green solutions and sustainability with City operations.
 - 3) KC Water will continue to be a leading sponsor for MARC's water quality public education program by engaging in key decision making processes and making significant contribution to program implementation.

Responsible Offices:

- The City's Office of Environmental Quality uses staff to contribute to the work.
- The Department of City Communications uses staff designated for KC Water.
- KC Water through Smart Sewer Division uses staff designated for education and outreach.

Iterative Processes:

- For the Water Quality Education Small Grant Program, the status and achievements of each project will be evaluated against those proposed in the grant proposals. The strength and weakness of the performance will be identified, and possible improvement will be sought. We will also look at the number of partner organizations, the number of school children and adults reached, and the number of projects that focus on pesticides, herbicides, fertilizers, used oil and/or toxic chemicals.
- For the KC Green Team, the impact on City policies will be assessed; the success of each activity or event will be evaluated based on performance, and participants' feedback.
- MARC's achievement will be evaluated based on the defined tasks set up at the beginning of each calendar year. Specifically, we will look at what pollutants are addressed, the composition of the audience, and whether there is any change in public awareness of water quality issues and public behavior which may have an environmental impact. The last part is done through a biennial regional survey.

2.6 BMP 4 – Promote, Publicize, and Facilitate Public Reporting of Illicit Discharges

The City uses a centralized system to provide multiple options for residents to access City services, including addressing illicit discharges. Residents can use any of the following reporting methods as they appear on the City's website:

- Call the City Services hotline 311 or (816) 513-1313

- Report a problem online using the online reporting form
- Download the app myKCMO (iOS and Android) to report problems
- If a citizen needs assistance, they could make a request at the City Hall 414 E. 12th St., Kansas City, MO 64106, weekdays from 8:00 AM - 5:00 PM, or use the Self-Service Station on the 1st floor with a phone to contact 311
- Twitter: Follow@KCMO311
- Mail: 311, City Hall, First Floor, 414 E. 12th St., Kansas City, MO 64106

Requests received through these options will be assigned a case number, logged by category and routed to the appropriate City department for follow-up and resolution.

Measurable Goal:

- Years 1-5:

Public complaints, once received, will continue to be addressed thoroughly and timely.

Responsible Offices:

- City 311 Call Center uses staff to track the complaints.
- KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

Iterative process:

Evaluate whether each case is investigated appropriately and addressed thoroughly and timely. If not, identify the process weaknesses and improve the procedure.

3. Public Involvement and Participation

3.1 Permit Requirement

- a. The permittee shall implement a public involvement/participation program that shall at a minimum, include the following:
 - i. Opportunities for public involvement in the development of the permittee’s SWMP; and
 - ii. Opportunities for public participation in implementation activities such as volunteer stream clean-up events.

3.2 Compliance Strategies

- a. The City developed a SWMP with the input from various stakeholders in 2019. The draft was posted on KC Water’s website for public comments for an extended period before it was finalized and submitted to the State for approval. The City will continue to evaluate 2019 SWMP to make improvements. The City will submit an updated SWMP to MDNR and seek approval prior to implementation of it.
- b. KC Water will continue to implement and support activities with public participation to help to keep streams clean. It will continue to explore opportunities to enhance and/or expand its current programs.

3.3 BMP 1 – Involve the Public in the Development of the SWMP

KC Water developed a SWMP in 2019 with the input from various stakeholders and the general public. As the City’s stormwater management programs continue to evolve, the 2019 SWMP will be updated, as needed, to better comply with the Permit terms. The City will follow the permit requirements.

Goals and Measurable Goals:

- Year 1: The City developed a SWMP with the input from various stakeholders and the general public. The SWMP was submitted to the State for approval.
- Years 2-5: The City will continue to re-evaluate its practices and make adjustments to the existing SWMP for better guidance to City implementation and better compliance with the permit requirements. The improved version will be submitted to MDNR for review and approval.

Responsible Offices:

- The Department of City Communications uses staff designated for KC Water.
- KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

Iterative process:

Seek the input from City Departments using SWMP, evaluate whether the SWMP provides a good guidance for use to fulfill compliance purposes and keep making improvements needed.

3.4 BMP 2 – Involve the Public in the Cleanup Events

Goals and Measurable Goals:

Years 1-5: The City will continue to host or partner with other agencies or parties to host public events that help to keep the streams clean.

- 1) Track the annual number of the events that occur; and
- 2) Track the number of volunteers.

Responsible Offices:

- The Department of City Communications uses staff designated for KC Water.
- KC Water through Smart Sewer Division uses staff designated for education and outreach.

Iterative process:

Evaluate the number of cleanup events hosted, the number of stream spots covered and the turnout of volunteers to see whether adjustments need to be made to similar events in the future.

4. Illicit Discharge Detection and Elimination

4.1 Permit Requirement

- a. The permittee shall develop, implement, and enforce a program to detect and eliminate illicit discharges, as defined in 10 CSR 20-6.200(1)(C)7, into the permittee’s MS4. As part of the SWMP, the permittee’s illicit discharge detection and elimination program shall include the following at a minimum to the extent allowable under state or local law:
 - i. A storm sewer map showing the locations of all constructed outfalls and the names and locations of all receiving waters of the state that receive discharges from the permittee’s MS4. The permittee shall describe the source of information they used for the map(s), and how the permittee plans to verify the outfall locations with field survey or field screening points. If already completed, the permittee shall describe how the map was developed and how the map will be regularly updated. The permittee shall make the map and map information available to the Department upon request;

- ii. A plan to prohibit through ordinance, orders, or similar means illicit discharges into the permittee's MS4, and implement appropriate enforcement procedures and actions.
- iii. Inspection and investigation procedures for detecting and eliminating illicit discharges.
- iv. A program to conduct field screening at field screening points or major outfalls with the purpose of finding and eliminating illicit discharges and illegal dumping. The program shall include the following:
 - 1. A description of areas or locations that will be evaluated by field screening including a description of how locations are established;
 - 2. A description of the number of locations that will be screened annually and how locations will be selected;
 - 3. A description of field screening procedures, including recording of visual observations and testing or sampling if flow is observed;
- v. Procedures to minimize, contain, and respond to spills that discharge or have potential to discharge into the MS4; and
- vi. A description of controls to limit infiltration of seepage from municipal sanitary sewers to the permittee's MS4.

4.2 Compliance Strategy

- a. KC Water maintains a geographical information system (GIS) that contains information on the City's storm sewer systems and receiving waterbodies. The attributes recorded in the GIS include the size, material, and type of each storm sewer component. The data was collected from different sources: previous city-wide watershed studies and levee sewer outfall inspection reports, investigations conducted under the City's Smart Sewer Program, and construction As-Built drawings. KC Water will continue to collect relevant information to maintain its database for stormwater assets.
- b. The City adopted an ordinance for Stormwater Discharge Control Regulations (Chapter 61. Article III.) in 2007. The article specifically prohibits illicit connections and discharges, and establishes legal authority to carry out all inspections, surveillances, monitoring and enforcement procedures necessary.
- c. KC Water developed an investigation procedure following the manual, *Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments*, authored by the Center for Watershed Protection and Robert Pitt. The procedure is followed to address illicit discharge complaints.
- d. KC Water uses a watershed-based approach to conduct field screening of the outfalls with the size equal to or more than 36". KC Water has completed screening of the outfalls north of the Missouri River, and is in the process of screening the outfalls south of the river. For the outfalls that were identified with issues such as needing clearing or repair etc., individual work orders are created in Hansen Data Management System and handled by the department's repair team or preventative maintenance team.
- e. The Fire Department implements two guidelines that address the potential impact on stormwater from a spill: (1) HazMat Response General Operational Guideline for Fuel Spills, and (2) HazMat response General Operational Guideline for First Responders. The former encourages using dry absorption as the preferred method to clear a spill. For fuel spills, the department uses absorbents almost exclusively, and the priority is to always block flow into all sewer systems and natural waterways. The department has additional capabilities of deploying absorbent booms and pads, damming and diking spills, and sampling for the presence of a product. The guideline also provides direction on how to properly dispose of water and avoid discharge into storm drains if flushing is the option. The 2nd guideline requires the flushed water to be confined after it has been used and then disposed of properly.

- f. The department uses its GIS to analyze the spatial distribution of the incidences of dry weather overflows and water in basements city-wide. The result is used to guide the department's preventative maintenance activities to focus its inspection scope. Depending on the inspection result, decisions are made for maintenance, repair, rehabilitation, or replacement, and for in-house handling or contracting out to resolve the issues.
- g. KC Water uses both in-house resources and contracting services to address inflow/infiltration to sanitary sewer systems. For targeted projects, contracting services are used. Appendix D in the City's 3rd Amendment of its Consent Decree has specified a modeling approach to estimating all I/I reduction efforts. The appendix lists 10 targeted projects with I/I reduction as a major part of the scope, and provides respective timelines for completion of these projects. These ongoing sanitary condition improvements limit any likelihood of exfiltration and potential consequence of reaching MS4, groundwater, or surface water bodies.
- h. The City operates multiple waste management programs that encourage proper disposal, as well as preventing and addressing illegal dumping. These programs include KC Recycles, Curbside Bulky Items Collection, Curbside Leaf and Brush Collection, Illegal Dumping Cleanup, Neighborhood Cleanup Assistance, as well as the operation of community recycling drop-off centers, yard waste drop-off centers, and the Household Hazardous Waste Facility. This comprehensive waste management approach helps to prevent and reduce stormwater pollution.

4.3 BMP 1 – Maintain and Update Storm Sewer GIS

KC Water continues to update its storm sewer GIS when receiving new As-Builts or new information from other sources including the levee sewer outfall inspection conducted in 2021. Corrections or additions to the outfall locations are made if a review of archived As-Builts or easement indicates any error.

Measurable Goals:

- Years 1-2: Add to the KC Water GIS all stormwater system components including outfalls, and newly replaced or constructed on public properties.
- Years 3-5: Continue the previous practice; if information is available, add to the GIS all outfalls on large commercial or industrial properties; review historical As-Builts for gaps to improve the database.
- After Year 5: Add to KC Water GIS newly constructed stormwater outfalls on large private properties, for which As-Builts are received by KC Water.

Responsible Offices:

KC Water through the GIS Division uses staff designated for recording stormwater assets.

Iterative process:

Regular reviews will be conducted to check the number of outfalls that are added, the number of corrections that are made, and number of As-Builts that are cited. Sources of information also need to be examined to ensure accuracy.

4.4 BMP 2 – Enhance the Storm Sewer GIS

Since 2020, KC Water has started to compile a database that includes stormwater BMPs that are constructed on the City's properties. Information recorded in the database contains the address/location, geographic coordinates, name of the construction project, the responsible department or other party for maintenance, new conformed type, and area size.

Measurable Goals:

Years 3-5: Complete the database for the stormwater BMPs that have been constructed on the City's properties, and keep the database updated.

Responsible Offices:

- KC Water through Division of Geographic Information System uses staff designated for stormwater asset recording.
- KC Water through Smart Sewer/Stormwater Engineering Divisions uses staff designated for green infrastructure implementation and MS4 compliance.

Iterative process:

Ensure the accuracy of the information through spot checking and field verification to ensure the accuracy of the information; Conduct interviews or surveys of City staff with maintenance responsibilities to evaluate the database.

4.5 BMP 3 – Follow the Established Procedure for Illicit Discharge Investigation and Enforcement

KC Water will continue to follow the established procedure for investigation of illicit discharges reported to the City. Enforcement action, when necessary, will be taken following the scope as set in the ordinance.

Measurable Goals:

Years 1-5:

- Conduct investigations on a timely basis; reduce and minimize the impact, if possible; stop and eliminate sources, if feasible.
- Take enforcement action when needed.

Responsible Office:

KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

Iterative Process:

- Evaluate the amount of time needed for each investigation and for remediation of the discharge, to assess the timeliness of the responses, and
- Review the documentation for thoroughness in handling each case.

4.6 BMP 4 – Follow the Established Procedure for Outfall Field Screening

KC Water will continue to follow the established procedure for outfall screening, and the screening will continue to be done on a watershed basis. An effort will be initiated to screen outfalls with smaller diameter sizes, as well as other stormwater discharging points.

Measurable Goals:

- Years 1-4: Inspect 100 outfalls annually.
- Years 5: Inspect 150 outfalls or other stormwater discharging points annually.
- Years 4-5: Follow up for the issues identified during the screening and have them resolved in a timely manner, if feasible.

Responsible Offices:

KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

KC Water through Stormwater Preventative Maintenance Division & Stormwater Repair Division

Iterative Process:

- Evaluate the screening result on a regular basis, identify any pattern of problems observed with screened outfalls, and use the findings to guide public outreach;
- Evaluate the time length spent on resolution of the identified issues for efficiency improvement.

4.7 BMP 5 – Follow the Established Guidelines to Address Spills

The Fire Department will continue to implement the established guidelines to minimize, contain, and respond to spills that discharge or have potential to discharge into the MS4.

Goals:

- Years 1-5: Implement the guidelines to address spills.
- Years 4-5: Track the spills that discharge or have potential to discharge to the MS4.

Responsible Office:

Fire Department through HazMat Division provides staff resources.

Iterative process:

- Continually evaluate the practices to see whether guidelines were followed. If the guidelines were followed, determine whether MS4 was protected sufficiently; if the guidelines were not followed, determine what the reasons or justifications were for doing it differently, and whether the practice still provides protection to the MS4.
- Continually evaluate the incidences of spills in terms of geographic locations and the condition of surroundings, and see whether there is any opportunity for the City to make any improvements to prevent or reduce spills.

4.8 BMP 6 – Limit Exfiltration from Sanitary Sewers

The Preventative Maintenance Division with KC Water will continue to inspect the city-wide sanitary sewer system. Issues identified during the inspection will be resolved on a timely basis, when practical.

The City's Smart Sewer Division will continue to implement the Consent Decree control measures related to infiltration and inflow reduction projects through 2029 which can contribute to limiting exfiltration potential from separate sanitary sewers.

Measurable Goals:

Each year a target mileage is set for sewer lines to be inspected through the department's regular maintenance program, and the issues identified through the inspection are required to be resolved in a timely manner.

- Year 1: 126 miles
Year 2: 133 miles
Years 3-5: 140 miles annually
Track the annual numbers of: lengths of sewer lines inspected and maintained; lengths of main and private laterals repaired, rehabilitated, and replaced; other sewer system components maintained and replaced.

- Years 1-5 and Year 5 after: Complete targeted projects in a timely manner.

Responsible Office:

KC Water uses staff from Divisions of Preventative Maintenance and Smart Sewers.

Iterative process:

Continue annual sanitary sewer investigations to examine sewer condition for assessing the effectiveness of the work completed; and identify the areas for future repair and replacement projects.

4.9 BMP 7 – Implement Programs for Solid Wastes and Household Hazardous Waste Management

The City will continue to implement a comprehensive waste management approach by maintaining the established programs. Public Works Solid Waste Division will continue to host KC Recycles, Curbside Bulky Items Collection, Curbside Leaf and Brush Collection, Illegal Dumping Cleanup, Neighborhood Cleanup Assistance, as well as maintaining the operation of community recycling drop-off centers and yard waste drop-off centers. KC Water will continue to operate the Household Hazardous Waste Facility and host mobile collection events.

Measurable Goals:

- Years 1-5:
 - 1) Maintain all the established programs;
 - 2) Host one or more rounds of city-wide curbside yard waste collection event;
 - 3) Maintain the operation of the three community recycling drop-off centers;
 - 4) Maintain the operation of the two yard waste drop-off centers, and
 - 5) Maintain the operation of household hazardous waste collection.

Responsible Office:

- Public Works through Solid Waste Division provides staff resource.
- KC Water through Regulatory Compliance Division provides staff resource.

Iterative process:

Both Public Works and KC Water will keep track of their program achievements and evaluate the records to identify any improvement opportunities.

5. Construction Site Runoff Control

5.1 Permit Requirement

- a. The permittee shall develop, implement, and enforce a program to reduce pollutants in stormwater runoff to their MS4 from construction activities on land disturbance sites that disturb one or more acres or disturb less than one acre when part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project. As part of the SWMP, this program shall include the development and implementation of the following:
 - i. Ordinances, orders, or similar means to require entities conducting land disturbance activities, in accordance with Part E.4.a. of this permit to implement and maintain erosion and sediment control BMPs at construction sites including sanctions designed to ensure compliance, to the extent allowable under state or local law;

- ii. Requirements for construction site operators to control construction site waste that may cause adverse impacts to water quality, such as discarded building material, concrete truck washout, chemicals, litter and sanitary waste;
- iii. Procedures for the permittee to review all construction site stormwater pollution prevention plans for potential water quality impacts;
- iv. Procedures for the permittee to receive and respond to public reporting of the discharge of pollutants from construction sites in coordination with the permittee's public education and outreach program;
- v. Procedures for the permittee to inspect construction sites and enforce control measures, including prioritization of site inspections;
- vi. A plan designed to ensure compliance with the permittee's erosion and sediment control ordinances, orders or similar means including sanctions and enforcement mechanisms the permittee will use to ensure compliance and procedures for when certain sanctions will be used. Possible sanctions include non-monetary penalties (such as stop work orders), fines, bonding requirements, and/or permit denials for non-compliance; and
- vii. A description of appropriate educational and training measures for construction site operators.

5.2 Compliance Strategy

- a. The City has established the City Code Chapter 63 Erosion and Sediment Control to regulate land disturbance activities. The regulation includes four divisions: In General, Administration, Implementation and Enforcement procedures. The regulation is intended to protect and enhance the water quality of watercourses, waterbodies, and wetlands by controlling erosion, sedimentation, and related environmental damage caused by construction-related or other activities. See the link below for the ordinance.
https://library.municode.com/mo/kansas_city/codes/code_of_ordinances?nodeId=COORKAMIVOII_CH_63ERSECO
- b. For the City's capital projects that disturb one or more acres or less than one acre as part of a larger common plan which will disturb a cumulative total of one or more acres over the life of the project:
 - i. The City uses e-Builder, a program management system to track and document projects.
 - ii. The City developed a template of a Stormwater Pollution Prevention Plan (SWPPP). The template contains requirements to manage construction site-related wastes, including but not limited to, solid waste, liquid waste, concrete waste (washout area), hazardous waste, etc. The template gets updated to be consistent with the regulatory requirement changes related to the MS Permit (MO-0130516) and the City's Land Disturbance Permit (MOR100006).
 - iii. The City has a construction site inspector that provides monthly oversight inspection of all the applicable capital project sites. The inspector reviews all the SWPPPs. Since August 2021, the manager of each applicable project is also required to review the SWPPP.
 - iv. The inspector communicates directly with the project managers and site operators of construction sites about their inspection results, and specifies the time allowed to have any identified issue addressed. Enforcement action will be taken following the City's ordinance, if needed.
 - v. The City's Office of Environmental Quality and KC Water are working together to host sediment and erosion control training for project managers of capital projects. The purpose is to get staff familiar with the regulatory requirements, become knowledgeable about the content of an SWPPP, gain an understanding of the mechanisms and functions of commonly used BMPs, and get updated on the current available technology and products.
- c. For private development projects that disturb one or more acres or less than one acre as part of a larger common plan which will disturb a cumulative total of one or more acres over the life of the project,
 - i. The City uses CompassKC, an online system for plan and permitting services.

- ii. The Land Development Division of City Planning and Development Department requires that private developers obtain a land disturbance permit directly from the State, and that construction site operators comply with the City's erosion control code requirements as well as the requirements of the Missouri Department of Natural Resources.
 - iii. The Land Development Division reviews the Site Disturbance Plans that are submitted for review as part of the construction plans for the proposed development.
 - iv. The Land Development Division provides a minimum of two inspections for each project site; additional inspections are as needed, depending on the scope and scale of the project. Enforcement action will be taken following the City's ordinance, if needed.
- d. The City uses the MYKCMO for public reporting or complaints of problems including issues with construction sites. Depending on the nature of the call, individual departments and offices will be assigned to address the problems. For private construction sites, the Investigation Division of the City Planning & Development Department is responsible for addressing the request. For City capital projects, the Stormwater Engineering Division of KC Water coordinates with the individual department that owns the project to address the issue.

5.3 BMP 1 – Implement and Enforce Erosion and Sediment Control for City Capital Projects

The City continues to require completion of a SWPPP for each applicable capital project prior to the land disturbance activity. Project managers and/or a City inspector are required to review the SWPPPs. The City requires SWPPPs be kept updated as necessary.

Site operation managers, their designees or contractors for each project are responsible for regular site inspection as defined in the SWPPP and for documenting the inspections. The City inspector conducts monthly oversight inspections and timely communicates with project managers for any site deficiencies and/or the need for any improvement or enforcement actions.

If there is any public reporting of site issues, the City inspector will coordinate with project managers, who work with contractors, to get the issues resolved timely. The e-Builder system is used for documentation including storage of SWPPPs and tracking the status of the projects.

The City inspector continues to be required to take relevant training on regular base. Project managers will be required to take relevant training when training resources are identified.

Measurable Goals:

- Years 1-5: Track annual numbers: construction sites, submitted SWPPPs and reviews, inspections conducted by the City inspector, enforcement actions, and employees who receive relevant training.
- Years 3-5: Provide training and/or education opportunities to project managers.

Responsible Offices:

- KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.
- City's Office of Environmental Quality provides staff resource.
- All City departments that have construction projects – Aviation, Public Works, Parks & Recreation, General Services and KC Water provide staff resource.

Iterative process:

Regularly review whether there is any public reporting of on-site issues, review monthly inspection results to determine whether there is a pattern of issues, such as multiple issues with one individual project, or single or

multiple issues with multiple projects by one project manager or one contractor, and make improvements by focused education.

5.4 BMP 2 – Implement and Enforce Erosion and Sediment Control for Private Projects

Developers will continue to be required to submit site disturbance plans to the Land Development Division, and obtain the land disturbance permits from the State. The Land Development Division will continue to be responsible for reviewing the site disturbance plan and providing review comments.

The land disturbance activities will continue to be required to adhere to both the City’s approved site disturbance plan and the State permit requirements, including the developer or his designee conducting regular site inspection and keeping inspection records. City inspectors from the Land Development Division will continue to conduct site inspection, document inspection result through CompassKC, and communicate with the site managers for resolution of issues identified.

Measurable Goals:

Years 1-5: Track the annual numbers: construction sites, reviews of submitted site disturbance plan, inspections conducted by City inspectors.

Responsible Offices:

City Planning & Development Department through the Land Development Division provides staff resource.

Iterative process:

Regularly review whether there is any public reporting on-site issues, review inspection results to see whether there is a pattern of issues, such as multiple issues with one individual project, or single or multiple issues with multiple projects by one contractor.

6. Post-Construction Stormwater Management in New Development and Redevelopment

6.1 Permit Requirement

- a. The permittee shall develop, implement, and enforce a program to address the quality of long-term stormwater runoff from new development and redevelopment projects that disturb one or more acres or disturb less than one acre when part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project. This program shall ensure that stormwater controls are in place that have been designed, developed, and implemented to minimize water quality impacts. This program, at a minimum, shall include:
 - i. Ordinances or other regulatory mechanisms to address post-construction runoff from new development and redevelopment projects to the extent allowable under state or local law. If the permittee needs to develop an ordinance or mechanism, the permittee shall describe the plan and a schedule for implementation. If the permittee’s ordinance or regulatory mechanism is already developed, the permittee shall include a copy of the relevant sections within the SWMP;
 - ii. A plan to ensure adequate long-term operation and maintenance of selected BMPs, including types of agreements between the permittee and other parties (e.g., post-development landowners, regional authorities, etc.);
 - iii. Strategies developed with the purpose to minimize water quality impacts, minimize the creation of stormwater pollution, and/or utilize BMPs that remove or reduce stormwater pollution that include

- a combination of structural and/or non-structural BMPs appropriate for the permittee's community. In developing these strategies, the permittee shall consider:
1. The assessment of site characteristics at the beginning of the development design phase to ensure adequate planning for stormwater program compliance;
 2. The development and implementation of a stormwater design criteria manual to contain standard sustainable site design criteria and BMP selection and design criteria to reduce water quality impacts;
 3. Buffer criteria for streams and other environmentally sensitive areas;
 4. Provisions for preservation of undisturbed natural areas, trees, and steep slopes, when feasible;
 5. The development of floodplain management controls to minimize pollution with floodplain management controls; and
- iv. Inspect or require the inspection of post-construction BMPs that functions to remove or reduce pollution of stormwater and ensure that all BMPs are implemented and effective.

6.2 Compliance Strategy

- a. The City's Zoning and Development Code entails the Stream Buffer Regulations, and the Open Space Developments and Conservation Developments Regulations. The intents of these two components are for better protection of life and property, to promote more open space and greater natural resource protection, and to promote healthy stream corridors while providing flexibility and development options in stream corridors and City-wide. Both regulations apply to new development and redevelopment. The Stream Buffer regulations also apply to construction and infrastructure projects near streams.

New development and redevelopment are also required to adhere to the City-adopted American Public Works Association (APWA) Standards and supplements, including the Manual of Best Management Practices (BMPs) for Stormwater Quality. The purpose of such a requirement is to mitigate the impacts for post-construction above pre-development conditions by including permanent water quality BMPs, buffers, and maintenance instruments.

- b. In November 2019, City Council passed Resolution #190760, which provided direction to implement the Green Stormwater Infrastructure (GSI) Manual. The GSI Manual was designed by KC Water to guide the developments of future of stormwater management infrastructure. The manual provides the tools, design guidelines, construction specifications, as well as establishment and maintenance procedures for green infrastructures. The link to the manual is: <https://www.kcwater.us/wp-content/uploads/2020/01/KCMOGSISManualAugust2018-2.pdf>
- c. The City adopted the Urban Tree Master Plan in February of 2020. The plan outlines the value and services provided by trees in Kansas City, assess the sustainability of the City's existing urban forest, convey a vision and mission for the future urban forest, and puts forth 10 strategies for action on how to achieve that vision. The adoption of the plan is to help the City to combat the impact from the ongoing climate changes, and promote, preserve and create a sustainable urban forest for the benefit of all residents of the City. Additionally, trees intercept overland flow, and help to reduce the amount and to improve the quality of stormwater runoff.

In March 2021, the City passed an administration regulation titled Tree Canopy Preservation & Expansion. The regulation provides policies and procedures for tree removal and replacement with City property and City right-of-way and expand the tree canopy based on the recommendations in the Urban Forestry Master Plan and the City's Climate Protection Plan.

- d. While the Stream Buffer regulations and the Open Space Developments and Conservation Developments Regulations, the BMP Manual, as well as the recent GSI Manual and Tree Preservation Regulation, provide a guidance for stormwater management during the initial planning phase of a development and the actual construction of a project, the general procedure to process an application for a development is as follows.

The City Planning & Development Department requires macro/micro stormwater drainage study for a development. A developer must submit a stormwater drainage study for a plat application as required by the City Code Chapter 66, Section 43 Preliminary plat and Section 45 Review of final plat by City Council. A general stormwater management plan must be submitted for the entire development when the preliminary plat is submitted. The plan must depict the concept for stormwater detention, BMPs, volume controls, or treatment areas as appropriate. A macro/micro drainage study must be submitted for the entire development when the first plat is submitted; a detailed micro drainage study must be submitted for approval before the issuance of any building permits; a macro storm drainage study for the entire development must be submitted with a micro stormwater drainage study for each phase during final platting. Adherence to Stream Buffer Standards and BMP manual is required. KC Water – Stormwater Engineering Division reviews both stormwater drainage studies and stormwater management plans, and provides review comments to the Land Development Division of City Planning & Development Department.

- e. For development/re-development and construction on flood hazard areas, there is an additional permit and review process. City Ordinance Chapter 28 addresses Floodplain Management. It requires that a floodplain development permit shall be obtained for all proposed development, including substantial improvements to existing structures, within any area designated as a ‘Special Flood Hazard Area’ by the official floodplain document. Article IV. Provisions for Flood Hazard Reduction Sec. 28-51, sets the general standards for storage or processing of materials including hazardous material, and storage of equipment.

City Planning & Development Department is responsible for floodplain development and construction permitting. KC Water provides technical assistance during the reviewing process of a permit application, adhering to City Code Chapter 28.

- f. The City adopts various approaches to ensure adequate long-term operation and maintenance of selected BMPs. For new development or redevelopment-related BMPs on private properties, City Planning & Development Department continues to use three covenants applicable to stormwater BMP maintenance scenarios: Stormwater Detention Covenant for Maintenance; Stormwater Detention & BMP Covenant for Maintenance; and Conveyance of Easement for BMPs. These documents require developers or property owners to take responsibility for maintenance, repair, and restoration of detention basins or BMP structures.

For new development or redevelopment-related BMPs on public properties, the maintenance responsibility may lie on the individual department which owns or operates the property, KC Water Green Solution Team, KC Water’s contractors, home owner associations, or other agencies or groups, depending on the initial agreement set when the project was constructed.

For projects built under the Smart Sewer Program (previously called Overflow Control Program), the BMPs are generally maintained for the first three years by the contractors that build the projects, and then they are subsequently maintained by the KC Water Green Solutions crew, KC Water contractors, or other parties. In occasional cases, the maintenance responsibility may be taken over by the property owner or third party, depending on the initial agreement.

For BMPs built through other stormwater projects (e.g., funded by City’s Public Improvement Advisory Committee), the KC Water Green Solutions crew or private entities may be responsible for maintenance, depending on the agreement set between KC Water and property owners prior to the construction.

6.3 BMP 1 – Implement and Enforce All Relevant City Ordinances

The City will continue to implement and enforce the Zoning and Development Code, which contains the Stream Buffer Regulations, and the Open Space Developments and Conservation Developments Regulations. The Land Development Division of City Planning & Development Department continues to require developments’ adherence to the adopted APWA Standards and Supplements that include the BMP manual for Stormwater Quality, and compliance with stream buffer regulations and floodplain management ordinance during the initial planning stages of new development/redevelopment, as well as during the construction of the projects.

KC Water will continue to support the City Planning & Development Department's effort to manage and regulate development and redevelopment activities. KC Water – Stormwater Engineering Division will continue to providing technical assistance including BMPs guidance during the plan review and approval process.

Measurable Goals:

Years 4-5: Track the annual numbers of: reviews of development applications, review of construction projects, pre-application development assistance sessions with development stakeholders, review of covenants for Maintenance, and review of stormwater BMP easements.

Responsible Offices:

- City Planning & Development Department through Land Development Division provides staff resource.
- KC Water through Stormwater Engineering Division uses staff designated for urban drainage.

Iterative process:

Review the City's relevant ordinances, standards, and internal plan review process, and make revisions and improvements as needed.

6.4 BMP 2 – Enhance Regulatory Mechanisms to Support Post-Construction Stormwater Management

The City is currently in the process of developing a new Tree Preservation and Enhancement ordinance. The new ordinance will aspire to preserve existing canopy on public properties and private properties for development, establish an internal and external policy, define penalties and require compensatory payments, and include resources for implementation, enforcement, and education.

Goals and Measurable Goals:

- Year 4: Complete the development of the Tree Preservation and Enhancement ordinance.
- Year 5: Track annual numbers: stormwater BMPs installed, and trees removed, pruned, planted, and damaged.

Responsible Offices:

- City's Office of Environmental Quality uses staff designated for leading KC Green Team.
- KC Water through Smart Sewer Division uses staff designated for green infrastructure implementation.

Iterative process:

Review the annual numbers listed in the measurable goals and determine whether the adoption of each ordinance provides a significant environmental impact.

6.5 BMP 3 – Inspect Post-Construction BMPs

For detention basins and stormwater BMPs constructed on City properties, the owner or operator's department takes responsibility for inspection and maintenance. For BMPs constructed under the Public Improvements Advisory Committee (PIAC) funding, KC Water – Green Solutions Team and property owners split the maintenance responsibility.

KC Water is currently compiling an inventory including the stormwater BMPs constructed on City-owned properties. The inventory is mapped in the City's Geographic Information System for tracking and for facilitation of operation and maintenance.

Measurable Goals:

Years 1-5:

- Inspect all stormwater BMPs constructed through PIAC projects, and have them maintained based on the agreement for maintenance responsibility set prior to construction.

Responsible Offices:

- KC Water through the Smart Sewer Division uses staff designated for green infrastructure implementation.
- KC Water through the Stormwater Engineering Division uses staff designated for MS4 compliance.
- All City departments that own or operate on properties that have stormwater BMPs provide staff resource.

Iterative process:

Review the annual numbers listed in the measurable goals, and determine whether any change needs to be made to facilitate field inspection and maintenance.

7. Pollution Prevention and Good Housekeeping for Municipal Operations

7.1 Permit Requirement

- a. The permittee shall develop and implement an operation and maintenance program for municipal operations owned or operated by the permittee. This program shall, at a minimum, include the following:
 - i. An employee training program to prevent or reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance. The permittee shall describe any existing, available material the permittee plans to use such as those available from EPA, the state, or other organizations;
 - ii. Maintenance BMPs, maintenance schedules, and long-term inspection procedures for structural controls to reduce floatables and other pollutants in discharges from the MS4;
 - iii. Controls for reducing or eliminating the discharge of pollutants from street, roads, highways, municipal parking lots, maintenance and storage yards, waste transfer station, fleet or maintenance shops with outdoor storage areas, and salt/sand storage locations and snow disposal areas the permittee operates. The permittee shall, at a minimum, conduct the following:
 1. Store and cover deicing chemicals and implement deicing practices to reduce the discharge of pollutants to the MS4;
 2. Street sweepings or similar activities on curb and gutter streets to MEP, and ensure the proper disposal of the street sweepings;
 3. Street design, construction, and maintenance practices that reduce the discharge of pollutants to the MS4; and
 4. Routinely clean grated inlets, roadway stormwater inlets, and catch basins;
 - iv. Storage of all paints, solvents, petroleum products and petroleum waste products (except fuels) under the control of the permittee shall not be exposed to stormwater. Sufficient practices of spill prevention, control, and/or management shall be provided to prevent any spill of these pollutants from entering waters of the state. Any containment system used to implement this requirement shall be constructed of materials compatible with the substances contained and shall also minimize the contamination of groundwater.
 - v. A plan to reduce pollutants in discharges from the permittee's MS4 associated with the application of pesticides, herbicides, and fertilizers. The plan shall include controls such as educational

activities, permits, certifications and other measures determined appropriate by the permittee for commercial applicators and distributors, and controls for application in public right-of-ways and at municipal facilities.

7.2 Compliance Strategy

- a. KC Water utilizes various venues to provide stormwater-related training and education to its employees across different departments.
 - KC Water hosts speakers to elaborate on stormwater-related special topics in its monthly stormwater coordinating committee meetings. The meetings are attended by management staff from different departments. Topics may include, but not be limited to: the functions, design standards, and regulations of green stormwater infrastructures; the importance of stream buffers, and the MS4 impact on the ecological quality of local streams.
 - Prior to the COVID-19 pandemic, KC Water used DVDs and a classroom approach for stormwater pollution prevention education regarding municipal operations for employees. The DVDs are produced by Excal Visual, and the titles are: *Stormwatch*; *A Drop in the Bucket*, and *Rain Check*. Each DVD is designed for stormwater pollution prevention for employees working outdoors with materials, wastes and operational activities that could potentially impact the quality of the stormwater runoff. Since the pandemic, KC Water obtained the online access to the three videos and is in the process of making the content accessible online to City employees. This move facilitates employee training and solves the challenges caused by the pandemics.
 - The City's Office of Environmental Quality is partnering with KC Water to host training sessions on the topic of sediment and erosion control for land disturbance activities. The training will be for City staff that handle capital projects that include land disturbance activities.
 - The City produces educational videos and makes them available on its YouTube channel. The topics include, but are not limited to, green stormwater infrastructure design recommendations and construction specifications; establishment and maintenance procedures for green infrastructures, and sustainability.
 - City employees are required to take training specific to their individual job responsibilities. Some of the training contents include those that can be helpful for stormwater pollution prevention and control effort, such as Spill Prevention, Control and Countermeasure (SPCC), Parts Washer, and HAZWOPER (Hazardous Waste Operations and Emergency Response).
- b. KC Water inspects both public and private detention basins. Its Preventative Maintenance Division inspects and maintains the public detention basins at 6013 North Strathbury Road, 300 Chestnut Trafficway, 3913 North Kensington Road, Stillwell Avenue, and Gardner Avenue (now a retention basin). Its Stormwater Engineering Division inspects private detention/retention basins for its detention credit program. There are currently 100 basins on the list. Inspection results are shared with property owners or operators for actions.
- c. The City's Public Works Department has deicing chemical and material storage facilities at each of its three districts and two outlying salt storage facilities. The facilities vary in size, and their storage capacities range from 6,000-12,000 tons of materials. Rock salt is stored in dome structures at two locations. The domes were constructed on asphalt slabs and consist of wooden and concrete structural materials, capable of containing deicing chemicals during periods of extended storage. The three additional salt storage facilities are Cover-All buildings with ten-foot high concrete walls constructed on an asphalt slab. Salt brine and calcium chloride solutions are also used as deicing agents for the public streets, and both are stored in tanks.
- d. The Public Works Department is leading the City's snow removal program with the support from other City departments – KC Water and the Parks & Recreation Department. The strategy is to deploy available resources through a smarter and more collaborative effort to improve traffic and passenger safety. In addition, the General

Services Department also sources its deicing chemicals mostly from Public Works Department. The department, through snow plowing and salting, maintains about 160 sites that the City owns to ensure pedestrian safety.

- e. Public Works Department is responsible for street design and construction.
- For street design, the department follows the Kansas City Metropolitan Chapter of the APWA standards with the supplements for all its relevant projects. See <https://www.kcmo.gov/city-hall/departments/public-works/public-works-design-construction-standards>. In addition, Public Works Department is required to comply with the City's Stream Buffer regulation and the recently adopted Green Stormwater Infrastructure Manual and Tree Preservation ordinance in its street design.
 - The department is required to comply with City Code Chapter 63 Erosion and Sediment Control for street construction. See Section 4. for details about requirements for capital projects.
- f. The City uses multiple approaches to keep City streets clean.
- KC Water conducts the Street Sweeping program. The department uses Elgin Eagles for sweeping. With the challenge of the widely sprawling City street network, the City launched an aggressive street-cleaning campaign which includes myKCMO app for residents to request street sweeping. The campaign makes the street sweeping program more effective with public guided targets.
 - The City also provides city-wide Curbside Leaf and Brush Collection services one to three cycles a year. Each household is allowed to have no more than 20 sacks or bundles to place along the curb for City's collection. In addition, the City maintains three Leaf and Brush Drop-off centers for residents to drop off leaves, yard waste, grass clippings and brush (including tree trimmings).
 - KC Water conducts inspection and cleanup of public stormwater inlets on a regular base, as well as per 311 service requests.
- g. The City implements the Environmental Management System (EMS), updated in 2020, as good environmental stewardship for all of its organizational activities. The EMS addresses the management of a variety of chemical products and wastes, which can potentially become pollutants to stormwater runoff. EMS Chapter 5. Chemical Management specifically addresses management of chemicals, including storage of paints, solvents, petroleum-related products. Chapter 6. Waste Management addresses specific requirements for latex paint, used oil contaminated materials, as well as used oil.
- EMS Chapter 5 also addresses: tank management including the requirements for petroleum tanks for spills and overfill prevention, and spill prevention, control and countermeasures (SPCC). Chapter 7 addresses spill prevention and response. It specifies job training and provides clear performance direction.
- The City's Office of Environmental Quality conducted annual inspections at all the sites that are either owned or operated by the City. The inspection is done in compliance with the EMS and tracked in the Archibus Environmental and Risk Management System (Archibus). An automated report is generated monthly to provide a summary of environmental compliance recommendations for each department.
- h. There are multiple chapters in the City's EMS that address the application of pesticides, herbicides, or fertilizers (PHFs). Chapter 2 has the language that states pesticides used throughout City facilities and its landscapes, are regulated by the Missouri Department of Agriculture, which certifies commercial, noncommercial, and public pesticide applicators. Chapter 5 specifies that persons engaged to apply pesticides for commercial, noncommercial, private, and public entities are required to be certified, and that City departments that apply for or utilize the services of those who apply PHFs should put into place BMPs to reduce their run-off before and after the products have been applied. Chapter 9 lists chemicals that are not allowed in the storm water system. The list includes herbicides and pesticides.

- i. Several City departments are responsible for managing City sites where pesticides, herbicides and fertilizers may be used. The general strategy is to use lawn chemicals only as needed. City staff and City contractors who apply pesticides and herbicides on City properties are required to be certified.
 - The General Services Department manages about 160 sites including associated lawns and landscaped areas, and does not use lawn chemicals.
 - The Parks & Recreation Department maintains over 12,000 acres of parkland in 220 parks; 135 miles of boulevards, parkways, and streets, and over 100 miles of trails and bikeways. Herbicides and fertilizers are used sparingly and only as needed on specific areas which require a higher level of maintenance.
 - The Parks & Recreation Department also maintains five golf courses by using environmental BMPs and procedures to reduce pesticide and fertilizer usage.
 - KC Water maintains approximately 30 acres of BMP sites and 13.2 miles of levee system.

7.3 BMP 1 – Continue with Multiple Training Efforts

KC Water will continue to host speakers to cover topics related to stormwater quality and pollution prevention in its monthly stormwater coordinating committee meetings.

KC Water will complete the process of making the stormwater training content accessible online to City employees. KC Water will continue to reach out to City employees whose job responsibility may impact the quality of stormwater runoff. The employees may include, but not be limited to crew that maintains park and open space, fleet and buildings, stormwater inlets, and streets.

The City's Office of Environmental Quality and KC Water will co-host training sessions on the topic of sediment and erosion control for land disturbance activities. The training will be for City staff that handle capital projects that include land disturbance activities.

The City will continue to post educational videos on YouTube channel available to the general public including city employees. The City may produce additional educational or informational videos for public access.

The City will continue to require its employees to take training specific to their individual job responsibilities including those courses that can be helpful for stormwater pollution prevention and control effort.

Measurable Goals:

- Years 3-5:
 - 1) Tracking the annual numbers of relevant presentations made in the monthly stormwater coordinating committee meetings; employees who receive online training on stormwater pollution prevention in municipal operations, and employees who receive trainings on SPCC, Parts Washer, and HAZWOPER. Track the total number of views of the relevant YouTube videos.
 - 2) Complete employee training on sediment and erosion control for land disturbance activities.

Responsible Offices:

- City's Office of Environmental Quality provides staff resource.
- KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.
- All City departments that have field crew provides staff support.

Iterative process:

Review the numbers listed in the measurable goals and see whether there is any opportunity to increase each number; check the results from monthly inspection of City's construction sites under capital projects under Section 4, and see whether the incidence of any sediment and erosion control-related issue has decreased.

7.4 BMP 2 – Inspect Public and Private Detention Basins

KC Water’s Preventative Maintenance Division will continue to inspect and maintain the public detention basins at 6013 North Strathbury Road, 300 Chestnut Trafficway, 3913 North Kensington Road, Stillwell Avenue, and Gardner Avenue (now a retention basin). KC Water’s Stormwater Engineering Division will continue to inspect private detention/retention basins for its detention credit program, and will continue to work with property owners or operators to have any identified issues addressed.

Measurable Goals:

Years 1-5:

- Inspect and maintain the listed public detention/retention basins.
- Inspect an average of 20 detention/retention basins per year.

Responsible Offices:

- KC Water through Preventative Maintenance Division provides staff resources.
- KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

Iterative process:

- Review the inspection results and identify any common issues observed with public detention basins and with private detention basins, respectively.
- Seek any public education and outreach efforts for improvement in maintaining the basins.

7.5 BMP 3 – Maintain the Storage Facilities and Improve the Snow Removal Program

The Public Works Department will continue to maintain the storage facilities for deicing chemicals. The department may replace one salt dome with a Cover-all building when funding is available.

The City will continue to improve its strategy to deploy available resources through a smarter and more collaborative effort with the priority for ensuring traffic and passenger safety while adjusting its salting policy. The City’s promotion of stormwater BMPs helps to mitigate the environmental impact from deicing operations.

The Public Works Department will continue to lead the City’s snow removal program with the support from KC Water and the Parks & Recreation Department. The General Services Department will continue to maintain about 160 City sites to ensure pedestrian safety during the winter season.

Measurable Goals:

Years 1-5: Track the annual weights of: different deicing chemicals used by Public Works Department including those applied by other City Departments but sourced from Public Works Department, and deicing chemicals applied by General Service Department but sourced directly from outside vendors.

Responsible Offices:

- Public Works Department through Operations Division provides the services.
- General Services Department through Architectural/Facilities Division uses staff designated for snow removal.

Iterative Process:

- Inspect and evaluate the structures of storage facilities for deicing chemicals, and make improvement if needed.

- Evaluate the salting policy and make improvement if needed.

7.6 BMP 4 – Incorporate BMPs in Street Design and Construction

The Public Works Department’s Capital Projects Group will continue to follow the City’s adopted APWA standards including the BMP Manual, and comply with the City’s Stream Buffer regulation and the recently adopted Green Stormwater Infrastructure Manual and Tree Preservation ordinance in its street design and construction.

For street construction, the Public Works Department’s Construction Inspection Division will continue to proceed with the sediment and erosion control practices as described in MCM 4 for capital project construction.

The Capital Projects Group will continue to review its various relevant standards on a regular basis to seek improvement. The group will continue to consider environmental factors in its project design, and will evaluate alternatives for avoiding or distancing from environmental sensitive areas, including but not limited to natural streams, wetlands, woody areas, wildlife habitats, and steep slopes.

Goal and Measurable Goal:

- Years 1-5: Follow the City’s adopted standards and comply with City’s effective regulations relevant to the reduction or elimination of pollutant discharges from the City’s traffic ways.
- Years 4-5: Track the annual number of BMPs included in street design.

Responsible Offices:

Public Works Department through Capital Projects Division provides staff resource.

Iterative process:

KC Water will evaluate street sweeping and inlet cleaning data to see whether streets designed with BMPs perform better in trapping pollutants including litter.

7.7 BMP 5 – Maintain Roadways and Stormwater Inlets

The City will continue its Street Sweeping program. The City has a routine sweeping plan for all of its streets with curbs and within the combined sewer system area. For the MS4 area with an expansive street system, the City targets the streets as guided by residents reporting through myKCMO app.

The City will continue to provide city-wide Curbside Leaf and Brush Collection services, as well as maintaining its leaf and brush drop-off sites. KC Water will continue to conduct inspection and cleanup of public stormwater inlets on a regular basis, as well as per 311 service requests.

Measurable Goals:

- Years 3-5:
 - 1) For the combined sewer system area – at least two times annually on all streets with curbs.
 - 2) For the MS4 area, street sweeping is conducted the same day for emergency requests and within 48 hours for non-emergency sweeping requests.
 - 3) Provide one or more rounds of Leaf and Brush Curbside Collection services.
 - 4) Maintain the three Leaf and Brush Drop-off sites.
 - 5) Inspect and clean 15,000 stormwater inlets annually.

Responsible Offices:

- Public Works Department through Operations Division provides the service.

- KC Water through Stormwater Preventative Maintenance Division provides staff resource.

Iterative process:

- KC Water will keep track of both its street sweeping and inlet cleanup programs on monthly basis.
- Public Works Department will keep track of its Leaf and Brush programs on regular or seasonal basis.
- The tracking will help to identify areas for improvement in program effectiveness.

7.8 BMP 6 – Implement and Enforce the EMS for City Operations

The Office of Environmental Quality will continue to conduct annual inspections at all sites that are either owned or operated by the City to ensure all site activities are in compliance with the 2020 EMS. The inspection will continue to be tracked in the Archibus. Follow up with each department will be tracked and addressed on monthly basis.

Measurable Goal:

Years 1-5:

- Inspect all City sites on annual basis following the effective EMS, and track the inspection result in Archibus.
- Follow up with each department about its site management and keep track of the follow-up on monthly basis.

Responsible Offices:

- City’s Office of Environmental Quality uses staff designated for facility inspections.
- All City Departments that have building structures provide staff support.

Iterative process:

The Office of Environmental Quality will evaluate the inspection results and follow up actions on a monthly basis, to ensure all City sites are in compliance with the EMS.

7.9 BMP 7 – Reduce Pollutants in MS4 Discharges Associated with Application of Pesticides, Herbicides, and Fertilizers

The City will continue to require that City staff and contractors who apply pesticides, herbicides and fertilizers (PHFs) on City properties be certified. The City will continue to make efforts to reduce the usage of PHFs, and use BMPs to reduce the environmental impact of application of PHFs.

Goals and Measurable Goals:

- Years 1-5:
 - 1) Ensure that crews engaged to apply pesticides at City sites are certified.
 - 2) Ensure that PHFs are not used, or used sparingly and only as needed at various City sites including those managed by the General Services Department, Parks & Recreation Department, and KC Water.
 - 3) Ensure that City golf courses are managed with an approach of responsible land management and conservation of natural resources.
 - 4) Identify opportunities to adopt BMPs or use environmentally friendly products in lieu of conventional pesticides.

- 5) Track annual numbers of: acres of land that are maintained, restored, or established by Parks & Recreation Department's crews to provide wildlife habitat and contribute to reducing stormwater runoff and water pollution throughout the City, and acres of stormwater BMP sites maintained by KC Water.

Responsible Offices:

- City's Office of Environmental Quality provides staff resource.
- General Services Department through Architectural/Facilities Division provides staff resource.
- Parks & Recreation Department provides staff resources.
- KC Water through Smart Sewer Division uses staff designated for green infrastructure implementation.

Iterative process:

Each department evaluates its practices on regular basis to seek opportunities for improvement in its practices.

8. Industrial and High Risk Runoff

8.1 Permit Requirement

- a. The permittee shall implement a program to monitor and control pollutants in stormwater discharges to the MS4 from industrial and high risk runoff facilities regardless of ownership. The program shall include, at a minimum, the following:
 - i. Identify all of the activities below that discharge into the MS4:
 1. Municipal landfills;
 2. Hazardous waste treatment, storage, and disposal facilities (i.e., Resource Conservation and Recovery Act facilities);
 3. Industries subject to reporting requirements pursuant to Title III Section 313 of the Superfund Amendments and Reauthorization Act of 1986; and
 4. Industrial facilities that the permittee determines are contributing a substantial loading of pollutants to the MS4.
 - ii. Identify priorities and procedures for inspections and establishing and enforcing control measures for such discharges; and
 - iii. A monitoring program for stormwater discharges associated with the facilities listed under Part E.7.a.i.1-4.
 - iv. The permittee shall develop and maintain a list of all municipal operations that are impacted by the permittee's Operation and Maintenance program under Part E.6. – Pollution Prevention and Good Housekeeping for Municipal Operations. The permittee shall include a list of industrial facilities that the permittee owns or operates that are subject to NPDES permits for discharges of stormwater associated with industrial activities that discharge to the permittee's MS4. The permittee shall include the permit number or a copy of the No Exposure Exemption Certification (if applicable) for each facility. NPDES permitted facilities not owned or operated by the permittee are not required to be part of the list.

8.2 Compliance Strategy

- a. The City ceased operations of all solid waste dump sites in 1974. The closed sites were operated by the City during various periods from 1950 to 1974. The 87th Street site is within the boundary of the MS4 area and is thus subject to the MS4 permit. The site has been closed from operation since 1972. The Office of Environmental Quality, in consultation with several departments, continues to monitor this inactive site for

compliance with the MS4 Permit and in general for issues that may pose a threat to public health or safety, threaten environmental protection, or that may create a nuisance condition.

- b. The Office of Environmental Quality established a maintenance program for the City's dump sites. All maintenance activities are geared toward maintaining the integrity of the site cap and minimizing the infiltration of water into the interred waste. The program may include surface waste removal and cap maintenance.
- c. The Office of Environmental Quality performed periodic walk-through inspections for 87th Street site. Visual observations during the inspection include evaluations for: (1) cap integrity and vegetative cover; (2) water ponding on the cap surface of the site; (3) fill material exposure; and (4) evaluate continued active seepage present at this site. The inspection results are documented and further investigations undertaken if warranted.
- d. KC Water maintains an inventory of high-risk runoff sites. The inventory contains various information about each site, such as the company's name, physical address, contact, City inspection dates, NPDES permit number, etc. The listed sites include:
 - i. Hazardous waste treatment, storage, and disposal facilities;
 - ii. Facilities subject to reporting requirements pursuant to Title III Section 313 of the Superfund Amendments and Reauthorization Act of 1986;
 - iii. Municipal facilities whose on-site operation may contribute a substantial loading of pollutants to the stormwater runoff, including those with a State NPDES permit; and
 - iv. All other industrial facilities and commercial sites that KC Water considers may contribute a substantial loading of pollutants to the stormwater runoff.
- e. There are approximately 220 facilities and sites in the inventory in 2021. About 60% of the listed ones are non-municipal facilities, 34% are municipal facilities, and the remaining are commercial sites. The non-municipal facilities may include private industrial facilities, private non-industrial facilities, and federal or state operation sites.
- f. The Inventory includes various information about each site, such as the company's name, physical address, contact, City inspection dates, NPDES permit number, etc.
- g. KC Water has an inspection and enforcement procedure in place for high risk runoff sites. The procedure includes a checklist/recording form, and follow up steps in case issues are identified. The factors considered for setting the inspection priority include: the nature of the site operation, the history of stormwater issues, the length of time elapsed since last inspection, and public complaints. Enforcement action, if needed, shall be taken following the City Code Chapter 61, Article III Sections 61-62 through 61-71.
- h. KC Water – Stormwater Engineering Division is responsible for conducting the inspection program at all the sites on the inventory. The Office of Environmental Quality also conducts annual environmental inspection at all municipal sites, providing additional stormwater inspection.
- i. KC Water's industrial monitoring program consists of four components. The first component is the stormwater runoff monitoring of selected sites. The second component is the collection of stormwater monitoring data generated by those State NPDES permitted facilities. The third component is the Stormwater No-exposure certification by KC Water. The fourth and last part is the Stormwater Self-assessment Program.
 - 1. Each year KC Water targets two to four sites for monitoring at a frequency of one or more rain events. Each of the sites is selected to represent the combined impact of industrial operations on the

- quality of local stormwater runoff. Thus the sites are downstream from a drainage area shared by multiple industrial facilities. The sites may stay the same for years until sufficient data is collected.
2. Field samples are collected at selected discharge points for both *in-situ* visual observation and laboratory analysis. The laboratory analysis includes testing of some general water quality parameters, such as pH and turbidity, and metals. Data is analyzed to help to understand the impact of industrial operations on the quality of stormwater runoff and decide whether additional inspection and outreach shall be conducted to the facilities within the drainage area.
 3. KC Water collects stormwater monitoring data generated by industrial facilities per their NPDES permit requirement on annual basis. The data is collected to help the department understand the impact of individual industrial operation on the quality of stormwater runoff.
 4. KC Water has an established a Stormwater No-exposure certification process for those facilities that do not have a State Stormwater No-exposure certificate, or NPDES permit. A facility may be eligible for such a certificate if its outdoor operation does not pose a significant impact on the quality of stormwater runoff from the site.
 5. KC Water has an established Stormwater Self-assessment Program. The program applies to the facilities without the State or the City's Stormwater No-exposure certificate, or the State's NPDES permit. The program requires that an eligible facility develop and implement a Stormwater Pollution Prevention Plan for its site operation, conduct monthly inspections for its outdoor areas, and submit an annual report to KC Water. Each year there are 15-20 facilities that implement this program.
- j. KC Water also promotes awareness of stormwater pollution among industrial communities by providing education and outreach through classroom training or online training. The DVDs that are used for training municipal employees for stormwater pollution prevention are also used as a tool to train non-municipal employees.

8.3 BMP 1 – Conduct Periodic Site Inspections

The Office of Environmental Quality will continue periodic site inspections at the 87th St. dump site. Visual observations during the inspection include evaluations for: (1) cap integrity and vegetative cover; (2) water ponding on the cap surface of the site; (3) fill material exposure; and (4) evaluate continued active seepage present at this site. The inspection results are documented and further investigations undertaken if warranted.

Goals:

Years 1-5:

- 1) Continue periodic site inspections;
- 2) Consider remedial options and determine a course of action, if necessary, and
- 3) Continue to implement the maintenance plans based on the result of the inspections.

Responsible Offices:

City's Office of Environmental Quality uses staff designated for facility inspections.

Iterative process:

The Office of Environmental Quality evaluates its inspection procedure to ensure the thoroughness of its inspection. Based on its inspection result, it will determine whether its maintenance work is effective and seek improvement if needed.

8.4 BMP 2 – Maintain the Inventory of High Risk Runoff Sites

KC Water will continue to keep the inventory updated regularly by consulting the lists of industrial facilities from other sources, such as MDNR’s Hazardous Waste Program and EPA’s EPCRA (Emergency Planning and Community Right-to-Know Act) Section 313 program; communication with facilities; online search, and other applicable methods. For the facilities including municipal facilities that have State NPDES permits, their permit numbers will be kept updated.

Goal:

Years 1-5: Keep the inventory updated.

Responsible Offices:

KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

Iterative process:

The Stormwater Engineering Division utilizes various sources to update and verify the information in the inventory.

8.5 BMP 3 – Conduct the Inspection Program

KC Water will continue to conduct the stormwater inspection at selected sites. The inspection will be conducted following the established procedure. Follow-up will be made with the facilities when issues are identified. Enforcement action will be taken if needed. The entire process will be documented.

Goal and Measurable Goal:

Years 1-5:

- 1) Inspect a minimum of 30 sites annually;
- 2) Follow up and have identified issues resolved timely, and
- 3) Conduct enforcement as necessary.

Responsible Offices:

KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

Iterative process:

The Stormwater Engineering Division may, if needed, conduct re-inspection with focused target to ensure previous identified issues are resolved.

8.6 BMP 4 – Implement the Monitoring Program

KC Water will continue to work on the four components of the monitoring program:

- Target two to four sites for monitoring at a frequency of one or more rain events by making visual observation of collected runoff samples on site, and having samples tested by the Department’s laboratory.
- Collect stormwater monitoring data generated by industrial facilities per their NPDES permit requirement on annual base.
- Evaluate industrial sites for Stormwater No-exposure certification.
- Continue to work with those facilities that have been implementing the Stormwater Self-assessment program, and continue to evaluate additional industrial sites for the need to have the program in place.

Goals and Measurable Goals:

Years 1-5:

- 1) Track the annual numbers of the sites and the number of rain events that are monitored;
- 2) Track the annual number of the facilities from which stormwater monitoring data is collected;
- 3) Track the annual numbers of the facilities that are certified for Stormwater No-exposure and the facilities that have the certificates, and
- 4) Track the annual numbers of the facilities that have the Stormwater Self-assessment program newly in place, and the facilities that maintains the program.

Responsible Offices:

KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

Iterative process:

The Stormwater Engineering Division keeps track of the issues identified during its inspections and actions taken by facilities to ensure that the same issue(s) does not recur, or if it recurs, a better action course shall be requested. The Division evaluates the monitoring data collected by its own effort and State permitted facilities. If the data results have any indication of issues with any industrial operations, the Division will pursue the investigation. If the data results do not show any issues for a period of time, the Division may consider changing its own monitoring sites.

8.7 BMP 5 – Reach Out to the Industrial Communities

KC Water will continue to provide education and outreach to the industrial communities. KC Water will continue to use the available resources to provide online training to both municipal and non-municipal employees, while exploring other education opportunities or venues.

Goals and Measurable Goals:

Years 1-5: Track the annual numbers of municipal and non-municipal employees that receive the City’s stormwater training.

Responsible Offices:

- KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.
- All City Departments with crew for field operations provide staff support.

Iterative process:

KC Water will keep track of the inspection results for both municipal and non-municipal sites to see whether education and outreach helps the facilities to make improvement to their site runoff management.

9. Flood Control Projects and Devices

9.1 Permit Requirement

- a. The permittee shall develop and implement procedures to assess the impacts on water quality in the design of all new flood control projects that will be associated with the permittee's MS4, including any flood control project that receives stormwater from the permittee's MS4 prior to discharging to waters of the state or discharges to the permittee's MS4. The process shall include considerations of controls that can be used to minimize the impacts to water quality, including adverse physical and hydrological changes, on the water bodies receiving stormwater discharges from the permittee's MS4;
- b. The permittee shall develop and implement an evaluation procedures for existing flood control devices to determine if retrofitting the device to provide additional stormwater pollutant reduction is feasible, respective of both affordability and engineering constraints. The permittee shall establish a prioritized schedule for implementing retrofits of flood control devices owned and operated by the permittee that have been determined to be feasible;
- c. The permittee shall include their procedure or provide means to access their procedure in their SWMP document.

9.2 Compliance Strategy

- a. New flood control projects: The flood control projects in which the City is involved are collaborative efforts with U.S. Army Corps of Engineers (USACE). Project design includes an Environmental Assessment and/or an Environmental Impact Statement(s). The Stormwater Engineering Division of KC Water reviews the designs and provides input on scoping the projects. The project's potential impact on water quality and BMP opportunities are the key elements that the Division considers in the review process.
- b. Existing flood control device: The Stormwater Engineering Division of KC Water re-evaluates the existing flood control devices on regular basis. The review engineers are required to be trained on stormwater BMPs, green stormwater infrastructures, and MS4 permit requirements. During the review process, the review engineers are required to consider BMP opportunities to improve the quality of stormwater runoff and/or stream water, as well as to enhance the habitats for healthy streams and riparian corridors.

9.3 BMP 1 – Assess the Water-Quality Impacts in the Design of New Flood Control Projects

The Dodson Flood Risk Reduction Project completed the construction phase by the spring of 2021. The project is a collaborative effort between USACE and KC Water. The Stormwater Engineering Division helped with scoping the project design during the design phase. The design features relevant to assessment of the water quality impact include: planting of aquatic plants in the detention area located on the river side of the Levee, the planting of native grasses in the detention area located on the land side of the floodwall, and the borrow areas designed to prevent erosion during the construction phase and to function as wetland mitigation with selectively vegetating post the construction. Since the completion of the construction phase, the contractors have been doing planting work as scoped in the design.

The Swope Park Industrial Park Levee/Floodwall is another collaborative effort between USACE and KC Water. The project consists of critical bank stabilization and initiating construction of the levee and east bridge approach. The Stormwater Engineering Division helped with scoping the project design during the design phase. The bank stabilization project protects the stream bank and reduces high

energy scour and debris transport. The project was completed in 2018. The construction of the flood levee system includes the installation of a detention basin which will be vegetated. The detention basin will help to trap debris and sediment, and to reduce bank erosion.

Goals:

- Year 3:
 - 1) Complete the construction of the Dodson Flood Risk Reduction Project and vegetate the areas as designed; and
 - 2) Complete the construction of the detention basin at Swope Park Industrial Park Levee and vegetate the areas as designed.
- Years 4-5: Maintain the vegetation in both Dodson Flood Risk Reduction Project and Swope Park Industrial Park Levee Project.

Responsible office:

KC Water through Stormwater Engineering Division uses staff designated for managing flood-control projects.

Iterative process:

KC Water will assess the performance of the detention basins and identify any weak or deficient spots for improvement.

9.4 BMP 2 – Evaluating Existing Flood Control Devices for Water Quality Retrofitting Opportunities

In 2019, KC Water entered into an agreement with the USACE for the Lower Brush Creek Ecosystem Restoration Feasibility Study in February 2019. Through Section 1135 of the **Water Resources Development Act**, USACE identified the need to modify any portions of Brush Creek between the Paseo Blvd. Bridge and the confluence with the Blue River in order to improve environmental quality and provide ecosystem restoration. The feasibility study is under way. The study will present conceptual designs for ecosystem restoration, provide analysis of the costs, benefits, and environmental impacts of the alternatives, and recommend a selected plan. The City can subsequently elect to partner with the USACE to proceed with design and construction of the selected plan.

The Indian Creek BMP project emanated from a flood mitigation project, in which the City bought out 3.1 acres of flood-damaged commercial properties abutting Indian Creek. Building structures had been demolished, and the asphalt surface been removed. KC Water Stormwater Engineering Division is evaluating design options to convert the area into a green space that will have stormwater best management features and provide a public education venue.

Goals:

- Brush Creek:
 - 1) Year 1: Enter into an agreement with the USACE for the Lower Brush Creek Ecosystem Restoration Feasibility Study.
 - 2) Year 2-5: Complete the feasibility study and seek funding for design and construction.
- Indian Creek:
 - 1) Years 1-2: Complete property buy-out process
 - 2) Years 3-5: Complete project design and initiate construction

Responsible office:

KC Water through Stormwater Engineering Division uses staff designated for managing flood-control projects.

Iterative process:

Upon the completion of the construction phase, KC Water will monitor the performance of the constructed system. KC Water will evaluate other existing flood control devices to explore the potential for water quality retrofitting.

10. Monitoring

10.1 Permit Requirement

- a. Representative monitoring shall be conducted by the permittee on representative outfalls, internal sampling stations, or instream monitoring locations with the purpose of characterizing the quality of stormwater discharging from the permittee's MS4. The monitoring program shall include the following:
 - i. Stormwater samples shall be collected from stormwater discharges from three (3) storm events annually occurring at least 1 month apart;
 - ii. The permittee shall conduct storm event representative sampling at a minimum of six separate locations to be described in the permittee's SWMP. The Department may allow changes to the monitoring locations upon notification to the Department by the permittee in accordance with Part D.5. of this permit;
 - iii. Parameters to be sampled and analyzed or calculated shall include the following at a minimum. The Department may allow changes to the parameters upon notification by the permittee in accordance with Part D.5. of this permit:
 1. Total Suspended Solids;
 2. Specific conductivity;
 3. Chemical Oxygen Demand;
 4. Biochemical Oxygen Demand;
 5. Oil and Grease;
 6. E. coli;
 7. pH;
 8. Total Kjeldahl Nitrogen;
 9. Nitrate + Nitrite;
 10. Dissolved Phosphorus;
 11. Total Phosphorus; and
 12. The Department may require additional parameters along with sampling conditions such as locations, season of sample collection, form of precipitation, and other parameters to ensure representativeness. In the event the Department requires additional parameters to be sampled, the Department will submit an official written request at least one calendar year prior to the expiration date of this permit.
 13. Storm event data records shall be maintained of all analytical results, the date and duration (in hours) of the storm event(s) samples, rainfall measurements or estimates (in inches) of the storm event which generated the runoff that was sampled, and the duration (in hours) between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event.

- b. Biological Assessments. During the life of this permit, the permittee shall conduct macroinvertebrate assessments of two urban streams for a minimum of one year (fall and spring). Before assessments begin, the permittee shall submit a sampling plan for Department approval. The permittee shall use current Department protocols for biological assessments, which are available through Department staff at the Environmental Services Program. The streams that are candidates for assessments and a rationale for the selection of streams for assessments shall be included in the SWMP. Selection rationale should reflect the comprehensive and iterative planning process as specified in 40 CFR 122.26(d)(2)(iv). The results of the assessments shall be included in the annual report and should address identification of water quality improvements or degradation.
- c. Analysis and collection of samples shall be conducted in accordance with methods specified in 40 CFR 136. Where an approved Part 136 method does not exist, any available method may be used unless a particular method or criteria for method sections (such as sensitivity) has been specified in this permit.

10.2 Compliance Strategy

- a. Stormwater Discharge Representative Monitoring:
 - i. KC Water – Stormwater Engineering Division oversees the implementation of the program. It has a sampling plan in place to address the field sampling requirement. The plan lists six designated sites. Stormwater samples are taken from each during three separate storm events annually occurring at least one month apart. Field records are taken for field observation and measurement. Field crews with KC Water Laboratory are responsible for the task.
 - ii. Collected samples are brought to KC Water’s Laboratory for analysis following the Laboratory’s established Quality Manual. Sample analysis includes the parameters specified in the Permit. For the parameter Biochemical Oxygen Demand, which is outside of the Laboratory’s testing scope, a contractor laboratory is used. KC Water Laboratory only contracts with laboratories that have acceptable quality control and assurance procedures. In general, sample collection and analysis are in accordance with methods specified in 40 CFR 136.
 - iii. KC Water Laboratory reviews the data for quality assurance. The final data is archived in the Element LIMS, a laboratory information management system. Stormwater Engineering Division is responsible for compiling data and perform analysis.
- b. Biological Assessments:
 - i. KC Water – Stormwater Engineering Division developed the Kansas City, MO Stream Biological Assessment Plan to address this requirement. The plan was submitted to MDNR for review on September 1, 2021. MDNR provided review comments and revisions were made accordingly. MDNR approved the revised plan on September 10, 2021.
 - ii. The Biological Assessment Plan specifies two rounds of assessments to occur in the spring and fall of 2022. Each assessment will include stream habitat assessment and semi-quantitative macroinvertebrate assessment, which will be conducted at two or more stream reaches. A contracting service will be used to implement the plan.
 - iii. The Biological Assessment Plan presents a list of candidate sites for consideration. These sites were assessed during previous years prior to the issuance of the renewed MS4 Permit. They were selected through joint efforts by the City and MDNR in 2006 and by the City and U.S. Geological Survey Columbia Environmental Research Center in 2011, using the same set of selection criteria, which includes the size of individual drainage area, the perennial stream reaches, dominant riffle/pool habitats and coarse substrate, and the current status of development within the drainage area. The list consists of three control sites and twelve urban-impacted sites.

- iv. The reason for the same sites to be considered for the current permit term is that a consistence in the same targets is necessary for data comparison and time-trend identification. Additional sites outside of the list may be selected, if deemed necessary for better understanding of local stream condition. When extra funding is available in the future, glide/pool predominant habitats may be considered for assessment.
- v. The Biological Assessment Plan also specifies the current MDNR protocols shall be followed.

10.3 BMP 1 – Implement the Stormwater Discharge Monitoring Program

KC Water will continue to conduct the monitoring at the six designated sites following the established sampling plan and the Quality Manual. If there is any change to the sampling locations, the department will send written notification to MDNR and will not make the change until approval is obtained from MDNR.

Goals and Measurable Goals:

Years 1-5:

- 1) Conduct field sampling at each of the six sites during three separate storm events annually occurring at least one month apart;
- 2) Take field measurement and laboratory testing of the collected field samples for 11 parameters specified in the Permit;
- 3) Field sampling and measurement, and laboratory testing shall follow the established sampling plan and the Quality Manual;
- 4) Keep record of all analytical results, the information of the rainfalls during which samples are taken, and field observation.
- 5) Compile the data and conduct analysis on annual basis.

Responsible Offices:

KC Water through divisions of Stormwater Engineering and Laboratory Services provides staff resources.

Iterative process:

Evaluate the data and make data comparison (1) between sites impacted by different land uses, and (2) over a time period (5 -10 years). If any pattern or trend is identified, explore or determine the cause(s) and possible contributing factors, and assess the impact of any BMPs implemented in individual drainage areas. If no pattern or trend can be discerned for a prolonged time period, consider adopting some appropriate BMPs or changing sampling locations.

10.4 BMP 2 – Conduct Biological Assessment at Selected Streams

KC Water will conduct the biological assessment in 2022 following the established sampling plan and relevant MDNR protocols.

Goals and Measurable Goals:

Years 3-5:

- 1) Develop the biological assessment plan and seek MDNR approval by September 30, 2021;
- 2) Select a contracting service to implement the plan by January 15, 2022;
- 3) Conduct two rounds of habitat assessment and macroinvertebrate sampling during the spring and fall of 2022, respectively;

- 4) Complete sample identification by May 31, 2023; and
- 5) Complete data analysis and reporting by August 31, 2023.

Responsible Offices:

KC Water through Stormwater Engineering Division uses staff designated for MS4 compliance.

Iterative process:

Evaluate the data result, examine the impact of MS4 and urban development, and assess the sites for representation of assumed level of urban development.