

CITY OF OMAHA NPDES PERMIT FOR THE MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) NE0133698 2019 ANNUAL REPORT



Submitted by: Environmental Quality Control Division 5600 S. 10 St. Omaha, NE 68107

March 31st, 2020

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<u>Attachment A – Storm Water Management Plan (SWMP)</u>

Attachment B – Omaha Environmental Enforcement Manual

<u>Attachment C – Complaint and Illicit Discharge Investigations</u>

<u>Attachment D – Inlet Marking Activities</u>

Attachment E – Education and Outreach Activities

Attachment F – Education and Outreach Material Inventory

Attachment G – Municipal Facility Forms

Attachment H – BMP Monitoring Plan and 2019 Monitoring Summary

Attachment I – Land Use Map

Attachment J - 5-year Education and Outreach Plan C

Attachment K – Construction Site Inspection Strategy

Attachment L – Post-Construction Complaint Strategy

Attachment M – Municipal Facility Assessment Strategy

<u>Attachment N – Municipal Employee Pollution Prevention Strategy</u>

<u>Attachment O – Municipal Maintenance Activity Descriptions</u>

Attachment P – Industrial Stormwater Compliance Strategy

Report of Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations. See 18 U.S.C. 1001 and 33 U.S.C 1319, and Neb. Rev. Stat. 81-1508 thru 81-1508.02."

James Play	3/30/2020
Signature of Authorized Representative or Cognizant Official	Date
James Kee	EQCD Manager
Printed Name	Title

Introduction

The third Omaha Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit (NE0133698/PCS 999428) was issued by the Nebraska Department of Environment and Energy (NDEE) and became effective on April 1, 2018. The MS4 permit authorizes the City of Omaha to discharge stormwater from all existing City of Omaha owned or operated MS4 outfalls to the Elkhorn River, the Papillion Creek, the Missouri River, and their tributaries subject to the identified limitations and the Storm Water Management Plan (SWMP) as modified. The City's Environmental Quality Control Division (EQCD) oversees the administration of the permit and ensures that the City is in compliance with the permit requirements.

The MS4 permit was issued for a five-year period and expires on March 31, 2023. The MS4 permit identifies the current City of Omaha SWMP. The SWMP requires the City to submit an annual report. In addition, reports will be made available to the public on the Omaha Stormwater Program (www.omahastormwater.org) and Papillion Creek Watershed Partnership web sites (www.papiopartnership.org).

The City of Omaha Departments that participates in meeting the MS4 permit requirements include:

- Public Works Department
 - o Environmental Quality Control Division
 - Street Maintenance Division
 - Sewer Maintenance Division
 - Construction Division
 - Design Division
- Parks, Recreation and Public Property Department
 - o Park Maintenance
 - Golf Operations
- Fire Department
- Law Department
- Planning Department

The City is committed to partnering with several organizations to meet the MS4 requirements in the most efficient manner possible. The major partners are listed below. The City intends to continue developing additional partnerships throughout the permit cycle to meet the permit requirements.

- Keep Omaha Beautiful (KOB)
- Papillion Creek Watershed Partnership (PCWP)
- Douglas-Sarpy County Extension Office
- Papio-Missouri River Natural Resource District (P-MRNRD)
- University of Nebraska at Omaha

This report satisfies the annual reporting requirement and covers the calendar year from January 1, 2019 through December 31, 2019. The report is laid out as follows: the program minimum control measures (MCMs) are shaded, the permit requirements are underlined, and the City's description of permit compliance is in plain text.

A. Public Education & Outreach

1. BMPs 1, 3, and 4: Develop a plan for outreach that defines the goals, objectives, target audience and distribution process of materials for the public education and outreach program.

Target Goals & Implementation Schedule: Year 1 – Develop a 5-year education and outreach plan. Years 2-5 – Review and update the plan each permit year and include the revised plan in the Annual Report.

The City of Omaha developed in 2019 a 5-year education and outreach plan. The plan outlines the program goals, target audiences, distribution methods and strategies, tracking, and assessment. Education and outreach efforts have continued throughout 2019. The plan in located in <u>Attachment J</u>. Below is summary of those efforts.

Outreach Events and Material Distribution

In 2019, The City of Omaha Stormwater Program conducted 64 outreach events with the public, schools, commercial companies, and community organizations with 15,145 attendees. Total materials distributed at these events was 7,316. The City also continued to contract with Keep Omaha Beautiful, Inc. (KOB) in 2019 for stormwater education and outreach and to distribute educational information. KOB conducted 202 outreach events with 8,771 attendees. Total materials distributed at these events was 4,565. The table below summarizes these totals.

Outreach Events & Materials			
	Events	Attendees	Materials
Omaha Stormwater	62	15,145	7,316
KOB	202	8,771	4,565
Total	264	23,916	11,881

Topics at these events ranged from general stormwater education to rain barrel workshops to information on green infrastructure. A summary table of these education and outreach events can be found in <u>Attachment E</u>. Two of these events, the Sediment and Erosion Control Seminar and World O! Water, and other Education and Outreach efforts are described in further detail below.

The City of Omaha Stormwater Program worked with the Papillion Creek Watershed Partnership (PCWP), Papio-Missouri River Natural Resource District (PMRNRD), Douglas County Environmental Services, and the Nebraska Department of Environmental Quality (NDEQ) to present the annual Sediment and Erosion Control Seminar on February 7th, 2019. There were 281 people that attended the seminar. Presentations at the event included:

- Stormwater 101 Why we do what we do, grading permit basics, & other highlights from past year
- Omaha CSO Program Update
- Omaha Stream & Stormwater: Tracking, Categorizing, Prioritizing, & Implementing Stormwater Capital Improvements
- NDEQ Construction Stormwater Permits & Enforcement
- Panel Discussion: SWPPP Development & Enforcement

The World O! Water Festival was held on September 7th, 2018 from 12 PM until 4PM at Wehrspann Lake / Chalco Hills Recreation Area. There were approximately 45 organizations that participated by handing out information, conducting an activity or providing demonstrations. Approximately 1,900 visitors attended the event. Topics included water stewardship, recycling, water quality, and water conservation. Activities included a watershed pollution demonstrative model, canoe rides, nature hikes, and science experiments. This was the 15th successful year the event was held.

In 2019, the Omaha Stormwater Program distributed a total of 7,086 outreach materials and KOB distributed 4,565, for a total of 11,651 at outreach events. The materials distributed covered topics concerning stormwater pollution, litter reduction, household hazardous waste, and more. An inventory of all outreach materials is provided in <u>Attachment F.</u>

In addition to the distribution of educational brochures and public outreach events, Keep Omaha Beautiful, Inc. coordinated several public service announcements (PSAs) and other information regarding stormwater pollution through radio, print, websites, social media, and other means such as e-newsletters in 2019. In total there were 252 PSA's with the breakdown by type provided in the table below. Topics and events addressed by these spots included stormwater pollution prevention, proper firework disposal, World O! Water, and storm drain marking.

PSA's	
Radio spots	10
Print ads	2
Television spots	34
Social media	195
E-News	11
Total	252

Website

The City of Omaha Stormwater Program website is <u>OmahaStormwater.org</u>. The website provides many resources for stormwater management and is organized generally by target audience: residential, commercial, construction, and industrial. From the website homeowners can learn of what they can do at their home to manage stormwater runoff. Industrial facilities can learn how to apply for a permit as well as entry resources to help them maintain compliance. Developers and engineers can access the necessary documents to apply for Grading Permits and Post-Construction Stormwater Management Plans (PCSMP).

Residents can also access information as to how they can improve water quality by actions they take at home. The Green Infrastructure Education Network was added to the residential section in 2018 and provides information and resources to schools and teachers to incorporate stormwater into the classroom. On the website, the public can also access the City's current MS4 permit, past and current annuals reports, and submit complaints or comments through an online form. The Stormwater Program also maintains a Facebook Page and provides additional communication with the public. Regular status updates sharing facts on stormwater, demonstration projects, and other related information were posted and helped to connect them to the Omaha Stormwater website.

In 2019 OmahaStormwater.org had 5,277 visitors with 14,975 total page views. The Omaha Stormwater Program Facebook page had a total reach of 8,547. Tables compiling the monthly breakdown for OmahaStormwater.org and the Omaha Stormwater Program Facebook Page can be found in Attachment E.

Signage

On-site, educational signage has been placed at many of the City's demonstration projects over the past 12 years, including at the UnderTheSink Facility, Orchard Park, Saddlebrook Joint Use Facility, Metropolitan Community College (MCC) Fort Omaha Campus, Creighton Prep, the University of Nebraska Omaha Welcome Center, Benson East Entrance at 58th & Maple, and Dundee Elementary School. One new sign was installed in 2019 at the City of Omaha's Sewer Maintenance Facility, next to the bioretention and permeable pavement systems. The sign describes what the green infrastructure practices are, why they are good strategies for managing stormwater runoff, and the monitoring taking place to assess the project's effectiveness. Smaller, non-site-specific signs for rain gardens and permeable pavement have been developed and can be placed at other City green infrastructure (GI) project sites.

In addition to signage at demonstration projects, fact sheets for City of Omaha GI projects have been developed to share basic information on each project with the community. There are 26 project fact sheets, and these are shared with participants on tours and other outreach events. These GI fact sheets have also been uploaded to the Omaha Stormwater Program's website, OmahaStormwater.org, for public access and linked to their respective projects. Information provided includes photos, background information, and other project details.

Pet Waste Campaign

The City of Omaha Stormwater Program developed and implemented a pet waste campaign in 2009. Advertisements were developed and published in several publications and locations across the city. We continue to use these materials today as part of our education and outreach program. It was a very successful campaign and won the Silver Award in the Total Advertising Campaign category from the Eighth Annual Service Industry Advertising Awards. EQCD provided and distributed pet waste flyers (201) and bag dispensers (1,512) at outreach events in 2019.

This permit requirement is being met.

2. <u>BMP 2: Maintain and update appropriate messages for targeted residential, construction, and commercial issues.</u>

Target Goals & Implementation Schedule: Year 1 – Inventory current outreach materials in each of these targeted areas and develop new materials as needed. Years 2-5 – Provide copies of new outreach materials in the annual report.

The City of Omaha Environmental Quality Control Division has developed many outreach materials over the years. These materials have been inventoried and categorized into the following target areas: residential, construction, commercial, and industrial. In 2019, there were no new outreach materials created. Three materials were translated into Spanish in 2019, the Pet Waste flyer, Grass Clippings brochure, and Water Pollution Comes in Many Forms brochure. All materials are available online at OmahaStormwater.org

This permit requirement is being met.

B. Public Participation & Involvement

1. <u>BMP 1: Provide opportunities for citizens to comment on new rules, ordinances, and regulations regarding the MS4</u>

Target Goals & Implementation Schedule: On-Going All Years – Post on the City Stormwater Website proposed changes to rules, ordinances, and regulations. Provide information in the annual report on approved changes and input received from the public.

There were no changes to rules, ordinances, or regulations in 2019.

This permit requirement is being met.

2. BMP 2: Create opportunities for citizens to participate in the implementation of stormwater controls.

Target Goals & Implementation Schedule: On-Going All Years – Post on the City Stormwater Website opportunities for public involvement in stormwater control related activities.

The City of Omaha Stormwater Program's website is regularly updated throughout the year with information on opportunities for citizens to participate. Events and information include the Sediment & Erosion Control conference, World O! Water festival, proper handling of fireworks debris, and various outreach events. Social media, including Facebook, is used to further advertise the website to a broader audience.

The public is also encouraged to attend the Papillion Creek Watershed Partnership's meetings held regularly throughout the year, to discuss watershed and water quality policies. There were six meetings held in the 2019 calendar year. The following table summarizes the times and attendance for the meetings.

Date	Count	Target Market	Comments
February 8, 2019	14	Partnership Members	Partnership Meeting
February 28, 2019	16	Partnership Members	Partnership Meeting
April 25, 2019	17	Partnership Members	Partnership Meeting
May 23, 2019	15	Partnership Members	Partnership Meeting
September 26, 2019	16	Partnership Members	Partnership Meeting
October 24, 2019	21	Partnership Members	Partnership Meeting

Storm Drain Marking

KOB coordinated neighborhood groups and scout troops in 2019 to mark and clean storm sewer inlets. In total, 3,060 inlets were marked with disks. Inlets were also cleaned during these events, 91 bags of trash and 1 bag of recyclables were collected. Through KOB's coordination, 586 youth and adult volunteers participated in inlet marking, totaling 1,601.25 hours of community service hours. Bilingual "Only Rain Down the Storm Drain" educational door hangers (which highlights HHW and Under the Sink) were distributed to individuals living near storm drains that were marked. A total of 5,448 of these educational door hangers were distributed. KOB also provides inlet marking discs to contractors installing storm sewers in the Omaha area. In 2019, 168 discs were sold to contractors.

Dog Parks

The City of Omaha has partnered with the Omaha Dog Park Advocates by supplying Pet Waste Bag Stations and Pet Waste Bags for the two dog parks in Omaha. The Advocates keep the dispensers supplied with bags and submit a count to EQCD. A total of 105,600 bags were used during 2019.

This permit requirement is being met.

3. BMP 3: Provide access to information about the City's SWMP

Target Goals & Implementation Schedule: On-going All Years – Maintain current City SWMP and MS4 annual reports on the Omaha Stormwater website.

The Omaha Stormwater website is current with the 2018 Annual Report and current version of the SWMP. The website will be updated with the 2019 Annual Report in 2020.

This permit requirement has been met.

C. Illicit Discharge Detection & Elimination

1. BMP 1a: Maintain a compliance plan or mechanism to follow up on illicit discharges.

Target Goals & Implementation Schedule: On-going All Years – Maintain the compliance procedures per the permit requirements.

The City of Omaha's compliance plan is titled the Omaha Environmental Enforcement Manual and is included in <u>Attachment B</u>. This manual describes the City's enforcement goals, process and mechanisms, program priorities, and civil penalty policy. No updates were made in 2019.

This permit requirement is being met.

2. BMP 1b: Maintain a map showing all known MS4 outfalls and the location of all state-designated waters receiving direct discharges from MS4 outfalls.

Target Goals & Implementation Schedule: On-Going All Years – Maintain a continually updated storm sewer system map per the permit requirements.

The City of Omaha's Sewer Maintenance Division is responsible for maintaining and updating the separate storm sewer system map, in addition to sanitary and combined sewers. EQCD utilizes this information to catalogue outfalls and support outfall screening efforts. State-designated waters are maintained by the City's GIS department. They utilize USGS data and LiDAR flown periodically for the City to identify waterbodies and maintain the map layer. GIS map layers of impaired waters are obtained from the Nebraska Department of Environment & Energy (NDEE), http://deq.ne.gov/Publica.nsf/Pages/WAT251. These layers are reviewed and updated as needed.

This permit requirement is being met.

3. BMP 1c: Conduct field screening activities per the permit requirements (set forth in 40 CFR Part 122.26(d)(1)(iv)(D)) specifically geared to local TMDL pollutants of concern such as *E. coli* and to eliminate illicit discharges.

Target Goals & Implementation Schedule: Year 1 – Develop dry-weather screening, sampling, and quality control plan to address pollutants of concern. Conduct screening under current plan during Year 1. On-Going All Years – Annually conduct dry-weather monitoring according to screening and sampling plan.

There were 268 potential outfalls identified by EQCD using GIS information collected by Sewer Maintenance in 2009. In 2019, the GIS information was reviewed to ensure all applicable outfalls are being screened. When potential outfalls are identified, they are classified as new to the outfall inventory for screening. Once screened, the outfalls are then classified as priority outfalls if they are 72" or greater or had a documented illicit discharge, regardless of size. Priority outfalls are screened annually. Outfalls that are documented with an illicit discharge are updated to priority status and screened annually for the next three years. If no illicit discharge is observed in those three years and it is less than 72", its status is updated to non-priority. Annexations of Sanitary & Improvement Districts (S&IDs) can occur periodically. When this occurs, all annexed outfalls are added as new to the outfall inventory for screening. Based on the screening,

they are then classified as being a priority outfall or not. CityWorks asset management software is used to document outfall screening efforts.

All outfall inspections are conducted after 48 hours of dry weather. A Physical Characteristics Examination is completed for each outfall, if flow was present. If an illicit discharge is encountered EQCD Inspectors are to call supervisory staff immediately. Photographs are taken of outfalls to be kept as a record of outfall conditions during the inspection.

Field screening in 2019 has been consistent with previous years. City of Omaha EQCD staff screened all 85 outfalls identified the previous year as priority outfalls. No new outfalls were screened based on the previous year's inspection noting an illicit discharge. There were 23 outfall screenings as a result of the GIS information review. Reviewing GIS information for outfalls not previously screened will continue annually going forward. There were 6 new outfalls from 4 S&ID annexations in 2019, these were not screened in 2019 due to timing of annexations and screening of other outfalls from the GIS information review. They will be screened in 2020. Any outfall with an obvious or suspicious discharge was to be reported immediately to EQCD.

In total, there were 108 outfall screenings. No suspicious discharges were found but 3 outfalls were characterized as potential (two physical characteristics observed) but had low severity index numbers and concluded not to be associated with illicit discharges. Outfall inspections were entered into the City of Omaha's Cityworks asset management system. The inspections were reviewed, and the outfall priority list was updated.

This permit requirement is being met.

4. BMP 1d: Implement procedures to investigate and trace sources of identified illicit discharges to the MS4.

Target Goals & Implementation Schedule: On-Going All Years – Document investigations and include date observed, result of investigation(s), and date closed.

The Omaha Stormwater Program operates a hotline, 402-444-3908, and a reporting form at OmahaStormwater.org to receive complaints from the public regarding stormwater issues, including illicit discharges. An Illicit Discharge Detection and Elimination (IDDE) Standard Operating Procedure (SOP) has been developed and is used to investigate and trace sources of illicit discharges. Inspections and supporting information for each complaint is tracked in CityWorks. A total of 238 complaints were received in 2019 with 165 resulting in being inspected, and 26 having an illicit discharge associated with it. A summary of 2019 complaint investigations that involved illicit discharges is provided in the table below.

Date	Actual	Address	Material Discharged	Resolution
Initiated	Finish			
3/26/2019	5/3/2019	Elmwood Park, West	Unknown	No Action Taken
		of grotto		
3/26/2019	6/25/2019	4651 F Street	Baking flour	RVC - Written
4/2/2019	4/26/2019	2554 Redick Ave	Kitchen grease	RVC - Written
4/18/2019	4/30/2019	8354 Templeton Dr	Pool water	RVC - Verbal

Date	Actual	Address	Material Discharged	Resolution
Initiated	Finish			
4/25/2019	5/1/2019	1903 F St	Sediment, paint chips and miscellaneous fines	RVC - Verbal
5/2/2019	5/17/2019	56th and Howard St	Sanitary sewer flow	Removed Connection
5/9/2019	5/29/2019	2734 S 90th St	Soapy water	RVC - Verbal
5/9/2019	8/23/2019	2520 So 64th Ave	Kitchen grease	RVC - Written
5/14/2019	5/15/2019	3317 S 23rd St	Drywall & paint	RVC - Written
5/15/2019	5/23/2019	2308 S 16th St	Unknown	RVC - Verbal
5/16/2019	6/6/2019	1409 N 21st St	Hydraulic fluid	RVC - Verbal
5/20/2019	6/3/2019	4323 S 16th St	Sanitary flow	RVC - Written
5/22/2019	7/11/2019	6734 Mason St	Pool water	RVC - Written
6/7/2019	6/10/2019	East of Skyline & Harney	Paint	RVC - Verbal
7/3/2019	7/12/2019	8418 Frederick	Concrete washout/slurry	RVC - Verbal
8/1/2019	12/27/2019	4513 S 19th St	Anti-freeze	RVC - Written
8/2/2019	8/7/2019	11016 Mockingbird Dr	Meat testing byproduct	RVC - Verbal
8/8/2019	10/22/2019	8545 Park Dr	Field paint	RVC - Verbal
8/23/2019	8/23/2019	5237 S 24th St	Oil fluid	RVC - Verbal
9/6/2019	11/6/2019	3340 S 105th Ave	Pool water	RVC - Verbal
9/9/2019	9/9/2019	9707 Q St	Dumpster juice	RVC - Verbal
9/20/2019	9/20/2019	7803 Miami St	Sediment	RVC - Verbal
9/20/2019	10/23/2019	S 17th St & Drexel St	Sediment	RVC - Verbal
9/27/2019	10/11/2019	N 148th St & Underwood Ave	Concrete washout	RVC - Verbal
10/7/2019	10/8/2019	7141 N 156th St	Pressure washing parking lot	RVC - Verbal
12/9/2019	12/17/2019	4626 Dahlman Ave	Truck washwater & unknown material in trucks	RVC - Verbal

This permit requirement is being met.

5. <u>BMP 1e</u>: Implement procedures to remove illicit discharges to the MS4. Document all interactions with potentially responsible parties.

Target Goals & Implementation Schedule: On-Going All Years — Use the code enforcement procedures to eliminate unauthorized non-stormwater discharges identified during an investigation.

Chapter 32 of the Omaha Municipal Code is the Stormwater Management Ordinance for the City of Omaha. Article II specifically addresses illicit discharges. Additionally EQCD works with the Planning Department's Plumbing Division to remove illicit connections when encountered. The Omaha Environmental Enforcement Manual, included in Attachment B, describes the City's process and mechanisms to obtaining compliance. A summary of all complaints is included in Attachment C. A summary of all complaint enforcement actions in 2019 is provided in the table below.

Complaint Enforcement Summary			
No Action Taken	51		
RVC - Verbal	82		
RVC - Written	16		
NOV	1		
Forwarded to Adjacent MS4	2		
Forwarded to Other	13		

This permit requirement is being met.

6. BMP 1f: Identify and address allowable non-stormwater discharges determined to be significant contributors to pollutants. Identify any additional non-stormwater discharges that will not be addressed as illicit discharges.

Target Goals & Implementation Schedule: On-Going All Years – Report on any local controls or conditions placed upon exempt non-stormwater discharges and additional identified exempted non-stormwater discharges.

No local controls or conditions have been placed on allowable non-stormwater discharges in 2019. There were no additional allowable non-stormwater discharges identified as non-illicit discharges in 2019.

This permit requirement is being met.

7. BMPs 2 & 3: Coordinate with adjacent permitted MS4s to report illicit discharges to the appropriate authority having jurisdiction and respond to reports from other MS4s.

Target Goals & Implementation Schedule: Year 1 – Develop procedures for coordination with adjacent permitted MS4s. On-Going All Years – Include in the annual report any known illicit discharge reports to and from adjacent MS4s.

The Omaha Stormwater Program operates a hotline, 402-444-3908, and a reporting form at OmahaStormwater.org to receive complaints from the public regarding stormwater issues. These options for reporting complaints and illicit discharges are promoted through the Papillion Creek Watershed Partnership (PCWP). Complaints received by the Omaha Stormwater Program located in adjacent MS4s are forwarded immediately to the Authority Having Jurisdiction (AHJ) for investigating. Complaints received by adjacent MS4s that are in the City of Omaha limits or it's Extra Territorial Jurisdiction (ETJ), are immediately forwarded over to EQCD. The City of Omaha has a Memorandum of Understanding with Douglas County's Department of Environmental Quality and the Nebraska Department of Transportation (NDOT) to coordinate and cooperate on illicit discharge investigations and other stormwater permit-related activities. Through the inter-local agreement with the PCWP, IDDE is identified as a program area of cooperation between members.

A summary of complaints forwarded to adjacent MS4s is included in the table below.

Date	Address	Complaint Type	Adjacent MS4
3/22/2019	4609 Sheridan Road Bellevue, NE	Construction	City of Bellevue
3/22/2019	10106 S 15th St Bellevue, NE	Construction	City of Bellevue

This permit requirement is being met.

8. BMP 4: Maintain written procedures for the IDDE component of the MS4 permit.

Target Goals & Implementation Schedule: On-Going All Years – Make available upon request the standard operating procedures developed under this program component.

The City is maintaining written procedures for the IDDE component of the MS4 permit and will provide a copy of the standard operating procedures developed under this program element upon request.

This permit requirement is being met.

9. BMP 5: Receive reports and complaints, internally and from the public, of illicit discharges and illegal dumping into the MS4. Respond to and investigate complaints about spills, dumping, or disposal of materials other than stormwater to the MS4.

Target Goals & Implementation Schedule: On-Going All Years — Coordinate with others in the City to resolve complaints. Develop a system to generate reports and track the number of calls per year in regard to spills, dumping or improper disposal of materials to the MS4. Include a count of complaints received and investigations completed in the annual report.

The Omaha Stormwater Program operates a hotline, 402-444-3908, and an online reporting form at OmahaStormwater.org to receive complaints from the public regarding stormwater issues, including illicit discharges. In addition to these options, the City of Omaha also operates the Mayor's Hotline, 402-444-5555 and the OmahaHotline.com website for citizen reporting of issues. CityWorks is an asset management system that the Omaha Stormwater Program and other City departments utilized to track complaints received. Notification of complaints relating to stormwater runoff are sent by service requests (SR). Once received, they are reviewed to ensure they are applicable to the Stormwater Program. Complaints not applicable are forwarded to the appropriate City department or outside agency. If applicable, a work order (WO) is created and assigned to an Environmental Inspector who will visit the site, identify the issue(s), work to correct the issue(s) as needed, determine responsible party, and resolve the identified issues.

A total of 238 complaints were received in 2019 with 165 resulting in an inspection by the Omaha Stormwater Program. A summary of the complaints inspected is included in Attachment C. **This permit requirement is being met.**

10. BMP 6: Develop, implement, and maintain a training program for municipal field staff with respect to the IDDE.

Target Goals & Implementation Schedule: Year 1 – Develop a strategy which identifies field staff and appropriate levels of training. Years 2-5 – Provide a count of employees which have received training in the annual report.

The City of Omaha Stormwater Program has developed an IDDE Training Strategy and is available for review. In 2019, there were 17 training events that discussed IDDE conducted by the Omaha Stormwater Program with a total attendance of 282 municipal field staff. At training events, resources about IDDE are made available to staff to learn more and to use at their work locations.

A summary table of these events is included below.

Date	Topic	Attendance #
2/8/2019	2019 Annual Sediment & Erosion Control Seminar	50
3/7/2019	Dry Weather Outfall Screening – EQC Staff	6
4/5/2019	Complaint Inspections Training – EQC Staff	6
4/11/2019	Dry Weather Outfall Screening – EQC Staff	7
6/25/2019	IDDE – EQC Staff	12
8/16/2019	FRCP Training - Park Maintenance D2	7
10/21/2019	FRCP Training - Street Maintenance D2 & Construction	47
10/22/2019	FRCP Training - Street Maintenance D3 & Fleet	28
	Management	
11/6/2019	FRCP Training - Street Maintenance D4	26
11/7/2019	FRCP Training - Elkhorn Street Maintenance & Park	12
	Maintenance	
11/12/2019	FRCP Training – Golf, multiple courses	5
11/12/2019	FRCP Training - Fleet Management	28
12/3/2019	FRCP Training - Traffic & Fleet Management	12
12/11/2019	FRCP Training - Central Maintenance, Park	23
	Maintenance Districts 5 & 6, Fleet Management	
12/12/2019	FRCP Training - Vehicle Impound Lot	9
12/16/2019	FRCP - Street Maintenance District 1	24
12/19/2019	FRCP Training - Park Maintenance D3 & D4, Sewer	20
	Maintenance - Vernon	
12/20/2019	FRCP Training - Sewer Maintenance – Jaynes Street Facility	10

This permit requirement is being met.

D. Construction Site Program

1. <u>BMP 1: Maintain the established program requiring operators of public or private construction activities to comply with local erosion and sediment control requirements.</u>

Target Goals & Implementation Schedule: On-Going All Years – Include any updates to City Code or Permit requirements in the annual report.

The City of Omaha's Environmental Quality Control Division continued to implement the Grading Permit Program in 2018. There were no changes to them in 2019. The Grading Permit Terms and Conditions were updated early 2018 and were rolled out February 1st, 2018 as part of the annual 2018 Sediment & Erosion Control conference sponsored by the City of Omaha. The updates were made to stay consistent with the NDEQ's Construction Stormwater Permit NER160000 that was issued November 1, 2016. The Grading Permit Terms and Conditions are available at OmahaPermix.com and OmahaStormwater.org.

This permit requirement is being met.

2. BMP 2: Maintain a compliance plan or mechanism to follow up on construction site non-compliance.

Target Goals & Implementation Schedule: On-Going All Years – Maintain the compliance procedures per the permit requirements.

The City of Omaha's compliance plan is titled the Omaha Environmental Enforcement Manual and is included in <u>Attachment B</u>. This manual describes the City's enforcement goals, process, program priorities, enforcement and civil penalty policy. No updates were made in 2019.

This permit requirement is being met.

3. BMP 3: Review grading permit applications and maintain a continually updated inventory of all private and public construction sites.

Target Goals & Implementation Schedule: On-Going All Years – Include in the annual report the number and type of grading permits reviewed.

The Public Works Department, Environmental Quality Control Division, reviews the grading permit applications and the associated Storm Water Pollution Prevention Plans (SWPPP). Unless the SWPPP meets the requirements specified in the Omaha Regional Storm Water Design Manual, a grading permit will not be issued. Sites 5 acres or greater are given priority over sites less than 5 acres.

The City of Omaha issued a total of 103 permits in 2019 with 43 permits for sites greater than 5 acres and 60 permits issued for sites less than 5 acres in size. During 2019, there were a total of 505 active permits. The Omaha Municipal Code Section 32-101 (Grading Permit Required) requires owners/operators to obtain a grading permit on sites sufficiently large enough to require an NPDES construction general permit.

This permit requirement is being met.

4. <u>BMP 4: Maintain the electronic records for inspection of construction sites and enforcement of erosion</u> and sediment control measures.

Target Goals & Implementation Schedule: Year 1 – Develop a strategy for site inspections by municipal staff and include in the annual report. On-Going All Years – Inspect construction sites on a regular basis and on a complaint basis. Track the number of sites inspected annually in a database. Initiate enforcement proceedings as appropriate to address violations. Include a summary of inspections completed and enforcement actions taken in the annual report.

The City of Omaha Stormwater Program updated their strategy for site inspections by municipal staff in 2019 and has included a copy in <u>Attachment K</u>. EQCD administers the inspection program for Erosion Control, both within the City of Omaha's jurisdiction as well as the Papillion Creek Watershed Partnership's (PCWP) individual member's jurisdiction. The City's Grading Permit Program requires that the owners of active sites assign a Project Inspector to do inspections weekly and after 0.5 inches of rain. In the 2019 calendar year, reports were submitted to an online permitting and reporting website, Permix, by City Inspectors and Project Inspectors for construction. The table below accounts for the reports submitted for sites within the City of Omaha's jurisdiction.

	City Inspection	Private Inspection
	Reports	Reports
Phase I Sites (>5 acres)	600	6,122
Phase II Sites (<5 acres)	526	4,999
Total	1,126	11,121

The first step in the enforcement process is a Request for Voluntary Compliance (RVC). If the site is not brought into compliance, a Letter of Warning is sent to the violator regarding the issue(s) and establishes a timeline for compliance. If the site does not come into compliance by the established timeline, a Notice of Violation is issued and may include a fine. In 2019, there were 256 Requests for Voluntary Compliance (RVC) during City inspections. When a complaint is received regarding a grading permit site, the City Inspector visits the site and files a complaint inspection. There were 66 complaint inspections conducted on 42 grading permit sites, with 32 of those inspections including an RVC. A summary table of Letters of Warning and Notices of Violation, is summarized in the table below.

		Date	Action
Permit Number	Status	Submitted	Taken
OMA20170410-4042-GP1	Resolved	10/1/2018	NOV with fine
OMA-2017-1207-4313-GP2	Not resolved in 2019	7/15/2019	NOV with fine
OMA-20181024-4747-GP1	Not resolved in 2019	12/13/2019	LOW
OMA-20151119-3347-GP1	Not resolved in 2019	12/13/2019	LOW
OMA-20141204-2880-GP1	Resolved	4/26/2019	LOW
OMA-20141219-2899-GP1	Resolved	8/30/2019	LOW

This permit requirement is being met.

5. BMP 5: Provide training for municipal staff with respect to their assigned duties as it relates to sediment and erosion control from construction activity. One formal training course for inspection staff during their employment with the City and internal training on an as-needed basis to maintain consistent reporting among all inspectors.

Target Goals & Implementation Schedule: On-Going All Years – Include in the annual report the number of staff and their sediment and erosion control training.

City of Omaha Environmental Inspectors who conduct inspections for sediment and erosion control must enroll and pass the Nebraska Local Technical Assistance Program's (LTAP) Erosion and Sediment Control for Inspectors. The training is a full-day course and includes a test at the end that if passed, the inspector becomes certified. This certification is valid for 5 years. When the certification expires, inspectors enroll for an online course to renew their certification. There are 16 certified inspectors in the City of Omaha's Environmental Quality Control Division (EQCD). A summary of active City inspectors is provided in the table below.

		Certification	Recertification
First Name	Last Name	ID#	Date
Christopher	Anderson	2101	10/4/2022
Casey	Black	848	1/23/2024
Mark	Ermeling	1979	10/5/2021
Neil	Graybill	1333	1/3/2022
Eric	Grimshaw	1261	12/8/2020
James	Kee Jr.	170	9/24/2024
Charla	Long (Shurter)	1666	9/24/2024
Matthew	Nusser	1986	10/5/2021
David	Nusser	924	9/12/2021
Therese	Pogge	172	9/24/2024
Jennifer	Proescholdt	1987	10/5/2021
Jeffrey	Ryba	1353	9/13/2021
Carol	Sorensen	171	9/24/2024
Andy	Szatko	1278	11/30/2020
Christina	Tisko	1476	9/14/2021
Blake	Wagner	3055	9/24/2024

In 2019, EQCD continued to incorporate sediment and erosion control training into the regular monthly safety toolbox meetings. Topics that are covered include review of inspection processes, enforcements, and open discussion to discuss current issues among staff. A summary of 2019 sediment and erosion control training is provided in the table below.

Date	Title	Attendees
1/22/2019	Inspector Training & Safety Toolbox	12
2/26/2019	Inspector Training & Safety Toolbox	15

Date	Title	Attendees
3/26/2019	Inspector Training & Safety Toolbox	11
4/23/2019	Inspector Training & Safety Toolbox	14
5/28/2019	Inspector Training & Safety Toolbox	7
6/25/2019	Inspector Training & Safety Toolbox	11
7/23/2019	Inspector Training & Safety Toolbox	17
8/27/2019	Inspector Training & Safety Toolbox	7
9/24/2019	Inspector Training & Safety Toolbox	12
10/22/2019	Inspector Training & Safety Toolbox	11
11/19/2019	Inspector Training & Safety Toolbox	7
12/17/2019	Inspector Training & Safety Toolbox	11

This permit requirement is being met.

6. BMP 6: Communicate with the regulated community and other groups affected by the Construction Site Runoff program and provide a mechanism to receive complaints from the public.

Target Goals & Implementation Schedule: On-Going All Years — Conduct workshops for developers, builders, site designers, contractors, and/or City staff as determined necessary (i.e., a rule or regulation is changed). Track reports from the public regarding construction sites. Include the number of reports received in the annual report and the permittees response.

Workshops

The City of Omaha holds multiple outreach events with the regulated community, including the events listed in the table below. Outreach materials are handed out at these events and participants are encouraged to visit OmahaStormwater.org for additional information and resources. Phone calls, emails, and many other types of communications happen as part of regular job duties where City staff provide information and resources to support sediment and erosion control efforts in the community.

Date	Event Name	# of Attendees	Location	Details/Comments
2/7/19	Sediment and Erosion Control Seminar	281	Hilton Hotel Downtown Omaha	Annual seminar to construction industry
2/19/19	PCWP Permit Reviewer Meeting	12	MO River WRRF	Review Grading Permit & PCSMP among jurisdictions
3/19/19	MOBA Luncheon	80	Anthony's Steakhouse	Presentation on sediment & erosion control on construction sites, with a focus on home construction sites
4/4/19	MCC Sustainable Leadership Presentation Series	15	Metro Community College - Fort Omaha Campus	Presentation about stormwater, stormwater management, & green infrastructure

Date	Event Name	# of Attendees	Location	Details/Comments
4/9/19	Olsson-Omaha Stormwater GP discussion	4	MO River WRRF	Meeting to discuss questions from Olsson regarding the grading permit
7/11/19	NeFSMA Annual Meeting	20	Arbor Day Lodge, Lincoln, NE	Presentation on City of Omaha Stormwater Program, BMP assessment, lessons learned
9/19/19	Omaha GI Tour	64	Across Omaha	Tour 8 GI sites across Omaha with a focus on operations & maintenance of GI
12/4/2019	E&A SWPPP Inspector Lunch-n-Learn Presentation	10	E&A Office	Presented & answered questions about grading permits & post-construction specific to their SWPPP inspectors
12/10/2019	E&A SWPPPP Designer Lunch-n-Learn Presentation	20	E&A Office	Presented & answered questions about grading permits & post-construction specific to their SWPPP designers
12/12/19	PCWP Permit Reviewer Meeting	12	MO River WRRF	Review Grading Permit & PCSMP among jurisdictions

Complaints/Reports

When a complaint is received regarding a grading permit site, the City Inspector assigned to the site is notified, then visits the site, and files a complaint inspection to document findings. There were 66 complaint inspections conducted on 42 grading permit sites, with 32 of those inspections including an RVC. See BMP 4 in this section for information regarding construction site complaints in 2019.

This permit requirement is being met.

E. Post Construction Runoff Control

1. BMP 1: Continue to implement the Post Construction program as stipulated in the Omaha Municipal Code (OMC). Periodically update guidance material and develop divergent standards for difficult sites such as linear projects. Update as need the Omaha Regional Stormwater Design Manual (ORSDM)

Target Goals & Implementation Schedule: Year 1 – Develop divergent standards for guidance document and update guidance as needed. Submit standards with the annual report. On-Going All Years – Revise as necessary. Include a summary of revisions in the annual report.

The City of Omaha's guidance document for post-construction is titled *City of Omaha Post Construction Stormwater Management Planning Guidance* and was developed in July 2009 and updated in August 2015. In 2019, the document was reviewed by the Omaha Post-Construction Engineer Reviewer as well as Reviewers in the Papillion Creek Watershed Partnership jurisdictions and the design community to solicit feedback on the document. Updates incorporated into the document as a result of this review includes the following:

- Example of a good drainage study report
- Certificate of Occupancy hold letter
- Post-Construction BMP inspection forms
- Updated text to clarify "no adverse impact"

The document is available on the City's website <u>OmahaStormwater.org</u> and <u>OmahaPermix.com</u>. No divergent standards were developed in 2018.

This permit requirement is being met.

2. <u>BMP 2: Review and update, if needed, the standards outlined in the OMC and ORSDM for consistency with required performance standards as they relate to post-construction management plans.</u>

Target Goals & Implementation Schedule: On-Going All Years – Report on any updates to the OMC or ORSDM.

The City of Omaha periodically reviews the ORSDM and guidance based upon feedback from the regulated community. No updates were made to the OMC or the ORSDM in 2019.

This permit requirement is being met.

3. <u>BMP 3: Maintain an online submittal and review process for site plans, easement and maintenance agreements, as-built drawings, deed recordings, and drainage studies.</u>

Target Goals & Implementation Schedule: On-Going All Years – Report number of PCSMP projects and the status of their progress in the annual report.

The City of Omaha reviews proposed post-construction stormwater management plants (PCSMP) for code compliance, functionality, and manageability. The City's online permitting and reporting website, Permix, is used for PCSMP review and approval. Documents that are included in the PCSMP include a drainage

study, proposed plan sheets, applicant certification, maintenance agreement, as-built drawings, BMP certification statement, certification cover sheet, and a certificate of occupancy letter (as-needed). Upon physical completion of the post-construction BMP(s), the PCSMP is recorded with the property deed to ensure long term compliance.

The table provided below summarizes PCSMP projects from 2019. Active projects refer to those projects that are in the document review process or waiting for construction documents to be submitted at the end of 2019.

2019 Omaha PCSMP Projects		
Applications	3	
Active Projects	451	
Document Review	298	
Construction Document	153	
Projects Certified	103	

This permit requirement is being met.

4. BMP 4: Develop SOP's for responding to complaints regarding Post Construction BMPs and a strategy for verifying BMPs are being installed and maintained in perpetuity.

Target Goals & Implementation Schedule: Year 1 – Submit SOPs with the annual report. On-Going All Years – Report on any complaints and/or BMPs which have been certified as complete.

The City of Omaha Stormwater Program has developed a strategy for responding to complaints regarding post-construction BMPs, this is included in <u>Attachment L</u>. In 2019, there were no complaints received regarding certified post-construction BMPs. One complaint was received regarding the City's bioswale demonstration project at 150th and Hillsdale regarding "overgrown weeds". Maintenance is conducted regularly at the site and was verified at the time of the complaint.

The strategy for verifying BMPs are being installed and maintained properly is as follows, excerpted from the *City of Omaha Post Construction Stormwater Management Planning Guidance* document.

Installed

Upon construction completion, all stormwater BMPs that are part of the Final Post-Construction Stormwater Management Plan shall be certified by a licensed professional civil engineer registered in the State of Nebraska or other professional approved by the City of Omaha Public Works Department, the Designer. For BMP Certification, the Designer shall submit the following elements to the City of Omaha Public Works Department.

- Record Drawings of the Final Post-Construction Stormwater Management Plan Sheets
- BMP Certification Document

Maintained

Section 32-124 of the City of Omaha Municipal Code states, "the applicant or owner is required to execute an inspection and maintenance agreement, to be filed on record, binding on all subsequent owners of land served by a private stormwater management facility. Such agreements shall provide for access to the facility, at reasonable times, for inspections by the City or its authorized representative to ensure that the facility is maintained in proper working condition to meet design standards."

Such agreements shall document the responsibilities of the owner, the Home Owner's Association or other responsible party (for Sanitary and Improvement Districts), and the City of Omaha. The maintenance agreement shall be approved by the Public Works Department as part of the Final PCSMP and recorded with the Register of Deeds. A sample copy of the Maintenance Agreement can be downloaded at OmahaStormwater.org.

Maintenance Agreement exhibits shall include the following:

- Exhibit A Real Property Depiction Provide lot certificate or platted subdivision with legal description, or PCSMP plan sheet if that information is contained on the sheet already (11"x17")
- Exhibit B BMP Maintenance Requirements as described in Section 2.5 of this document (See Appendix A also)

This permit requirement is being met.

5. BMP 5: Maintain a database that stores information on approved PCSMPs.

Target Goals & Implementation Schedule: On-Going All Years – Provide an inventory of certified stormwater control measures installed as part of the PCSMP requirements. Include a count of BMP types as well as any known changes to BMPs in the annual report.

In 2019, there were 103 projects with a total of 111 individual BMPs certified in Omaha. These BMPs are summarized by BMP type in the table below. At the end of 2019, there were a total of 1,051 certified BMPs in Omaha's jurisdiction.

2019 Certified BMP by Type	Count
Bioretention System	17
Constructed Wetland	1
Disconnected Impervious Cover	0
Extended Dry Detention Basin	10
Filter Strip	1
Grassed Swale	3
Green Roof	0
Infiltration Trench	0
Level Spreader	0
Manufactured System	27
Other (flow-based)	8
Other (volume-based)	7
Permeable Pavement	3
Permeable Pavers	0
Rain Barrel/Cistern	0
Rain Garden	2
Retention Wet Ponds	0
Roof Drain Filters	13
Sand Filter	0
Soil Conditioning	6

2019 Certified BMP by Type	Count
Subsurface Storage	12
Vegetated Bioswale	1
Total	111

This permit requirement is being met.

6. BMP 6: Inspect sites that are certified by the engineer of record and all sites identified as deficient on a complaint basis. Develop a protocol to bring sites into compliance.

Target Goals & Implementation Schedule: Year 1 – Develop protocol for compliance assistance and inspection strategy. On-Going All Years – Document and maintain inspection records of the certified PCSMP projects as identified in the strategy developed. Document any enforcement actions taken. Summarize activities in the annual report.

The City of Omaha Stormwater Program has developed a strategy for compliance assistance and inspection of post-construction BMPs, this is included in <u>Attachment L</u>.

There were no enforcement actions against a project's PCSMP BMPs in 2019.

This permit requirement is on schedule to be met.

F. Pollution Prevention/Good Housekeeping

1. BMP 1: Maintain an inventory and map of municipal facilities. Review annually and update if needed.

Target Goals & Implementation Schedule: On-Going All Years – Maintain an inventory and map of all municipal facilities.

The City of Omaha Facilities Management Division maintains an inventory of municipal facilities. The Sewer Maintenance Division maintains an inventory of municipal stormwater controls associated with the storm sewer system. The Omaha Stormwater Program maintains an inventory of municipal storm controls associated with stormwater basins and green infrastructure practices. These facilities have been included in the City's GIS system and are readily available for viewing and use.

This permit requirement is being met.

2. BMP 2: Conduct assessments of municipal maintenance facilities and review their municipal runoff control plans as applicable. Revise plans as needed if facilities expand or reduce activities and implement recommendations based on annual inspections.

Target Goals & Implementation Schedule: Year 1 – Develop a strategy to assess municipal facilities and prioritize them based upon a defined set of criteria. Include strategy in the annual report. Years 2-5 – Track the number of assessments for municipal facilities based upon the strategy developed in year 1. Include the number of assessments completed, a description of the assessment procedure and any changes in facilities ranking in the annual report.

The strategy for assessing municipal facilities is included in Attachment M. The City of Omaha employed the services of Felsburg Holt & Ullevig (FHU) in 2009 to develop the current program to assess facilities and assign a score according to the types of daily activities associated with each facility that have potential for stormwater exposure. The score is based on a 30-point scale with a score greater than 20 indicating a "Hot Spot", greater than 10 indicating a "Potential Hot Spot", and less than 10 "Not a Hot Spot". Facilities with municipal activities that present little to no exposure of pollutants to stormwater, such as office buildings and libraries, were removed from the list of sites requiring further evaluation. From the initial evaluation and an ongoing basis, high priority facilities have been prioritized as "Hot Spots", and are audited annually. Facilities classified as "Potential Hot Spots" are audited every two years, and remaining facilities are audited every three years.

Facilities qualifying as "Hot Spots" have a Facility Runoff Control Plan (FRCP) implemented. FRCPs include provisions for general good housekeeping practices, storage of de-icing materials, fueling operations, vehicle maintenance, and equipment and vehicle washing. The Municipal Hot Spot Evaluation Form is included in Attachment G.

The City of Omaha conducted compliance inspections at City Maintenance Facilities where FRCP's had been implemented. The inspections are given an overall score of Outstanding, Satisfactory, or Needs Improvement. The scores were based upon a records and site review. The inspector not only looked to see that facility inspections were being conducted but that any corrective actions that were noted had been addressed in a timely manner. In 2019, the City of Omaha coordinated a total of 29 municipal facility

compliance inspections. 14 inspections were at 12 "Hot Spot" facilities with associated Facility Runoff Control Plans. The other 15 inspections were at facilities with hot spot scores less than 20, primarily public parks/golf courses. In 2019, 5 facilities received a Needs Improvement, 14 facilities received a Satisfactory, and 10 received an Outstanding rating. Copies of EQCD findings were forwarded to the facility and department supervisors.

This permit requirement is being met.

3. <u>BMP 3: Continue to implement Omaha's Good Housekeeping Program for municipal facilities that addresses "high-priority" facilities (hot spot score of 20-30 out of 30) and site specific SOPs.</u>

Target Goals & Implementation Schedule: On-Going All Years – Annually report new, removed, or significantly-updated municipal facilities.

In 2019, there were no new, removed, or significantly-updated municipal facilities.

This permit requirement is being met.

4. BMP 4: Implement practices for maintaining the storm sewer system that includes catch basin maintenance, open channels and other drainage structures, street sweeping, and structural stormwater controls. All maintenance procedures are to be performed such that waste water and waste materials don not enter the MS4.

Target Goals & Implementation Schedule: Year 1 - Provide a description of the maintenance programs in the annual report. On-Going All Years – Annually report on Sewer maintenance activities related to maintaining the storm sewer system and changes to any of the maintenance practices.

Descriptions for City maintenance programs have been compiled and is included in <u>Attachment O</u>. The document is laid out by maintenance activity type with a description of who is involved, the maintenance activity, monitoring, waste disposal, documentation, and training.

Storm Sewer System Maintenance

The Sewer Maintenance Division is responsible for the inspecting, cleaning, repairing and maintaining of the storm sewer system. The Street Maintenance Division is responsible for any creek maintenance cleaning or clearing. They use the same work order tracking system to account for their activities. The table below represents both Divisions' storm sewer system activity for the permit year of 2019.

Work Order Type (Description of Work)	Storm/Storm Combined	Storm	Task Total
Clean FE	0	8	8
Clean Inlet	977	568	1,545
Clean MH	8	14	22
Clean Storm Structure	2	0	2
Dye Test	83	263	346
I-Clean	2	14	16
I-Flared End	1	3	4
I-New	2	3	5

Work Order Type (Description of Work)	Storm/Storm Combined	Storm	Task Total
Inlet Blown Off	2	0	2
Inlet Broken	2	14	16
Insp Structure	561	571	1,132
I-Repair	59	136	195
I-Replace	16	7	23
L/S Locate	55	99	154
MH Blown Off	2	13	15
MH Broken	2	8	10
MH Locate	9	20	29
MH Stolen	3	1	4
MH-Abandon	0	0	0
MH-Clean	1	1	2
MH-New	0	0	0
MH-R/C	2	14	16
MH-Repair	2	38	40
MH-Replace	0	0	0
Odor-Inside	0	0	0
P-Abandon	1	0	1
P-Combo Repair	5	0	5
P-Combo Replace	0	1	1
P-New	0	2	2
Private	5	12	17
P-Sanitary Repair	1	0	1
P-Storm Repair	14	43	57
P-Storm Replace	4	11	15
Street Flooding	3	20	23
Test Hole	0	1	1
TV Assessment	6	2	8
TV Inspection	64	80	144
Unscheduled Jet	19	25	44
Unscheduled Jet Vac	119	85	204
Unscheduled Saw	1	0	1
Vac Facility Pit	0	1	1
ROW Cleanup/Signs	-	-	251
ROW Drainage Mtce	-	-	63
ROW Vegetation Repair	-	-	28
ROW Erosion Repair	-	-	123
Total			4,576

Street Sweeping

There are approximately 4,877 lane miles within the City of Omaha. In 2019, the City mechanically swept a total of 7,967 curb miles. The table below gives a more detailed accounting of the City's street sweeping activities. The street sweeping operation does not allow for debris to be separated by areas of the city.

Area of City	Curb Miles Swept	Tons of Debris Removed
Business District & Major Streets	1,737	1,689
Residential Areas	6,230	4,134
Totals	7,967	5,823

Additionally the City of Omaha's Public Works Department's Parking Divisions mechanically sweeps municipally owned parking structures and lots twice a year, in Spring and Fall. Municipally owned parking structures are also washed twice per year in conjunction with sweeping, practices are used to capture the solids from the wash down which are then disposed of at the landfill.

Inlet Marking

The City of Omaha's standard plate for inlets includes a stamp to indicate it drains to the creek. To mark inlets without that stamp and increase stormwater awareness, the City of Omaha coordinated with Keep Omaha Beautiful to continue to organize groups to mark and clean storm sewer inlets in 2019. In total, an additional 3,060 inlets were labeled with disks, and an additional 168 discs were distributed to contractors to install them as part of storm sewer infrastructure projects. In total, 586 youth and adult volunteers participated, totaling 1,601.25 hours of community service hours. There were 91 bags of trash and 1 bag of recyclables were collected as part of this effort. Bilingual "Only Rain Down the Storm Drain" educational door hanger (which highlights HHW and Under the Sink) were distributed to individuals living near storm drains that were marked. A total of 5,448 of these educational door hangers were distributed.

Date(s) of Service	Location Description [Starting Address]	# of Drains Marked & Cleaned	# of Drains Cleaned (already marked)	# of Door Hangers Distributed	# of Trash Bags Collected	# of Recycling Bags Collected
4/26/2019	Around Mutual of Omaha	32	0	37	3	0
4/28/2019	154th and Fowler	10	3	15	0.5	0
5/5/2019	116th and Harrison	18	4	94	2	0
5/12/2019	Oakbrook Meadows	20	0	40	0.5	0
5/19/2019	Oakbrook Meadows	20	0	25	1	0
5/22/2019	108th and Q	61	16	200	6	0
6/1/2019	South of Leavenworth, west of Saddle Creek, east of 58th	37	7	72	1	0
6/7/2019	Walnut Grove Park area, 144th and Q-F Streets	167	13	313	2	0
6/7/2019	Maple to Blondo, 144th to 150th	32	0	81	3	0
6/5/2019	90th and Fort area	200	0	296	4	0

Date(s) of Service	Location Description [Starting Address]	# of Drains Marked & Cleaned	# of Drains Cleaned (already marked)	# of Door Hangers Distributed	# of Trash Bags Collected	# of Recycling Bags Collected
6/10/2019	Maple to Blondo, 150th to 156th	32	0	81	3	0
6/18/2019	16th-27th Streets north of Cuming	147	0	313	4	0
6/22/2019	Ames to Miami, 39th to 45th	32	15	96	3	0
6/22/2019	Briar Hills (168th and Blondo)	88	0	130	1	0
6/24/2019	33rd-42nd, D St to J St	133	1	230	5	0
6/24/2019	Blondo to Dodge, 90th to 102nd	24	0	75	3	0
7/1/2019	Around Boys Town	17	2	91	2	0
7/20/2019	Around 24th and Spencer	20	0	50	6	0
7/11/19- 7/24/19	183rd and Pacific area	195	0	196	2	0
7/19/2019	195th and Pacific	77	0	113	2	0
7/12/2019	Around Boys Town	62	0	323	6	0
7/15/2019	Around Boys Town	0	0	0	0	0
7/19/2019	Around Boys Town	92	4	245	6	0
7/22/2019	Around Boys Town	13	19	129	3	0
8/4/2019	Near Walnut Grove Park	70	70	240	2	0
8/6/2019	90th and Fort area	28	0	12	0	0
8/24/2019	Cuming Street to Lake St, 28th to 40th	185	2	250	0	0
8/24/2019	Grace St to Sorensen Parkway, 16th-24th	186	0	250	0	0
9/7/2019	Center to Grover, 54th-63rd	36	13	55	3	0
9/21/2019	T Street-Y Street, 32nd-41st	30	0	100	2	0
9/8/2019	S to Madison, 45th-52nd	11	0	59	2	0
9/22/2019	Leavenworth to Woolworth, 56th-65th	34	57	93	3	0
9/29/2019	Leavenworth to Woolworth, 56th-65th	20	34	34	1	1
9/20/2019	Around 90th and Q	20	0	48	2	0
9/1/2018- 10/20/2019	North of Harrison, South of L, from JFK to 49th	597	79	618	0	0
9/15/2019	160th-170th and south of Maple	41	0	130	1	0
10/13/2019	144th and Dodge north	3	0	10	2	0
10/23/2019	160th-170th and south of Maple	90	0	244	1	0
11/9/2019	Oakbrook Meadows / Ambrust	110	0	60	2	0

Date(s) of	Location Description [Starting	# of	# of	# of Door	# of	# of
Service	Address]	Drains	Drains	Hangers	Trash	Recycling
		Marked	Cleaned	Distributed	Bags	Bags
		&	(already		Collected	Collected
		Cleaned	marked)			
	Acres					
	Armbrust Acres, Harvey Oaks,					
	Neighborhood behind					
	Akerman elementary [156-168					
11/17/2019	and Q on north side of Q].	70	0	0	1	0
	Totals	3,060	339	5,448	91	1

Stormwater Structure Maintenance

EQCD inspects City-owned stormwater basins at least once a year with most being inspected twice for any major maintenance issues in early spring and in early winter. Lake James Park was not inspected in 2019 due to active construction, part of the Lake James to Fontenelle Park CSO project. 18th and Avenue H and 14th and Ida basins were not inspected in 2019 because they were underwater as a result of high Missouri River levels. A physical characteristics examination form is completed during the inspection for structures that had flow or were wet. One basin, Pershing 1, had physical characteristics of an illicit discharge in 2019. The source was a storm inlet where kitchen grease was being dumped. Door hangers were distributed to adjacent properties and Sewer Maintenance was notified to clean the inlets.

Maintenance is performed by various City Departments based upon the type of activity required. Most of the City Departments are using CityWorks to track their maintenance activities. Additionally, EQCD employed staff members, one full-time and two part-time employees, who are dedicated to maintaining City owned stormwater BMP structures throughout the year. The table below indicates when the inspection occurred as well as any maintenance issues noted at that time.

Site	Inspection Dates	Sediment Removal	Trash Removal	Tree Removal & Chipping	Mowing	Erosion Repairs
Storz	4/2/2019	Yes	Yes	No	No	No
Expressway (E)	11/4/2019	Yes	Yes	No	No	No
Storz	4/2/2019	Yes	Yes	No	No	No
Expressway (W)	11/18/2019	Yes	Yes	No	No	No
Adams Park	4/8/2019	No	No	No	No	Yes
Lagoon	12/27/2019	Yes	Yes	No	No	Yes
Lake James Park	Park under construction in 2019, part of the Lake James to Fontenelle Park CSO Project					
Fontenelle Park	4/8/2019	No	Yes	No	No	No
Lagoon	12/19/2019	No	Yes	No	No	No
John J Pershing	4/2/2019	Yes	Yes	Yes	No	No
Drive 1.5	11/18/2019	Yes	Yes	Yes	Yes	No

Site	Inspection Dates	Sediment Removal	Trash Removal	Tree Removal & Chipping	Mowing	Erosion Repairs
Miller Park	5/10/2019	No	Yes	No	No	Yes
	11/18/2019	No	No	No	No	Yes
10th & Nicholas	4/2/2019	No	No	No	No	No
	11/4/2019	No	No	No	No	No
13th & Carter	5/10/2019	No	Yes	Yes	No	Yes
Blvd	11/18/2019	No	Yes	Yes	No	Yes
13 & Fowler	5/10/2019	No	Yes	Yes	No	No
	11/18/2019	No	Yes	Yes	No	No
Carter Lake	5/20/2019	No	No	No	No	Yes
	12/13/2019	No	No	No	No	Yes
19 & Carter Blvd	5/10/2019	Yes	Yes	Yes	No	No
	11/18/2019	Yes	Yes	Yes	Yes	No
Ave H 14th & Ida St				uri River levels, t		
John J. Pershing	4/2/2019	No	No	Yes	No	No
No. 1	12/23/2019	No	No	No	No	No
John J. Pershing No. 2	4/2/2019	No	Yes	Yes	No	No
	11/18/2019	No	No	Yes	Yes	No
Gifford Dr. No 1	4/2/2019	No	No	No	No	No
	11/4/2019	No	No	No	No	No
9th & Storz	4/2/2019	No	Yes	No	No	No
	12/31/2019	No	Yes	No	Yes	No
Westlawn	4/8/2019	No	No	No	No	No
Cemetery	12/18/2019	No	No	Yes	No	No
64th Street	4/8/2019	No	No	Yes	No	No
Channel	12/1/2019	No	No	Yes	No	No
Elmwood Park	4/8/2019	No	No	No	No	No
	12/13/2019	No	No	No	No	Yes
Spring Lake Park	4/8/2019	Yes	Yes	No	No	No
- F &	1/ 0/ 2017	105	105	110	110	110

EQCD also inspects City-owned green infrastructure (GI) practices throughout the city. The GI practices were reviewed to ensure they are functioning property and identify maintenance needs. The table below indicates when the inspection occurred as well as an overall condition assessment for the site.

	Inspection	
GI Site	Date	Condition
Country Club	3/26/2019	Satisfactory
Leavenworth LS	3/26/2019	Outstanding
Orchard Park	3/25/2019	Satisfactory
Prairie Lane Park	4/4/2019	Satisfactory
Sewer Maintenance	4/4/2019	Satisfactory
SOIA LS	3/26/2019	Outstanding
The Colonies	4/4/2019	Needs Improvement
50th & Pine	4/16/2019	Satisfactory
Hilton Omaha	4/16/19	Outstanding
SE Police Precinct	12/23/19	Needs Improvement
UTS	7/31/19	Satisfactory
Vehicle Impound Lot	9/5/2019	Needs Improvement
Zorinsky Water Park	4/16/2019	Needs Improvement
24th St Bioretention	4/16/2019	Satisfactory
Douglas Streeetscape	5/17/2019	Satisfactory
Florence Streetscape	5/29/2019	Satisfactory
Saddle Hills	6/3/19	Satisfactory
Saddlebrook	6/20/19	Needs Improvement
58th & Maple	5/15/2019	Outstanding
Fire & Police Training	6/5/19	Needs Improvement
St Phillip Neri	11/8/19	Outstanding
144th St bioretention	12/23/19	Needs Improvement

This permit requirement is being met.

5. BMP 5: Provide training for municipal employees in pollution prevention and good housekeeping.

Target Goals & Implementation Schedule: Year 1 – Develop a strategy for municipal employee training in pollution prevention and good housekeeping. Include strategy in annual report. On-Going All Years – Conduct training events for municipal staff. Include number of employees trained, based on strategy developed in Year 1, in annual report.

The City of Omaha Stormwater Program has developed a training strategy for municipal employees involved in implementing pollution prevention and good housekeeping practices, this is included in Attachment N.

In 2019, training was provided to multiple municipal employees in various departments and divisions including Sewer Maintenance, Street Maintenance, Fleet Maintenance, Parks, and Planning. EQCD staff, including Environmental Inspectors, receive additional training throughout the year on various SWMP-related topics. In 2019, EQCD staff attended or participated in 30 workshops or in-house training sessions. In addition to these events, staff are encouraged to seek out webinars, conferences, and other training opportunity of interest that is stormwater and MS4 related. These opportunities continue to further our municipal employee knowledge and experience on water quality and stormwater management. The following table is a summary of 2019 workshops and in-house trainings for City staff.

Date	Title	Associated Program	Attendees
1/22/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	12
2/8/2019	2019 Annual Sediment & Erosion	Construction, Post-construction	50
	Control Seminar		
2/26/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	15
3/7/2019	Dry Weather Outfall Screening	IDDE	6
3/26/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	11
4/5/2019	Complaint Inspections Training	IDDE	6
4/11/2019	Dry Weather Outfall Screening	IDDE	7
4/23/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	14
5/28/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	7
6/25/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	11
6/25/2019	IDDE - EQC Staff	IDDE,	12
7/23/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	17
8/16/2019	FRCP Training - Park Maintenance D2	Good Housekeeping, IDDE	7
8/27/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	
9/24/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	12
10/21/2019	FRCP Training - Street Maintenance D2 & Construction	Good Housekeeping, IDDE	47
10/22/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	11
10/22/2019	FRCP Training - Street Maintenance D3 & Fleet Management	Good Housekeeping, IDDE	28
11/6/2019	FRCP Training - Street Maintenance D4	Good Housekeeping, IDDE	26
11/7/2019	FRCP Training - Elkhorn Street Maintenance & Park Maintenance	Good Housekeeping, IDDE	12
11/12/2019	FRCP Training - Golf	Good Housekeeping, IDDE	5
11/12/2019	FRCP Training - Fleet Management	Good Housekeeping, IDDE	28
11/19/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	7

Date	Title	Associated Program	Attendees
12/3/2019	FRCP Training - Traffic & Fleet	Good Housekeeping, IDDE	12
	Management		
12/11/2019	FRCP Training - Central Maintenance,	Good Housekeeping, IDDE	23
	Park Maintenance D5 & D6, Fleet		
	Management		
12/12/2019	FRCP Training - Vehicle Impound Lot	Good Housekeeping, IDDE	9
12/16/2019	FRCP - Street Maintenance D1	Good Housekeeping, IDDE	24
12/17/2019	EI Training & Safety Toolbox	Good Housekeeping, Construction	11
12/19/2019	FRCP Training - Park Maintenance	Good Housekeeping, IDDE	20
	D3 & D4, Sewer Maintenance -		
	Vernon		
12/20/2019	FRCP Training - Sewer Maintenance -	Good Housekeeping, IDDE	10
	Jaynes		

The City's Environmental Quality Control Division and the Parks and Recreation Department have applicators who are required to be FIFRA certified. There are currently 55 certified applicators. All certifications are up to date and are obtained from the Douglas–Sarpy County Extension Office.

This permit requirement is being met.

6. BMP 6: Provide educational material to contractors hired to perform maintenance activities on the MS4.

Target Goals & Implementation Schedule: Year 1 – Develop materials to provide to contractors and include in the annual report. Years 2-5 – Include in the annual report any new materials or updates to existing materials.

In 2019, there were no new outreach materials or updates to existing materials. City of Omaha personnel conduct most of the maintenance activities on the MS4. If an outside party is hired to complete maintenance activities, educational materials are available to share with the contractors to educate them on stormwater controls, good housekeeping practices, and maintaining compliance with applicable permits.

This permit requirement is being met.

G. Industrial Facilities

A. <u>BMP 1: Maintain a program that identifies industries within the MS4 area that fall into sectors identified in the ISW- NPDES permit.</u>

Target Goals & Implementation Schedule: Year 1 – Develop a strategy that will identify industries and their compliance with NPDES permits. On-Going All Years – Review and update strategy developed in Year 1 and report on any changes in the annual report.

The City of Omaha Stormwater Program has developed a strategy to identify industries and their compliance with NPDES permits, this is included in Attachment P.

This permit requirement is on schedule to be met.

2. BMP 2: Request a list of permitted facilities and the NOI from NDEQ in January of each permit year.

Target Goals & Implementation Schedule: On-Going All Years – Maintain a database to track NPDES permitted facilities.

In January 2019, Omaha requested and received from the NDEE a list of industries in Omaha permitted under the NER910000 ISW-GP. 140 facilities were included on this list. The GIS database was updated with this list of facilities.

This permit requirement is being met.

3. <u>BMP 3: Inform industries about the NPDES ISW permit and notify the state when industries are not in compliance with the state regulations.</u>

Target Goals & Implementation Schedule: On-Going All Years – Develop industry-specific publications regarding NPDES regulations and distribute to inspected facilities.

The City of Omaha Stormwater Program has 22 sector-specific information sheets, brochures, and additional information regarding industrial stormwater on the Industry pages of OmahaStormwater.org. The website also has the ISW-GP NER910000 permit and FAQs to help industries with maintaining compliance.

Outreach to Omaha industries has continued in 2019 to update industries that the City of Omaha's Industrial Stormwater Program is focused on ensuring compliance with the NDEE's ISW-GP. Industries that call or email the Omaha Stormwater Program are informed about the NDEE's ISW-GP and how to stay in compliance.

No industries in 2019 were referred to the state for not maintaining compliance with state regulations. **This permit requirement is being met.**

4. <u>BMP 4: Inspect NPDES permitted industries from a list provided by NDEE in January of each year.</u>
<u>Maintain a tracking system for inspections and SWPPP reviews. Review SWPPP or NEC prior to completing an inspection.</u>

Target Goals & Implementation Schedule: On-Going All Years – Inspect 20% of the facilities on the list provided by NDEE each year so that all industries are inspected once in the permit cycle.

In January 2019, Omaha requested and received from the NDEE a list of industries in Omaha permitted under the NER910000 ISW-GP. There were 140 facilities were included on this list. E&A Consulting Group (E&A) and SCS Engineers (SCS) were contracted to assist the City with inspecting industrial facilities in 2019. Inspectors from these firms have extensive experience with industrial stormwater regulations and performing inspections. The inspection form they used as part of their inspections was provided to them from the Omaha Stormwater Program and was developed to be consistent with the NDEE's inspection and capture necessary information to assess compliance. A total of 28 facilities were inspected for compliance with the NDEE ISW-GP NER910000. The 28 inspected facilities represent 20% of the 140 NDEQ ISW-GP permitted facilities in Omaha, see summary table below.

Program_ID	Permit Type	Facility Name	Address	Inspection date	Report Sent
63303		Hawkins Construction	5506 South 60th	7/3/2019	
	Industrial	and Demolition Waste	Street		
	Stormwater	Disposal Area			8/30/2019
50008		Omaha Printing	4700 F Street	7/22/2019	
	No Exposure	Company			8/30/2019
17409		Ready-Mixed Concrete	700 Seward Street	7/9/2019	
	Industrial	Company - 7th and			
	Stormwater	Seward Plant			8/30/2019
19905		Town Delivery, Inc.	2615 North 11th	7/1/2019	
	No Exposure		Street		8/26/2019
63339		United Auto Recyclers	5702 South 60th	7/30/2019	
	Industrial	(also goes by: Hansen's	Street		
	Stormwater	Truck Salvage)			8/30/2019
85394		Advanced Prosthetics	9109 Blondo Street	7/8/2019	
	No Exposure	Center, LLC			8/26/2019
65115	Industrial	Concrete Supply -	20395 Ohio St.	7/31/2019	
	Stormwater	Elkhorn			9/12/2019
50963	No Exposure	Epsen Hillmer Graphics	13748 F Street	7/19/2019	8/26/2019
84686	Industrial	Phillips Manufacturing	4949 South 30th	7/26/2019	
	Stormwater	Company	Street		8/30/2019
10328	Industrial	Wynne Transport	2222 N. 11th St	8/28/2019	
	Stormwater	Service, Inc			10/1/2019
14471		Mi Mama's Tortillas,	828 South 17th	7/11/2019	
	No Exposure	LLC	Street		10/2/2019
10504		Omaha World-Herald	1398 Capitol	8/13/2019	
	No Exposure	Freedom Center	Avenue		10/7/2019
83668		Ready-Mixed Concrete	848 North 192nd	7/10/2019	
	Industrial	Company - Elkhorn	Street		
	Stormwater	Plant			11/4/2019
10489	Industrial	Skylark Meats, LLC	4430 South 110th	7/25/2019	
	Stormwater		Street		10/7/2019

Program ID	Permit Type	Facility Name	Address	Inspection date	Report Sent
83034	Industrial	U-Pull-It North Yard	1405 Grace Street	8/16/2019	Bellt
03031	Stormwater	C I dil it i toldi i did	1 103 Grace Street	0,10,2019	10/7/2019
12007	Industrial	BMAKK Corporation,	1440 Read Street	10/30/19	
	Stormwater	Inc.			11/14/2019
63887	Industrial	First Student, Inc.	3333 Keystone	8/6/2019	
	Stormwater	#20898	Drive		10/7/2019
17225		Kruger Commodities	4125 Dahlman	8/7/2019	
	No Exposure		Avenue		10/7/2019
63814	No Exposure	Milko Tool & Die, Inc.	2405 N 11th St	8/2/2019	10/7/2019
63460	No Exposure	Darling Ingredients Inc.	3505 S. 34th Street	8/7/2019	10/24/2019
62772	Industrial	Eco Storage Investments	3701 Dahlman Ave.	8/20/2019	
	Stormwater	Green Acres Recycling			10/28/2019
10257	Industrial	J.F. O'Neill Packing Co.	3120 G Street	8/1/2019	
	Stormwater				10/24/2019
17661	Industrial	U-Pull-It South Yard	5600 S. 60th Street	8/16/2019	
	Stormwater				10/28/2019
99981	Industrial	Conreco, Inc.	4010 D Street	7/24/2019	
	Stormwater				10/24/2019
17411	Industrial	Drake-Williams Steel,	1602 North 11th	8/21/2019	
	Stormwater	Inc.	Street		10/24/2019
10550	Industrial	Nox-Crete Products	1444 S. 20th Street	9/4/2019	
	Stormwater	Group			10/24/2019
13495	No Exposure	Rabe's Quality Meat, Inc.	13075 Renfro Cir.	8/21/2019	10/24/2019
14665	No Exposure	Future Foam, Inc	6425 North 16 Street	8/15/2019	10/25/2019

This permit requirement is being met.

5. BMP 5: Ensure inspectors completing industrial stormwater inspections are competent.

Target Goals & Implementation Schedule: On-Going All Years – Report inspection activities in the annual report.

The City of Omaha Stormwater Program contracted with E&A Consulting Group (E&A) and SCS Engineers (SCS) to perform inspections of industrial sites. Inspectors from these firms have extensive experience with industrial stormwater regulations and performing inspections. Firms contracted to perform industrial stormwater inspections on behalf of the City of Omaha must have demonstrated knowledge, skills, and experience. Omaha Stormwater Program Environmental Inspectors review and edit as needed the reports by the firms prior to sending to the industry. Each Environmental Inspector is adequately trained on the industrial stormwater program prior to reviewing inspection reports or conducting an inspection.

This permit requirement is being met.

H. Stormwater Monitoring

1. BMP 1: Dry Weather Screening.

Target Goals & Implementation Schedule: On-Going All Years – Implement a dry-weather screening of priority outfalls for IDDE following screening and sampling plan. Keep a record of outfalls observed and a record of the field screen results. Follow strategy in SWMP program Component C- IDDE for outfalls showing presence of an illicit discharge. Update priority list based on observations.

In 2019, the City of Omaha EQCD staff inspected all outfalls identified the previous year as priority outfalls. No new outfalls were inspected based on the previous year's inspection noting an illicit discharge. There were 6 new outfalls from S&ID annexations in 2019, these were not inspected in 2019 due to timing of annexations and screening of possible outfalls from the sewer node review, described below. Any outfall with an obvious or suspicious discharge was to be reported immediately to EQCD.

A review was done in 2019 of the Sewer Maintenance sewer nodes GIS layer to ensure all applicable outfalls are being screened. A search query was used to identify those nodes that meet the basic definition of an outfall. These potential outfall points were created on a map and labeled as "new" so they could be easily identified to do a desktop review and on tablets in the field. If the potential outfall did not meet the definition of an outfall, such as a culvert, the GIS point was updated to reflect it is not an outfall. If it did meet the definition of an outfall, a full screening of the outfall occurred. There were 23 new outfall screenings in 2019. Screening of these potential outfalls from this sewer node review is planned to be done in 2020. Going forward, the sewer node layer will be regularly reviewed to determine if there are any new outfalls to be screened.

No suspicious discharges were found but 3 outfalls were characterized as potential (two physical characteristics observed) but had low severity index numbers and concluded not to be associated with illicit discharges. Outfall inspections were entered into the City of Omaha's Cityworks asset management system. In 2019, there were 85 existing priority outfalls and 23 new outfalls were screened, for a total of 108. The inspections were reviewed, and the outfall priority list was updated.

This permit requirement is being met.

2. BMP 2: Develop a wet weather BMP assessment monitoring plan for demonstration BMPs to facilitate future SWMP planning. Evaluate the effectiveness of the selected BMPs. BMP assessment may include flow-based monitoring or water quality sampling. Biological systems may include plant assessments and visual observations. Construct structural BMPs and implement non-structural BMPs to evaluate the effectiveness of their ability to address pollutants of concern. Include in the BMP assessment program in applicable

Target Goals & Implementation Schedule: Year 1 – Revise the BMP assessment monitoring plan and submit to NDEQ for approval. Amend as necessary when new demonstration projects have been constructed. On-Going All Years – Implement monitoring plan in demonstration projects. Report the following in the annual report: (1) The location of the monitoring site, (2) the intensity and duration of the storm event monitored, (3) the time of sampling in comparison to the occurrence of the storm event and to the discharge of peak stormwater flows, and (4) the monitoring data and a summary of the findings.

The City of Omaha Stormwater Program updated their BMP Assessment Monitoring Plan in 2019 and is included in <u>Attachment H</u>.

The City of Omaha continued to implement the BMP Monitoring Plan in 2019 to assess the performance of existing green infrastructure demonstration projects benefits on water quantity and quality. 2019 monitoring is summarized by site below with the full site summaries provided in <u>Attachment H</u>.

Due to security changes and updates to the Campbell equipment software license, data was not able to be downloaded and analyzed for the University of Nebraska at Omaha (UNO) Welcome Center site for this annual report. As of this annual report, coordination is on-going with the monitoring equipment supplier to determine if data can be retrieved. It if can, it will be summarized and presented in the next annual report.

Additional monitoring occurred during 2019 to assess the performance of BMPs at City demonstration project sites. The Program again worked with USGS to assess the peak flow and water volume benefits of the Sewer Maintenance bioretention system. Also, infiltration testing of existing bioretention and rain gardens resumed in 2019. The USGS provided monitoring summary and infiltration monitoring are included in Attachment H.

Saddlebrook

The Saddlebrook green roof and bioretention system continues to perform very well in reducing the volume and peak flows of runoff from the site. Peak flow rate and total flow reduction from the green roof has improved steadily since 2017 indicating the green roof is maintaining, if not increasing, efficiency in controlling stormwater. The City will continue to assess the performance of the green roof and bioretention system in 2020 with no change in what data is being collected.

Orchard Park

Orchard Park continues to function very well in a variety of storm events. Benefits were not fully realized due to the valve for the west bioretention system being mostly open and allowing water to rapidly drain through the system. Monitoring will continue for Orchard Park in 2020 and the bioretention valves will be properly set during deployment of monitoring equipment.

Creighton Prep

Creighton Prep bioretention system continues to function very well in reducing peak flows. Water quality samples taken indicate an increase in concentration for the outflow when compared to the inflow from the parking lot. The bioretention system takes on a significant amount of inflow from other sources in addition to the runoff from the parking lot that is monitored. These areas include the adjacent football field, baseball field, and drainage area to the east up to 72nd Street. These other inflow sources make it difficult to fully assess the water quality benefits provided by the bioretention system. The slide gate valve is also fully open on the underdrain system, allowing it to drawdown rapidly and likely contributing to the increase in concentrations. Monitoring of Creighton Prep will continue in 2020.

Sewer Maintenance

The Sewer Maintenance bioretention system continues to function very well, and are showing ongoing effectiveness in treating runoff pollutants, particularly solids. Efforts in the upcoming year will analyze the discharge from the permeable pavement underdrain as well as the curb cut collecting drainage from the impermeable parking lot for a more in depth look of the system.

Adams Park

The Adams Park wetlands continues to perform as designed and is providing a wonderful amenity for the community and local environment. Maintenance of the site in 2019 transferred from the installation contractor to the City due to the 2-year establishment period ending. Good maintenance has helped the vegetation become well-established across the site. Monitoring of water levels will continue in 2020 and future assessments will start to look at trends over the years.

Albright Park

The Albright Park bioretention system is performing very well overall but due to the gap in the stop logs, the full water quantity benefit of it was not realized. Monitoring of the water level will continue in 2020 and the gap in the stop logs will be addressed prior to monitoring equipment deployment.

This permit requirement is being met.

3. BMP 3: Utilize data collected by others to help assess the effectiveness of BMPs.

Target Goals & Implementation Schedule: On-Going All Years – Gather data from others and include in the annual report with a summary of the findings.

The City of Omaha again partnered with the University of Nebraska at Omaha (UNO) and Omaha Public Schools' Northwest High School in 2019 on a project titled *Evaluating the Infiltratoin*, *Permeability and Pollutant Removal Characteristics of Bioretention Garden Underdrain Systems*. The project came about as part of a service-learning grant UNO received to engage science teachers in Omaha Public Schools in the scientific method by doing real-life research projects. Steve Rodie, Professor, Biology and Environmental Studies, was the project lead, Rachael Burns, Horticulture teacher at Northwest High School in Omaha, was the researcher, Andy Szatko, Stormwater Program Supervisor with the City of Omaha provided technical support. Their report has been included in Attachment H.

This permit requirement is being met.

I. Additional Permit Reporting Requirements

1. Status of MCMs and Associated BMPs

This report satisfies the annual reporting requirement and covers the calendar year from January 1, 2019 through December 31, 2019. The permit was issued April 1st, 2018, as a result April to December represents 9 months of permit year 2.

The City of Omaha continues to implement each of the eight minimum control measures (MCM), maintain associated BMPs of the SWMP, and maintain compliance with the MS4 Permit. Significant efforts were made in 2019 by the City of Omaha Stormwater Program to create and update strategies required in the MS4 permit. These efforts have had a positive effect on reducing stormwater pollution by ensuring consistent education and outreach with multiple target audiences, improving internal workflows, and adaptively managing stormwater controls. See the Evaluation Assessment below for more detailed information on each MCM

2. Proposed SWMP Changes and Revisions

The third Omaha Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit (NE0133698/PCS 999428) was issued by the Nebraska Department of Environmental Quality (NDEQ) and became effective on April 1, 2018. There are no SWMP changes in 2019.

The City annexed the following unincorporated areas in 2019 and would now be considered part of the MS4 Permit coverage area.

				Sq		Annexation
Area Name	SID#	Description	Population	Mile	Acres	Date
Stone Creek Plaza	443	SW 156th & Fort	234	0.06	39.56	7/31/2019
The Willows & Adjacent		NW 168th &	543	0.13	84.24	7/31/2019
Area	496	Blondo St.				
Ranchview Estates,		SE Ranchview Dr	178	0.19	122.21	7/31/2019
Ranch View Estates 3 &		& Pacific St				
Adjacent Area	467					
Avenue One		S of 192nd and	0	0.25	162.06	7/31/2019
	0	West Dodge Rd.				

3. Additional Monitoring Data and Land Use

A land use map was created defining land use based on zoning for the City of Omaha; this has been included in Attachment D. Land use patterns were based on current zoning procedures/practices and used to map areas within the City Limits and within the Extra Territorial Jurisdiction (ETJ). Areas that are not defined with a zoning code, i.e. public roads, are not included in the values provided. Four classifications were used to document current land use patterns including Agricultural, Commercial (including Mixed-

Use), Industrial, and Residential areas. There is approximately 87.89 mi² within the MS4 and 178.8 mi² within Omaha's ETJ covered by the four different classifications, as shown in the table below.

Land Use by Square Mile – MS4 Limits & ETJ

Land Use	Omaha MS4	MS4 % Cover	Omaha ETJ	ETJ % Cover	Total	MS4 % Cover to Total
Agricultural	4.88	5.55%	55.20	33.60%	60.08	8%
Commercial	41.60	47.33%	13.00	30.53%	54.60	76%
Industrial	4.63	5.27%	0.49	2.86%	5.12	90%
Residential	36.78	41.85%	22.22	33.00%	59.00	62%
Total	87.89		90.91		178.80	49%

This permit requirement is being met.

Zoning by Square Mile

Omah	na Only	Omaha and ETJ		
Zone	Sq Mi	Zone	Sq Mi	
AG	5.60	AG	60.74	
AV	4.10	AV	4.32	
CBD	0.00	CBD	0.86	
CC	4.57	CC	5.33	
СН	0.02	СН	0.02	
DR	9.42	DR	33.47	
DS	0.01	DS	0.51	
GC	0.54	GC	1.29	
GI	6.44	GI	10.16	
GO	1.02	GO	1.46	
HI	0.40	HI	2.76	
LC	0.18	LC	0.21	
LI	0.35	LI	0.44	
LO	0.27	LO	0.30	
MH	0.19	MH	0.44	
MU	3.70	MU	5.02	
NBD	0.06	NBD	0.22	
R1	2.64	R1	3.89	
R2	9.62	R2	10.61	
R3	9.56	R3	11.23	
R4	17.13	R4	37.47	
R5	2.92	R5	6.45	
R6	2.84	R6	3.69	
R7	1.36	R7	3.89	
R8	0.43	R8	0.66	
RR	0.84	RR	1.74	
	84.22		207.18	

A literature review of pollutant loads by land use type was conducted in 2017. There were a wide range of values found for several stormwater pollutants including total nitrogen, total phosphorus, total suspended solids, and E. coli. Pollutant load values were reported as either pollutant export coefficients or event mean concentrations. Pollutant export coefficients represent the average total amount of a pollutant loaded into a system annually from a defined area (kg/ha/yr), whereas event mean concentrations estimate the mass of pollutant per unit of volume (mg/L) based on data generated from local stormwater monitoring. In order to calculate total pollutant loads from event mean concentrations knowledge of surface imperviousness for a given land use type and precipitation data for the area must be used. These literature values, while not specific to Omaha, provide a basic assessment of the range of pollutant loading concentrations within the Omaha area based on current land use patterns.

Pollutant Export Coefficients for total nitrogen and total phosphorus and total nitrogen and phosphorus load based on land use type area. The highest and lowest estimates are shown.

		Total Nitrogen (kg/ha/yr)		Total Phosphorus (kg/ha/yr)		Total Nitrogen Load (kg/yr)		Total Phosphorus Load (kg/yr)	
	Area (ha)	Low	High	Low	High	Low	High	Low	High
Agricultural	1,263.35	2.10	79.60	0.26	18.60	2,653.04	100,562.78	328.47	23,498.34
Commercial	10,773.43	1.90	13.80	0.10	7.60	20,469.52	148,673.39	20,469.52	81,878.10
Industrial	1,199.44	1.90	14.00	0.40	4.10	2,278.94	16,792.17	2,278.94	4,917.71
Residential	9,527.08	5.00	7.50	0.77	2.20	47,635.41	71,453.11	47,635.41	20,959.58

Event Mean Concentrations for total nitrogen, total phosphorus, and total suspended solids with the highest and lowest estimates shown.

	Total Nitrogen (mg/L)		Total Phosphorus (mg/L)		Total Suspended Solids (mg/L)	
	Low High		Low	High	Low	High
Agricultural	0.23	41.49	0.08	2.29	19	582
Commercial	0.96	1.8	0.18	0.28	49.6	284
Industrial	0.86	2.9	0.27	0.36	92.2	231
Residential	1.5	5.92	0.38	75	73	299

4. Evaluation Assessment

Environmental Indicators

The City of Omaha continues its efforts to promote and implement green infrastructure practices as an effective means to manage stormwater runoff. BMP assessment monitoring remains a cornerstone of our stormwater program. We continue to update BMP assessment monitoring to better understand how BMPs can be used to improve water quality in Omaha. Monitoring in 2019 again indicated that green infrastructure effectively reduces peak flows and total volume of stormwater and improves water quality. See Attachment H for the summary of 2019 monitoring efforts.

Administrative Indicators – by MCM **Public Education & Outreach**:

BMPs in this MCM have been effective in increasing the public awareness of stormwater issues and what can be done to address them in 2019. The Program continues to successfully distribute education materials and host outreach events that raise stormwater awareness across various audience demographics. Collaboration with Keep Omaha Beautiful (KOB) was excellent and together we reached over 23,000 people in 2019, an increase of approximately 3,000. Similar to 2018, the program had a low social media presence due to many factors including Spring flooding, above average rainfall, and prioritizing other MS4 Permit requirements. KOB provided excellent social media outreach in 2019 with 195 postings that resulted in over one million impressions. In 2020, efforts will continue to utilize the Omaha Stormwater Facebook page and OmahaStormwater.org website and to coordinate with KOB.

Public Participation and Involvement:

BMPs in this MCM have been effective in engaging the public in the implementation of stormwater controls and providing access to information about the City's SWMP and annual reports in 2019. Public participation opportunities continue to be shared by the Program's website and Facebook page. Collaboration with KOB and other community groups via Facebook and their newsletters help to share these announcements. The inlet marking program continues to be a very successful program for Public Participation. In 2019, there were 586 participants that marked and cleaned 3,060 inlets. 5,448 door hangers were placed on nearby residences of these marked inlets for awareness and how they can reach out to be a part of the program. In 2020, the Program will continue to increase exposure of participation opportunities for the public on social media platforms and the OmahaStormwater.org website.

Illicit Discharge Detection and Elimination:

BMPs in this MCM have been effective in eliminating illicit discharges in the MS4 service area. GIS information maintained by the Sewer Maintenance Division continued to be reviewed in 2019 to ensure all applicable outfalls were accounted for and screened. This initial review of GIS information will be completed in 2020. Going forward, regular review of the Sewer Maintenance GIS information will occur. Complaints received by the Program continues to utilize the Cityworks asset management software and has been very beneficial in streamlining documentation and tracking of all complaints, including those that involve an illicit discharge.

Construction:

BMPs in this MCM have been effective in reducing construction site runoff and erosion issues in 2019. The continued emphasis on compliance and education has provided positive results for public and private construction activity. By providing training to municipal staff, mechanisms for complaints, and education to developers and contractors, the Program continues to promote construction site compliance. Public input and transparency prompts the Program to best serve the needs of the regulated community, the public, and the City.

Post Construction:

BMPs in this MCM have been effective in achieving the goals of the Post-Construction Stormwater Program. Guidance for developers was updated in 2019 to provide a good example of a drainage study, Certificate of Occupancy Hold Letter, and updating of text based on feedback from the development community and adjacent jurisdictions. Internal processes have also been made to improve the program

overall in 2019. This includes requiring a project to submit and have approved, a post-construction application prior to the issuance of a grading permit. This has proven to be an effective way to ensure projects are progressing forward with the approval process. Education opportunities, such as lunch-and-learns, for industry professionals continued in 2019. Feedback from these opportunities have indicated they are very useful for those developing Post-Construction Stormwater Management Plans (PCSMP) on behalf of the applicant.

Pollution Prevention & Good Housekeeping:

BMPs in this MCM have been effective in managing stormwater pollution from City facilities and operations in 2019. Ensuring the Program is in compliance with its own regulations is crucial for maintaining integrity and achieving water quality goals. The City's facilities continue to be reviewed for potential pollutant exposure to stormwater, to identify vulnerabilities, and further educational needs. The Program continues to enhance training programs for City employees to provide more applicable information to more individuals. City-owned basins and green infrastructure have regular inspections and maintenance to ensure they are working to their highest potential.

Industry:

BMPs in this MCM have been effective in increasing compliance with the NDEE Industrial Stormwater Permit (ISW Permit) in 2019. The Program continues to coordinate with NDEE to maintain an updated and accurate list of industries in Omaha. This has resulted in less confusion among the regulated community and improved overall implementation of the industrial stormwater permit by industries. NDEE has stated they plan to develop a list of industries that should be permitted and will share that with the Program. This will be used to provide education and outreach to those industries to obtain and maintain compliance with the NDEE industrial stormwater permit. In 2020, the Program will continue to implement these BMPs and improve education and outreach to industries in order improve water quality and industry compliance.

BMP Assessment Monitoring:

The Program has previously contracted out the monitoring of some BMPs to consultants in order to fully implement the BMP monitoring plan. Due to the lack of State Stormwater Grant funds in 2019, this was not done, instead all monitoring efforts were done with Program staff. This will be the case going forward as well. The BMP monitoring plan was updated in 2019 to update the sites and parameters. The locations and parameters for monitoring evolve but data collected consistently supports that BMPs are effective at improving water quality and reducing stormwater flows. Efforts will continue to be made to partner with more groups to reference and compare data. This data helps the Program make recommendations to residents and developers for types and styles of BMPs that will be most effective under specific conditions. Because of this monitoring, the Program can confidently say that BMPs being recommended are having a positive impact on environmental quality.

5. Expenditures for the Storm Water Program

At the time of preparation of this annual report the City Finance Department had not finalized the accounting for 2019 expenditures, so the following figures are subject to minor revisions. A copy of the complete City of Omaha budget with past expenditures can be found at http://finance.cityofomaha.org. Stormwater management activities are embedded in a variety of City programs and work groups. These activities are funded by a variety of sources including the General Fund, Sewer Revenue Funds, Stormwater Administrative Fee Fund, Street and Highway Allocations, and the Street Maintenance Fund.

As such, it is difficult to accurately compile a comprehensive financial summary of every City activity that may have impacts on stormwater. For example, the City maintains litter cans in business districts throughout the City and has a contractor scheduled to empty them on a regular basis. This activity constitutes a stormwater source control or pollution prevention program. These costs are expended from the Solid Waste budget and are not included in the figures below.

1. Administrative

The Quality Control Division of the Omaha Public Works Department has responsibility for coordinating City activities to implement the SWMP and insure that the City meets its MS4 and CSO permit requirements. The estimated MS4 administrative expenditures for 2019 and appropriated 2020 budget amounts are listed below.

	2019	2020
Administrative	Expenditures	Planned
Flood Control Administration	\$180,105	\$365,591
Baseline/BMP Monitoring ¹	\$403,560	\$446,539
Sediment/Erosion Control Program	\$403,560	\$446,539
Industrial Program ²	\$80,712	\$89,308
Public Education/Outreach	\$295,944	\$327,462
MS4 Planning	\$161,424	\$178,615
Annual Administrative Total	\$1,525,306	\$1,854,053

¹ Includes outfall monitoring, outfall inspections, and illicit discharge investigations

² Includes industrial inspections and permitting

2. Operation and Maintenance

The major MS4-related Operation and Maintenance 2019 expenditures and budgeted amounts for 2020 are listed below. These amounts were estimated by evaluating the overall activity costs in the City budget organizations and assigning a percentage for the costs attributable to storm water related activities. There are undoubtedly additional City funded expenditures that impact storm water management, and the following is a conservative estimate of total costs for the City.

	2019	2020
Operation and Maintenance	Expenditures	Budgeted
Engineering Design	\$686,171	\$848,951
Pavement Maintenance	\$768,449	\$2,820,383
Creek/Open Channel Maintenance	\$952,860	\$663,434
Street /Right of Way Cleaning	\$2,989,701	\$3,965,814
OWP (debris removal)	\$14,781	\$13,355
Residential Street Rehabilitation	\$1,541,521	\$588,377
Bridge Maintenance and Rehab	\$97,501	\$72,500
Sewer Maintenance	\$1,339,609	\$946,380
Annual O&M Total	\$8,390,593	\$9,919,194

ATTACHMENT A

City of Omaha - Storm Water Management Plan

Measurable goals listed in the Storm Water Management Plan are target goals on which progress will be reported on in the annual report.

A. Public Education and Outreach						
BMP#	SWMP Element Description	Target Goals & Implementation Schedule				
1, 3, & 4.	Develop a plan for outreach that defines the goals, objectives, target audience and distribution process of materials for the public education and outreach program.	Year 1 – Develop a 5-year education and outreach plan. Submit the plan to NDEQ with the Annual Report. Years 2-5 – Review and update the plan each permit year and include the revised plan in the Annual Report.				
2.	Maintain and update appropriate messages for targeted residential, construction, and commercial issues.	Year 1 – Inventory current outreach materials in each of these targeted areas and develop new materials as needed. Years 2-5 – Provide copies of new outreach materials in the annual report.				

	B. Public Participation and I	nvolvement
BMP#	SWMP Element Description	Target Goals & Implementation Schedule
	Provide opportunities for citizens to comment on	On-Going All Years – Post on the City
	new rules, ordinances, and regulations regarding the	Stormwater Website proposed changes to
1.	MS4.	rules, ordinances, and regulations. Provide
		information in the annual report on approved
		changes and input received from the public.
	Create opportunities for citizens to participate in the	On-Going All Years – Post on the City
2.	implementation of stormwater controls.	Stormwater Website opportunities for public
۷.		involvement in stormwater control related
		activities.
	Provide access to information about the City's SWMP.	On-Going All Years – Maintain current City
3.		SWMP and MS4 annual reports on the Omaha
		Stormwater website.

		C. Illicit Discharge Detection a	nd Elimination
BMF	P #	SWMP Element Description	Target Goals & Implementation Schedule
1.	_	Maintain a compliance plan or mechanism to follow	On-Going All Years – Maintain the compliance
Δ.	а	up on illicit discharges.	procedures per the permit requirements.
		Maintain a map showing all known MS4 outfalls and	On-Going All Years – Maintain a continually
1.	b	the location of all state-designated waters receiving	updated storm sewer system map per the
		direct discharges from MS4 outfalls.	permit requirements.
		Conduct field screening activities per the permit	Year 1 – Develop dry weather screening,
		requirements (set forth in 40 CFR Part	sampling, and quality control plan to address
		122.26(d)(1)(iv)(D))specifically geared to local TMDL	pollutants of concern. Conduct screening
1.	С	pollutants of concern such as E. Coli and to eliminate	under current plan during Year 1.
		illicit discharges,	On-Going All Years – Annually conduct dry
			weather monitoring according to screening
			and sampling plan.
		Implement procedures to investigate and trace	On-Going All Years – Document investigations
1.	d	sources of identified illicit discharges to the MS4.	include date observed, result of
			investigation(s) and date closed.
		Implement procedures to remove illicit discharges to	On-Going All Years – Use the code
1		the MS4. Document all interactions with potentially	enforcement procedures to eliminate
1.	е	responsible parties.	unauthorized non-stormwater discharges
			identified during an investigation
		Identify and address allowable non-stormwater	On-Going All Years – Report on any local
		discharges determined to be significant contributors	controls or conditions placed upon exempt
1.	f	to pollutants. Identify any additional non-stormwater	non-stormwater discharges and additional
		discharges that will not be addressed as illicit	identified exempted non-stormwater
		discharges.	discharges.
		Coordinate with adjacent permitted MS4s to report	Year 1 – Develop procedures for coordination
		illicit discharges to the appropriate authority having	with adjacent permitted MS4's.
2 &	3.	jurisdiction and respond to reports from other MS4s.	On-Going All Years – Include in the annual
			report any known illicit discharge reports to
			and from adjacent MS4s.
		Maintain written procedures for the IDDE component	On-Going All Years – Make available upon
4.		of the MS4 permit.	request the standard operating procedures
			developed under this program component.
		Receive reports and complaints, internally and from	On-Going All Years – Coordinate with others
		the public, of illicit discharges and illegal dumping	in the City to resolve complaints. Develop a
		into the MS4. Respond to and investigate complaints	system to generate reports and track the
_		about spills, dumping, or disposal of materials other	number of calls per year in regard to spills,
5.		than stormwater to the MS4.	dumping or improper disposal of material to
			the MS4. Include a count of complaints
			received and investigations completed in the
			annual report.
		Develop, implement and maintain a training program	Year 1 – Develop a strategy which identifies
		for municipal field staff with respect to IDDE.	field staff and appropriate levels of training.
6.		·	Years 2 - 5 – Provide a count of employees
			which have received training in the annual
			report.

D. Construction Site Runoff Control			
BMP#	SWMP Element Description	Target Goals & Implementation Schedule	
1.	Maintain the established program requiring operators of public or private construction activities to comply with local erosion and sediment control requirements.	On-Going All Years – Include any updates to City Code or Permit requirements in the annual report.	
2.	Maintain a compliance plan or mechanism to follow up on construction site non-compliance.	On-Going All Years – Maintain the compliance procedures per the permit requirements.	
3.	Review grading permit applications and maintain a continually updated inventory of all private and public construction sites.	On-Going All Years – Include in the annual report the number and type of grading permits reviewed.	
4.	Maintain the electronic records for inspection of construction sites and enforcement of erosion and sediment control measures.	Year 1 – Develop a strategy for site inspections by municipal staff, and include in the annual report. On-Going All Years – Inspect construction sites on a regular basis and on a complaint basis. Track the number of sites inspected annually in a database. Initiate enforcement proceedings as appropriate to address violations. Include a summary of inspections completed and enforcement actions taken in the annual report.	
5.	Provide training for municipal staff with respect to their assigned duties as it relates to sediment and erosion control from construction activity. One formal training course for inspection staff during their employment with the City and internal training on an as needed basis to maintain consistent reporting among all inspectors.	On-Going All Years – Include in the annual report the number of staff and their sediment and erosion control training completed.	
6.	Communicate with the regulated community and other groups affected by the Construction Site Runoff program and provide a mechanism to receive complaints from the public.	On-Going All Years – Conduct workshops for developers, builders, site designers, contractors, and/or City staff as determined necessary (i.e., a rule or regulation is changed). Track reports from the public regarding construction sites. Include the number of reports received in the annual report and the permittees response.	

E. Post Construction Runoff Control			
BMP#	SWMP Element Description	Measurable Commitments & Implementation Schedule	
1.	Continue to implement the Post Construction Program as stipulated in the OMC. Periodically update guidance material and develop divergent standards for difficult sites such as linear projects. Update as needed the Omaha Regional Stormwater Design Manual (ORSDM).	Year 1 – Develop divergent standards for guidance document and update guidance as needed. Submit standards with the annual report. On-going All Years – Revise as necessary. Include a summary of revisions in the annual report.	
2.	Review and update, if needed, the standards outlined in the OMC and ORSDM for consistency with required performance standards as they relate to post-construction stormwater management plans.	On-going All Years – Report on any updates to the OMC or ORSDM.	
3.	Maintain an online submittal and review process for site plans, easement and maintenance agreements, as built drawings, deed recordings and drainage studies.	On-going All Years – Report number of PCSMP projects and the status of their progress in the annual report.	
4.	Develop SOP's for responding to complaints regarding Post Construction BMPs and a strategy for verifying BMPs are being installed & maintained in perpetuity.	Year 1 – Submit SOP's with the annual report. On-going All Years – Report on any complaints and/or BMP's which have been certified as complete.	
5.	Maintain a database that stores information on approved PCSMPs.	On-going All Years – Provide an inventory of certified stormwater control measures installed as part of the PCSMP requirements. Include a count of BMP types as well as any known changes to BMPs in the annual report.	
6.	Inspect sites that are certified by the engineer of record and all sites identified as deficient on a complaint basis. Develop a protocol to bring sites in to compliance.	Year 1 – Develop protocol for compliance assistance, and inspection strategy On-going All Years – Document and maintain inspection records of the certified PCSMP projects as identified in the strategy developed. Document any enforcement actions taken. Summarize activities in annual report.	

F. Pollution Prevention and Good Housekeeping			
BMP#	SWMP Element Description	Target Goals & Implementation Schedule	
1.	Maintain an inventory and map of municipal facilities. Review annually and update if needed.	On-Going All Years – Maintain an inventory and map of all municipal facilities.	
2.	Conduct assessments of municipal maintenance facilities and review their municipal runoff control plans as applicable. Revise plans as needed if facilities expand or reduce activities and implement recommendations based on annual inspections.	Year 1 – Develop a strategy to assess municipal facilities and prioritize them based upon a defined set of criteria, include strategy in the annual report. Years 2 - 5 – Track the number of assessments for municipal facilities based upon the strategy developed in year 1. Include the number of assessments completed, a description of the assessment procedure and any changes in facilities ranking in the annual report.	
3.	Continue to implement Omaha's Good Housekeeping Program for municipal facilities that addresses "high-priority" facilities (hot spot score of 20-30 out of 30) and site specific SOPs.	On-Going All Years – Annually report new, removed, or significantly updated municipal facilities	
4.	Implement practices for maintaining the storm sewer system that includes catch basin maintenance, open channels and other drainage structures, street sweeping, and structural stormwater controls. All maintenance procedures are to be performed such that waste water and waste materials do not enter the MS4.	Year 1 – Provide a description of the maintenance programs in the annual report. On-Going All Years – Annually report on Sewer Maintenance activities related to maintaining the storm sewer system and changes to any of the maintenance practices.	
5.	Provide training for municipal employees in pollution prevention and good housekeeping.	Year 1 – Develop a strategy for municipal employee training in pollution prevention and good housekeeping, include strategy in annual report. On-Going All Years – Conduct training events for municipal staff include number of employees trained, based on strategy developed in year 1, in annual report.	
6.	Provide educational material to contractors hired to perform maintenance activities on the MS4.	Year 1 – Develop materials to provide to contractors and include in the annual report. Years 2 - 5 – Include in the annual report any new materials or updates to existing materials.	

G. Industrial and Related Facilities			
BMP#	SWMP Element Description	Target Goals & Implementation Schedule	
1.	Maintain a program that identifies Industries within the MS4 area which fall into sectors identified in the ISW- NPDES permit.	Year 1 – Develop strategy that will identify industries and their compliance with NPDES permits. On-going All Years – Review and update strategy developed in year on and report on any changes in the annual report.	
2.	Request a list of permitted facilities and the NOI from NDEQ in January of each permit year.	On-going All Years – Maintain a database to track NPDES permitted facilities.	
3.	Inform industries about the NPDES ISW Permit and notify the state when industries are not in compliance with the state regulations.	On-going All Years – Develop industry specific publications regarding the NPDES regulations and distribute to inspected facilities.	
4.	Inspect NPDES permitted industries from a list provided by NDEQ in January of each year. Maintain a tracking system for inspections and SWPPP reviews. Review the SWPPP or NEC prior to completing an inspection.	On-going All Years – Inspect 20% of the facilities on the list provided by NDEQ each year so that all industries are inspected once in the permit cycle.	
5.	Ensure inspectors completing industrial stormwater inspections are competent.	On-going All Years – Report inspection activities in the annual report.	

H. Monitoring Program			
BMP#	SWMP Element Description	Measurable Commitments & Implementation Schedule	
1.	Dry Weather Screening	On-going All Years – Implement a dry weather screening of priority outfalls for IDDE following screening and sampling plan. Keep a record of outfalls observed and a record of the field screening results. Follow strategy in SWMP Program Component C - IDDE for outfalls showing presence of an illicit discharge. Update priority list based on observations.	
2.	Develop a wet weather BMP assessment monitoring plan for demonstration BMPs to facilitate future SWMP planning. Evaluate the effectiveness of the selected BMPs. BMP assessment may include flow based monitoring, or water quality sampling. Biological systems may include plant assessments and visual observations. Construct structural BMPs and implement nonstructural BMPs to evaluate the effectiveness of their ability to address pollutants of concern. Include in the BMP assessment program if appropriate.	Year 1 – Revise the BMP assessment monitoring plan and submit to NDEQ for approval. Amend as necessary when new demonstration projects have been constructed. On-going All Years – Implement monitoring plan in demonstration projects. Report findings in the Annual Report. The following information shall be included in the Annual Activity Report: 1) the location of the monitoring site 2) the intensity and duration of the storm event monitored; 3) the timing of sampling in comparison to the occurrence of the storm event and to the discharge of peak storm water flows; 4) the monitoring data; and a summary of the findings.	
3.	Utilize data collected by others to help assess the effectiveness of BMPs.	On-going All Years — Gather data from others and include in the annual report with a summary of findings.	

ATTACHMENT B

Environmental Enforcement Manual

Environmental Quality Control City of Omaha

May, 2019



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Section I: Omaha EQC Enforcement Guidelines

ENFORCEMENT GOALS & PROCEDURES

The City's environmental enforcement goals are to:

- □ Reduce the risk to human health and the environment
- ☐ Correct existing violations and deter future violations
- □ Prevent or have cleaned up pollution and minimize waste
- □ Preserve the integrity of the regulatory structure

To accomplish this the City will assure a high level of compliance, and strive for timely discovery and correction of significant compliance problems. This manual was written in order to maximize resources and ensure the effective and consistent enforcement of the various regulations.

It is very important in enforcement to understand that every enforcement action the City takes must have supportive power set out in the Federal State and/or City statutes. To carry out the policies of the administrative branch of Government, the Legislature has granted numerous powers and responsibilities to the City.

The Nebraska Statute # 84-901 et seq... governs various aspects of administrative Environmental Law, such as the adjudication of cases and judicial review of the City actions. Agencies in their decision-making and enforcement cannot be arbitrary or capricious or disregard the law that applies to their actions.

The City can exercise its enforcement powers in administrative, civil and / or criminal proceedings, or can refer cases to the NDEQ or EPA. The exercise of this authority is discretionary. The City also has informal and indirect enforcement options available. These include seeking voluntary compliance through warning communications (Faxes, e-mails, etc...) and compliance assistance to provide a violator an opportunity to return to compliance. It is important to keep in mind that the City's statutes and regulations are part of a larger system of environmental law that includes federal and state court decisions, policies, and guidance. The City has the power to enact and enforce laws and regulations that meet minimum federal criteria. In many cases the City has become the primary permitting and enforcement authority.

The EPA and NDEQ negotiate with the City through permits, work-plans and delegation Memorandums on how the agencies will work together. The EPA and NDEQ retain the right to take enforcement actions independently of the City, but defer to the City in most cases if the City's action has been timely and appropriate.

Process and Mechanisms

The primary goal of enforcement is compliance. A strong enforcement program establishes credibility that when violations are identified, a return to compliance is achieved and, if appropriate, penalties are obtained. The enforcement strategy and priorities developed by the City are implemented through regular inspections and complaint investigation activities. The enforcement program strives for compliance, prosecuting violators in as systematic and uniform manner as possible, while retaining enough flexibility to make adjustments based on the particular case.

The various program managers make the final decisions on the issuance of administrative orders, referrals to the Law Department, and settlement. The City staff in recommending enforcement action should consider the same factors that affect the managers' ultimate decision. This requires the exercise of professional judgment and discretion in determining the most appropriate response. Some considerations during the review are:

from the standards; the impact of the violation upon the integrity of the program under consideration.
The enforcement history of the entity involved in terms of past violations and demonstration of good faith.
Whether the violation can be corrected through improved operation and maintenance and, if so, will correction be lengthy? Has the problem already been corrected?
Consideration of "Fairness and Equity." Is the requirement reasonable? Was it imposed with complete information? Is the City treating facilities with similar violations in the same manner? Have events occurred beyond the control of the violator, which have resulted in the violation?

Program Priorities

Violations are classified in terms of their importance to the regulatory schemes and whether pollution is likely to result. Other factual considerations, such as whether the violations are chronic, the violator is cooperative or recalcitrant, or the extent of the deviation must be evaluated on a case-by-case basis.

Prompt and timely communication is the key to an effective enforcement program. Timeliness equates to importance in the eyes of the violator, regulatory community, public, and courts. Prompt communication ensures that evidence is gathered and presented while fresh and improves agency credibility.

Situations involving an emergency or imminent and substantial endangerment to public health and welfare or the environment should be given highest priority and the enforcement accelerated.

DISCOVERY OF VIOLATIONS

The City discovers violations in a variety of ways, including but not limited to, report reviews, compliance inspections, complaint investigations, and referrals from other agencies. Once a violation has been determined, they should be documented in an inspection report or memorandum as soon as possible, and filed in the company or complaint file.

Inspections

Typically most site inspections occur as a result of routine, program-specific compliance inspections. When the City receives a complaint of a possible violation, the City staff should document all of the

information on a complaint form. The name of the complainant is confidential, but may be disclosed in an enforcement proceeding or if compelled by a court.

Entry / Access

An inspector, upon arriving at a facility, source, or site should attempt to locate the owner, operator, or agent in charge, and identify him or herself, show his or her credentials, and explain the reason for the inspection. Nebraska Statute authorizes the inspector "to enter and inspect, during reasonable hours, any building or place, except a building designed for and used exclusively for a private residence." Statute also allows a representative of the Director to enter and inspect any contaminant source with the consent of the person or persons in control.

An inspector may sign a login sheet, but cannot sign a sheet, which purports to hold the source harmless in the event of injury to the inspector regardless of the facility's negligence. It is the facility's right to refuse entry or access to records for that or other reasons, but if this should occur the inspector should inform the source that that is a violation, and leave the facility. The inspector should contact their supervisor. The supervisor should contact the Law Department to obtain an inspection and search warrant. Nothing prohibits an inspector from viewing the property from a location where the public has access, such as a roadway or adjacent property, with permission of the owner.

Evidence

As a general rule, photographs should begin with the general area and then move in on the area that portrays the violation itself. At hearing or trial, photographs are most often used to illustrate the inspector's or another's testimony. Photographs are usually admissible as a form of non-verbal testimony. The photograph should be a good, fair, and accurate depiction of the object or scene at the relevant time. If videotape is used, only the voice of the person taping the video should be recorded.

Field Notes/Sketches/Diagrams

The field log should contain only relevant, objective observations and remarks. The major benefit to a field log is that it may be used latter in court or administrative hearing to "refresh" the inspector's memory of events. However, the decision to retain or discard field log notes must be consistent within the program.

When asking people information about a matter under investigation or in taking written statements, the inspector should focus on the basic questions of who, what, where, when, why, and how. If a person appears to have done an illegal act under the direction or order of another person, the inspector should find out who gave the order or direction. Inspectors should avoid intimidating people since a less confrontational approach usually elicits more information.

The inspector should also be aware of the records or documents that are required to be filed with the Department, such as weekly erosion control reports, semi-annual air compliance reports, emission inventories, discharge monitoring reports, biennial hazardous waste reports and Title III reports. These documents may provide support for a determination as to the extent of harm that may result from a violation.

Samples

When samples are collected, the inspector should give a receipt to the facility representative, describing the sample(s) obtained. The sample shall be collected in a proper container, labeled with time, date, facility, sample collector, point of collection, type of sample, etc... The sample collector shall maintain a chain of custody form on the sample, which indicates when and to whom a sample is transferred. There must be no "broken link" in the chain of custody where the sample may be unknowingly tampered with. Once the results of the samples are reviewed, a copy of the results should be sent to the facility representative, unless otherwise directed by the Law Department.

Inspection Reports

The central purpose of an inspection report is to clearly, accurately, and objectively communicate the factual information gathered during the inspection to the reader. It should be written as if the reader had no knowledge of the operation, or the facts outside of the report. The inspector should avoid any opinions, erroneous conclusions, inferences, or interpretations in the report. A good inspection report strengthens the credibility of the inspector as a witness.

Inspection reports should be written as soon as possible after the inspection, and filed. This helps to assure that the facts are recorded accurately while the events are fresh in the inspectors mind. An inspection report must make clear what actions are required of the facility, the inspector, or their supervisor.

After the report is written, a letter should be sent to the facility representative with a copy of the inspection. This is a courtesy, and in keeps them clearly informed of their compliance status, and if non-compliance was found during the inspection, it is a clear record of the violation and what actions, or timeframes where established to bring the facility back into compliance.

ENFORCEMENT

If possible, all discussions with the violator should be coordinated first through the Law Department during pending enforcement action, unless otherwise instructed by the attorney. The "Date of Discovery" is important to highlight with the report, this date establishes the statutory date that the Law Department has to bring legal action, or the action is barred.

The inspector or their supervisor should prepare any "Letter of Warning" (LOW). The program manager should prepare and sign "Notices of Violation" (NOV). For civil penalty actions or actions for injunctive relief, the manager will prepare an initial contact letter, which may be signed by the attorney, to send to the violator. This letter acknowledges to the source that the matter has been referred to the Law Department with the recommendation that enforcement action be taken. It will identify the violations or reference the LOW & NOV previously sent. It will outline the civil penalties, or injunctive relief deemed appropriate by the agency to settle the matter without litigation.

Settlement agreements are considered to be confidential, and any questions on an ongoing enforcement should be referred to the Law Department.

Enforcement Mechanisms

It is important to provide the violator with the opportunity to voluntarily come into compliance prior to referring a violation to the Law Department for enforcement. The purposes of the various stages of notices are to document the violations that have been observed and alert the violator to the consequences for failing to comply.

Voluntary Compliance

The City's first course of action is to pursue correction of the violation through voluntary compliance, unless an emergency exists. Documentation of this steep is essential. This is typically done less formally, through Faxes, or e-mails. The violation should be clearly outlined, and the timeline for submitting a voluntary compliance schedule clearly stated, typically not more than 10 working days. Some cases will warrant enforcement action regardless of whether the violator voluntarily returns to compliance. The City can make the decision to forgo voluntary compliance efforts.

Letter of Warning

If voluntary compliance is not successful, or the violator has a history of non-compliance on the same issue, the City should send a "Letter of Warning". This letter should identify the specific violation(s), with citations, such as 40 CFR 61,145(b)(i), that has occurred and, when necessary, the required action to be taken to correct the violation. The "Letter of Warning" should require the violator to submit a written response with a compliance schedule within a specific number of days, generally not more than thirty (30) days. The letter should state that failure to respond, or continued violation will result in referral to the Law Department with the recommendation of enforcement action (fine). Attach a copy of the specific regulation violated to this LOW. These LOW are always sent by certified mail, establishing the date of receipt of the information.

Notice of Violation

A "Notice of Violation" is a legal document that may be issued by the Program Manager whenever he or she has reason to believe that a violation of the City laws, regulations, or permit requirements has occurred. The "NOV" is a written complaint that specifies:

- 1) The provisions of the law, regulations, or permit alleged to be violated.
- 2) The facts alleged to constitute the violation thereof, and
- 3) The corrective action to be taken within a reasonable time necessary to achieve compliance.

The City does not have the authority to impose penalties in a "NOV". Therefore, a "NOV" is the appropriate vehicle to impose compliance schedules for improved operation and maintenance,

capital improvements, installation of pollution control equipment, remedial actions, or any other actions necessary to achieve compliance.

A "NOV" can include a penalty calculation, which if agreed to and paid by the alleged violator through a voluntary consent order, would be acceptable in lieu of the City seeking judicial action. Advantages to accepting a "NOV" settlement over a judicial action are that a "NOV" is usually faster and therefore requires fewer resources. It also allows the Department more control of the conduct and progress of the action, rather than relying on Judicial Decisions.

Voluntary Consent Order

These are voluntary, negotiated, written legal documents between the City and the violator that regulate any matter within the City's jurisdiction. They are signed by both the Director, or his representative, and a representative of the violator and are equally binding on both. They are frequently used when a violator agrees to come into compliance and is willing to make a written commitment in good faith. These agreements may be negotiated before a NOV is issued, or as a result of a NOV.

If a compliance provision in a Voluntary Consent Order, agreement or stipulation is missed, unless otherwise agreed, this is a violation of a final order of the Director and the matter may be referred to the Law Department with a recommendation for further action.

Permit Denial, Revocation, or Modification

If a chronic violation occurs at a site, a permit may need to be denied, revoked, or modified. Nebraska Statute provides that any person who is denied a permit by the director or who has one revoked or modified shall have the opportunity for an administrative hearing. The Public Works Director usually chairs all Administrative Hearings. The request for a hearing must be filed within thirty days of the permit action. After the hearing the director shall make his decision known. The permit holder may appeal the director's final decision in court.

Civil Action

If the City has exhausted all administrative alternatives, it may seek to impose civil penalties for a violation, the director may refer the matter to the Law Department for prosecution. In order for the Law Department to determine if there is sufficient legal merit to justify a civil or criminal proceeding, the program managers must develop a Litigation Report that should include basic factual information about the violation(s) and the violator(s), a description and analysis of the legal elements necessary to prove the statutory, regulatory, order or permit violations, the documentation on the potential penalties to which the violator may be subject, injunctive relief to which the City is entitled, and any potential weakness in the case or affirmative defenses and any suggested resolution of the matter.

In practice the City and the defendant in a civil action may negotiate a settlement of the matter. Typically, this settlement is memorialized in a consent decree that is filed with the court. A consent decree may also include compliance requirements in addition to payment of civil penalties. Violation of a consent decree may be pursued in court.

Criminal Cases

State law establishes criminal liability for many of the same violations subject to civil penalties, if they are committed "knowingly and willingly". In order to prevail in a criminal action, the City must prove each element of the case "beyond a reasonable doubt", which is a higher standard of proof than a civil action. Evidence gathering in a criminal case is more restrictive, and the Police Department or State Patrol should provide assistance with witness investigation.

PENALTIES

The assessment of penalties for violations of environmental statutes, regulations, and permits provides incentives to comply with these requirements and services as a deterrent to further violations. The City's policy in seeking penalties is to ensure that penalties are:

- 1. Assessed in a fair, consistent, and equitable manner.
- 2. Appropriate to the circumstances of the violation
- 3. Sufficient to remove any economic benefit or other financial incentive to non-compliance
- 4. Sufficient in severity to deter further non-compliance by the violator and others similarly situated
- 5. Resolve any outstanding environmental problems quickly.

There is EPA and NDEQ guidance documents on the assessment of penalty size. These workbooks should be used as a general guide in assessing a penalty. The factors used in the evaluation of penalties include:

- ☐ *Statutory Factors* such as degree, duration and extent of the violation and economic benefit on behalf of the violator;
- □ *Mitigating Factors* such as the response and compliance history of the violator and the ability to pay; and
- ☐ *Injunctive* Relief with respect to environmental costs, costs of mitigation and/or damaged infrastructure.

A complete procedure for the assessment of penalties is located in the following section of this manual.

Section II: Civil Penalty Policy POLICY

(Copied after: EPA's CLEAN WATER ACT Civil Penalty Policy)

Before filing a Notice of Violation, the City of Omaha will use the following guidelines to determine the minimum amount the City will accept in settlement for counts based on violations of the erosion or dust regulations. This amount, along with the appropriate worksheet and a supporting rationale, should be included in the enforcement-confidential portion of the case file. After a complaint is filed, as the City receives more relevant information regarding liability and penalty issues, the City should adjust its settlement figure accordingly, documenting the rationale for the changes.

The bottom-line figure resulting from application of this civil penalty settlement policy and the specific calculation that led to it are not public. Each is privileged, enforcement-confidential information. It is work product developed for negotiation purposes and should not be shared with administrative judges, respondents or defendants, or the public.

This policy itself, however, is public and not confidential. In calculating the bottom-line settlement figure, the City should assume that all the allegations in the complaint will be successfully proven, except to the extent this policy specifically allows for the incorporation of litigation considerations into the penalty calculation. The subjective aspects of the various penalty factors should be applied conservatively in determining the settlement bottom-line because that figure represents the minimum the Agency will accept in settlement, which may be less than the penalty amount that the City considers otherwise ideally suited to the violation. The City may, of course, republish this policy to clarify the newly adjusted settlement amounts.

- The seriousness of the violation or violations;
- The degree of culpability involved;
- The nature, extent, and degree of success of any efforts of the violator to minimize or mitigate the effects of the discharge;
- Any history of prior violations.

ASSESSMENT CRITERIA

Step 1: Seriousness

The seriousness of a violation depends, in part, on the risk it poses to the public and the environment. "Risk" can encompass the coverage area of the violation, the likelihood of a spill, the sensitivity of the environment, and the duration of the violation. The coverage area of the violation, which also contributes to the severity of the violation, depends on the erodible area covered, the existence and adequacy of sediment containment, the degree and nature of the violations of relevant requirements, and the duration of the violation. The sensitivity of the environment can be characterized by considering the potential environment impact from a worst-case discharge at the site.

Step 1.a: Apply matrix. Determine an initial figure from the following table. Within each range, the City should exercise discretion, considering capacity and extent of noncompliance only, since other considerations are incorporated in later steps.

Extent of Noncompliance	Less than 1 acre	1 acre to 5 acres	5 acres to 10 acres	More than 10 acres
Minor	\$50 to 100	\$75 to \$175	\$125 to \$250	\$225 to \$350
Moderate	\$110 to \$175	\$175 to \$275	\$250 to \$375	\$350 to \$450
Major	\$175 to \$225	\$275 to \$325	\$375 to \$450	\$450 to \$500

Use the following criteria to determine the extent of noncompliance:

Minor Noncompliance. Cumulatively, the violations have only a minor impact on the ability of the respondent to prevent or respond to worst-case erosion or dust violation through the development and implementation of a compliance plan.

Minor noncompliance: Failure to have GR2 inspections on site in a timely manner; failure to submit required report online in a timely manner; failure of reports to reflect minor changes in BMP.

Moderate Noncompliance. Cumulatively, the violations have a significant impact on the ability of the respondent to prevent or respond to worst-case erosion or dust violation through the development and implementation of a compliance plan.

Moderate Noncompliance: Site work inconsistent with BMP; Failure to update BMP or reflect major changes; Failure to amend plan after rainfall or work practices show the plan to be inadequate; Failure to submit information of a control measure failure.

Major Noncompliance. Cumulatively, the violations essentially undermine the ability of the respondent to prevent or respond to worst-case erosion or dust violation through the development and implementation of a compliance plan.

Major Noncompliance: No BMP submitted; Work started prior to permit issuance; inadequate or incomplete plan resulting in major environmental or citizen harm; failure to maintain equipment and/or personnel to implement BMP/dust control measure resulting in hazardous conditions; intentional or known violations.

Step 1.b: Adjust the amount determined from the matrix to reflect the potential environmental impact of a worst-case discharge. Choose the most serious applicable category.

Major Impact. A discharge would likely have a significant on human health/safety, an actual or potential effect on a receiving lake or wildlife due to factors such as proximity or adequacy of containment. Upward adjustment of 25-50%.

Moderate Impact. A discharge would likely have a significant effect on storm sewers or receiving stream or vegetation due to factors such as proximity to water or adequacy of containment. Upward adjustment of up to 25%.

Minor Impact. No adjustment.

Step 1.c: Adjust the amount from **Step 1.b** to account for the duration of the violation. Determine the number of weeks that the violation continued. For each week, add one half of one percent to the amount from Step 1.b (e.g., if the violation continued for 32 weeks, increase the amount from the previous step by 16%) up to a 30% maximum.

Step 2: Culpability

Assess the degree to which the respondent should have been able to prevent the violation, considering the sophistication of the respondent, the resources and information available to them, and any history of regulatory staff explaining to the respondent legal obligations or notifying the respondent of violations. Depending upon the degree of culpability, the city may increase the amount from STEP 1 by as much as 75%.

Step 3: Mitigation

This policy requires that in assessing a penalty the City must consider the "nature, extent, and degree of success of any efforts of the violator to minimize or mitigate the effects of the discharge". Though a violation of the regulations increases the threat of a discharge rather than actually causing a discharge, this factor can be taken into account by considering how quickly the violator comes into compliance, thereby mitigating the threat of a discharge. The City should use the following guidelines:

When the violator comes into compliance before being notified of violation by regulatory staff or ally or in writing, reduce the amount from **STEP 2** by up to 25%.

When the violator, after notification of violation, comes into compliance within a reasonable time period not exceeding six weeks: No adjustment.

This is a downward adjustment only because any failure to come into compliance promptly after being informed of the violation is accounted for in **STEP 2** (Culpability).

Step 4: History of Previous Violations

Adjust the amount from **STEP 3** if the respondent has a relevant history of violations within the past five years. Consider violations of erosion and dust regulations, the BMP or reporting requirements, and any violation of an environmental statute that relates to the respondent's ability to prevent or mitigate a violation. Related violations, for example, could include certain operation and maintenance violations that indicate a respondent's inattention to pollution control requirements. Relevant violations at any other facility under common ownership or control should be considered under this step. Violations include admitted violations (such as reports or other required self-reporting), adjudicated violations, findings of violations by the City, NDEQ, EPA or other agencies that have not been withdrawn or overturned by a reviewing authority, and cases that were settled by consent and involved the payment of a penalty (whether or not liability was admitted). If there is a history of such violations, the City may increase the **STEP 3** amount by up to 100%, depending on the frequency and severity of such past violations

Section II: Civil Penalty Policy				

Section III: Supplemental Environmental Project Policy APPLICABILITY

In the settlement of environmental enforcement cases in Omaha, the City requires that violators resolve the violation, change standard operational procedures to avoid future non-compliance, and pay a civil penalty; in certain instances "Supplemental Environmental Projects" (SEP) and their environmental and community benefits may be part of the settlement; the primary purpose of the SEP policy is to obtain environmental and/or public benefits that may not otherwise occur, in the community impacted by the violation. SEPs are offered as an opportunity to contribute to the community in lieu of paying a penalty, and to help the defendant / respondent understand that their action has had an impact on the community as a whole, and is therefore offered to first time offenders only.

The environmental programs administered by the City have penalty assessment criteria used in determining an appropriate penalty. These policies establish an appropriate initial settlement offer to avoid the time and cost of a court hearing where appropriate. These policies have been established with consideration of the economic benefit to the violator, the seriousness of the violation, and any prior history of violations. Penalties deter violations and level the playing field, while the use of SEP's add an additional role of securing the advantage environmental or public benefits. The penalty calculation worksheets from the appropriate program are used to determine the Initial Settlement offer, without the influence of a SEP;

The primary goal of the City's Environmental regulations is the avoidance or reduction of pollution, followed in order by the responsible recycling of pollutants, then the proper disposal of pollutants.

CRITERIA

The Environmental Quality Control Division of the City of Omaha Public Works Department reviews SEP's with the following criteria:

- 1. The City of Omaha evaluates the types of settlement cases where SEP's would be appropriate, the types of projects that are acceptable, and the penalty mitigation that is allowed;
- 2. The City of Omaha uses this SEP policy is part of that evaluation process, and is typically only considered for first time violators;
- 3. All else being equal, the final settlement penalty cost will be lower for a violator who agrees to perform an acceptable SEP compared to one who does not agree to perform a SEP;
- 4. The City of Omaha encourages the use of SEP's that are consistent with this policy, and recognizes that SEP's may not be appropriate in settlement of all cases, but they are an important part of the City's environmental enforcement program;
- 5. SEP's that have an educational or pollution prevention aspect are preferred, and would be given preference in consideration;

The Environmental Quality Control Division determines that a SEP is qualified only if the SEP meets the following criteria;

- 1. The SEP is a project that has environmental benefits, that the violator is not otherwise legally obligated to perform;
- 2. The SEP cannot be inconsistent with any Environmental Statutes;
 - 2.1. The SEP must advance an environmental objective of the statutes the enforcement action is based on.
 - 2.2. The SEP must reduce the likelihood of similar violations, or
 - 2.2.1. Reduce the consequence on the public or the environment that was impacted by the violation, or
 - 2.2.2. Reduce the overall risk to the public or the environment affected by the violation;
- 3. The SEP should affect the Public or the environment in the Omaha Metropolitan area;
- 4. The City retains the right to oversee a SEP and ensure that it is implemented pursuant to the provisions of the settlement offer, and retains legal recourse if the SEP is not adequately performed;
- 5. The City may not play any role in managing or controlling the funds that are to provide for the SEP;
- 6. The SEP cannot be used to satisfy a City statutory obligation, and cannot provide the City with additional resources to support activities that are covered by budgetary obligations, e.g. a SEP cannot buy a computer for City personnel use;
- 7. The SEP cannot be used to extend an existing City contract;

There are several broad categories of projects that qualify as SEP's; these are:

- 1. Environmental Restoration & Protection: a restoration project is one that enhances or restores a natural environment, or a man-made environment in the Omaha Metropolitan area;
 - 1.1. Help protect the environment from actual or potential damage or improve the overall condition of the ecosystem; OR
 - 1.2. The protection of endangered species or their habitat; OR
 - 1.3. Augment another environmental restoration project with recreational improvements such as hiking & bicycling trails, or information signage not already earmarked for the project;
 - 1.4. Remediation of pollution of man-made environments, like community centers, may include the removal of asbestos, lead paint, or contaminated soils;
- 2. Environmental Compliance Promotion: These projects can be contracted to experts to develop and implement the compliance promotion project and shall provide training, or outreach to other parts of the community to;
 - 2.1. Achieve and maintain compliance with the regulatory requirements;
 - 2.2. Go further than the regulations and reduce pollution beyond legal requirements;
 - 2.3. Promote the same environmental program as the violation;
- 3. Public Health: a project to provide diagnostic, preventative and /or remedial components of health care to the population potentially harmed, including but not limited to, epidemiological data, examinations, or medical treatment;

- 4. Pollution Prevention: a project that targets the reduction at the source so that the amount of pollution entering into the atmosphere or waste stream is reduced;
- 5. Pollution Reduction: is a project which results in a decrease in the amount or toxicity of any pollutant in a waste stream or released into the environment (e.g. offsite recycling of waste collected and used as raw material for another products);
- 6. Other projects that do not fit into one of the above categories may be considered if they have environmental merit, and are consistent with the rest of the SEP goals

The City of Omaha uses the above criteria to determine if a SEP is qualified, and excludes the following from SEP consideration;

- 1. Projects done for private gain;
- 2. Projects that the defendant / respondent would be required to do under any rule or regulation;
- 3. Projects that the respondent would directly benefit from
- 4. Projects where the City needs to contribute significant resources to assure completion;

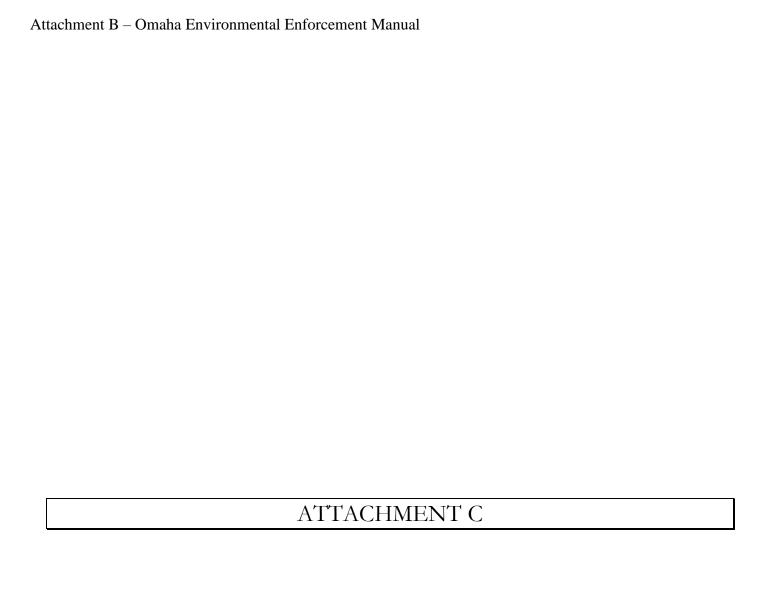
In a settlement where the defendant / respondent agree to a SEP, the SEP amount has to be calculated to;

- 1. Exceed any known economic benefit from the non-compliance activity;
- 2. Be at least 75% of the total agreed upon initial settlement offer

The defendant / respondent shall submit a settlement agreement that accurately describes the SEP and provides reliable and objective means to verify that the defendant / respondent completes the project, including clear benchmarks that can be tracked and reported, and can be completed in a timely manner while having community benefit.

The settlement agreement shall outline a requirement that the defendant / respondent pay a stipulated penalty of at least 75% to 150% of the initial settlement amount originally proposed, depending on the degree of completion and the monies spent, if the SEP outlined in the settlement agreement is not completed, or is only partially completed.

The defendant /respondent may only publicize his involvement in the results of the SEP if it is prominently stated that the SEP was taken as a part of a settlement of an environmental enforcement action.



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Date Initiated	Address	Valid Complaint	Illicit Discharge	Complaint Type	Enforcement Action Taken
1/3/2019	S 156th St & Valley St	Yes	No	Construction	RVC - Verbal
1/7/2019	12005 Pacific St	Yes	No	Construction	RVC - Verbal
1/14/2019	18551 Madison Cir	Yes	No	Construction	RVC - Verbal
1/18/2019	12318 Read St	Yes	No	Stormwater Runoff	No Action Taken
1/18/2019	3131 S 156th Street	Yes	No	Construction	RVC - Verbal
1/18/2019	D Street at I-80 overpass	Yes	No	Other	Forwarded to PW - Design
1/30/2019	6216 S 182nd Ave	No	No	Other	No Action Taken
2/4/2019	9910 N 111th St, Douglas County, NE, 68142	No	No	Stormwater Runoff	No Action Taken
2/11/2019	15901 Valley St	Yes	No	Other	No Action Taken
2/28/2019	3707 Center St	Yes	No	Stormwater Runoff	No Action Taken
3/14/2019	5929 No 72nd Street	Yes	No	Stormwater Runoff	No Action Taken
3/18/2019	3116 S 59th St Omaha NE 68106	Yes	No	Construction	RVC - Verbal
3/18/2019	S 38th Ave & Jones St	Yes	No	Construction	RVC - Verbal
3/18/2019	3624 Farnam St	Yes	No	Construction	RVC - Verbal
3/18/2019	1311 South 9th Street	Yes	No	Construction	RVC - Verbal
3/22/2019	4609 Sheridan Road Bellevue, NE	Forwarded		Construction	Forwarded to adjacent MS4
3/22/2019	10106 S 15th St Bellevue, NE	Forwarded		Other	Forwarded to adjacent MS4
3/25/2019	10770 I Street	Yes	No	Other	RVC - Verbal
3/26/2019	Elmwood Park, West of grotto	Yes	Yes	Other	No Action Taken
3/26/2019	4651 F Street	Yes	Yes	Other	RVC - Written
3/28/2019	1926 S 67th St	Yes	No	Other	RVC - Verbal
4/1/2019	6950 Q St Omaha NE 68117	Yes	No	Other	RVC - Verbal
4/1/2019	9521 Douglas St	Yes	No	Construction	No Action Taken
4/1/2019	S 90th St & Woolworth Ave	Yes	No	Construction	RVC - Verbal
4/1/2019	5639 Ruggles St	No	No	Stormwater Runoff	No Action Taken
4/2/2019	2554 Redick Ave	Yes	Yes	Illicit Discharge	RVC - Written

Date Initiated	Address	Valid Complaint	Illicit Discharge	Complaint Type	Enforcement Action Taken	
4/2/2019	7921 Leavenworth St	Yes	No	Construction	Forwarded to Sewer Maintenance	
4/2/2019	6805 S 135th Ave Omaha NE 68137	No	No	Stormwater Runoff	RVC - Verbal	
4/3/2019	168th & State St	Yes	No	Construction	NOV	
4/3/2019	4910 Northwest Radial HY	Yes	No	Other	RVC - Verbal	
4/5/2019	3417 Vinton St	Yes	No	Construction	RVC - Verbal	
4/8/2019	3608 Farnam St	Yes	No	Construction	No Action Taken	
4/8/2019	1110 N Skyline Dr Omaha NE 68022	No	No	Stormwater Runoff	No Action Taken	
4/8/2019	S 122nd St & Grover St	No	No	Illegal Dumping	No Action Taken	
4/8/2019	1314 Saddle Creek Rd	Yes	No	Other	RVC - Verbal	
4/11/2019	13936 Arbor Cir	No	No	Other	No Action Taken	
4/15/2019	16th & Cornish	No	No	Construction	n No Action Taken	
4/18/2019	8354 Templeton Dr	Yes	Yes	Illicit Discharge	RVC - Verbal	
4/22/2019	4917 S 50th Ter, Omaha, NE, 68117	Yes	No	Other	RVC - Written	
4/23/2019	3125 N 32nd St	Yes	No	Construction	RVC - Verbal	
4/24/2019	3838 Dewey Ave	Yes	No	Construction	RVC - Verbal	
4/25/2019	1903 F St	Yes	Yes	Illicit Discharge	RVC - Verbal	
4/30/2019	4708 Ohern St	Yes	No	Other	RVC - Written	
5/1/2019	3900 Dahlman Ave	No	No	Construction	RVC - Verbal	
5/1/2019	3600 Dahlman Rd	Yes	No	Other	RVC - Verbal	
5/2/2019	56th and Howard St	Yes	Yes	Illicit Connection	Removed Connection	
5/2/2019	10405 N 29th Ave	Yes	No	Construction	RVC - Verbal	
5/3/2019	4905 N 168th St Douglas County NE 68116	No	No	Construction	RVC - Verbal	
5/9/2019	2734 S 90th St	Yes	Yes	Illicit Discharge	RVC - Verbal	
5/9/2019	2520 So 64th Ave	Yes	Yes	Illicit Discharge	RVC - Written	
5/9/2019	Douglas St & Park Ave	Yes	No	Stormwater Runoff	RVC - Verbal	
5/9/2019	N 60th St & Blondo St	Yes	No	Construction	RVC - Verbal	

Date Initiated	Address	Valid Complaint	Illicit Discharge	Complaint Type	Enforcement Action Taken	
5/9/2019	432 S 38th Ave	No	No	Construction	RVC - Verbal	
5/13/2019	225 S 243rd St	Yes	No	Construction	RVC - Verbal	
5/14/2019	3317 S 23rd St	Yes	Yes	Illicit Discharge	RVC - Written	
5/14/2019	4708 S 15th St	Yes	No	Construction	RVC - Verbal	
5/15/2019	2308 S 16th St	Yes	Yes	Illicit Discharge	RVC - Verbal	
5/15/2019	8844 Lakeview Dr	No	No	Other	No Action Taken	
5/16/2019	1409 N 21st St	Yes	Yes	Illicit Discharge	RVC - Verbal	
5/16/2019	702 N 75th Street	No	No	Yard Waste	RVC - Written	
5/20/2019	4323 S 16th St	Yes	Yes	Illicit Discharge	RVC - Written	
5/21/2019	16616 Howard Cir	No	No	Other	No Action Taken	
5/21/2019	6805 S 135th Ave Omaha NE 68137	Yes	No	Stormwater Runoff	Forwarded to Sewer Maintenance	
5/22/2019	6734 Mason St	Yes	Yes	Illicit Discharge	RVC - Written	
5/23/2019	42nd & P St	Yes	No	Other	No Action Taken	
5/28/2019	11568 Scott St	Yes	No	Construction	RVC	
5/29/2019	4320 S street	Yes	No	Stormwater Runoff	No Action Taken	
5/29/2019	5109 S 38th St, NE, 68107	Yes	No	Construction	RVC - Verbal	
5/30/2019	2945 S 132nd St	Yes	No	Construction	RVC - Verbal	
5/31/2019	Brook Hollow entrance near 114th & Pine Plaza	Yes	No	Stormwater Runoff	No Action Taken	
6/3/2019	1117 N 13th St	Yes	No	Construction	RVC - Verbal	
6/3/2019	4167 I St	No	No	Other	No Action Taken	
6/4/2019	4765 S 135th St	No	No	Illicit Discharge	No Action Taken	
6/7/2019	East of Skyline & Harney	Yes	Yes	Illicit Discharge	RVC - Verbal	
6/7/2019	5051 S 40th St, NE, 68107	Yes	No	Construction	RVC - Written	
6/7/2019	9501 Douglas St	Yes	No	Construction	RVC - Verbal	
6/7/2019	7901 N 154th St, Douglas County, NE, 68007		No		RVC - Verbal	

Date Initiated	Address	Valid Complaint	Illicit Discharge	Complaint Type	Enforcement Action Taken
6/7/2019	10883 Polk St Omaha NE 68137	Yes	No	Other	No Action Taken
6/10/2019	S 7th St & Leavenworth St, NE, 68102	Yes	No	Stormwater Runoff	Forwarded to Sewer Maintenance
6/10/2019	19134 Pinehurst Ave		No	Construction	RVC - Verbal
6/11/2019	11716 Leavenworth Rd	No	No	Stormwater Runoff	No Action Taken
6/18/2019	5109 S 38th St, NE, 68107	No	No	Stormwater Runoff	Forwarded to Planning CE
6/25/2019	24348 DOUGLAS CIRCLE DR	Yes	No	Construction	RVC - Verbal
6/28/2019	1218 Nicholas St	No	No	Construction	No Action Taken
7/3/2019	8418 Frederick	Yes	Yes	Illicit Discharge	RVC - Verbal
7/5/2019	15011 Miami Cir	No	No	Other No Action Ta	
7/6/2019	2635 X St	No	No		No Action Taken
7/8/2019	310 N 168th Cir Omaha NE 68118	No	No	Stormwater Runoff	No Action Taken
7/10/2019	4513 S 19th St	Yes	No	Other	No Action Taken
7/11/2019	25009 Emile Cir	Yes	No	Construction	No Action Taken
7/12/2019	6747 Florence Blvd	No	No	Other	No Action Taken
7/12/2019	13828 Hillsborough Dr Omaha NE 68164	Yes	No	Other	Forwarded to Planning CE
7/12/2019	1815 S 192nd ST	Yes	No	Construction	RVC - Written
7/12/2019	15125 Boyd St Omaha NE 68116	Yes	No	Construction	RVC - Written
7/15/2019	930 S S 192ND ST	No	No	Construction	RVC - Verbal
7/16/2019	3221 R St, NE, 68107	Yes	No	Stormwater Runoff	Forwarded to Sewer Maintenance
7/22/2019	3921 S 191st Ave, NE, 68130	Yes	No	Stormwater Runoff	Forwarded to Planning CE
8/1/2019	4513 S 19th St	Yes	Yes	Illicit Discharge	RVC - Written
8/1/2019	2520 S 64th Ave	Yes	No	Other	No Action Taken
8/1/2019	19507 Pierce St	Yes	No	Construction	RVC - Verbal
8/2/2019	11016 Mockingbird Dr	Yes	Yes	Illicit Discharge	RVC - Verbal
8/8/2019	8545 Park Dr	Yes	Yes	Illicit Discharge	RVC - Verbal

Date Initiated	Address	Valid Complaint	Illicit Discharge	Complaint Type	Enforcement Action Taken
8/13/2019	15033 Hillsdale Ave Omaha NE 68137	Yes	No	Other	No Action Taken
8/13/2019	2216 N 204th Ter	Yes	No	Construction	RVC - Verbal
8/14/2019	2222 N 11th St	Yes	No	Construction	No Action Taken
8/15/2019	19134 Pinehurst Ave	Yes	No	Construction	RVC - Verbal
8/21/2019	John A Creighton Blvd & Sprague St	Yes	No	Construction	RVC - Verbal
8/21/2019	1218 Nicholas St	Yes	No	Construction	No Action Taken
8/21/2019	6210 N 107th St	Yes	No	Other	Forwarded to Construction
8/22/2019	2425 S 67th St	Yes	No	Construction	RVC - Verbal
8/23/2019	5237 S 24th St	Yes	Yes	Illicit Discharge	RVC-Verbal
8/23/2019	4201 Woolworth Ave Omaha NE 68105	Yes	No	Construction	RVC - Verbal
8/23/2019	7152 Pacific St Omaha NE 68106	No	No	Other	No Action Taken
8/26/2019	9118 Pauline St Omaha NE 68124	Yes	No	Construction	Forwarded to Sewer Maintenance & MUD
8/26/2019	9005 Washington St	No	No	Other	No Action Taken
8/26/2019	California St & Embassy Row	No	No	Construction	RVC - Verbal
8/27/2019	17311 Y St Omaha NE 68135	No	No	Illegal Dumping	No Action Taken
8/28/2019	4717 N 19th St, NE, 68110	Yes	No	Other	Forwared to Parks Dept CE
8/28/2019	5108 N 14th St E Omaha NE 68110	No	No	Other	No Action Taken
8/29/2019	19265 Ruggles Cir	No	No	Construction	No Action Taken
9/6/2019	3340 S 105th Ave	Yes	Yes	Illicit Discharge	RVC - Verbal
9/6/2019	3706 L St Omaha NE 68107	Yes	No	Other	Forward to Street Maintenance
9/9/2019	9707 Q St	Yes	Yes	Illicit Discharge	RVC - Verbal
9/9/2019	425 Bancroft St Omaha NE 68108	Yes	No	Construction	No Action Taken
9/16/2019	5819 S 14th St	Yes	No	Construction	RVC - Verbal
9/19/2019	17203 T Cir Omaha NE 68135	Yes	No	Illicit Discharge	RVC - Verbal

Date Initiated	Address	Valid Complaint	Illicit Discharge	Complaint Type	Enforcement Action Taken	
9/20/2019	7803 Miami St	Yes	Yes	Illicit Discharge	RVC - Verbal	
9/20/2019	S 17th St & Drexel St	Yes	Yes	Illicit Discharge	RVC - Verbal	
9/20/2019	1428 S 190th Plz Omaha NE 68130	No	No	Construction	No Action Taken	
9/23/2019	8825 Edgevale Pl	Yes	No	Construction	RVC - Verbal	
9/23/2019	15609 Seward Cir, NE, 68118	Yes	No	Construction	RVC - Written	
9/25/2019	1010 S 91st Cir	Yes	No	Construction	RVC - Verbal	
9/26/2019	18601 Barbara St, Omaha, NE, 68130	Yes	No	Construction	RVC - Verbal	
9/26/2019	12905 Jackson St	Yes	No	Other	No Action Taken	
9/27/2019	N 148th St & Underwood Ave	Yes	Yes	Illegal Dumping	RVC - Verbal	
9/30/2019	6503 Grover St	Yes	No	Construction	n RVC - Verbal	
10/1/2019	2214 N 204th Ter	Yes	No	Construction	RVC - Verbal	
10/1/2019	6340 N 31st Ave	Yes	No	Construction	RVC - Verbal	
10/2/2019	1238 S 10th St	Yes	No	Stormwater Runoff	No Action Taken	
10/7/2019	7141 N 156th St	Yes	Yes	Illicit Discharge	RVC - Verbal	
10/7/2019	2715 N 160th St	No	No	Construction	No Action Taken	
10/7/2019	7210 L St	Yes	No	Stormwater Runoff	No Action Taken	
10/10/2019	2717 N 73rd St, NE, 68134	Yes	No	Construction	No Action Taken	
10/10/2019	12005 Pacific St	Yes	No	Construction	RVC - Verbal	
10/10/2019	5522 N 153rd Ave	Yes	No	Construction	RVC - Verbal	
10/23/2019	5037 S 41st Ave	Yes	No	Construction	RVC - Written	
10/24/2019	1216 S 108th St	Yes	No	Other	RVC - Verbal	
10/31/2019	1218 Nicholas St	Yes	No	Construction	RVC - Verbal	
11/8/2019	13704 P St	Yes	No	Construction	RVC - Verbal	
11/13/2019	2612 S 72nd Ct	No	No	Other	No Action Taken	
11/14/2019	4716 Grant St	Yes	No	Other	RVC - Verbal	
11/22/2019	3201 S 90th St	Yes	No	Stormwater Runoff	RVC - Verbal	
11/22/2019	6107 N 108th Avenue Cir	Yes	No	Construction	RVC - Verbal	
11/25/2019	6119 S 146th St	Yes	No	Yard Waste	RVC - Written	
11/27/2019	3825 N 202nd St	Yes	No	Other	RVC - Verbal	

ATTACHMENT C – Complaint and Illicit Discharge Investigations

Date Initiated	Address	Valid Complaint	Illicit Discharge	Complaint Type	Enforcement Action Taken	
12/5/2019	4603 S 198th Ave	No	No	Other	No Action Taken	
12/5/2019	805 Crown Point Ave	Yes	No	Other	RVC - Verbal	
12/9/2019	4626 Dahlman Ave	Yes	Yes Illi Dis		RVC - Verbal	
12/10/2019	4023 S 21st St	No	No	Other	No Action Taken	
12/17/2019	3405 S 204th Street	No	No	Construction	No Action Taken	
12/18/2019	825 Dorcas St	No	No	Construction	No Action Taken	
12/19/2019	Southby Plaza, W of 96th St	Yes	No	Construction	RVC - Verbal	
12/23/2019	4765 S 135th St	Yes	No	Other	RVC - Verbal	
12/23/2019	5198 S 192nd St	Yes	No	Construction	RVC - Verbal	
12/31/2019	3866 Dodge St	Yes	No	Construction	RVC - Verbal	

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Date(s) of Service	Location Description [Starting Address]	Organization [Group #]	# of Drains Marked	# of Door Hangers Distributed	Total # of Adult Volunteers	Total # of Youth Volunteers	Hours for the Event	Total Volunteer Hours	# of Trash Bags Collected	# of Recycling Bags Collected
4/26/2019		Mutual of Omaha	32	37	0	12	1	12	3	0
4/28/2019	154th and Fowler	Pure Hair Salon	10	15	0	5	1	5	0.5	0
5/5/2019	116th and Harrison	Girl Scout Troop 42466	18	94	6	3	1.25	11.25	2	0
5/12/2019	Oakbrook Meadows	Individual Volunteer	20	40	1	1	2	4	0.5	0
5/19/2019	Oakbrook Meadows	Individual Volunteer	20	25	1	1	1.5	3	1	0
5/22/2019	108th and Q	GBA	61	200	0	8	3	24	6	0
6/1/2019	South of Leavenworth, west of Saddle Creek, east of 58th	Individual Volunteer	37	72	0	1	5	5	1	0
6/7/2019	Walnut Grove Park area, 144th and Q-F Streets	Convergent Technologies	167	313	0	8	5	40	2	0
6/7/2019	Maple to Blondo, 144th to 150th	Boys Town Summer Enrichment Program	32	81	22	6	1	28	3	0
6/5/2019	90th and Fort area	Family	200	296	2	1	9	27	4	0
6/10/2019	Maple to Blondo, 150th to 156th	Boys Town Summer Enrichment Program	32	81	22	6	1	28	3	0
6/18/2019	16th-27th Streets north of Cuming	McPherson Ave Church of Christ	147	313	10	2	4	48	4	0
6/22/2019	Ames to Miami, 39th to 45th	UNMC SHPEP	32	96	0	11	2	22	3	0
6/22/2019	Briar Hills (168th and Blondo)	Family	88	130	3	1	6	24	1	0
6/24/2019	33rd-42nd, D St to J St	Bailey Lauerman	133	230	0	19	3	57	5	0
6/24/2019	Blondo to Dodge, 90th to 102nd	Boys Town Summer Enrichment Program	24	75	28	7	2	70	3	0
7/1/2019	Around Boys Town	Boys Town Summer Enrichment Program	17	91	10	4	3	42	2	0
7/20/2019	Around 24th and Spencer	Global Leadership	20	50	1	11	2	24	6	0
7/11-7/24/19	183rd and Pacific area	Individual Volunteer	195	196	2	1	4	12	2	0
7/19/2019	195th and Pacific	Family	77	113	2	1	6	18	2	0
7/12/2019	Around Boys Town	Boys Town Summer Enrichment Program	62	323	25	6	4.5	139.5	6	0
7/15/2019	Around Boys Town	Boys Town Summer Enrichment Program	0	0	0	0	0	0	0	0
7/19/2019	Around Boys Town	Boys Town Summer Enrichment Program	92	245	28	7	4.5	157.5	6	0
7/22/2019	Around Boys Town	Boys Town Summer Enrichment Program	13	129	30	7	3	111	3	0
8/4/2019	Near Walnut Grove Park	Water's Edge Church	70	240	0	6	2	12	2	0
8/6/2019	90th and Fort area	Family	28	12	2	1	2	6	0	0
8/24/2019	Cuming Street to Lake St, 28th to 40th	Creighton Welcome Week	185	250	0	90	2	180	0	0
8/24/2019	Grace St to Sorensen Parkway, 16th-24th	Creighton Welcome Week	186	250	0	90	2	180	0	0
9/7/2019	Center to Grover, 54th-63rd	Individual-NHS service	36	55	1	1	3	6	3	0
9/21/2019	T Street-Y Street, 32nd-41st	Individual Volunteer	30	100	1	2	3	9	2	0
9/8/2019	S to Madison, 45th-52nd	Girl Scout Troop 42445	11	59	2	2	3	12	2	0
9/22/2019	Leavenworth to Woolworth, 56th-65th	Individual-NHS service	34	93	2	2	3	12	3	0
9/29/2019	Leavenworth to Woolworth, 56th-65th	Individual-NHS service	20	34	1	2	1	3	1	1
9/20/2019	Around 90th and Q	Wells Fargo	20	48	0	9	2	18	2	0
9/1/2018- 10/20/2019	, ,	Eagle Scout Project - Smith	597	618	20	11	6	186	0	0
9/15/2019	160th-170th and south of Maple	Family	41	130	1	1	2	4	1	0
10/13/2019	144th and Dodge north	Beth-el Synagogue	3	10	5	3	2	16	2	0

Date(s) of Service	Location Description [Starting Address]	Organization [Group #]	# of Drains Marked	# of Door Hangers Distributed	Total # of Adult Volunteers	Total # of Youth Volunteers	Hours for the Event	Total Volunteer Hours	# of Trash Bags Collected	# of Recycling Bags Collected
10/23/2019	160th-170th and south of Maple	Family	90	244	4	1	5	25	1	0
11/9/2019	Oakbrook Meadows / Ambrust Acres	Individual Volunteer	110	60	0	2	6	12	2	0
11/17/2019	"Armbrust Acres, Harvey Oaks, Neighborhood behind	Individual Volunteer	70	0	1	1	4	8	1	0
	Akerman elementary [156-168 and Q on north side of Q]."	Mutual of Omaha	32	37	0	12	1	12	3	0
		TOTAL	2,465	5,288	253	353		1601.25	91	1

ATTACHMENT E

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Date	Event Name	Activity	People	Target Audience(s)
1/15/19	UNO ENVN 4090 Green Infrastructure Class - MS4 & CSO Programs	Presentation/ Demonstration	15	Residential Commercial
1/29/19	E&A Lunch-n-Learn Presentation	Presentation/ Demonstration	30	Commercial Construction
2/5/19	UNO ENVN 4090 Green Infrastructure Class - Permeable Pavement	Presentation/ Demonstration	16	Residential Commercial
2/7/19	Sediment and Erosion Control Seminar	Workshop	281	Construction Commercial
2/7/19	2019 Omaha Home Show & Garden Expo	Education Booth	1000	Residential Commercial
2/7/19	2019 Omaha Home Show & Garden Expo	Presentation/ Demonstration	15	Residential Commercial
2/19/19	PCWP Permit Reviewer Meeting	Meeting	12	Construction Commercial Residential
2/22/19	Grading Permit discussion	Meeting	1	Construction
3/4/19	UNO ENV 2010 Class	Presentation/ Demonstration	24	Residential Commercial
3/6/19	Urbans Soils Class UNL - Stormwater Management	Presentation/ Demonstration	15	Residential Commercial
3/19/19	MOBA Luncheon	Presentation/ Demonstration	80	Construction Commercial
3/25/19	Grading Permit discussion	Meeting	1	Construction
3/28/19	SEC Flipbooks	Distribution		Construction
3/28/19	SEC Flipbooks	Distribution		Construction
4/2/19	SEC Flipbooks	Distribution		Construction
4/4/19	MCC Sustainable Leadership Presentation Series	Presentation/ Demonstration	15	Commercial Residential Construction
4/4/19	Deer Ridge Neighborhood Presentation	Presentation/ Demonstration	12	Residential
4/4/19	SEC Flipbooks	Distribution		Construction
4/8/19	SEC Flipbooks	Distribution		Construction
4/9/19	UNO ENVN 4090 Green Infrastructure Class - GI Operations & Maintenance	Presentation/ Demonstration	12	Residential Commercial
4/9/19	UNO ENVN 4090 GI Class	Presentation/ Demonstration	12	Residential Commercial
4/9/19	Olsson-Omaha Stormwater GP discussion	Meeting	4	Construction Commercial
4/13/19	Earth Day	Education Booth	3000	Community Residential
4/15/19	SEC Flipbooks	Distribution		Construction

Date	Event Name	Activity	People	Target Audience(s)
4/18/19	Kennedy Elementary Family Night	Education Booth	160	Residential
4/24/19	Lauritzen Arbor Day Festival	Education Booth	250	Residential
4/25/19	Lauritzen Arbor Day Festival	Education Booth	500	Residential
5/2/19	MORE Nature Night	Education Booth	70	Residential
5/9/19	MORE Nature Night	Education Booth	70	Residential
5/13/19	KOB	Distribution		Residential Commercial
5/13/19	SEC Flipbooks	Distribution		Construction
5/16/19	Water Leaders Academy tour	Tour	30	Construction
6/7/19	SEC Flipbooks	Distribution		Construction
6/11/19	Aim for the Stars Summer Camp	Presentation/ Demonstration	22	Residential
6/25/19	Great Plains LID Symposium	Conference Presentation	95	Commercial Construction Residential
7/11/19	NeFSMA Annual Meeting	Presentation/ Demonstration	20	Commercial Construction
7/12/19	Construction outreach	Distribution		Construction
7/13/19	SAFE Fest 2019	Education Booth	3500	Residential
7/18/19	SEC Flipbooks	Distribution		Construction Commercial
7/18/19	SEC Flipbooks	Distribution		Construction Commercial
8/1/19	SEC Flipbooks	Distribution		Construction Commercial
8/1/19	SEC Flipbooks	Distribution		Construction Commercial
8/19/19	SEC Flipbooks	Distribution		Construction
9/5/19	Master Gardener GI Tour	Tour	35	Residential Commercial Construction
9/7/19	World O! Water	Presentation/ Demonstration	1900	Residential Commercial Construction
9/17/19	Spring Lake Park-South HS Outreach Event	Presentation/ Demonstration	90	Residential
9/18/19	Spring Lake Park-South HS Outreach Event	Presentation/ Demonstration	90	Residential
9/19/19	Omaha GI Tour	Tour	64	Commercial Construction Residential
9/25/19	SEC Flipbooks	Distribution		Construction Commercial
9/25/19	Little Free Library - 6 locations	Distribution		Residential
9/26/2019	MORE Nature Night	Education Booth	150	Residential

Date	Event Name	Activity	People	Target Audience(s)
9/29/2019	Walk for the Animals	Education Booth	900	Residential
9/30/2019	UNO ENV 2010 Class Lecture	Presentation/ Demonstration	15	Residential Commercial
9/30/2019	Sustainable Landscape Manuals	Distribution		Residential
10/3/2019	Goldenrod Festival	Education Booth	1042	Residential
10/8/2019	Girl Scout Troop Rain Barrel Demonstration	Workshop	10	Residential
10/19/2019	Fall Home & Garden Show	Education Booth		Residential Commercial
10/24/2019	MORE Nature Night	Education Booth	175	Residential
	SEC Flipbooks	Distribution		Construction Commercial
	SEC Flipbooks	Distribution		Construction Commercial
11/6/2019	SEC Flipbooks	Distribution		Construction Commercial
11/7/2009	Karen Western Career Day	Education Booth	160	Residential
12/4/2019	E&A SWPPP Inspector Lunch- n-Learn Presentation	Presentation/ Demonstration	10	Construction
12/10/2019	E&A SWPPPP Designer Lunch-n-Learn Presentation	Presentation/ Demonstration	30	Construction
12/12/2019	PCWP Permit Reviewer Meeting	Meeting	12	Construction Commercial Residential
12/15/2019	Holidays with the Blue	Education Booth	1200	Residential
TOTALS			15,145	

Ke	Keep Omaha Beautiful Public Education and Outreach Activities						
	Event Name		Target				
Date	(if applicable)	Activity Type	Audience	Youth	Adults		
1/10/2019	After School Club Presentation (OPS)	Presentation/	School	4	0		
		Demonstration					
1/17/2019	After School Club Presentation (OPS)	Presentation/	School	8	0		
		Demonstration					
1/24/2019	After School Club Presentation (OPS)	Presentation/	School	9	0		
		Demonstration					
1/31/2019	After School Club Presentation (OPS)	Presentation/	School	11	0		
	, ,	Demonstration					
2/14/2019	After School Club Presentation (OPS)	Presentation/	School	6	0		
	, ,	Demonstration					
2/21/2019	After School Club Presentation (OPS)	Presentation/	School	8	0		
	, ,	Demonstration					
2/28/2019	After School Club Presentation (OPS)	Presentation/	School	8	1		
	, ,	Demonstration					
3/7/2019	After School Club Presentation (OPS)	Presentation/	School	10	1		
	, ,	Demonstration					
3/9/2019	PLT Workshop	Presentation/	Community	0	13		
	1	Demonstration					
3/10/2019	Sunday School	Presentation/	Community	65	20		
		Demonstration					
3/12/2019	School Presentation (Millard)	Presentation/	School	44	1		
		Demonstration					
3/13/2019	Rapid Round Table - GOC	Presentation/	Community	8	40		
		Demonstration					
3/19/2019	School Presentation (Papillion-Lavista)	Presentation/	School	35	5		
	, 1	Demonstration					
3/20/2019	Hubbard Lecture Series	Education	Community	0	22		
		Booth					
3/21/2019	UNO Seven Days of Service	Presentation/	School	0	7		
	·	Demonstration					
3/21/2019	After School Club Presentation (OPS)	Presentation/	School	4	0		
		Demonstration					
3/27/2019	School Presentation (Private)	Presentation/	School	27	1		
		Demonstration					
3/28/2019	After School Club Presentation (OPS)	Presentation/	School	4	1		
	, ,	Demonstration					
3/29/2019	School Presentation (Private)	Presentation/	School	4	1		
3/49/4019	School Fleschation (Phyale)	Demonstration	SCHOOL	4	1		
		Demonstration					

D. A.	Event Name	A .4. 14 TD	Target	X 7. 41.	A 1 1/2
Date	(if applicable)	Activity Type	Audience	Youth	Adults
4/1/2019	Legacy School Presentation	Presentation/ Demonstration	School	88	10
4/1/2019	Growing Up WILD Class - Millard Area DayCare Providers	Presentation/ Demonstration	Community	0	16
4/4/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	4	2
4/4/2019	Boy Scout Roundtable Event	Education Booth	Community	0	38
4/7/2019	Church Meeting	Presentation/ Demonstration	Community	0	17
4/11/2019	College of St Mary's Spirit of Service	Presentation/ Demonstration	School	0	23
4/13/2019	Earth Day Omaha	Education Booth	Community	150	241
4/16/2019	College Presentation (Metro CC)	Presentation/ Demonstration	School	0	18
4/16/2019	Stream Cleanup with Nebraska Water Environment Assn	Presentation/ Demonstration	Community	0	9
4/17/2019	Sustainable Spaces Education & Service Day #1	Presentation/ Demonstration	Community	0	5
4/18/2019	NEScifest	Education Booth	School	658	50
4/18/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	7	1
4/19/2019	School Presentation (Private)	Presentation/ Demonstration	School	4	1
4/23/2019	School Presentation (OPS)	Presentation/ Demonstration	School	125	7
4/24/2019	Arbor Day Festival for Students - Day 1	Education Booth	School	518	44
4/25/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	8	1
4/25/2019	Arbor Day Festival for Students - Day 2	Education Booth	School	706	60
4/26/2019	NEScifest	Education Booth	School	429	40
4/29/2019	Global Leadership Group	Presentation/ Demonstration	Community	17	3
4/30/2019	School Presentation (Millard)	Presentation/ Demonstration	School	49	1

Ke	Keep Omaha Beautiful Public Education and Outreach Activities							
	Event Name		Target					
Date	(if applicable)	Activity Type	Audience	Youth	Adults			
4/30/2019	Facebook Employee Service Day	Presentation/	Community	3	14			
		Demonstration	_					
5/2/2019	After School Club Presentation (OPS)	Presentation/	School	8	0			
		Demonstration						
5/2/2019	Scouts Roundtable-Iron Horse District	Education	Community	0	27			
		Booth						
5/3/2019	South High-PackMAC Cleanup	Presentation/	School	11	2			
		Demonstration						
5/9/2019	College Presentation (Metro CC)	Presentation/	Community	0	11			
		Demonstration						
5/9/2019	School Presentation (OPS)	Presentation/	School	65	3			
		Demonstration						
5/9/2019	After School Club Presentation (OPS)	Presentation/	School	7	0			
		Demonstration						
5/10/2019	The Knot Worldwide Donate Day	Presentation/	Community	0	15			
		Demonstration						
5/13/2019	School Presentation (OPS)	Presentation/	School	125	8			
		Demonstration						
5/14/2019	School Presentation (Millard)	Presentation/	School	38	3			
		Demonstration						
5/15/2019	School Presentation (Private)	Presentation/	School	36	3			
		Demonstration						
5/16/2019	After School Club Presentation (OPS)	Presentation/	School	10	0			
		Demonstration						
5/29/2019	Sustainable Spaces Education & Service	Presentation/	Community	0	12			
	Day #2	Demonstration						
6/1/2019	Global Leadership Group	Presentation/	Community	11	7			
		Demonstration						
6/6/2019	School Presentation (Private)	Presentation/	School	56	6			
		Demonstration						
6/7/2019	School Presentation (Private)	Presentation/	School	29	7			
		Demonstration						
6/10/2019	School Presentation (Private)	Presentation/	School	27	6			
		Demonstration						
6/10/2019	School Presentation (Private)	Presentation/	School	30	4			
		Demonstration			_			
6/12/2019	School Presentation (OPS)	Presentation/	School	22	8			
		Demonstration						
6/13/2019	Camp Program (UNO)	Presentation/	School	80	12			
		Demonstration						

Keep Omaha Beautiful Public Education and Outreach Activities						
	Event Name		Target			
Date	(if applicable)	Activity Type	Audience	Youth	Adults	
6/17/2019	School Presentation (Private)	Presentation/	School	21	6	
		Demonstration				
6/17/2019	School Presentation (Private)	Presentation/	School	29	5	
		Demonstration				
6/18/2019	School Presentation (OPS)	Presentation/	School	58	6	
		Demonstration				
6/18/2019	School Presentation (Private)	Presentation/	School	20	4	
		Demonstration				
6/19/2019	School Presentation (OPS)	Presentation/	School	36	5	
		Demonstration				
6/21/2019	College Presentation (Metro CC)	Presentation/	School	0	32	
		Demonstration				
6/24/2019	School Presentation (Private)	Presentation/	School	26	7	
		Demonstration				
6/24/2019	School Presentation (Private)	Presentation/	School	30	4	
		Demonstration				
6/25/2019	School Presentation (Private)	Presentation/	School	22	4	
		Demonstration			_	
6/26/2019	School Presentation (OPS)	Presentation/	School	85	9	
		Demonstration				
6/28/2019	School Presentation (OPS)	Presentation/	School	64	9	
		Demonstration				
6/29/2019	Global Leadership Group	Presentation/	Community	7	9	
		Demonstration				
7/1/2019	School Presentation (Private)	Presentation/	School	24	7	
		Demonstration				
7/12/2019	School Presentation (Private)	Presentation/	School	26	7	
		Demonstration				
7/15/2019	School Presentation (Private)	Presentation/	School	22	6	
		Demonstration				
7/15/2019	School Presentation (Private)	Presentation/	School	20	6	
		Demonstration				
7/19/2019	Cause Connections	Presentation/	Community	0	40	
		Demonstration				
7/29/2019	School Presentation (Private)	Presentation/	School	16	6	
	, , ,	Demonstration				
7/30/2019	School Presentation (Private)	Presentation/	School	40	7	
	, , ,	Demonstration				
8/5/2019	Early Learning Connection Providers	Presentation/	Community	0	16	
	Meeting	Demonstration				

Ke	Keep Omaha Beautiful Public Education and Outreach Activities						
Date	Event Name (if applicable)	Activity Type	Target Audience	Youth	Adults		
8/7/2019	King Science and Technology Community/Teacher event	Education Booth	School	0	37		
8/12/2019	Educator Workshop - Growing Up Wild - Papillion Montessori	Presentation/ Demonstration	School	0	29		
8/22/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	10	0		
8/24/2019	Creighton Community Day of Service (Large Group)	Presentation/ Demonstration	Community	0	600		
8/24/2019	Creighton Communty Day of Service (Small Group)	Presentation/ Demonstration	Community	0	60		
8/28/2019	UNO Service/Volunteer Fair	Education Booth	School	0	50		
8/29/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	11	0		
9/5/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	10	0		
9/7/2019	World O! Water	Education Booth	Community	510	285		
9/11/2019	Creighton Service/Volunteer Fair	Education Booth	School	0	60		
9/12/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	10	0		
9/19/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	12	0		
9/20/2019	United Way Day of Caring	Presentation/ Demonstration	Community	0	23		
9/24/2019	Boy Scouts Meeting	Presentation/ Demonstration	School	47	41		
9/26/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	10	0		
10/3/2019	Goldenrod Festival	Education Booth	School	559	50		
10/4/2019	Mount View Pre-K / Headstart program	Presentation/ Demonstration	School	37	4		
10/4/2019	Durham Teacher's Night	Education Booth	School	0	221		
10/5/2019	Light's On Afterschool	Education Booth	School	350	34		

Keep Omaha Beautiful Public Education and Outreach Activities						
	Event Name		Target			
Date	(if applicable)	Activity Type	Audience	Youth	Adults	
10/8/2019	School Program (OPS/UNO)	Presentation/	School	14	18	
1011015015		Demonstration				
10/10/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	12	0	
10/12/2019	Elkhorn Area Providers Training	Presentation/	School	0	9	
		Demonstration				
10/16/2019	After School Club Presentation (OPS)	Presentation/	School	14	2	
		Demonstration				
10/16/2019	Sustainable Spaces Education & Service	Presentation/	Community	3	1	
	Day #3	Demonstration				
10/16/2019	Sustainable Spaces Education & Service	Presentation/	Community	8	3	
	Day #4	Demonstration				
10/21/2019	After School Club Presentation (OPS)	Presentation/	School	11	3	
		Demonstration				
10/23/2019	Learning Community Center of North	Presentation/	Community	0	11	
	Omaha	Demonstration				
10/24/2019	After School Club Presentation (OPS)	Presentation/	School	14	0	
		Demonstration				
10/25/2019	Completely Kids Out of School Day	Presentation/	School	105	15	
		Demonstration				
10/28/2019	After School Club Presentation	Presentation/	School	24	1	
	(Elkhorn)	Demonstration				
10/31/2019	After School Club Presentation (OPS)	Presentation/	School	12	0	
	,	Demonstration				
11/4/2019	School Program (Millard)	Presentation/	School	38	3	
	2 , ,	Demonstration				
11/5/2019	School Program (OPS)	Presentation/	School	19	1	
		Demonstration				
11/7/2019	After School Club Presentation (OPS)	Presentation/	School	16	0	
		Demonstration				
11/8/2019	School Program (Private)	Presentation/	School	18	2	
		Demonstration				
11/12/2019	School Program (OPS)	Presentation/	School	18	1	
	, ,	Demonstration				
11/12/2019	School Program (OPS)	Presentation/	School	19	3	
	`	Demonstration				
11/13/2019	School Program (Ralston)	Presentation/	School	6	1	
	. , ,	Demonstration				

Ke	Keep Omaha Beautiful Public Education and Outreach Activities						
Date	Event Name (if applicable)	Activity Type	Target Audience	Youth	Adults		
11/14/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	7	0		
11/16/2019	Elkhorn Area Providers Training	Presentation/ Demonstration	School	0	11		
11/21/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	8	0		
12/3/2019	School Program (OPS)	Presentation/ Demonstration	School	20	1		
12/4/2019	Learning Community Center of North Omaha	Presentation/ Demonstration	Community	0	14		
12/5/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	6	0		
12/10/2019	School Program (OPS)	Presentation/ Demonstration	School	20	1		
12/12/2019	School Program (Millard)	Presentation/ Demonstration	School	15	1		
12/12/2019	After School Club Presentation (OPS)	Presentation/ Demonstration	School	17	0		
TOTALS				6,132	2,639		

Target Markets

- Construction Developers, contractors, owners
- Commercial Stores, commercial property managers
- Residential Homeowners, residential property managers
 - o School Students, teachers, administrators
 - o Community Non-profit groups, homeowner associations, etc...

Stormwater Facebook Page						
		Total				
2019 Month	Total Reach	Impressions				
January	292	783				
February	223	410				
March	938	1,875				
April	673	1,175				
May	39	76				
June	39	69				
July	4,068	5,647				
August	345	519				
September	61	169				
October	1,482	2,806				
November	347	454				
December	40	68				
Totals	8,547	14,051				

Omal	Omaha Stormwater Website								
2019 Month	Users	Page Views	Sessions						
January	468	1,296	660						
February	424	1,233	580						
March	538	1,625	781						
April	547	1,488	771						
May	487	1,468	706						
June	378	1,072	538						
July	392	1,257	602						
August	441	1,139	613						
September	366	1,056	548						
October	488	1,289	664						
November	389	1,065	568						
December	359	987	519						
Totals	5,277	14,975	7,550						

2019 REPORT



KOB'S EFFORTS RELATED TO STORMWATER











Household Hazardous Waste

AGREEMENT: KOB shall distribute brochures provided to them by the City of Omaha or developed by KOB regarding the proper disposal of household hazardous waste (HHW) and promote the use of the HHW facility, UnderTheSink. KOB will document the distribution outlets as well as the number and type of brochures distributed.

RESULTS:

- Brochures KOB staff distributed 1,661 of KOB's new *Disposing of Household Chemicals* brochure (approved by EQC late last year) and 551 of the City's *Water Pollution Comes in Many Forms* brochure, both of which highlight UnderTheSink and the appropriate disposal of HHW. The combined total of 2,212 was a slight increase from last year's total of 2,196. Brochures were primarily provided to adult participants attending KOB's school-based and community outreach events/presentations. In addition to the aforementioned, 1,775 *Disposing of Household Chemicals* brochures were provided to EQC for inclusion in the Omaha Spring Cleanup site packets.
- **Door Hangers** KOB also coordinated volunteers who distributed 5,448 English/Spanish "Only Rain Down the Storm Drain" educational door hangers to residents living near marked storm drains, which highlight appropriate HHW disposal and UnderTheSink. The number distributed eclipses last year's record of 5,288 (a slight increase of 3%).
- **Video** In addition to printed brochures and door hangers, a total of 410 people viewed KOB's online video regarding how to appropriately prepare for and drop off household hazardous waste at UnderTheSink (last year = 284).
- Tracking File A full list of distribution outlets and dates, along with the type and number of brochures passed out, is included in the 2019 Tracking Google Document for EQC.

World O! Water

AGREEMENT: KOB shall assist with the planning, coordination, promotion, and evaluation of the World O! Water event, which engages the public on issues related to water conservation, pollution, and recreation. KOB's role will include helping with advertising, recruiting and coordinating volunteers, securing new event partners and vendors, reserving equipment for the event, coordinating waste reduction efforts, and surveying event attendees.

- Event Support & Attendance From February through the September

 7th event date, KOB staff assisted the City of Omaha with planning, coordinating,
 and promoting the World O! Water (WO!W) event. This included reserving equipment, recruiting/coordinating 101
 volunteers, securing food sponsors and event partners, and ensuring recycling opportunities. Based on our counter, we
 estimate approximately 1,700 participants attended, representing 29 different zip codes (similar to last year).
- Feedback Survey Results KOB conducted an intercept survey with participants leaving the event. Results indicated:
 - o 99% were satisfied with the event (86% very satisfied, 13% satisfied)
 - 86% were able to clearly articulate at least one thing they learned from the event related to water conservation, pollution prevention, and/or recreation
 - 88% reported that they found the event extremely beneficial or very beneficial in helping them/their family understand ways to prevent water pollution and/or conserve water
- Advertising & Media Coverage Given the diversified marketing approach, respondents reported hearing about the event via many different channels, especially social media, online calendars, and postcards. The Omaha World-Herald and one local television station also covered the event.
- Waste Reduction & Recycling KOB helped reduce waste at the event by deploying recycling/trash stations in the food area and making portable event recycling units available throughout the event grounds. After providing lunch to an estimated 1,000 people, only one bag of trash was produced in the food area.



Marking Storm Inlets

AGREEMENT: KOB shall organize the marking of storm inlets with discs warning that illegal dumping is prohibited and that storm drains are connected to open bodies of water. KOB will recruit, train, and coordinate volunteers to perform the markings and distribute educational door hangers to area residents regarding how to prevent water pollution. KOB will document the number of storm inlets marked, the locations and the year the markings occurred, the number of educational door hangers distributed, and the results of the related online assessment survey. KOB will also track the number of volunteers involved and total number of volunteer hours completed.



- **Discs** KOB volunteers placed "No Dumping / Drains to Waterways" discs on 3,060 storm drains (an increase of 4.4% from last year's record of 2,931). Contractors also obtained 168 discs and installed them over the course of the year. In addition, volunteers cleaned out 339 drains that already had discs.
- **Door Hangers** As noted in the *Household Hazardous Waste* section, KOB volunteers distributed 5,448 English/Spanish "Only Rain Down the Storm Drain" educational door hangers to households near the drains they marked, which eclipses last year's record of 5,288.
- Community Survey Results In addition to encouraging people to never dump anything down a storm drain, the educational door hangers highlight simple actions that residents can take to prevent stormwater pollution. The door hangers also advertise an incentive (i.e., monthly gift certificate drawing) for completing an online assessment. The results of the online survey for 2019 include the following:
 - 90% of respondents accurately indicated why it is important to never dump anything down a storm drain
 - o 93% of respondents accurately identified potential stormwater pollutants
 - Regarding the likelihood of continuing current behaviors and adopting new actions to prevent stormwater pollution, the percentage ranged from 90% of respondents indicating they are likely or very likely to sweep/blow any grass clippings on the street back into their yard to 30% of respondents indicating they are likely or very likely to obtain/use a rain barrel to collect runoff from their roof (there were eight total behaviors listed)
- **Volunteers** 586 volunteers (233 youth and 353 adults) were involved in the Only Rain Down the Storm Drain program this year, providing a total of 1,601 hours of community service (last year = 1,498 hours).
- Tracking File KOB staff updated the City's GIS system with the marked storm drains. The <u>2019 Tracking Google</u> <u>Document for EQC</u> also notes the locations of the marked storm drains, the date they were marked, and additional information about volunteers (e.g., organizations involved).

Public Awareness Communications

AGREEMENT: KOB shall develop public awareness communications that promote stormwater protection and educate the community about the impacts that specific human activities have on water quality. KOB will document the number of announcements, the type of media, the specific topic addressed, and the dates that the announcements were made.

RESULTS:

- Social Media & E-Newsletters KOB developed and paid for boosted Facebook/Instagram posts and digital advertisements covering a variety of topics and events related to HHW & UnderTheSink, appropriate disposal of fireworks waste, the World O! Water festival, and various actions to prevent stormwater pollution. In addition, KOB sent out a monthly e-newsletter to our distribution list covering various stormwater pollution and water quality topics and events. In total, these posts, ads, and e-newsletters achieved 146,492 impressions and 12,004 engagements (last year's records = 98,577 impressions and 5,549 impressions).
- Partner Ads & Radio Spots KOB also created and paid for digital/printed advertisements connected to partner organizations' e-newsletters and hard-copy newsletters (e.g., Girl Scouts Spirit of Nebraska), which promoted the Only Rain Down the Storm Drain program and World O! Water. Furthermore, KOB staff promoted stormwater pollution prevention and World O! Water via an English/Spanish radio advertisement that was aired 46 times.
- Media Coverage In addition to paid advertisements, KOB helped obtain free media coverage by local radio and television stations for Omaha Spring Cleanup (extended UnderTheSink hours), World O! Water, and appropriate disposal of firework waste.
- Website Over the course of year, KOB's Only Rain Down the Storm Drain webpage, which links to the Omaha Stormwater website, received 911 views.
- Tracking File The <u>2019 Tracking Google Document for EQC</u> notes additional details about paid advertising/outreach and free media coverage (e.g., date of the advertising or media coverage).

Litter Cleanups Near Dam Sites & Streams

AGREEMENT: KOB shall recruit and coordinate volunteers to collect litter near streams and dam sites, as well as other public areas that have storm water management features (green infrastructure) or a body of water nearby. KOB will document the areas addressed, the number of volunteers involved, the total number of volunteer hours complete, the dates of the cleanup activities, and the number of bags of litter collected.

- Cleanups KOB volunteers conducted 772 litter cleanups in 2019, significantly exceeding last year's record of 465. Much of this increase is due to repeated cleanups conducted by Adopt-A-Spot partners and individuals who are completing community service requirements. Out of the 772 litter cleanup events that KOB volunteers conducted this year, 288 of the cleanups involved a lake/dam site (e.g., Zorinsky Lake Park), a park/trail in close proximity to a water body (e.g., Seymour Smith Park, Keystone Trail, etc.), or a stream bank cleanup (e.g., Hell Creek). Last year's total was 229 cleanups.
- **Volunteers & Service Hours** A total of 3,299 volunteers (1,490 youth and 1,809 adults) participated in these 288 litter cleanups, providing 6,484 hours of service to the community.
- Bags of Litter Collected The volunteers collected 2,466 bags of litter (trash & recycling) from the noted areas, which is a slight reduction from last year's total of 2,615 bags.
- **Tracking File** The **2019 Tracking Google Document for EQC** notes additional details about KOB's litter cleanups for the year, including date, location, organization involved, etc.



School-Based Educational Activities/Presentations

AGREEMENT: KOB shall conduct age-specific educational activities with youth in Omaha schools regarding the topics of water conservation, water quality, and storm water management. KOB will document the date and location of activities as well as the number of activities conducted, the participants involved, and the percentage of activities that integrate service learning.

RESULTS:

- Participants & Service Learning KOB conducted 93 presentations/activities in area schools related to stormwater management and pollution prevention. A total of 2,709 participants were involved (2,153 youth and 556 adults). This is an increase from last year's total of 2,488. In addition, 69% of the presentations incorporated service learning (marking storm drains and/or picking up litter).
- Student Assessments Via our unique assessment mechanisms, 92% of students showed gains in knowledge about stormwater pollution and prevention. In addition, 97% of the students demonstrated correct behavioral application/intention. Specifically, students were able to note and draw specific actions on a postcard, which they pledged to adopt in order to help prevent stormwater pollution.
- Teacher Feedback Regarding teacher feedback, 96% of teacher respondents indicated KOB's educational activities
 were very or extremely beneficial to meeting their curricular objectives and advancing student learning. In addition, 92%
 of teachers indicated there were likely to conduct additional, related activities using KOB-provided resources. Please
 note that the aforementioned data for students and teachers is combined, reflecting both KOB's stormwater-related
 educational efforts as well as our activities focused on litter/waste prevention & recycling.
- Teacher Trainings In addition, KOB started conducting environmental education certification trainings for local
 teachers. During these training workshops, the topics of stormwater pollution/prevention and litter/waste reduction are
 typically covered. In 2019, KOB certified 89 teachers in three different environmental education curricula, and these
 teachers collectively work with 4,600+ students on an annual basis.
- Tracking File The <u>2019 Tracking Google Document for EQC</u> notes additional details about KOB's school-based education efforts connected to stormwater management & pollution prevention (e.g., presentation date, location, etc.).

Community-Based Educational Activities/Presentations

AGREEMENT: KOB shall conduct presentations at community outreach events that educate citizens about the City of Omaha's Stormwater Program and how to prevent water pollution. KOB will document the type and number of presentations conducted, and the estimated number of participants involved. KOB will also track the date that the presentation was conducted and the location and name of each event.

- Participants & Service Learning KOB conducted 15 presentations and education booths throughout the community related to stormwater pollution prevention. A total of 1,113 participants (618 youth and 495 adults) were exposed to these educational presentations/booths. This is a reduction from last year; however, 60% of the presentations incorporated service learning (marking storm drains and/or picking up litter), whereas last year equaled 25%. Research has shown that kinesthetic-based activities that incorporate community service are much more beneficial from a learning perspective. Most of the service was completed at KOB's revitalized vacant lot (Sustainable Spaces), which serves as an outdoor education site, featuring rain gardens, native plants, permeable paths, and educational signage related to green infrastructure and stormwater management.
- Tracking File The <u>2019 Tracking Google Document for EQC</u> notes additional details about KOB's community outreach efforts connected to stormwater pollution prevention (e.g., event date, location, etc.).



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						Developed
Official Name to Use	Title on Piece	Res	Com	Con	Ind	by
Landscape Brochure	Keep It Clean On Your Golf Course or Landscape Projects!	X	X			OSW
Stormwater & Dust	Stormwater & Dust Control	X	X	X		OSW
Control Brochure						
Water Pollution Brochure	Water Pollution Comes In Many Forms	X	X	X		OSW
Rain Barrel Brochure	Building A Rain Barrel	X	X			OSW
Storm Drain Awareness Brochure	Keeping Pollution Out Of Our Storm Drains	X	X			OSW
Concrete Brochure	Best Management Practices for Concrete Masonry and Ready Mix Professionals				X	OSW
Pressure Washing Brochure	Take Some Pressure Off Our Environment				X	OSW
Metal Fabrication Brochure	Shape Your Plans to Control Wastewater				X	OSW
Proper Paint Disposal Brochure	Know Your Role In Protecting The Environment	X	X			OSW
Restaurant Brochure	Keep It Clean At Your Restaurant!		X			OSW
Outdoor Event Brochure	Keep It Clean At Your Outdoor Event!		X			OSW
LUPs Brochure	Linear Underground Projects & Stormwater Best Management Practices			X	X	OSW
10 Important Things Flyer	10 Important Things To Remember On The Job Site		X	X		OSW
Pet Waste Flyer	Some Things Are Better Not Left Behind!	X				OSW
Rain Garden Fact Sheet	Rain Gardens	X				OSW
Bioretention Garden Fact Sheet	Bioretention Systems		X			OSW
Bioswale Fact Sheet	Bioswales and Filter Strips		X			OSW
Green Roof Fact Sheet	Green Roofs	X				OSW
Downspout Disconnection Fact Sheet	Downspout Disconnections	X				OSW
Permeable Pavement Fact Sheet	Permeable Pavement		X	X		OSW
Rain Harvesting Fact Sheet	Rain Harvesting	X				OSW
Soil Conditioning Fact Sheet	Soil Conditioning					OSW
Storm Drain Fact Sheet	Storm Drain					
Bioretention Manual	Bioretention Gardens		X	X		OSW
2/20/2020	<u>I</u>	ı	1	ı		1

Official Name to Use	Title on Piece	Res	Com	Con	Ind	Developed by
Sustainable Landscapes Manual	Sustainable Landscapes		X	X		OSW
OmahaPlants.com Postcard	Omahaplants.org	X	X	X		OSW
Grass Clipping Door Hanger	Properly Dispose of Grass Clippings and Yardwaste	X	X			OSW
Rain Barrel Door Hanger	Omaha's Rain Barrel Program	X				OSW
OSW Frisbees		X				OSW
Pet Waste Bag Dispensers		X				OSW
WOW! Activity Books	WOW! Activity Books	X				OSW
WOW! Crayon Boxes	WOW! Crayon Boxes	X				OSW
City of Omaha Environmental Field Guide	City of Omaha Environmental Field Guide		X	X		CSO
Automotive UTS		X		X		SW/Recycl ing
Guide to HHW		X				SW/Recycl ing
Housing Dangerous Products		X				SW/Recycl ing
How to Discard Your Unusued Medications		X				SW/Recycl ing
OmaGro		X	X	X		SW/Recycl ing
Used Motor Oil, Tires, etc.		X				SW/Recycl ing
Pollution Sources Around Your House		X				SW/Recycl ing
Prepare Yourself for UTS		X				SW/Recycl ing
Recycling Paint UTS		X				SW/Recycl ing
Illegal Dumping		X				SW/Recycl ing
Get the Point (Medical HHW)		X				SW/Recycl ing
UTS Drop-off Locations		X				SW/Recycl ing
Proper Paint Disposal		X				SW/Recycl ing

00°-1-1 N 4- TI	T24 P2	D	C	C	T J	Developed
Official Name to Use Clean Water Team	Title on Piece	Res X	Com	Con	Ind	OSW
Certificate Certificate	Clean Water Team Certificate	Λ				USW
Little Steps. Big Impact.		X				OAQ
Brochure		Λ				OAQ
Little Steps. Big Impact.		X				OAQ
Index Card		21				Orig
SEC Flip Book				X		OSW
World O! Water patches		X				OSW
Inlet Marking Door	Only Rain Down the Storm Drain	X				KOB
Hanger	only Rain Bown inc Storm Brain	21				ROB
Sector A - Timber	Sector A - Timber Products				X	OSW
Products						
Sector AA - Fabricated	Sector AA - Fabricated Metal				X	OSW
Metal Products	Products					
Sector AB - Industrial	Sector AB - Industrial Machinery and				X	OSW
Machinery and Auto	Auto Repair					
Repair	-					
Sector AC - Eletrical	Sector AC - Electrical Photographic				X	OSW
Photographic and Optical	and Optical Goods					
Goods						
Sector B - Paper and	Sector B - Paper and Allied Products				X	OSW
Allied Products						
Sector C - Chemical and	Sector C - Chemical and Allied				X	OSW
Allied Products	Products				**	OGM
Sector D - Asphalt	Sector D - Asphalt Paving and				X	OSW
Paving and Roofing	Roofing				37	OGM
Sector E - Glass, Clay,	Sector E - Glass, Clay, Cement, and				X	OSW
Cement, and Gypsum	Gypsum Sactor F. Drimony Motels				v	OSW
Sector F - Primary Metals	Sector F - Primary Metals				X	
Sector J - Mineral Mining	Sector J - Mineral Mining and				X	OSW
and Dressing Sector K - Hazardous	Dressing Sector K - Hazardous Waste				v	OSW
Waste Treatment,					X	OSW
Storage, and Disposal	Treatment, Storage, and Disposal Facilities					
Facilities	1 acmities					
Sector M - Automotive	Sector M - Automotive Salvage Yards				X	OSW
Salvage Yards	Sector in Tratomotive Survage Tards					
Sector N - Scrap	Sector N - Scrap Recycling				X	OSW
Recycling						
Sector O - Steam Electric	Sector O - Steam Electric Generating				X	OSW
Generating Facilities	Facilities					

Attachment F - Education and Outreach Materials

						Developed
Official Name to Use	Title on Piece	Res	Com	Con	Ind	by
Sector P - Land	Sector P - Land Transportation and				X	OSW
Transportation and	Warehouse					
Warehouse						
Sector R - Ship and Boat	Sector R - Ship and Boat Building				X	OSW
Building						
Sector S - Air	Sector S - Air Transportation Facilities				X	OSW
Transportation Facilities						
Sector U - Food and	Sector U - Food and Kindred Products				X	OSW
Kindred Products						
Sector W - Furniture and	Sector W - Furniture and Fixtures				X	OSW
Fixtures						
Sector X - Printing and	Sector X - Printing and Publishing				X	OSW
Publishing						
Sector Y - Rubber, Misc	Sector Y - Rubber, Misc Plastics				X	OSW
Plastics Industries	Industries					
Sector Z - Leather	Sector Z - Leather Tanning and				X	OSW
Tanning and Finishing	Finishing					

Res – Residential

Com – Commercial

Con – Construction

Ind - Industrial

OSW - Omaha Stormwater Program

OAQ - Omaha Air Quality Program

SW/Recycling - Omaha Solid Waste & Recycling Programs CSO - Omaha CSO Program

KOB - Keep Omaha Beautiful



Hot Spot Checklist Form

Facility: Date:

Activity	Never (0)	Occ. (1)	Freq.	Routinely / Everyday (3)	Comments	Score
Maintenance & Repair						
Fueling (0, ≤10, 10- 100, >100 gallons)						
Washing						
Storage						
Loading & Unloading						
Outdoor Material Storage						
Dumpsters/Trash Compactors						
Building & Ground Maintenance						
Parking Lot Maintenance						
Turf Management / Landscaping						
						0

Rating

Never = 0 or only rare occasion, Occasionally = 1-2/yr., Frequently = Approx. 1/mo., Routine = At least 1/wk.

Maintenance yards are defined as locations where activities include: Vehicle & equipment maintenance & repair (excluding small engine repair) Vehicle & equipment fueling (bulk fuel storage capacity - stationary or mobile) Vehicle & equipment washing (particularly outdoor washing) Vehicle & equipment storage outdoor) Outdoor loading & unloading Outdoor material storage (stockpiles & bulk storage, etc.) Dumpster/trash compactors for waste management Building & Grounds Maintenance (i.e. trench drains, sumps, o/w separators, stormwater drainages) Parking Lot Maintenance (i.e. sweeping, patching, paving, grading) Turf management & landscaping maintenance (i.e. fertilizer and pesticide management, mixing, storage)

Scale	Result	Action
>20	Hot Spot	FRCP required
10-20	Potential Hot Spot	Targeted Education & Policy (Consider FRCP)
<10	Not a Hot Spot	Targeted Education

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Stormwater BMP Monitoring Plan City of Omaha Omaha, NE

REVISION 1 March 2020





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List of Acronyms

°C Degrees Celsius AC Alternating Current

BMP Best Management Practice
BOD Biological Oxygen Demand
COD Chemical Oxygen Demand
CSO Combined Sewer Overflow

CWP Center for Watershed Protection

EMC Event Mean Concentration
LID Low Impact Development

ml milliliter

MS4 Municipal Separate Storm Sewer System

NDEE Nebraska Department of Environment and Energy NPDES National Pollutant Discharge Elimination System

NWTPH-HCID Northwest Total Petroleum Hydrocarbon Identification

PVC Polyvinyl Chloride QA Quality Assurance

QAPP Quality Assurance Project Plan

QC Quality Control SM Standard Method

SOP Standard Operating Procedure
TMDL Total Maximum Daily Load

TSS Total Suspended Solids

USEPA United States Environmental Protection Agency

USGS United States Geological Survey

SECTION ONE Introduction

1.1 PURPOSE AND SCOPE

This Stormwater Best Management Practice (BMP) Monitoring Plan details the approach to be used for monitoring the City of Omaha's Stormwater BMPs. This Monitoring Plan provides a detailed description of monitoring protocols and procedures that will be used for the assessment of the effectiveness of BMPs.

The BMPs described in this plan are those implemented by the City of Omaha in compliance with Section H of the City's Stormwater Management Plan, prepared in accordance with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit. The MS4 Permit is regulated by the Nebraska Department of Environment and Energy (NDEE). The MS4 Permit requires the City to evaluate the effectiveness of BMPs using wet weather sampling.

The overall purpose of this monitoring program is to help assess the effectiveness of low impact development (LID) techniques and stormwater BMPs in reducing pollutant levels entering waters of the state from urban runoff within the city. A primary focus of this work is on pollutants with Total Maximum Daily Loads (TMDLs) in receiving waters. Since virtually every property and BMP site has unique characteristics, it will not be possible to apply one single approach to stormwater monitoring at all BMP sites. Each type of BMP is structurally unique. Further, in some cases, BMPs are stand-alone units, in others they are parts of "treatment trains." Some have single inflow or outflow points, others have multiple inputs and discharges. Consequently, the monitoring approach will need be customized at each site.

In locations where BMPs are "stand-alone" and stormwater inflow and outflow points are well defined, it may be possible to monitor the inflow and outflow to assess the effectiveness of the unit by itself. In locations where it is not possible to quantify inflows to BMPs due to multiple inflow points or site limitations, the City will attempt to monitor discharges from treated vs. untreated portions of the landscape to assess BMP effectiveness. Regardless of conditions, the monitoring will attempt to provide some type of useful data on the effects of stormwater BMPs on reducing TMDL pollutants, and also provide information that may help refine the design of future BMPs employed by the City.

1.2 DEVELOPMENT OF LOW IMPACT DEVELOPMENT BMPS

LID is a new concept in United States stormwater management system. Many of the LID techniques utilized in this monitoring plan were pioneered by Prince George's County, Maryland in the early 1990s (USEPA 2000). LID is a site design strategy with the goal of controlling stormwater at the source through the use of microscale controls distributed throughout a site. Most LID practices can be integrated into infrastructure and are typically more cost effective and aesthically appealing than traditional stormwater conveyance systems. The following are common examples of LID BMPs:

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• **Bioretention systems**, and **rain gardens** for smaller drainage areas, are designed based on local soil types, site conditions, and local flora. Bioretention systems can consist of several components (grass buffer strips, ponding area, soil planting bed, organic/mulch layer, vegetation) which all aid in the reduction of flow and pollutant loads. They are less cost intensive than traditional stormwater collection systems but typically require annual maintenance (including replacement of mulch or surficial soils every 5 to 10 years to maintain soil integrity).

- Grass swales are typically open channel systems that are best suited for smaller drainage areas with a sloping topography. They reduce runoff velocity and function as filtration/infiltration devices. Typical cement-type swales can be two to three times more expensive than engineered grass swales (CWP 1998). Grass swales require some maintenance to remove sediment as it builds up over time and mowing to prevent overgrowth.
- Rain barrels and cisterns are collection devices which are typically placed under the
 downspouts of roofs. Rain barrels are typically constructed out of a 55-gallon drum with a
 discharge hose and a screen filter to keep particulate matter out of the water. The collected
 water is then used to water gardens and lawns. Cisterns collect larger volumes of water for
 reuse.
- **Vegetated roof covers**, also known as **green roofs**, aid in the reduction of impervious surfaces in urban areas and typically consist of a flora layer, growing media, geotextile layer, and a synthetic drain layer. Green roofs have been used in Europe for over 25 years and have been shown to reduce energy costs, increase the lifespan of roofs, and are very effective in reducing the total runoff volume.
- **Permeable pavements** allow stormwater to infiltrate into underlying soils which promotes pollutant treatment and recharge. They are best suited for low traffic areas (parking lots, sidewalks) and perform best when installed in areas with sandy soils and flat slopes. They can be used over clay soils when used with a gravel and underdrain system. Permeable pavement systems include pavement stones and blocks, porous asphalt, and porous concrete.

1.3 OBJECTIVES

The primary objective of the BMP Monitoring Program is to evaluate the reduction of target TMDL pollutants that pass through the BMP.

Secondary objectives identified for the BMP Monitoring Program include:

- Evaluate the reduction of flow volumes or flow rates that pass through the BMP
- Compare the performance of the BMP for different intensity storm events
- Assess the performance of BMPs over time
- Evaluate the reduction of pollutants that pass through the BMP

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1.4 DATA INPUTS

To meet the primary objective of evaluating the reduction of TMDL pollutants, water quality monitoring will be conducted at BMP locations. Water quality parameters may vary, depending on potential sources of pollutants and TMDL pollutants that are a concern in the receiving waterbody. Potential pollutant parameters include: biological oxygen demand (BOD), total suspended solids (TSS), ammonia nitrogen, nitrate-nitrogen, total nitrogen, soluble phosphorous, total phosphorous, pH, and *E. coli*.

Monitoring at BMP locations also includes evaluating indirect reduction of TMDL pollutants. This includes flow rate and total flow through the BMP during a sampling event, and the extent of infiltration. BMPs can be effective merely by preventing water containing pollutants from reaching receiving water through retention and slower dispersion.

1.5 STUDY BOUNDARIES

The BMP Monitoring Program applies to the City of Omaha in Douglas County, Nebraska. The BMPs are located in the Papillion Creek and Missouri River watersheds within the Omaha City Limits. Discharges into the Combined Sewer Overflow (CSO) portion of the City's stormwater system are not covered by the MS4 Permit.

The City continues to develop and construct individual BMPs throughout their jurisdiction. Currently, there are eight stormwater BMP areas (**Figure 1**) included in this document. These BMP areas are:

- Saddlebrook Joint Use Facility
- Orchard Park
- Under the Sink
- Creighton Prep
- UNO Welcome Center
- Sewer Maintenance Facility
- Adams Park
- Albright Park

Individual BMPs are addressed in the appendices of this plan.

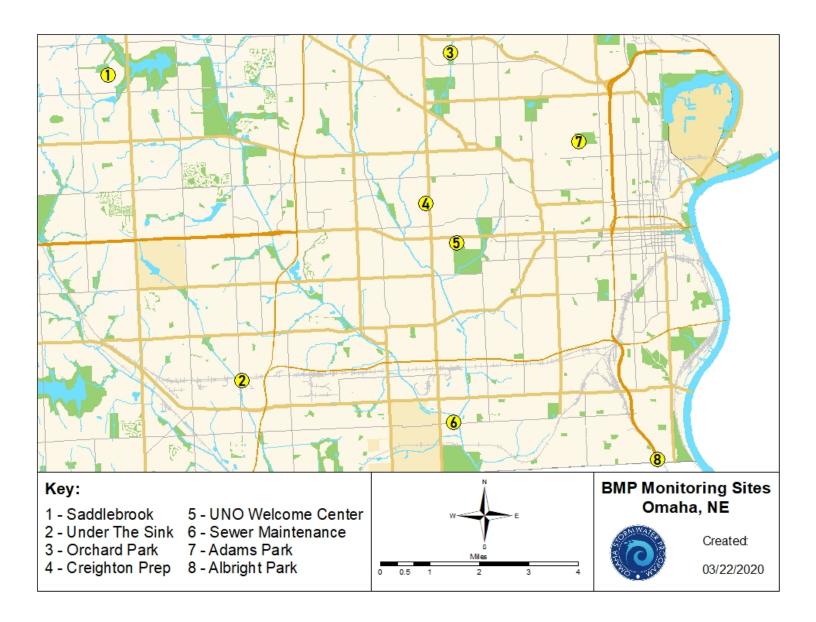


Figure 1: BMP Monitoring Sites

2.1 MONITORING APPROACH

The primary objective defined in Section 1.3 is to assess the effectiveness of the BMP in reducing TMDL pollutants. This will be done through direct monitoring of the BMP system and a nearby "control" system without a BMP, when available. The goal of LID BMPs is to maintain predevelopment characteristics of the area during wet weather periods to the extent feasible. The capabilities of various BMPs are unique and variable, and the monitoring approach will be tailored to the specifics of each BMP area. Specific monitoring approaches for individual BMPs are described in the appropriate appendix.

2.2 PERFORMANCE ACCEPTANCE CRITERIA

Stormwater monitoring data will be collected in accordance with the methods described in Section 2.3, with further details included in the appropriate appendix for site-specific BMPs. Data will be analyzed and reviewed in accordance with the Quality Assurance Project Plan (QAPP) (Appendix A).

2.3 METHODS

2.3.1 Determining Sampling Events

Determining appropriate sampling events presents one of the greatest challenges to the BMP Monitoring Program as BMP performance varies by storm event size, duration, and frequency. For the purpose of this Monitoring Plan, a sampling event is defined as at least 0.1 inch of rain occurring after at least 72 hours of dry weather. However, the capacities of individual BMP's vary and may not discharge stormwater until a storm event reaches a particular intensity. The capacity and appropriate sized storm event will be determined for each BMP.

2.3.2 Wet Weather Sampling Methods

Water quality parameters will generally be collected using either a grab or automatic sampler for "first flush" samples or an automatic sampler for composite samples. Manual sampling provides a means to manually start the sample collection to avoid "false" sampling when an event does not meet the requirements described in Section 2.3.1. Automatic samplers offer the benefit of being able to collect samples when the field crew is unable to reach the site before the first flush. Automatic samplers are used for composite sampling as they can be programmed to collect either a flow or time proportioned sample.

2.3.3 Flow Monitoring

Accurate flow measurements are required to complete water balance computations and are critical for estimating BMP capture and bypass volumes, as well as volume losses. These flow rate measurements also affect the estimates of event mean concentrations (EMCs) and pollutant loads.

Stormwater runoff flow through BMPs can be measured using a variety of devices dependent upon the conveyance (natural channel, engineered open channel, or pipes) of the flow. Open channel flow has an open water surface that varies with depth as the flow is driven by gravity. Flow rate in open channels is not only dependent upon depth, but also the shape and slope of the channel along the length of the channel, the hydraulic roughness of the channel surface, the rate of depth flow change over time, and the spatial scale over which flow rate changes. Closed channel flow (i.e., flow through pipes) is caused by and increases with the hydraulic pressure gradient.

2.3.3.1 Measuring Flow

Flow rates and volume of stormwater are not typically part of TMDL listings, but they are critically important to physical and habitat functionality of waterways. For this reason, stormwater quantity elements (flow rate and volume reduction) are considered as conditions of concern in evaluating BMP effectiveness, along with the stormwater quality parameters listed in Section 2.3.5. However, flow and volume reduction effectiveness are subject to the assumptions applied to the various BMPs.

A variety of methods and devices can be used to measure flow and will vary depending upon the BMP. Specific methods and devices for each BMP will be discussed in the appropriate appendix.

2.3.3.2 Sample Parameters for Water Quantity

Monitoring the hydrologic performance of BMPs provides information on BMPs' ability to reduce the peak flow rates of runoff leaving the landscape and entering the storm sewer system, as well as the ability to reduce the overall total volume of runoff (by infiltrating a portion of the flow volume). Monitoring hydrologic performance also provides information on how BMPs function during various-sized storm events, during successive storm evens, after prolonged dry periods, and if infiltration improves over time as vegetation becomes established.

Monitoring inflow and outflow rates allow peak flow rates and total runoff volumes to be calculated as well as create storm event hydrographs. Hydrographs can be plotted over graphs of rainfall volume versus storm duration with the times when the grab or composite samples were collected. These graphs aid in interpretation of chemical data as well as aiding in the identification of any monitoring errors (USEPA 2009).

Recommended data to be collected includes: inflow and outflow rates, BMP construction details (area, soil type, depth, plant distribution, etc.), and other visual observations (overall BMP functionality and design). It is also recommended a control area be identified in order to properly assess the functionality of each BMP. Water volume monitoring may not be suitable for all BMPs installed as part of the City of Omaha's Stormwater Program; therefore, specific recommendations for water quantity monitoring at each applicable BMP site are listed in the appropriate appendices.

2.3.4 First Flush Sampling

"First flush" is defined by the United States Environmental Protection Agency (USEPA) as the first ½ inch of stormwater runoff (USEPA 2000). The first flush often contains the highest pollutant concentrations in a storm runoff event, especially in small drainage areas with mostly impervious surfaces, and in storms with relatively constant rainfall. In such cases, the first flush may carry pollutants that accumulated in the collection system and paved surfaces during the dry period before the storm. The results from single grab samples collected during the first flush of storm runoff can be useful for determining which pollutants are present at levels of concern. The first flush strategy may be less effective in areas with frequent and numerous low-intensity, long duration storms because "first flush" effects are less obvious when the dry periods between storms are short. For the purposes of this BMP Monitoring Plan, first flush samples will be collected within 45 minutes of the initial stormwater discharge.

2.3.5 Sample Parameters for Water Quality

Typical water quality parameters can include a variety of constituents. Selection of the specific parameters will be based primarily upon permit requirements and will focus on TMDL requirements for the receiving water body. Other parameters may be selected based on land use in the surrounding area, anticipated target pollutants for the BMP, and overall program objectives and resources. Specific sampling parameters are discussed in Appendix A and in each BMP-specific Appendix.

2.3.5.1 Surrogate Parameters

Certain parameters can serve as representative surrogates for an entire class of pollutants. These serve as cost effective ways to simplify BMP comparison and data collection and may provide a more feasible method of sample collection than direct sampling of some parameters. Some surrogates and the contaminants they represent are:

- TSS: can represent organic compounds and total metals. TSS also correlates well to COD, BOD, and total phosphorus. These all tend to be substances that adsorb to or are themselves particulate materials. TSS is representative of materials that have the potential to settle.
- **Dissolved zinc** (as percent removal): can represent most dissolved metals. The mechanisms (such as filtration, precipitation, or adsorption) that remove one dissolved metal have similar effects on other dissolved metals in that chemical class. Although metals may partition into dissolved and total forms in different proportions, depending on environmental conditions (pH, total organic carbon, etc.), the percent removals tend to be comparable among the different dissolved metals.
- *E. coli*: can represent pathogens. Virus and bacteria survival and die-off rates tend to be affected by similar environmental conditions, such as temperature, sunlight, and filtration mechanisms.

Sample and surrogate parameters for each BMP will be discussed in each appropriate appendix.

2.3.5.2 Measuring Pollutant Removal

Pollutant removal efficiency, usually represented by a percentage, specifically refers to the pollutant reduction from the inflow to the outflow of a system. The two most common computation methods are EMC efficiency and mass or load efficiency. EMC efficiency measures the inflow and outflow concentrations for all storm events but does not account for water volume. Mass efficiency is influenced by the volume of water entering the BMP and water losses within the BMP (e.g., evapotranspiration and infiltration). This method is based on the sum of incoming and outgoing loads and is considered a more accurate calculation than EMC efficiency, which gives equal weight to both small and large storm events. As a general rule, the concentration-based technique often results in slightly lower performance efficiencies than the mass-based technique (CWP 2007).

2.3.6 Data and Sampling Needs

A range of various sized storm events will be measured as pollutant concentrations vary between different storm flows. Small and large rainfalls can be overemphasized in the sampling results and may not be representative of the typical flow through the system due to their infrequency. Thus, intermediate storm events are typically the most relevant when determining BMP effectiveness. A stratified random approach will be used for monitoring BMPs as their effectiveness varies with storm volume and flow rate.

3.1 DATA ANALYSIS PROCEDURE

As data is collected and sample results received from the assigned laboratory, data validation procedures will be performed. This includes checking that all requested analyses were performed on the correct samples, checking holding times to ensure sample quality was not compromised, ensuring that laboratory quality procedures were followed and within laboratory control limits, and assigning appropriate qualifiers to potentially uncertain data.

Once data validation is completed, raw data will be entered into the appropriate spreadsheets, and data evaluation will be conducted. Through data evaluation it can be determined if BMPs are achieving desired goals of pollutant and flow reduction.

3.2 QUALITY CONTROL

To ensure collected samples and flow measurements are accurate and representative of each BMP, quality assurance (QA), and quality control (QC) benchmarks will be established. Effective QA/QC practices include frequent and routine site visits by trained personnel, repetitious methods for each BMP, frequent data review, and quality audits.

To ensure sampling methods satisfy QA/QC benchmarks, appropriate field, sampling, and laboratory methods will be used. These include using precaution when obtaining grab samples to prevent algae or other debris from entering the sample, handling bottle caps with precaution to avoid introducing extraneous dirt, debris, etc., and labeling sample bottles directly. When obtaining samples from a transfer container, similar techniques will be used, but additional precautions, such as rinsing the container several times with deionized water and new sample water prior to collecting a sample for analysis, will also be incorporated to prevent crosscontamination between samples.

Contamination can occur during the sample and equipment preparation and during the sample collection, transportation, and analysis. "Blank" samples (test blanks, equipment blanks, field blanks, method blanks, etc.) can be used to determine if contamination has occurred during any of these steps. "Duplicate" samples are used to provide a measure of the representativeness of the sampling and analysis procedures (for field duplicates), assess the reproducibility of laboratory analysis methods (for laboratory duplicates), and determine the accuracy and precision of the analysis methods (for matrix spike/matrix spike duplicates).

Specific details of the QA/QC program are detailed in the QAPP (Appendix A) and the Policies and Procedures for Quality Control Division Laboratory Manual (City of Omaha 1998).

3.3 PROGRAMASSESSMENT

BMP assessment monitoring results will be reviewed and summarized annually in the City of Omaha's MS4 Permit Annual Report These summaries will include the monitoring data, site locations, events monitored, time between peak stormwater flows and timing of sampling, as well as any additional observations and conclusions that can be drawn from the monitoring.

As data is collected and compiled, assessments of the effectiveness of each BMP can be made. BMPs can be modified to enhance their effectiveness and future BMPs will be created utilizing this knowledge.

3.3.1 Using BMP Data to Improve Design

Data generated by BMP Monitoring will be carefully evaluated before using the data to make design judgments. These data evaluations will provide a means to determine if the BMP is effectively achieving the objective of reducing pollutants, and provide a comparison of different BMPs to evaluate which designs are more effective. Generally, monitoring BMPs will give a basis for future BMP design and construction and may be incorporated into the Omaha Regional Storm Water Design Manual (ORSDM 2014).

SECTION FOUR References

Center for Watershed Protection (CWP). 1998. Better Site Design: A Handbook for Changing Development Rules in Your Community.

- City of Omaha Public Works Department. 1998. Policies and Procedures for Quality Control Division's Laboratory Testing. March.
- CWP. 2007. National Pollutant Removal Performance Database. September.
- Omaha Regional Storm Water Design Manual (ORSDM). 2014.
- United States Environmental Protection Agency (USEPA). 2000. Low Impact Development: A Literature Review. October.
- USEPA. 2009. Urban Stormwater BMP Performance Monitoring. Prepared by Geosyntec Consultants and Wright Water Engineers, Inc. June.



A.1 INTRODUCTION

This QAPP describes the Quality Assurance (QA) and Quality Control (QC) procedures that will be implemented as part of the City's Stormwater Management Program. The QAPP has been designed to ensure that the data generated are of sufficient quality to meet the data quality objectives.

A.2 DATA QUALITY OBJECTIVES

All data will be gathered in accordance with NDEE Title 119, Chapter 21.006 and the City of Omaha BMP Monitoring Plan. Sample collection protocol and analytical requirements are discussed in the Stormwater BMP Monitoring Plan and the appendices. Data quality objectives are qualitative and quantitative statements that specify the quality of the data and define the level of certainty necessary to support BMP effectiveness. The data collected as a part of the City of Omaha's Stormwater BMP Monitoring Plan will be used to assess water quality, flow, and eventually the design of the individual BMPs.

A.3 PROJECT PERSONNEL

The following will be the core project personnel. A project contact list is included in Appendix B.

A.3.1 Project Managers

The project managers are responsible for overall project coordination, including the production of all project deliverables, collection and submittal of environmental samples to the designated laboratories for the chemical and physical analyses specified in the QAPP. The project manager is also responsible for coordinating these tasks with the other interested and involved parties associated with this monitoring plan and ensuring that the monitoring plan is implemented as specified.

A.3.2 Project QA/QC Manager

The QA/QC Manager is responsible for coordinating with the analytical laboratories, ensuring conformances with data quality objectives, overseeing data validation, and managing project quality assurance and quality control.

A.3.3 Contract Laboratory Project Manager

The laboratory project manager will provide analytical support to the project and is responsible for ensuring that laboratory analyses are performed according to the protocols, quality control criteria, and other specifications detailed in this QAPP.

A.4 CONTRACT LABORATORY REQUIREMENTS

The contract laboratory is expected to meet the following minimum requirements:

- Adhere to the methods outlined in the statement of work, including methods referenced for each analytical procedure
- Deliver hard copy and electronic data as specified
- Meet reporting requirements for deliverables
- Meet turnaround times for deliverables
- Implement QA/QC procedures, including the QAPP data quality requirements, laboratory analysis plan requirements, and performances evaluation testing requirements
- Allow laboratory and data audits to be performed, if necessary
- Follow documentation, chain of custody, and sample logbook procedures

Changes in the laboratory procedures specified in the QAPP will not be permitted without written documentation of the intended change and the rationale. The Project QA/QC Manager must approve all changes in advance.

A.5 QUALITY ASSURANCE OBJECTIVES

Laboratory analysis parameters include:

- Ammonia nitrogen
- Bacteria (*E. coli*)
- BOD
- Nitrate-nitrogen
- Total and dissolved phosphorus
- Total metals (copper and zinc)
- Total nitrogen
- Total petroleum hydrocarbons
- TSS

Field analysis parameters include:

- Dissolved oxygen
- pH
- Temperature
- Turbidity

The QA objectives for the project are to develop and implement procedures that will ensure the collection of representative physical and chemical data of known and acceptable quality.

A.6 PRECISION

Precision is the degree to which measurements can be reproduced (or repeated) under a given set of conditions and demonstrate the same or similar results. Field precision will be evaluated by the collection of field duplicates. Field duplicates will be collected at a rate of 10 percent or at least one duplicate per sampling event. One sample location will be chosen for field duplicates during each event. The field duplicate will be "blind" to the assigned laboratory.

A.7 ACCURACY

Accuracy is the degree of closeness of a measured or calculated quantity to its actual (true) value. Field accuracy is controlled by adherence to the sample collection methods outlined in the monitoring plan. Analytical accuracy can be assessed by utilizing samples "spiked" with known standards (surrogates, laboratory control samples, and/or matrix spike) and measuring the percent recovery.

A. 8 REPRESENTATIVENESS

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that work plans and appropriate standard operating procedures (SOPs) are followed and that proper sampling techniques are used. These can include the analysis of trip blank, method blank and field blank data. Using the proper analytical procedures, appropriate methods, following laboratory SOPs, meeting sample holding times and analyzing and assessing field duplicate samples ensures laboratory representativeness.

A.9 COMPARABILITY

Comparability expresses the confidence with which one data set can be evaluated in relation to another data set. For this monitoring program, data will be used to evaluate trends over time and evaluate areas that are not performing as desired. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that work plans and appropriate SOPs are followed and that proper sampling techniques are used. Analytical data will be comparable when similar sampling and analytical methods are used and laboratory SOPs are followed and documented in the QAPP.

A.10 COMPLETENESS

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. The data quality objective for completeness for all components of this project is 90 percent. Data that have been qualified as estimated because the quality control criteria were not met will be considered valid for the purpose of assessing completeness. Data

that have been qualified as rejected will not be considered valid for the purpose of assessing completeness.

A.11 QUALITY CONTROL PROCEDURES

Sampling procedures for each BMP of the Monitoring Plan are described in detail in the appendix for each BMP. The following section (Section A.11.1) describes the field quality control samples (duplicates) to be collected.

A.11.1 Field Quality Control Procedures

To verify the quality of field samples, one field duplicate will be collected. Validation guidelines have not been established for field quality control samples. However, they are useful in identifying possible issues and problems resulting from samples collection or processing in the field. All field quality control samples and procedures will be documented in a field logbook.

A.11.2 Sample Handling

To control the integrity of samples during transit to the laboratory and during holding time prior to analysis, previously established preservation and storage measures will be incorporated into sample collection and preparation practices.

A.11.3 Sample Custody Documentation

Sample labels will be placed directly on the bottle and secured with clear tape to prevent handling mistakes or confusion as to what analysis should be performed on each bottle. Preformatted chain of custody forms will be used to document the transfer of samples to the laboratory as well as the type of analysis to be performed on each bottle. All samples will be analyzed following USEPA standardized methods.

A.12 LABORATORY QUALITY CONTROL PROCEDURES

The laboratory will maintain SOPs which describe in detail the analytical procedures for this study and will respond to inquiries if the need arises. These SOPs will be kept in the project file at the analytical laboratory and will include written protocols for the analytical methods used.

A.12.1 Reporting Limits and Analytical Methods

The laboratory will calculate the method detection limits for each analyte in each matrix of interest and will establish an initial calibration curve for all analytes. Reporting limits have been set at or below ambient water quality criteria for chronic exposure and maximum containment levels for drinking water. All sample containers provided by the contracted laboratory will be certified clean containers by the laboratory. Table A-1 describes the analytical requirements for parameters that will be frequently used.

Table A-1. Analytical Methods

Analyte	Volume Required (mL)	Container	Preservation	Analytical Method	Holding Time
Total Metals – Copper and Zinc	100	1000 mL HDPE bottle	Nitric Acid	USEPA 200 Series	6 Months
Petroleum Hydrocarbons	800	1000 mL amber jar	4°C	OA-2	7 Days to Extract
E. Coli	100	120 mL HDPE bottle	4°C, Sodium Thiosulfate	SM9223	6 Hours
Biological Oxygen Demand	1000	1000 mL HDPE bottle	4°C	SM5210B	48 Hours
Nitrate and Nitrite	100	500 mL HDPE bottle	Sulfuric Acid	USEPA 300	48 Hours
Ammonia Nitrogen	nia Nitrogen 100		4°C, Sulfuric Acid	USEPA 3503.	28 Days
Total Kjeldahl Nitrogen 500		500 mL HDPE bottle	Sulfuric Acid	USEPA 351.3, 351.4	28 Days
Total Phosphorous	50	500 mL HDPE bottle	Sulfuric Acid	USEPA 365.1, 365.3	28 Days
Dissolved Phosphorus	sphorus 50		Unpreserved to lab for filtering and preservation	USEPA 365.1. 365.3	28 days
Total Suspended Solids	200	500 mL HDPE bottle	4°C	USEPA 160.2	7 Days

°C = degrees Celsius

mL = milliliter

HDPE = High Density Polyethylene

OA-2 = Iowa Modified Method

SM = Standard Method

USEPA = United States Environmental Protection Agency

USGS = United States Geological Survey

A.12.2 Laboratory Quality Control Criteria

The analyst will review results of the quality control samples from each sample group immediately after a sample group has been analyzed. The quality control sample results will then be evaluated to determine if control limits have been exceeded. If control limits are exceeded in the sample group, the Project Manager or Project QA Manager will be contacted immediately and corrective action will be initiated prior to processing a subsequent group of samples.

All primary chemical standards and standard solutions used in this project will be traceable to the National Institute of Standards and Technology, Environmental Resource Associates, or other documented, reliable, commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in the standard will be documented.

A.12.2.1. Matrix Spikes and Matrix Spike Duplicates

Analysis of matrix spike samples provides information on the extraction efficiency of the method on the sample matrix. By performing duplicate matrix spike analyses, information on the precision of the method is also provided for organic analyses. A minimum of 1 matrix spike will be analyzed for every sample group or for every 20 samples, whichever is more frequent, when possible.

A.12.2.2 Surrogate Spikes

All project samples analyzed for organic compounds will be spiked with appropriate surrogate compounds as defined in the analytical methods. The laboratories will report surrogate recoveries; however, no sample result will be corrected for recovery using these values.

A.12.2.3 Method Blanks

Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. A minimum of 1 method blank will be analyzed for every extraction batch or for every 20 samples (10 samples for conventional parameters), whichever is more frequent.

A.13 DATA REVIEW AND REPORTING

All data will undergo two levels of QA/QC evaluation: one at the laboratory, and one by the QA/QC Manager.

Initial data reduction, evaluation, and reporting at the laboratory will be carried out as described in the appropriate analytical protocols and the laboratory's QA Manual. Quality control data resulting from methods and procedures described in this document will also be reported.

A.13.1 Minimum Data Reporting Requirements

The following describes the minimum data reporting requirements necessary for proper QA/QC evaluation of the analytical data.

A.13.1.1 Sample IDs

Records will be produced that clearly match all blind duplicate QA samples with laboratory sample IDs.

A.13.1.2 Sample Receipt

Chain of custody forms will be filled out for all sample shipments to document problems in sample packaging, custody, and sample preservation upon receipt at the laboratory.

A.13.1.3 Reporting

For each analytical method run, analytes will be reported as a detected concentration or as less than the specific reporting limit. The laboratories will also report dilution factors for each sample as well as date of extraction (if applicable) and date of analysis. Standard data packages will consist of a case narrative, sample results, QA sample results, and chain of custody forms.

A.13.2 Internal Quality Control Reporting

Internal quality control samples will be analyzed at the rates specified in the applicable analytical method.

A.13.3 Independent Data Quality Review

Once data is received from the laboratory, a number of QC procedures will be followed to provide an accurate evaluation of the data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness.

A qualified environmental scientist will perform a data quality review. The contract laboratory will deliver complete data packages for all chemical analyses. The data will be evaluated in accordance with the QAPP. All chemical data will be reviewed with regard to the following, as appropriate to the particular analysis:

- Holding Times
- Blanks
- Detection Limits
- Surrogate Recoveries
- Matrix spike/Matrix spike duplicate
- Laboratory and field duplicate relative percent differences

The results of the data quality review will be summarized as a part of the annual monitoring report. This report will be submitted to the project QA Manager for final review and confirmation of the validity of the data.

A.14 LABORATORY AUDITS AND CORRECTIVE ACTIONS

A.14.1 Laboratory and Field Performance Audits

Laboratory and field performance audits consist of on-site reviews of quality assurance systems and equipment for sampling, calibration, and measurement. Laboratory audits will not be

conducted as part of this study; however, all laboratory audit reports will be made available to the Project QC Manager upon request. All laboratories are required to have written procedures addressing internal QA/QC All laboratories must ensure that personnel engaged in sampling and analysis tasks have appropriate training.

A.14.2 Corrective Action Procedures

A.14.2.1 Corrective Action for Field Sampling

The Project Manager will be responsible for correcting equipment malfunctions during the field sampling effort and for resolving situations in the field that may result in noncompliance with the QAPP. All corrective measures will be immediately documented in the field logbook.

A.14.2.2 Corrective Action for Laboratory Analysis

All laboratories are required to maintain and comply with their SOPs. The Laboratory Project Manager will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

The Project Manager or QA/QC Manager will be notified immediately if any quality control sample exceeds the project-specified control limits. The analyst will identify and correct the anomaly before continuing with the sample analysis. A narrative describing the anomaly, the steps taken to identify and correct the anomaly, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, re-extraction) will be submitted with the data package.

APPENDIX B Project Contact List

Table B-1: Project Contacts

Project Personnel					
Project Managers					
James P. Kee, Jr.	Andy Szatko				
City of Omaha Public Works Department	City of Omaha Public Works Department				
Environmental Quality Control Division (EQCD)	EQCD - Stormwater Program Supervisor				
- Environmental Quality Control Manager					
5600 S. 10 th St.	5600 S. 10 th St.				
Omaha, NE 68107	Omaha, NE 68107				
Phone: 402-444-3915 ext. 3909	402-444-3915 ext. 1101				
Fax: 402-444-3904	Fax: 402-444-3904				
james.kee@cityofomaha.org	andy.szatko@cityofomaha.org				
Project QA/QC Manager	Contracting Laboratory Project Manager				
City of Omaha Public Works Department	Heather Ramig				
EQCD – Lab Supervisor	Midwest Laboratories - Account Manager				
	Representative				
5600 S. 10 th St.					
Omaha, NE 68107	13611 B St				
Phone: 402-444-3915 ext. 1136	Omaha, NE 68144				
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	Fax: 402-334-9121				
	heather@midwestlabs.com				

C.1 SITE DESCRIPTION

The Saddlebrook Joint Use Facility is a collaboration between Omaha Public Schools and the City of Omaha. It includes an elementary school (Pre-Kindergarten through 4th grade), an Omaha Public Library, and a Recreational Center. It opened in August 2009 and is located at 14850 Laurel Avenue in northwest Omaha.

The facility includes a "green roof" and bioretention area adjacent to the parking lot. The roof and bio-retention areas both include two distinct monitoring areas: one to measure an untreated, control portion and one to measure each BMP.

C.2 SITE OBJECTIVES

Monitoring at the Saddlebrook Joint Use Facility is designed to measure flow, volume, and pollutant reductions that occur through the BMPs. The



objectives and monitoring capabilities for the site reflect the overall objectives for the BMP Monitoring Program, to evaluate the effectiveness of pollutant reductions through the BMPs. Over time, it is expected data will help create a design assessment of each BMP.

C.3 SITE BOUNDARIES

The Saddlebrook Joint Use Facility BMP monitoring area includes the green roof portion of the facility and the paved parking area that drains into the bioretention system. Control groups include the standard construction portion of the roof and the paved parking area that drains directly into the storm sewer.

C.4 SITE MONITORING

C.4.1 Equipment

- Isco 2150 Area Velocity Modules
- Isco Area Velocity Sensors
- Isco 2105ci Interface Modules
- Isco 674 Tipping Bucket Rain Gauge
- Isco Avalanche Samplers
- Water quality sample containers

C.4.2 Sample Control Area

Control samples will be collected from the designed monitoring areas on the traditional (not green) roof and an area of the parking lot which does not flow through the bioretention system. For valid comparison of flow and pollutant load, both control areas have permanently installed sampling points of similar construction and drainage area to the corresponding BMP points.

C.4.3 Rainfall

Rainfall data will be measured on site and corroborated with NOAA rainfall data for accuracy. Rainfall is measured on site with an Isco 674 Tipping Bucket rain gauge. It is measured in increments of 0.01 inches and records data every 15 minutes with an Isco 2105ci Module, that also serves as a modem for remote data access; Flowlink software is utilized for data retrieval and management.

C.4.4 Grab Sampling Procedures

Sampling locations at Saddlebrook Joint Use Facility contain discharge pipes located in manholes. Due to safety precautions during a rain event, entering the manhole to collect a sample directly isn't feasible. Therefore, a transfer container will be used to collect grab samples. A clean dipper attached to an extension rod will be lowered to just above the bottom of the water column, withdrawn, and used to fill the sample containers. This method provides the most representative sample, prevents preservative loss, and provides the greatest amount of safety for site workers.

Single-use transfer containers will be used to collect samples and will be discarded after each use. The selected type of transfer device, the composition of this device, and the volume of the device will be recorded in the field notes.

C.4.5 Composite Sampling Procedures

Composite samples will be collected in large, pre-cleaned, glass jars using Isco Avalanche Samplers, which are permanently installed at four locations throughout the Saddlebrook Facility. The Isco Avalanche Samplers provide refrigeration and are programmable for several sampling routines including: pause/resume sampling for intermittent-discharge flow monitoring, sampler pacing by time, non-uniform (random) time, flow or external event, and random interval sample collection.

The city will conduct flow proportional sampling and the automatic sampler will collect all aliquots based on the parameters in Table C-1. These sampler settings may be refined in the future if storm flows through the system warrant a change in settings.

Table C-1.	Automatic S	Sampler	Settings
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Sample Location	Drainage Area (ft²)	0.5-inch Rain Volume (Ccf)	Aliquot Pacing	Maximum Samples	Aliquot Volume (mL)	Total Composite Sample Volume (mL)
West Parking Lot	77,520	32.2	1 per 1 Ccf	37 or 32	250	8,000 to 9.250
East Parking Lot	64,234	26.76	1 per 1 Ccf	26	300	7,800
Green Root	9,166	3.27	1 per .1 Ccf	32	250	8,000
Grey Root	7,865	3.82	1 per .1 Ccf	38	200	7,600

Ccf = 100 cubic feet mL = milliliter ft2 = square feet

C.4.6 Flow Monitoring

Flow sampling will be conducted utilizing Isco 2150 Flow Module which uses continuous wave Doppler technology to measure mean velocity. The Flow Modules are collocated with the Isco Avalanche Samplers and are permanently installed in the manholes show on **Figure 2**. Flowlink software will be utilized for data analysis and data will be uploaded to a laptop computer.

C.4.7 Sampling Equipment

Single-use transfer containers will be used to collect grab samples and will be discarded after each use. All sample containers will be pre-cleaned and pre-preserved as provided by the contract laboratory.

C.4.8 Method for Samples Collected by Transfer Container

- The depth of water will be determined and the transfer container will be lowered to the appropriate sampling location
- The transfer container will be inserted and withdrawn very slowly and carefully to avoid agitation of the bottom sediments
- The sample container will be filled to the appropriate necessary volume
- The sample will be labeled
- The outside surface of the container will be decontaminated as required
- The time of sampling will be recorded
- Samples will be stored on ice in a cooler

C.4.9 Method for Samples Collected by Automatic Samplers

- The large glass jar (or similar container) will be removed from the Isco Avalanche Sampler
- The sample will be carefully poured into laboratory provided sample containers
- Container will be filled to desired volume
- The sample will be labeled
- The outside surface of the container will be decontaminated as required
- The time of sampling will be recorded
- Samples will be stored on ice in a cooler

C.4.10 Monitoring Parameters

E. coli is the only TMDL pollutant for the receiving water body. However, the City may sample additional parameters to evaluate the overall effectiveness of the BMP. These parameters include:

- Ammonia nitrogen
- Bacteria (E. coli)
- BOD
- Dissolved oxygen
- pH
- Nitrate-nitrogen
- Temperature
- Total and dissolved phosphorus
- Total metals (copper and zinc)
- Total nitrogen
- Total petroleum hydrocarbons
- TSS
- Turbidity

These parameters may be modified as data are collected. Monitoring parameters may be discontinued or additional parameters may be added, depending on the data evaluation. In addition to the water quality parameters, additional information may be collected to supplement the evaluation of the effectiveness of the BMPs. This information may include:

- Flow volumes through the sample points
- Plant distribution and health within the gardens and green roof
- Indications of performance or failure erosion, sedimentation, plugging, flow short-circuiting or bypass, weeds, mulch loss, etc.

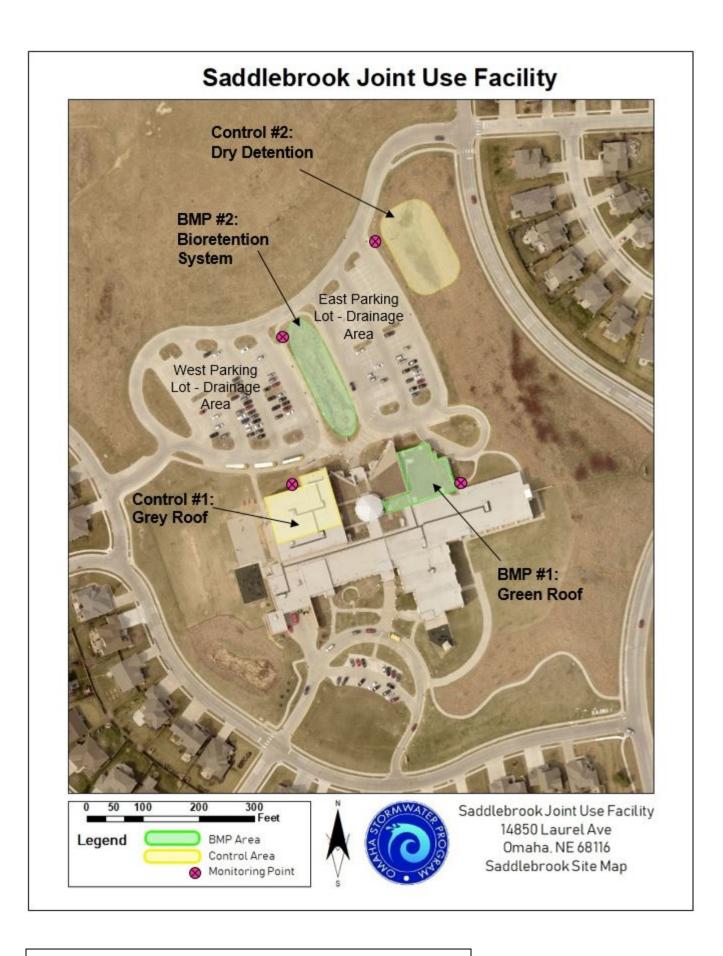


Figure 2: Saddlebrook Joint Use Facility Monitoring Sites

APPENDIX D Under the Sink

APPENDIX D Under the Sink

D.1 SITE DESCRIPTION

Under the Sink is a household hazardous waste (or special waste) collection facility located at 4001 South 120th Street. It accepts oil- and latex-based paints, batteries, antifreeze, used oil, florescent light bulbs, fertilizers and pesticides, mercury thermometers, and a variety of other household cleaners and supplies for safe disposal and/or recycling.

The site includes a series of bio-retention areas, bio-swales, level spreader, and a dry creek bed. Under the Sink is situated at the bottom of two hillsides (to the north and east), which results in bio- retention areas receiving flow from multiple sources. One bio-retention area receives flow from a roof drain, the bio- swale receives runoff from the parking lot and surrounding hillside and directs flow into a series of five bio-retention areas, and a series of six bio-retention

areas along 120th Street receive parking lot runoff. The dry creek bed also receives parking lot and hillside runoff and flows into one bio-retention area.



D.2 SITE OBJECTIVES

Monitoring has not been completed in the past at Under the Sink, since the BMPs were not constructed with monitoring in mind. Implementing a monitoring program at this facility is not anticipated in the future; therefore, the objectives for the site are recommended to be more qualitative in nature. These include:

- Inspecting the BMPs to ensure regular maintenance (cleanout) occurs.
- Evaluating whether specific segments of the BMP system tend to function better than other segments.
- Inspecting overall plant health and modifying plant communities if certain varieties are unhealthy.

D.3 SITE BOUNDARIES

Under the Sink BMP Monitoring is limited to the bio-retention, bio-swales, and dry creek bed areas only.

APPENDIX D Under the Sink

D.4 RECOMMENDED SITE SAMPLING

D.4.1 Sample Control Area

Sampling is not recommended at this time; however, if a sampling program were to be implemented in the future, control samples could be collected from an area north of the parking lot entrance where flow is directed over limestone rock and directly into the storm sewer.

D.4.2 Sampling Methods

Samples for pollutant analysis could be collected as manual grab samples. Automatic samplers have not been installed at Under the Sink.

D.4.3 Monitoring Parameters

Water quality sampling is not recommended at this time.

E.1 SITE DESCRIPTION

Orchard Park is located on 66th and Hartman Streets in northeast Omaha. The community park includes a sprayground play area, playground equipment, multi-use trails, tennis courts, and a softball field.

The site includes four bio-retention areas and a bio-swale. The bio-retention areas and bio-swale flow into Cole Creek, which is directly adjacent to the site. Cole Creek has undergone rechannelization to include meanders which will allow the creek to flow in a more natural manner when swollen with stormwater from severe storm events.





There are four distinct bio-retention areas: one directly south of the main parking lot, one to the east of the main parking lot circle, and two located north of the tennis courts. The tennis court bio-retention areas collect water from 66th Street and Kansas Avenue. These BMPs are installed in a series, so when the first bio-retention area fills with water, overflow is directed via three polyvinyl chloride (PVC) pipes into the eastern bio-retention area. The eastern area then drains to Cole Creek via an underdrain system.

E.2 SITE OBJECTIVES

Sampling and monitoring equipment at Orchard Park is designed to analyze the hydrology of a two-tiered bioretention system attest its efficiency at reducing pollutant loads. Orchard Park is also the oldest monitored BMP and provides a unique opportunity to observe long term effectiveness of bioretention systems.

E.3 SITE BOUNDARIES

Orchard Park BMP Monitoring includes the two bioretention systems, and the curb cut inflow point and outlet structure.

E.4 RECOMMENDED SITE SAMPLING

E.4.1 Monitoring Equipment

- ECH20 GS3 Soil Moisture Sensors by METER, Inc.
- ECRN-100 High Res Rain Gauge by METER, Inc.
- Em50 Data Loggers by Decagon Devices, Inc.
- HOBO U20L-04 Water Level Loggers by Onset
- Water quality sample containers

E.4.2 Control Area Recommended Monitoring Methods

Water quality control samples will be grabbed before runoff enters the system at the curb cut on the south side of the west bioretention system. One of the 5 locations for soil moisture sensor installation lies outside of the bioretention system to serve as a control.

E.4.3 Rainfall

Local rainfall measurements will be observed on site with an ECRN-100 High Res Rain Gauge and corroborated with national weather rainfall data.

E.4.4 Ponding Depth

A HOBO U20-4 Water Level Logger has been installed at ground level in a PVC stilling basin with 3/8-inch perforations on 1.5-inch centers at the bottom of the east bioretention facility. Ponding depth will be measured every 5 minutes and stored in the attached data logger.

E.4.5 Soil Moisture and Temperature

Ten ECH20 GS3 Soil Moisture Sensors are installed around the downstream bioretention system. The soil moisture sensors are installed in 5 locations, each with 2 sensors at depths of 6-inches and 36-inches. Within the bioretention system, two monitoring locations are be located close to the bottom and two located farther away but still in line with the stilling basin. One set of sensors are located outside of the bioretention area to serve as a control location. Soil temperature and volumetric moisture content (VMC) will be measured at each location and logged every 5 minutes.

E.4.6 Grab Sampling Procedure

Grab sampling at Orchard Park will occur at the 4-inch outflow pipe at Cole Creek and the south

inlet to the system. In order to ensure stormwater flow enters the second bioretention system, the valve in the west basin will be closed, forcing water to overflow into the east basin and eventually into the underdrain out to Cole Creek. Samples will be taken via direct fill versus transfer container because the discharge sites are not within manholes. A complete set of samples will be collected from both locations along with one duplicate set.

Sample containers will be filled to the appropriate volume applicable for each parameter analysis, labeled, and stored to the specifications of the QAPP. Samples will be taken to the contracted laboratory within recommended holding time for the most sensitive parameter.

E.4.7 Water Quality Parameters

The City may sample additional parameters to evaluate the overall effectiveness of the BMP. These parameters can include:

- Ammonia nitrogen
- Bacteria (E. coli)
- BOD
- Dissolved oxygen
- Nitrate-nitrogen
- Nitrite-nitrogen
- pH
- Total and dissolved phosphorus
- Total metals (copper and zinc)
- Total nitrogen
- Total petroleum hydrocarbons
- Total Solids (TS)
- TSS
- Turbidity

APPENDIX F Creighton Prep **APPENDIX** F Creighton Prep

F.1 SITE DESCRIPTION

The Creighton Prep site is located on the southern edge of the Creighton Preparatory High School near the intersection of N 72nd Street and Western Avenue. A bioretention system was constructed at Creighton Prep in 2014. Most of the stormwater runoff to the bioretention system is generated in the parking lot to the west, where it enters through a 24-inch storm sewer. The

contributing drainage area to this 24-inch storm sewer is 2.1 acres of 80% impervious land cover. The bioretention system receives additional runoff via overland flow from a 7.7-acre irrigated grass turf sports field to the north. A 4-inch PVC pipe underdrain with valve runs the length of the bioretention system, regulating surface flow through the soils and subsurface drainage. For storm events producing runoff greater than 0.5-inches the cobble stone overflow weir is overtopped and the area inlet collects and conveys stormwater to the 36-inch storm sewer downstream in Western Avenue.



F.2 SITE OBJECTIVES

Monitoring at the Creighton Prep bioretention system is designed to measure inflow, outflow and ponding depths in order to model flow and discharge rates with respect to ponding depth and calculate storage volumes.

F.3 SITE BOUNDARIES

Creighton Prep monitoring is limited to the bioretention system and at the 24-inch inflow and 12-inch outflow pipes.

F.4 SITE MONITORING

F.4.1 Equipment

- Isco 2150 Area Velocity Modules
- Isco Area Velocity Sensors
- Isco 674 Tipping Bucket Rain Gauge
- Isco 4120 Submerged Probe Flow Logger

APPENDIX F Creighton Prep

- HOBO U20L-04 Water Level Logger by Onset
- Water quality sample containers

F.4.2 Sample Control Area

Control water quality samples will be taken at the 24-inch inflow pipe that conveys untreated stormwater from the impervious parking lot upstream. Flow metering occurs in the inlet pipe to measure pre-treatment conditions.

F.4.3 Rainfall

Isco 674 Rain Gauge will accurately measure local rainfall and store data (along with area velocity data) in the Isco controller.

F.4.4 Flow Monitoring

Isco 2150 Area Velocity flow meters measure average velocity and total volume. Area velocity meters are installed in 24-inch inflow pipe and 12 inch area outflow pipe. Inflow and outflow rates are measured every 15 minutes when dry and every minute once flow is detected.. Data will be stored electronically in the Isco controller and regularly downloaded for data review and quality control.

F.4.5 Ponding Depth

Ponding depth in the bioretention system is monitored using HOBO U20L-04 Water Level Logger installed at ground level in a stilling basin within the bioretention system. The stilling basin consists of a 2-inch PVC pipe with 3/8-inch perforations on 1.5-inch centers. The pressure transducer records ponding depth every 5 minutes.

F.4.6 Grab Sampling Procedure

Water quality sampling will occur at the manholes to the inflow and outflow pipes for the bioretention system. Because of safety concerns during a rain storm grab samples will be acquired with the use of transfer containers that will be lowered into the discharge. Some parameters such as *E. coli* will be acquired via direct fill instead of transfer container. One complete set will be taken from each manhole along with one duplicate set.

Containers will be filled carefully, so as to not disturb the bottom sediments and returned to the surface to fill individual sample containers. Containers will be filled, labeled, and stored to the specifications of the QAPP. Samples will be taken to the contracted laboratory within recommended holding time for the most sensitive parameter.

APPENDIX F Creighton Prep

F.4.7 Water Quality Parameters

The City may sample additional parameters to evaluate the overall effectiveness of the BMP. These parameters can include:

- Ammonia nitrogen
- Bacteria (E. coli)
- BOD
- Dissolved oxygen
- Nitrate-nitrogen
- Nitrite-nitrogen
- pH
- Total and dissolved phosphorus
- Total metals (copper and zinc)
- Total nitrogen
- Total petroleum hydrocarbons
- Total Solids (TS)
- TSS
- Turbidity

G.1 SITE DESCRIPTION

The UNO Welcome Center site is located on the west side of the University of Nebraska at Omaha campus at 6001 Dodge Street. It was constructed in 2012. Runoff from the Welcome Center building constitutes most of the drainage to the bioretention system at the UNO Welcome Center site. Two bioretention infiltration trenches receive runoff from the UNO Welcome Center via 8-inch drain pipes and tie into 4-inch PVC pipe underdrain which regulates the subsurface drainage.



The two bioretention infiltration trenches

are separated by a segmental retaining wall. At ponding depths greater than 1 foot water from the south trench overtops the wall through a small weir into the north bioretention infiltration trench and ponding depths greater than 1 foot in the north infiltration trench overtop a precast wall cap unit onto the river rock apron, where the trench drain inlet collects and conveys stormwater to an existing 4-inch PVC pipe into the parking lot to the west.

G.2 SITE OBJECTIVES

Monitoring at the UNO Welcome Center is designed to measure plant health, ponding depth, and soil properties within a bioretention garden. This data will be used to analyze the effectiveness of treated soils in infiltrating and distributing stormwater. Plant monitoring set up allows for long-term health responses by vegetation that will help determine which plants to recommend. Installed at UNO, we intend to coordinate with green infrastructure classes on developing research

G.3 SITE BOUNDARIES

Monitoring at this site is limited to the soil and plants within the bioretention system.

G.4 SITE MONITORING

G.4.1 Equipment

- Campbell Scientific (Models: CS655-U-L40-PT-DS, CS655-U-L30-PT-DS, and CS655-U-L25-PT-DS) Soil Moisture Sensors
- Campbell Scientific CS451-75-SA-7-SN Pressure Transducers
- Campbell Scientific CR6-NA-ST-SW Data Logger
- Network Video Recording (NVR) cameras

G.4.2 Ponding Depth

Ponding depth is measured using Campbell Scientific pressure transducers at the base of each infiltration trench. The pressure transducers are mounted on the inside of 4-inch PVC pipe with 3/8-inch perforations on 1.5-inch centers. Data is logged every 5 minutes and recorded with the Campbell Scientific Data Logger.

G.4.3 Soil Moisture and Temperature

Twenty-five Campbell Scientific soil moisture sensors will be installed at five locations within and directly surrounding the bioretention facilities. At each of the five locations, sensors will be buried at depths of 6, 12, 18, 24, and 30-inches. The sensors will measure and record volumetric moisture content, soil temperature, and electric conductivity every 15 minutes.

G.4.4 Plant Monitoring

Qualitative monitoring continues with the use of NVR camera. Year-round video is stored on a network for easy retrieval. Plant health, bloom times, seasonal growth, and other parameters will be looked at remotely.



H.1 SITE DESCRIPTION

The City of Omaha Sewer Maintenance Facility is located in an industrial area of Omaha at 6880 Q Street and was installed in 2014. The monitoring site is a bioretention system that receives inflow from the maintenance facility parking lot though a curb cut and from an underdrain pipe of a permeable pavement system. The Sewer Maintenance BMP handles runoff from a relatively large parking lot, some of which is treated first by a section of permeable pavement. Outflow exits the bioretention system via an underdrain pipe and high flow overflow structure that ties directly into the existing storm sewer.



H.2 SITE OBJECTIVES

Monitoring at Sewer Maintenance Facility is designed to measure pollutant load reductions that occur as a result of the BMP.

H.3 SITE BOUNDARIES

Monitoring on this site is limited to inflow and outflow areas of the bioretention facility.

H.4 SITE MONITORING

H.4.1 Equipment

- Water quality sample containers
- Additional monitoring equipment installed by USGS

H.4.2 Control Area

Inflow samples collected from the parking lot curb-cut and the access port downstream of the permeable pavement will be compared to outflow samples collected from the infiltration trench outlet to assess BMP performance.

H.4.3 Grab Sampling Procedure

During a rain event, inflow samples will be taken at the west inlet and outflow samples will be collected at the bioretention underdrain monitoring manhole, which has an access flume for grab sampling. Transfer containers may be used when collecting outflow samples. One complete set of

samples will be collected from the inflow and outflow points, along with one duplicate set.

Sample containers will be filled to the appropriate volume applicable for each parameter analysis, labeled, and stored to the specifications of the QAPP. Samples will be taken to the contracted laboratory within recommended holding time for the most sensitive parameter.

H.4.4 Monitoring Parameters

The City may sample additional parameters to evaluate the overall effectiveness of the BMP. These parameters can include:

- Ammonia nitrogen
- Bacteria (E. coli)
- BOD
- Dissolved oxygen
- Nitrate-nitrogen
- Nitrite-nitrogen
- pH
- Total and dissolved phosphorus
- Total metals (copper and zinc)
- Total nitrogen
- Total petroleum hydrocarbons
- Total Solids (TS)
- TSS
- Turbidity

APPENDIX I Adams Park

APPENDIX I Adams Park

I.1 SITE DESCRIPTION

The Adams Park site is located on the west side of John A. Creighton
Boulevard between Bedford Avenue and Maple Street. It was constructed in 2014 as part of the City of Omaha's Combined Sewer Overflow (CSO) Long Term Control Plan. The Adams Park site is an expansive 14-acre wetland detention facility that provides up to 77 acre-feet of storage to detain the 100-year event. Stormwater runoff from 387 acres of residential and commercial zoned drainage area enter the southwest



corner of the facility via two basin inlet pipes 72 and 84 inches in diameter. The basin outlet structure on the north east corner of the site controls the discharge of stormwater through two 48-inch basin outlet pipes into the downstream combined sewer system.

I.2 SITE OBJECTIVES

Monitoring at Adams park is designed to capture the behavior of the neighborhood-sized detention basin to different sized rain events, specifically ponding depth and drawdown times. In previous years, flow was monitored to analyze total and peak flow reductions across the wetland.

I.3 SITE BOUNDARIES

Ponding depth will be taken at locations within the detention basin.

Additionally, .flow monitoring can be conducted at the inlet and outlet structure. An outside organization has conducted flow monitoring previously, and the data will be provided to the City of Omaha.

I.4 SITE MONITORING

I.4.1 Monitoring Equipment

HOBO U20L-04 Water Level Loggers by Onset

I.4.2 Ponding Depth

HOBO pressure transducers are installed at three locations in the wetland detention system: one upstream of a culvert near the center of the basin, one in a wetland micropool offline from the main channel, and one at the basin outlet. The pressure transducers are installed at ground level within PVC pipes with ½-inch perforations on 1.5-inch centers, anchored to T-posts for stability. Ponding depth will be measured and logged in each location every 5 minutes during the monitoring period.

APPENDIX J Albright Park

J.1 SITE DESCRIPTION

The Albright Park bioretention system is located on the east side of Albright Park, south of Gilmore Avenue and west of Highway 75. The bioretention site was constructed in 2017 and receives runoff directly from the adjacent 6 acres (approximate) of park area, and 4 acres of drainage area from the south. The 4 acres of contributing area south of Albright Park drains to a storm inlet on the west end of Madison Circle and is subsequently piped to the site.

Flow enters Albright Park at the southeast corner of the site and is conveyed to the bioretention system via a meandering channel. The bioretention system has a perforated underdrain that ties into the outlet control structure. Ponding in the bioretention system is controlled by an AgriDrain grated outlet structure, containing an inline weir, which discharges water to a 12-inch outlet pipe when either the grated top and/or internal weir elevation is exceeded. The 12-inch outlet pipe taps into the recently constructed Gilmore Avenue separate storm sewer that then discharges to the South Barrel Outfall Sewer east of the site.

J.2 SITE OBJECTIVES

Albright Park monitoring is designed to measure water quality and drawdown rate with the goal of assessing the effectiveness of large BMPs at reducing pollutant load and peak runoff.

J.3 SITE BOUNDARIES

Albright Park monitoring is limited to the inlet and outlet structures of the bioretention system.

J.4 SITE MONITORING

J.4.1 Equipment

- HOBO U20L-04 Water Level Logger by Onset
- Water quality sample containers

J.4.2 Sample Control Area

Inflow samples collected from the piped inlet will be compared to outflow samples collected from the AgriDrain outlet structure.

J.4.3 Ponding Depth

Both the subsurface and surface water level within the bioretention system is monitored using a pressure transducer that records water level on 5 minute intervals. The pressure transducer is inserted into a 2-inch PVC pipe with 3/8-inch perforations on 1.5-inch centers. It is installed within the AgriDrain outlet structure, mounted on the upstream side of the inline weir. Based on the AgriDrain design water level at this point represents the water line beneath (or above) the ground.

J.4.4 Grab Sampling Procedure

APPENDIX J Albright Park

Water quality sampling has occurred at Albright Park in the past and the BMP is now designated as an alternate water quality sampling site. If taken, water quality samples will be collected at the inflow and outflow structures of the bioretention system. Inflow samples will be taken at the inlet pipe and outflow samples will be taken from the AgriDrain structure. A complete set of samples will be collected from both locations along with one duplicate set.

Sample containers will be filled to the appropriate volume applicable for each parameter analysis, labeled, and stored to the specifications of the QAPP. Samples will be taken to the contracted laboratory within the recommended holding time for the most sensitive parameter.

J.4.5 Water Quality Parameters

The City may sample additional parameters to evaluate the overall effectiveness of the BMP. These parameters can include:

- Bacteria (E. coli)
- BOD
- Dissolved oxygen
- Nitrate-nitrogen
- Nitrite-nitrogen
- pH
- Total and dissolved phosphorus
- Total metals (copper and zinc)
- Total nitrogen
- Total petroleum hydrocarbons
- Total Solids (TS)
- TSS
- Turbidity

Site Weather Observations

Data

Daily weather history and observations were gathered from the National Weather Service (NWS) Eppley Airfield (Station ID: USW00014942) and Valley (Station ID: USC00258795) weather stations. Provisional rain data from the Papio Missouri Natural Resource District City Maintenance Shop (411701095570601), Cole Creek (06610760), Hitchcock Park (411232095584201), Big Papillion Creek at Q Street (06610770), and Little Papillion Creek near Irvington, Nebraska (06610750) rain gauges was used to supplement data gaps from on-site rain gauges.

Observations

Early 2019 was marked by historic flooding throughout Northeast Nebraska leading to milder and wetter than average conditions. Average high and low temperatures in 2019 were lower than average during the monitoring period, however, during the monitoring period average temperatures fell within the normal range. The Valley Weather Station data recorded a total precipitation in 2019 of 39.77 inches, substantial departure from the NOAA Average Rainfall of 30 inches annually (Table 1). Cumulative precipitation was ahead of normal for the entire year and especially increased during the monitoring period. Four of the 6 months that monitoring occurred recorded greater than average rainfall including two events, one in September and one in October, in which recorded precipitation was more than double the normal depth (Figure 1).

Month	NOAA Rainfall 2019 (in)	NOAA Average Rainfall (in)		2019 Average Low (°F)	2019 Average High (°F)	Omaha Normal Low (°F)	Omaha Normal High (°F)
Jan	0.86	0.72		15.6	33.4	13.6	33.4
Feb	2.01	0.85		9.3	25.8	18.1	38.1
Mar	2.68	1.99		26.6	44.5	28.1	50.9
Apr	1.35	2.96		43.4	66.3	39.8	63.7
May	7.65	4.76		52.6	71.3	50.9	73.8
Jun	2.8	4.18		64.9	83.5	61	83.2
Jul	2.64	3.83		70	87.3	66.2	87.3
Aug	5.31	3.82		67.2	83.7	64	85.1
Sep	5.81	2.68		64	83.3	53.9	77.6
Oct	5.63	2.15		39.6	58.3	41.6	64.7
Nov	0.93	1.64		27.7	47	28.8	48.9
Dec	2.1	1.04		23.4	41.2	16.7	35.3
Total:	39.77	30.62	Avg:	42.03	60.47	40.23	61.83

Table 1: Summary of NOAA Valley Weather Station 2019 and historical average precipitation and temperatures

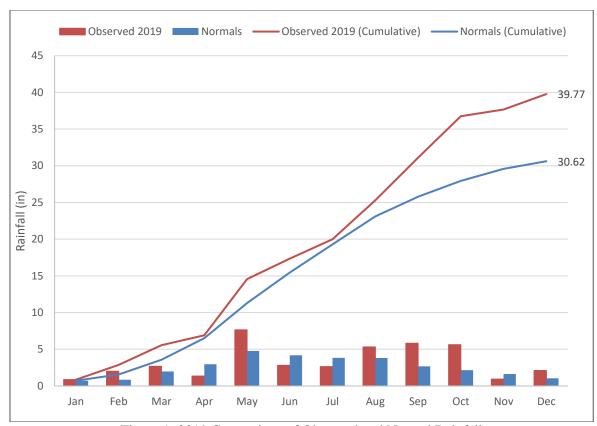


Figure 1: 2019 Comparison of Observed and Normal Rainfall

According to the NWS Eppley Rain Gauge, over 50 measurable rain events, from 0.01 inches to 3.19 inches, occurred between May 24th and October 28th. During this monitoring period, 14 rain events exceeded 0.5 inches, and 8 of these precipitation events exceeded 1 inch. A summary of the 0.5-inch and 1-inch events are included in Table 2.

Date	Event Rainfall (in)
27-May	1.24
28-May	1.67
3-Jun	0.78
23-Jun	0.69
3-Jul	0.54
16-Jul	0.55
11-Aug	3.19
21-Aug	0.9
19-Sep	2.79
22-Sep	1.39
29-Sep	0.87
1-Oct	2.12
5-Oct	1.42
10-Oct	1.8

Table 2: Summary of 2019 rain events of 0.5in or greater.

Rain Events for BMP Assessment

Two rain events were evaluated for each monitoring site. All sites were analyzed for the same two events in 2018 with the exception of Orchard Park. The two events included a large, intense storm and a smaller, gentle storm. On-site rain gauges or the nearest rain gauge was utilized for each site. The rain gauge at Eppley Airfield is presented below and is used to described why these events were selected for BMP assessment.

The first event (Event 1) was a 3.19-inch event that occurred the morning of 08/11/2019 (Figure 1). Event 1 was the largest event recorded at the National Weather Service (NWS) rain gauge at Eppley Airfield. It happened over the course of 5 hours, having an average intensity of 16.20 mm/hr. It had the second highest intensity of rain events during the monitoring period and based on NOAA Atlas 14 for Omaha, NE (see Appendix A for NOAA Atlas 14 tabular output), is classified as between a 3 and 5-year event. Event 1 was selected to observe BMP performance during more severe rain events.

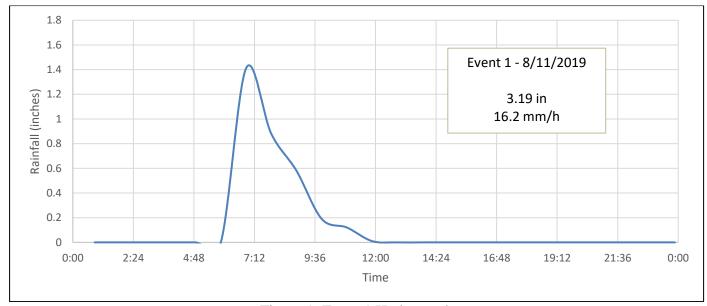


Figure 1: Event 1 Hydrograph

The second event (Event 2) was a 1.80-inch event that occurred 10/9/19 to 10/10/19 (Figure 3). Event 2 had an average intensity of 0.075 in/hr (1.905 mm/hr) and was selected to observe the performance of BMPs under low-intensity and long-duration rain events. For most sites, an event of this size would produce at least 0.50 inches of runoff. It should also be noted that event two occurred at the end of a string of low intensity storms that lasted for almost 20 days. Events ranged from 0.4 inches to 1.24 inches totaling 3.24 inches during this period.

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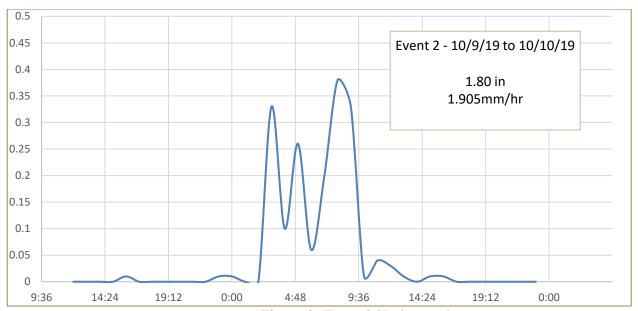


Figure 2: Event 2 Hydrograph

Saddlebrook

Data were collected with Isco 2150 Area Velocity Flow Modules and Sensors that measure quantity and velocity of stormwater runoff. Flow analysis is included for the green and grey roofs as well as the bioretention system for the 2019 sampling period. This data is used to compare volume, peak flow rate, and overall efficiency between the traditional and green infrastructure practices. Outflow (discharge) data was collected from the grey and green roofs for direct comparison. Outflow data was collected from the bioretention system and inflow (runoff) data was collected from the east parking lot. Runoff to the dry detention basin from the east parking lot has not been treated by a BMP and serves as a control for the bioretention system in this study. An Isco 674 Tipping Bucket rain gauge was also installed on site for local and accurate precipitation measurements.

Monitoring equipment collected data from May to October 2019. During this time 46 rain events totaling 17.67 inches were measured with the rain gauge. Twelve of the 46 rain events did not produce flow at any of the flow sensors (Figures 1 and 2). Total accumulation recorded at the Saddlebrook rain gauge was lower than the recorded values (during the same sampling period) at the National Weather Service Valley weather station (Valley, NE; station ID USC00258795) of 25.08 inches. The lowest measured rain event in 2019 was .01 inches and the largest was 2.48 inches. The average precipitation across these events was 0.38 inches. Rain event durations ranged from under 30 minutes to almost 24 hours.

Total discharge from the green and grey roofs varied greatly, and largely depended on the amount of rainfall. During the 2019 sampling period the flow meter on the grey roof measured a total volume of 10,042.22 cubic feet (75,121.04 gallons). Monitoring equipment recorded discharge from the green roof in only 19 of the 46 rain events and observed 2,101.42 cubic feet (15,719.71 gallons) of total flow. The green roof had 13,581.88 cubic feet (101,599.51 gallons) less total flow than the grey roof, a 76.8% reduction in volume from May through October. Accounting for the variation in area of both roofs, on average one square foot of grey roof displaced 1.27 cubic feet (9.5 gallons) of stormwater runoff while one square foot of green roof displaced 0.23 cubic feet (1.72 gallons).

Confidence in the flow data for the dry detention basin and the bioretention system in 2019 is low due to the bioretention system showing an increase of volume discharged. Processes were maintained from previous year analyses, it is unclear at the time of this annual report why data shows an increase in outflow compared to inflow. It should also be noted that the period of study for the bioretention system and dry detention basin was limited to May through August due to power issues to the basin data logger and sensor.

On average, peak flow reduction through the green roof has been consistent with previous years of monitoring. In 2019 peak flow was reduced by 76.8%, a slight increase from 76.01% in 2018 and 75% reduction in 2017. The green roof showed a delay of flow compared to the traditional grey roof. In all cases, the start of flow from the green roof was recorded after the gray roof with times ranging 15 minutes to 2 hours (Table 1). During most rain events, especially those less than one inch, flow through the green roof displayed a common pattern in which initial and peak flow was delayed and peak flow was slower and more muted compared to the gray roof (Figure 2).

Year	Date	Total Precip	Total Grey Roof Flow	Total Green Roof Flow	Peak Grey Roof Flow Rate	Peak Green Roof Flow Rate	Peak Flow Rate Reduction	Initial Flow Delay
уууу	dd-mmm	in	cf	cf	cfs	cfs	%	min
2019	03-Jun	0.82	390.96	102.84	0.09	0.03	66.7%	90
2019	11-Jun	0.36	180.96	4.08	0.112	0.004	96.4%	30
2019	17-Jun	0.24	132.84	0	0.068	0	100.0%	-
2019	18-Jun	0.24	64.68	6.6	0.008	0.001	87.5%	156
2019	21-Jun	0.29	152.16	8.58	0.05	0.002	96.0%	217
2019	22-Jun	0.5	75.48	14.58	0.133	0.007	94.7%	30
2019	23-Jun	0.22	100.56	45.66	6.24	1.38	77.9%	15
2019	03-Jul	0.02	20.52	0	0.004	0	100.0%	-
2019	09-Jul	0.3	43.86	0	0.054	0	100.0%	-
2019	10-Jul	0.01	6.78	0	0.003	0	100.0%	-
2019	16-Jul	0.2	37.08	16.56	0.02	0.002	90.0%	48
2019	21-Jul	0.57	355.26	55.44	0.059	0.009	84.7%	90
2019	28-Jul	0.08	139.02	0	0.04	0	100.0%	-
2019	31-Jul	0.06	34.8	0	0.021	0	100.0%	-
2019	07-Aug	0.02	82.86	0	0.024	0	100.0%	-
2019	11-Aug	1.3	813.72	393.54	0.123	0.091	26.0%	45
2019	12-Aug	0.38	235.98	85.32	0.083	0.036	56.6%	15
2019	21-Aug	0.44	526.62	0	0.099	0	100.0%	-
2019	26-Aug	0.44	219.84	2.16	0.108	0.004	96.3%	60
2019	07-Sep	0.12	175.44	0	4.08	0	100.0%	-
2019	09-Sep	0.09	125.46	0	0.043	0	100.0%	-
2019	10-Sep	1.39	591.06	240	0.241	0.135	44.0%	14
2019	11-Sep	0.06	100.44	0	0.035	0	100.0%	-
2019	19-Sep	2.02	610.14	610.14	0.124	0.192	-54.8%	90
2019	22-Sep	0.68	1022.58	74.64	0.105	0.023	78.1%	445
2019	24-Sep	0.27	119.76	0.48	0.073	0.002	97.3%	19
2019	28-Sep	0.69	890.1	57.24	0.11	0.04	63.6%	15
2019	01-Oct	2.11	0.141	0.22	1623.12	813.96	49.9%	292
2019	02-Oct	0.11	385.2	0.96	0.052	0.001	98.1%	169
2019	05-Oct	1.04	795.9	382.38	0.114	0.217	-90.4%	15
2019	09-Oct	0.06	242.52	0	0.076	0	100.0%	-
2019	10-Oct	1.69	1369.5	0	0.05	0	100.0%	-
		16.82	10042.22	2101.42		Average:	76.8%	97.6

Table 1: Summary of 2019 rain/discharge events for the Green and Grey Roofs at Saddlebrook

Year	Date	Total Precip	Total Basin Flow	Adjusted Total Basin Flow	Total Bioretention Flow	Peak Flow Rate Basin	Peak Flow Rate Bioretention	Flow Rate Reduction	Initial Flow Delay
уууу	dd-mmm	in	cf	cf	cf	cfs	cfs	%	min
2019	30-May	0.16	46.68	56.48	0	0.003	0	100.0%	-
2019	03-Jun	0.82	2611.44	3159.84	1453.02	0.324	0.065	79.9%	75
2019	11-Jun	0.36	524.34	634.45	618.6	0.446	0.044	90.1%	45
2019	17-Jun	0.12	223.14	270.00	219.3	0.338	0.025	92.6%	75
2019	18-Jul	0.36	197.04	238.42	2310.84	0.66	0.82	-24.2%	45
2019	21-Jul	0.29	471.36	570.35	879.36	0.071	0.04	43.7%	74
2019	22-Jun	0.58	1993.5	2412.13	2535.6	2.635	0.077	97.1%	30
2019	23-Jun	0.8	1040.7	1259.25	1722.42	0.354	0.11	68.9%	17
2019	26-Jun	0.17	77.34	93.58	344.88	0.065	0.024	63.1%	90
2019	09-Jul	0.3	54.54	65.99	951.18	0.306	0.139	54.6%	15
2019	16-Jul	0.3	159.18	192.61	374.94	0.316	0.039	87.7%	45
2019	21-Jul	0.57	1158.06	1401.25	2383.14	0.223	0.184	17.5%	60
2019	28-Jul	0.07	65.82	79.64	0	0.102	0	100.0%	-
2019	31-Jul	0.06	24.48	29.62	0	0.05	0	100.0%	
		4.96		10463.62	13793.28		Average	69.3%	51.9

Table 2: Summary of 2019 rain/discharge event for the bioretention system and basin at Saddlebrook

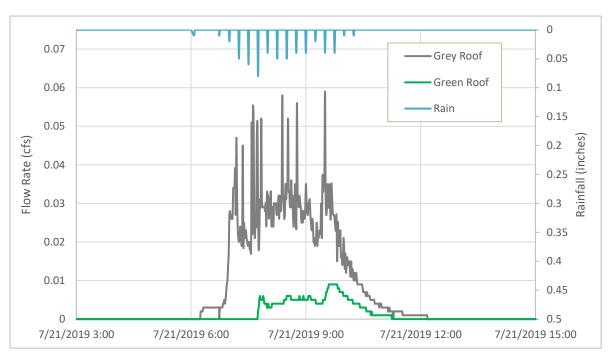


Figure 2: Discharge event for 07/21/19 at the green/grey roofs (top) and bioretention/basis systems (bottom).

Precipitation was recorded at 0.57 inches.

Orchard Park

Local rain data was gathered from the Papio Missouri NRD weather station at Little Papillion Creek near Irvington, Nebraska (ID: 06610750). One HOBO water level pressure transducer was installed in the east bioretention system at the north end of Orchard Park. Flow enters through curb cuts along N 66th Street into the west bioretention system then overflows into the east one. During the 2019 monitoring period, the underdrain valve in the west bioretention cell was opened too far, allowing water to rapidly drain through the infiltration cell and limiting ponding and subsequent spillover to occur. Very few ponding events occurred until the valve was closed in late August. See Figure 1.

Because there was no observed ponding on 8/11/2019 a substitute event was chosen as Event 1 for Orchard Park. This event occurred over night between 7/3/2019 and 7/4/2019 and was the only event before September to produce significant ponding before the valve was closed in the west bioretention cell. Ponding levels during Events 1 and 2 are the highest and second highest recorded at Orchard Park in 2019.

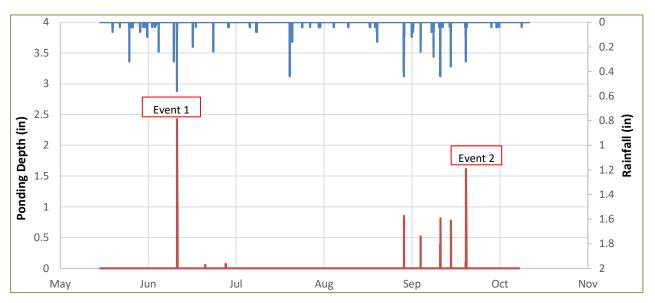


Figure 1: 2019 Orchard Park Ponding and Rain Events

Event 1

The local rain gauge during the event recoded 1.64 inches of rainfall in just under one hour for an average intensity of 1.79 in/hr (45.44 mm/hr). This is a more intense storm but with less total precipitation than Event 1 studied at other sites. Event 1 is classified as between 2-year and 5-year storm based on NOAA Atlas 14.

Ponding during Event 1 follows a similar pattern observed previously for Orchard Park. At the beginning of the event, a small amount of water begins to pool. Once enough rain has fallen, peak ponding occurs quickly and the water level begins to quickly draw down. Peak water elevation for Event 1 reached 29.11 inches. Drawdown for Event 1 began quickly at an average rate of 0.46 in/hr, slowed to 0.33 in/hr after. It steadily declined at this rate for almost 4 hours then ponding rapidly drew down. Average drawdown for the entire event was 0.47 in/hr. Based on water level data, the east bioretention cell dewatered from its maximum ponding level in 5.75 hours.

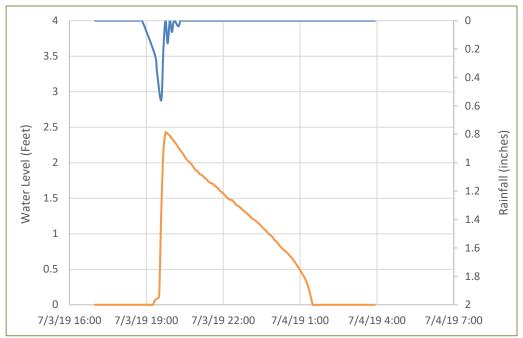


Figure 2: Orchard Park Event 1 (1.64 inches, 45.44 mm/hr)

Event 2

Event 2 was slightly larger but much less intense than Event1. Ponding during Event 2 displayed similar patterns to Event 1. A small peak was recorded early followed by a rapid increase in water level that corresponded with peak rainfall. The maximum ponded water level reached 19.8 inches. Water level drawdown was slow at first then increased rapidly as it did in Event 1. The average drawdown rate for Event 2 was 0.32 in/hr and the cell dewatered from the maximum ponding level in 5.16 hours.

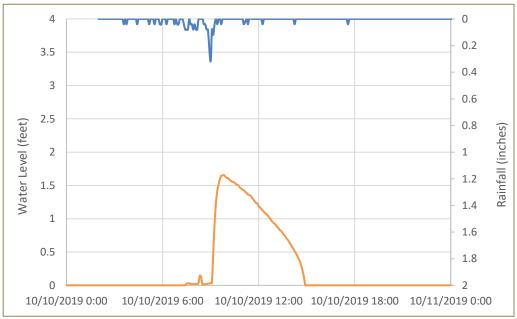


Figure 3: Orchard Park Event 2 (2.16 inches, 3.91 mm/hr)

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Orchard Park bioretention system continues to perform as designed and is effective at managing stormwater runoff that enters it. This is the oldest bioretention system demonstration project for the Program that utilizes the infiltration cell concept (limited footprint of amended soils and underdrain with a valve). The valve on the underdrain system is a significant factor for improving the overall effectiveness of the bioretention system. The ability to slow water flow through it significantly reduces peak flow and total flow due to evapotranspiration and infiltration losses. Monitoring will continue in 2020.

Creighton Prep

A stilling basin with a pressure transducer (STB) near the overflow weir measures the ponding depth of the bioretention system. An area-velocity sensor measures flow entering from the parking lot to the west. Another area-velocity sensor measures outflow from the site in the outflow storm sewer located in the area inlet located just downstream of the overflow weir. Data from the rain gauge installed at Creighton Prep in 2019 was suspect. Local rain data was gathered from the Papio-Missouri NRD Cole Creek at Blondo Rain Gauge (ID: 06610760). No rain had fallen at this site sine 10/5/2019, five days before the sample event. Rain started at 3:00 AM and continued to fall into the afternoon.

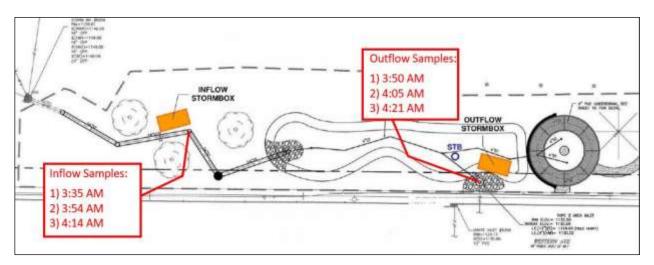


Figure 1: Creighton Prep monitoring equipment locations

Event 1

Total precipitation for this event was 2.36 inches with an average intensity of 0.54 in/hr (13.83 mm/hr). Over one hour, 0.16 inches of rain had fallen before ponding began by the pressure transducer. The maximum ponded depth for Event 1 was 18.55 inches which occurred 1.5 hours after ponding began. Average drawdown for Event 1 was 5.44 in/hr and it took 3.75 hours to completely dewater from the surface.

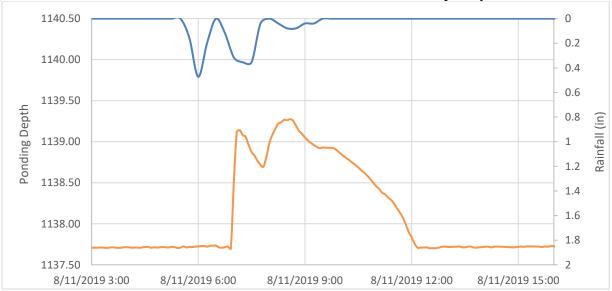


Figure 2: Event 1 Creighton Prep Water Level

Event 2

Total precipitation was recorded at 1.84 inches of rain at an average intensity of 0.16 in/hr (4.06 mm/hr). No rain had fallen at this site sine 10/5/2019, five days before the sample event. Rain started at 3:00 AM and continued to fall into the afternoon. Ponding did not occur for roughly 1.5 hours after the rain started and 0.28 inches fell during that time. Maximum ponding depth was 17.28 inches and occurred just over 4 hours after ponding began. Average drawdown for Event 2 was 3.83 in/hr and it took 4.5 hours to dewater.

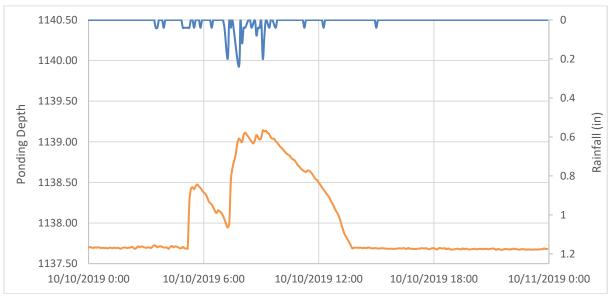


Figure 3: Event 2 Creighton Prep Water Level

Water Quality Sampling

Water quality samples were taken on 10/10/2019 at Creighton Prep. Three inflow samples were grabbed from a manhole containing a drainage inflow pipe that directs runoff from a storm inlet in the parking lot to the bioretention system. Outflow samples were collected from the outflow pipe from the bioretention underdrain (Figure 4). A blind duplicate was grabbed from the outflow pipe for validation of lab and field sampling techniques.

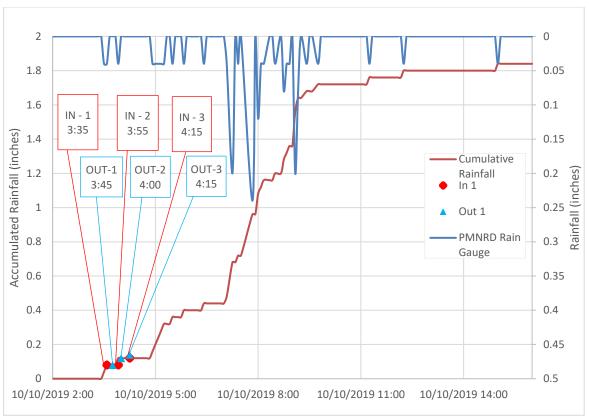


Figure 4: Inflow and outflow sample times during 10/10/19 rain event (1.84 inches, 4.064 mm/hr)

Water quality samples were delivered to Midwest Laboratories in an iced cooler on 10/10/2019, at 7:30 AM. Water quality samples were tested for Total Kjeldahl Nitrogen (TKN), Nitrate/Nitrite Nitrogen (NO3/NO2-N), Phosphorous (P), Total Dissolved Phosphorus, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), and *E. coli*. As reported by Midwest Laboratories, the grab samples were held and holding time ranged from 6.5 – 8 hours for the samples, which exceeds the regulatory holding time of 6 hours for *E. coli*. Laboratory technicians at Midwest Laboratories recommended that *E. coli* samples be tested within 48 hours if not for regulatory compliance. When hold times are exceeded, the bacteria can start to grow more, and the concentration from the lab testing may be greater than actual concentrations in the field. Therefore, actual concentrations of *E. coli* may be less than the values reported. Table 1 summarizes the results of the water quality testing. Full reports from Midwest Laboratories are included in Appendix C.

Lab ID:	1551631-01	1551631-02	1551631-03		
Sample Time:	3:35 AM	3:54 AM	4:14 AM	Reporting	
Constituent	In 1	In 2	In 3	Limit	
TKN (mg/L)	<	<	<	2.5	
NO2/NO3-N (mg/L)	1.05	0.44	0.53	0.2	
Dissolved P (mg/L)	0.14	<	<	0.05	
P (mg/L)	0.28	0.08	0.06	0.05	
TS (mg/L)	154	<	<	10	
TSS (mg/L)	102	10	<	4	
E. coli (CFU/100mL)	<	90	36	1	

Table 1: Creighton Prep Inflow Water Quality Results

[^]E. coli results are included but may not be representative as the sample holding times exceeded the 6-hour regulatory holding time for E. coli

Lab ID:	1551631-04	1551631-05	1551631-06	1551631-07	
Sample Time:	3:50 AM	4:05 AM	4:21 AM	4:05 AM	
_					Reporting
Constituent	Out 1	Out 2	Out 3	Duplicate	Limit
TKN (mg/L)	<	<	<	<	2.5
NO2/NO3-N (mg/L)	1.45	0.85	0.78	0.84	0.2
Dissolved P (mg/L)	0.13	0.08	0.18	<	0.05
P (mg/L)	0.4	0.17	0.14	0.19	0.05
TS (mg/L)	347	129	86	90	10
TSS (mg/L)	390	48	20	54	4
E. coli (CFU/100mL)	5000	3300	1120	10000	1

Table 2: Creighton Prep Outflow Water Quality Results

Mean outflow concentrations were higher than mean inflow concentrations for all parameters. *E. coli* concentration increased the most between the inflow and outflow. All three *E. coli* concentrations in the outflow far exceeded the EPA Recreational Water Quality Criteria of 126 CFU/100mL. Nitrogen, Phosphorus, TSS, and TS concentrations decreased with time as the inflow and concentrations for all parameters decreased with time at the outflow except for Dissolved Phosphorus which was pretty consistent.

[^]E. coli results are included but may not be representative as the sample holding times exceeded the 6-hour regulatory holding time for E. coli

Sewer Maintenance

Water Quality Assessment

Water quality samples were collected on 11/20/19 at the inflow and outflow locations as depicted in Figure 1. Three inflow grab samples were collected from the curb cut that discharges to the bioswale and conveys flow to the bioretention system, and three outflow samples were collected from the bioretention underdrain via monitoring flume. A blind duplicate was grabbed from the curb cut for validation of lab and field sampling techniques.

Local rain data was unavailable for this site because the rain gauge was taken down before sampling occurred. Data from NWS Weather Station at Eppley Airfield (ID: USW00014942) was used for site analysis. The rain event sampled produced 0.48 inches with an average intensity of 0.80 in/hr (2.03 mm/hr). Rain started between 7:00 PM and 8:00 PM and the first sample was taken at 8:34 PM (Figure 1). Trace amounts (<0.01 inches) of rain had fallen on 11/18/2019, two days before sampling occurred. Before then, no rain had fallen since 11/11/2019 resulting in nine days without runoff

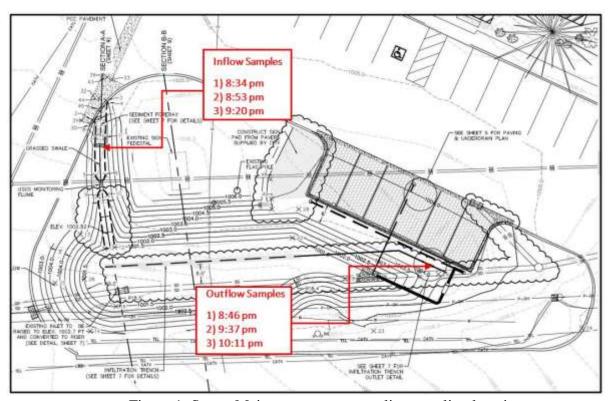


Figure 1: Sewer Maintenance water quality sampling locations

Water quality samples were delivered to Midwest Laboratories in an iced cooler on 11/21/19 at 8:00am when they opened. Water quality samples were tested for Total Kjeldahl Nitrogen (TKN), Nitrate/Nitrite Nitrogen (NO3/NO2-N), Phosphorous (P), Total Dissolved Phosphorus, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), and *E. coli*. Because of the late sample time, the Sewer Maintenance samples had exceeded the allotted holding time for *E. coli* but were tested anyway. The sample holding time from sample collection until sample preparation for *E. coli* by Midwest Laboratories ranged from 13.50 - 15.25 hours. Therefore, actual concentrations of *E. coli* may be less than reported values. Tables 1 and 2 summarize the

3/30/2020

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results of the water quality testing at the inflow and outflow. Full reports from Midwest Laboratories are included at the end of this summary.

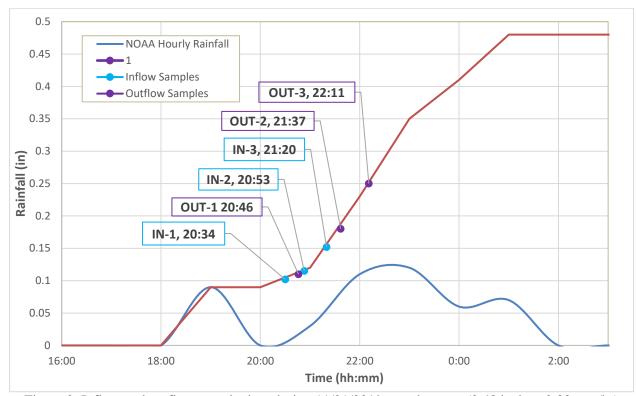


Figure 2: Inflow and outflow sample time during 11/21/2019 sample event (0.48 inches, 2.03 mm/hr)

Lab ID:	15511629-01	15511629-02	15511629-03	15511629-07	
Sample Time:	20:34	20:53	21:20	20:53	
				Duplicate	Reporting
Constituent	In 1	In 2	In 3	(In 2)	Limit
TKN (mg/L)	0.87	1.11	0.69	0.63	0.5
NO2/NO3-N (mg/L)	0.39	0.46	0.44	0.47	0.2
Dissolved P (mg/L)	0.08	<	0.11	0.09	0.05
P (mg/L)	0.21	0.14	0.13	0.19	0.05
TS (mg/L)	293	55	70	110	10
TSS (mg/L)	159	21	28	18	4
E. coli					
(CFU/100mL) [^]	<	<	10	<	10, 1*

Table 1: Sewer Maintenance Inflow Water Quality Results

[^]E. coli results are included but may not be representative as the sample holding times exceeded the 6-hour regulatory holding time for E. coli

^{*}The reporting limit for *E. coli* was recorded as 10 CFU/100mL for In-1, In-2, and the duplicate and 1 CFU/100mL for In-3

Lab ID:	15511629-04	15511629-05	15511629-06	
Sample Time:	20:46	21:37	22:11	Donoutino
Constituent	Out 1	Out 2	Out 3	Reporting Limit
TKN (mg/L)	<	0.57	<	0.5
NO2/NO3-N (mg/L)	2.23	1.6	0.83	0.2
Dissolved P (mg/L)	0.14	0.17	0.27	0.05
P (mg/L)	0.18	0.36	0.4	0.05
TS (mg/L)	427	230	170	10
TSS (mg/L)	80	59	22	4
E. coli (CFU/100mL)	110	110	160	1

Table 2: Sewer Maintenance Outflow Water Quality Results

Outflow concentrations were lower than average inflow concentrations for TKN and TSS only. Outflow concentrations of TKN, NO3/NO2-N, and TDS decreased with time for most samples throughout the rain event while Dissolved P and P increased steadily. All effluent *E. coli* concentrations fell within the EPA Recreational Water Quality (RWQ) Criteria of 126 CFU/100mL except for the third outflow sample however *E. coli* concentrations may not be representative of actual *E. coli* concentrations due to exceeded holding times.

United State Geologic Survey (USGS) monitoring equipment was in-place at the Sewer Maintenance Facility in 2019 to assess the water balance of the bioretention system, see their summary report in this attachment for more details. Results from that assessment demonstrates a long-term trend in peak flow and total volume reduction through the bioretention system. Despite some parameters showing an increase in concentration, total pollutant load is most likely reduced due to the reduction in runoff.

USGS Water Balance Assessment

In 2019, the City of Omaha Stormwater Program contracted with USGS to monitor the Sewer Maintenance Facility, which has a bioretention system and permeable pavement parking area. Monitoring at the site characterized the water balance components of 187 stormwater events from 2015-19. On average, the bioretention cell redirected approximately 43-percent of the stormwater volume away from the storm sewer through infiltration and evaporative processes. This and other metrics will be considered locally when trying to identify ways to improve performance in other green infrastructure projects. Regionally, those metrics will be put in the context of other cities to evaluate how different soils and climatic conditions may influence the design and performance of otherwise similar green infrastructure projects.

The 2019 monitoring season had several monitoring challenges, most notably and long-lasting of which were the leaks into the chamber surrounding the underdrain flume. The leaking prevented the inclusion of many events, including all but 2 events larger than ¼" of precipitation, in the metered event analysis because the altered flow patterns were bypassing the bioretention cell and causing errant readings and excess flow in the underdrain. It is believed that this unmeasured flow originates in the paver aggregate and is following preferential flow paths through the subsurface. Although attempts were made in late August to seal the

[^]E. coli results are included but may not be representative as the sample holding times exceeded the 6-hour regulatory holding time for E. coli.

chamber to prevent these flows, the data show that this unmeasured flow continued throughout the remainder of the monitoring season.

The bioretention system at sewer maintenance is functioning as designed and continues to reduce total flow and peak flow rates of stormwater runoff. The site removed 85% of total flow from the sewer. This has increased year-to-year since 2016. Monitoring will continue with USGS as well as water quality monitoring in 2020.

Adams Park

Local rain data was gathered from the Papio Missouri NRD Rain Gauge at City Maintenance Shop (ID: 411701095570601). A total of 2.21 inches of rain fell at Adams Park during Event 1 at an average rate of 11.22 mm/hr. A total of 1.93 inches fell during Event 2 at an average rate of 0.88 mm/hr.

Water level data was used to assess the Adams Park site in 2019. Water level data was collected from three pressure transducers installed on site: PT-1) upstream of outlet structure, PT-2) in a micropool on the west side of the wetland area, and PT-3) upstream of the culvert beneath the future park road, as shown in Figure 1. Pressure Transducer-3 (PT-3) encounters flow first. Ponding in the micropool is largely dependent on flow from the main channel overtopping a berm at roughly 1074.75 feet. Pressure Transducer-1 (PT-1) is installed at a lower elevation to record data even when water elevation is low. When the water surface elevation is above 1076.50 feet, drawdown is controlled by the slotted weir at the outlet structure. After the water surface elevation drops below 1076.50 feet, drawdown is controlled by an 8-inch orifice with an invert elevation of 1074.00 feet. Flow monitoring equipment was not installed in 2019.

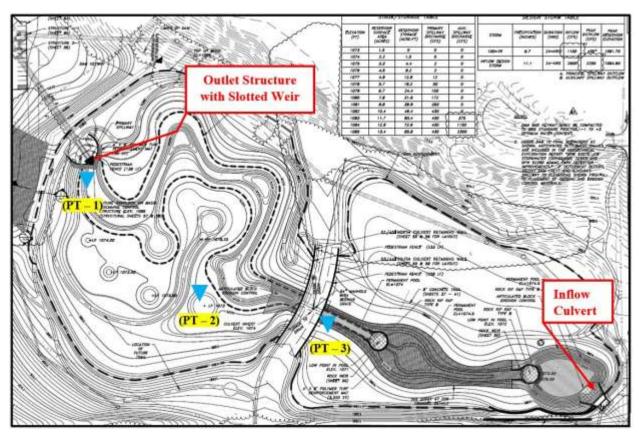
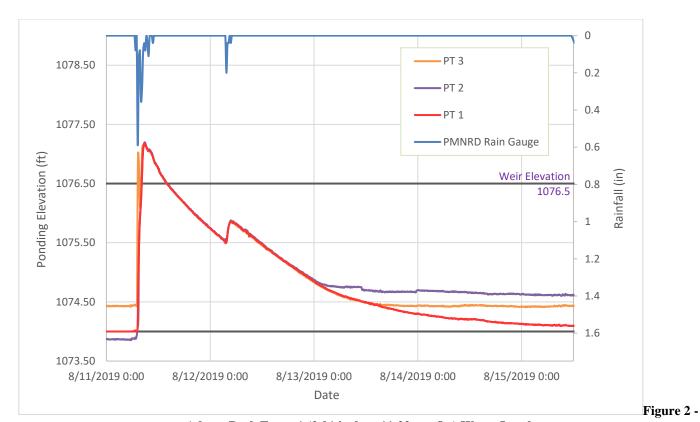


Figure 1 - Inflow, outflow and pressure transducer locations at Adams Park

Event 1

There is approximately a 10-minute lag time between the peak water surface elevation in the detention area upstream of the future park road (PT-3) and the peak water surface elevation observed at the basin discharge structure (PT-1). PT-3 observed ponding 5 minutes prior to PT-1. Once ponding was observed, PT-1 peak water surface elevation of 1077.18 was reached after 1.6 hours. Ponding at PT-3 dewatered to its permanent pool elevation in approximately 2.5 days after the rain event, whereas ponding at PT-1 lasted over 4 days (Figure 2). Average drawdown when the water level exceeded the slotted weir elevation was approximately 1.60 in/hr and average drawdown below the weir was approximately 0.64 in/hr. The micropool drawdown rate was 0.04 in/hr.



Adams Park Event 1 (2.01 inches, 11.22 mm/hr) Water Level

Event 2

There was approximately a 15-minute lag between peak water surface elevations at PT-3 and PT-1. Once ponding was observed, PT-1 peak water surface elevation of 1077.41 was reached in 5 hours. Ponding at PT-3 dewatered to its permanent pool elevation in 2.15 days after the rain event, whereas ponding at PT-1 lasted 4.5 days. Average drawdown rate controlled by the slotted weir, above 1075.65 feet was 1.93 in/hr and below 1076.50, controlled by the 8-inch orifice, was 0.65 in/hr.

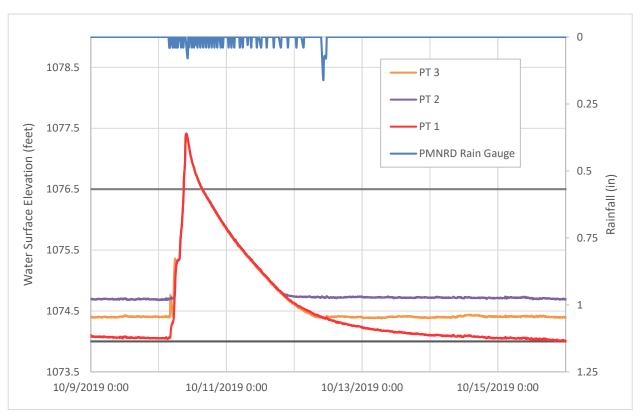


Figure 3 - Adams Park Event 2 (1.93 inches, 0.88 mm/hr) Water Level

Dry Weather Drawdown

Dry weather flow analysis is typically based on a dry period lasting 14 days, however, no dry weather period lasted for 14 days during the 2019 monitoring period. The longest dry period for each of the 5 months (June through October) where water level data was available, was analyzed to approximate evapotranspiration and evaporation. The average drawdown rate was calculated based on the PT-1 pressure transducer data for each of the dry weather periods depicted in Table 1. Mean monthly Class A pan evaporation was obtained from NOAA Technical Report NWS 34 for each month. Mean monthly pan evaporation data was converted to mean monthly free water surface (FWS) evaporation using the pan coefficient of 0.74 for Omaha, Nebraska, obtained from NOAA Technical Report NWS 33. The dry weather drawdown rate is a function of three mechanisms: 1) FWS evaporation, 2) evapotranspiration, and 3) infiltration. Assuming that the wetland liner is impervious, subtracting mean FWS rate from the dry weather drawdown rate provides an approximation for evapotranspiration.

			Decrease		Mean FWS	
Start	End		in water	Drawdown	Evaporation	Approximated
Date	Date	Duration	Level	Rate	Rate	Evapotranspiration
		(days)	(ft)	(in/day)	(in/day)	Rate (in/day)
6/13/19	6/18/19	4.569	0.187	0.492	0.218	0.274
7/23/19	7/25/19	2.868	0.156	0.654	0.207	0.447
8/1/19	8/4/2019	3.694	0.230	0.747	0.190	0.557
8/31/19	9/5/19	4.983	0.125	0.301	0.142	0.159
10/13/19	10/19/19	5.667	0.188	0.399	0.099	0.300

Table 1 – Drawdown rates for PT-1

According to this estimate, evapotranspiration rate steadily rose to and peaked in late summer. These rates are higher, on average, than estimated rates in 2018. Wetland plants surrounding the channel became more established and with each year of growth, are expected to contribute to greater evapotranspiration rates under favorable conditions.

The Adams Park wetlands continue to perform as designed and are providing a wonderful amenity for the community and local environment. Maintenance of the site in 2019 transferred from the installation contractor to the City due to the 2-year establishment period ending. Good maintenance has helped the vegetation become well-established across the site. Monitoring of water levels will continue in 2020 and future assessments will start to look at trends over the years.

Albright Park

Rainfall was obtained from the rain gauge located at Hitchcock Park. One pressure transducer was installed in the AgriDrain outlet control structure, on the upstream side of the inline weir. Installing the pressure transducer at this location allows for observation of the drawdown rate within the bioretention system due to evaporation (in the case of ponded water), infiltration, and evapotranspiration. The pressure transducer was installed at the bottom of the AgriDrain structure, approximately 72 inches below the structure rim elevation, as depicted in Figure 1. The top of the inline weir is approximately 66 inches above the bottom of the AgriDrain structure. Ponding occurs when the water depth reaches approximately 36 inches above the sensor level. Based on the construction plans, there is approximately 30 inches of ponding available until the hydraulic grade line of the ponded water exceeds the weir elevation, when water from the bioretention system would discharge to the downstream system. Ponded water that overtopped the AgriDrain rim elevation would enter control structure through the bar grate lid and could bypass the inline weir, discharging directly to the outlet pipe.

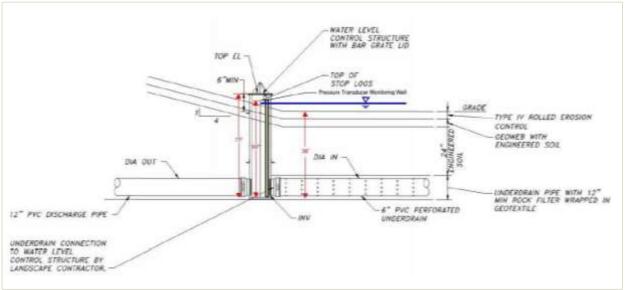


Figure 1: Albright Park AgriDrain Structure

Late in 2019, a four inch gap between stop logs was found. The gap was located where the third stop log from the bottom would sit, roughly 15 to 20 inches above the sensor (Figure 2). Due to this gap, the water level within the AgriDrain structure did not exceed 16 inches for any events from June through October 2019. It is unclear what caused this gap or when it occurred, but all stop logs will be assessed with a camera at the time of equipment installation to avoid this going forward.

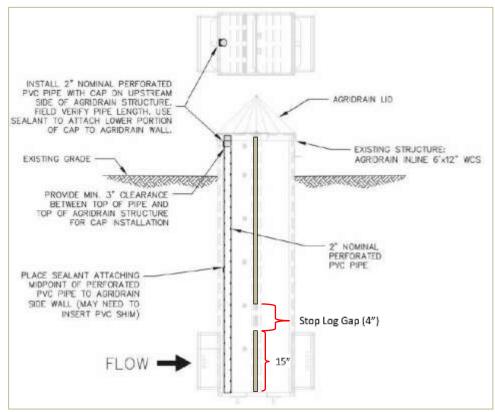


Figure 2: Albright Park water level control structure gap location.

Event 1 (8/11/2019, 3.19")

There was no ponding that occurred in the bioretention system for this event because water level could not reach 36 inches, the point where ponding on the surface begins. Ponding did occur within the AgriDrain structure. Drawdown from this event occurred in three parts. During the event and immediately after, water level stayed relatively stable at about 15.25 to 15.40 inches. The level slowly drew down at an average rate of 0.02 inches/hour during and immediately after the rain event. The rate then increased to 2.94 inches per hour, likely indicating the point at which runoff stopped entering the bioretention system. The rate increased again to over 14 in/hr once the level droped below 6 inches (Figure 2), the reason for this increase is not apparent at this time but it could be due to seepage between the stop logs of the weir. Average drawdown for this event after the assumed end of runoff entering the bioretention system was 4.36 in/hr. Water was held back by the weir system for roughly 10 hours during Event 1. This is proportional to the retention time of similar-sized event in previous years.

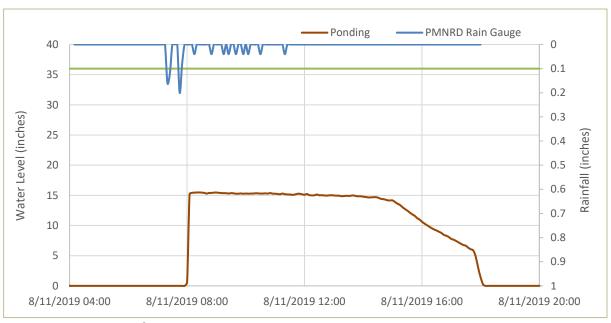


Figure 2: Albright Park Event 1 (0.92 inches, 5.84 mm/h) Water Level

Event 2

Event 2 for Albright Park was expanded to include multiple low intensity storms that lasted for almost 20 days (Figure 3). These rain events ranged from 0.4 inches to 1.24 inches totaling 3.24 inches and averaging 2.12 mm/h intensity. The last of the four, October 10th, produced 0.76 inches of rain with an average intensity of 1.67 mm/hr.

Drawdown followed a similar patter as other Albright Park events in 2019. Water level drew down slowly during and immediately after rainfall for an average of 0.02 in/hr, the same rate as Event 1. Drawdown rate after the event (dry weather) increased but was dramatically slower than Event 1. The average drawdown for the four events after runoff stopped entering the bioretention system was 0.12 in/hr. Ponding for all of the events lasted for 19.5 days, however drawdown from the October 10th event alone lasted 8.5 days, much longer that observed in Event 1.

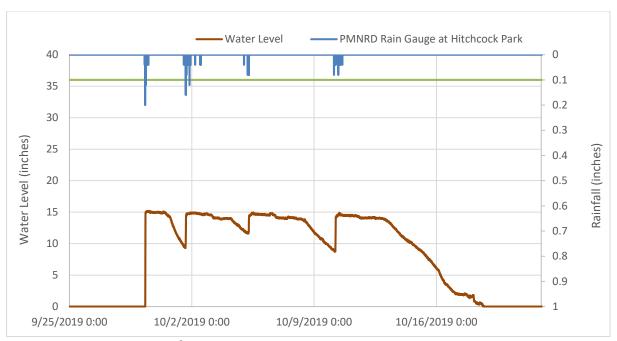


Figure 3: Albright Park Event 2 (3.24 inches,) Water Level

The Albright Park bioretention system is functioning as intended despite the gap in the outflow weir. During and immediately following rain events, drawdown rates are consistently very low (around 0.02 in/hr). This is due to the inflow maintaining 15" of ponding depth in the weir structure, the elevation that corresponds to the gap in the weir. Once inflow stops, the drawdown rate increases steadily with full draw down within hours. With the gap in the weir addressed in 2020, it is expected the bioretention system performance will be significantly better with respects to total water quantity managed and reducing peak flows. Monitoring at Albright Park will continue in 2020.

Infiltration Assessment of Existing City of Omaha Bioretention Systems and Rain Gardens

The purpose of this study was to estimate infiltration rates via saturated hydraulic conductivity (K_{sat}) measurements within bioretention systems, rain gardens, and adjacent traditional turf areas. K_{sat} is a quantitative measure of the maximum water transmission rate of a saturated soil. Data generated from this study will be added to annual assessments for each project, provide comparison estimates to baseline measurements collected in 2016, and examine seasonal variation of K_{sat} within individual bioretention systems and rain gardens. An additional objective of this study was to examine the spatial distribution of K_{sat} values. Understanding how these living systems function over time will help improve overall stormwater management.

For the past 4 years, except for 2018, nine sites have been studied: Saddle Hills Park (SHP), University of Nebraska at Omaha (UNO) Welcome Center, Orchard Park (OP), Florence Streetscape (FL), The Benson East Gateway (BEN), Under the Sink Facility (UTS), Creighton Prep (CRP), South Omaha Industrial Area (SOIA) Lift Station, and Omaha Sewer Maintenance Facility (SMF) (Figure 1). A summary of site details can be found in Table 1.

Measurements were collected at all sites using Modified Philip-Dunne (MPD) Infiltrometers. The MPD infiltrometer is a falling head device used to measure the saturated hydraulic conductivity (K_{sat}) at the soil surface. K_{sat} is important for modeling infiltration rates within Best Management Practices (BMPs). Sampling at each site was conducted using a grid method technique. Grid sampling allows for a better approximation of the spatial variability for a given parameter within site, is easier to set up for routine monitoring, and provides better estimates for site characteristics as a whole. Grid sampling for each site was set up to account for 2016 sampling locations, while still trying to capture the spatial variability of K_{sat} within each site accurately.

Samples were collected during two periods in 2019; summer (late-May to August), and fall (September to early November). Sampling in fall occurred prior to the ground freezing. Three sites (UNO, SMF, and OP) were sampled in the summer months and all sites were sampled during the fall. A total of 178 MPD Infiltrometer samples were acquired in 2019, with a combined total of 1027 samples since 2016. Data generated were compared within site and against non-BMP controls (nearby turf and landscape areas) adjacent to each site. Data were compared across sites for evaluation of pretreatment effect on K_{sat} within the bioretention systems, distribution of K_{sat} across the entire system and plant influence.

Comparative analysis between fall 2016, 2017 and 2019 shows a fairly consistent decrease in average K_{sat} values over time. In the fall of 2019 site average Ksat values ranged from 2.57 in/hr to 43.69 in/hr with an average of 11.44 in/hr (Table 2). This is lower than mean Ksat values in 2016 and 2017 at 29.89 in/hr and 25.63 in/hr respectively. Benson was the only site in 2019 to show an increase in mean K_{sat} values from fall averages in 2016 and 2017. Saddle Hills had higher fall averages than 2017 but not from the baseline 2016 values. Both of sites that were sampled in summer 2017 and 2019 (SMF and UNO) recorded lower values in 2019 (Table 2).

Lower Ksat values are likely due to sediment deposition from runoff over time. In 2019, spatial analysis of K_{sat} values across sites identified similar low permeability areas as previously observed. These low permeability areas correspond to locations within proximity or adjacent to inflow points, contributing to 3/30/2020

evidence that clogging potential is high in these areas due to sediment deposition from inflow. Pretreatment devices that are routinely maintained is effective at reducing this clogging and improve overall function. Additional maintenance of the plants and soils in these areas should be expected.

Though the data indicates a decline in K_{sat} over time, the City's rain gardens and bioretention systems are fully functional and plants are healthy and vibrant. The mean K_{sat} values across all sampling periods and for both rain gardens and bioretention systems sampled ranged from 14.37 to 31.20 in/hr (Table 2). Across all survey sites and all sampling periods, average measurements of saturated hydraulic conductivity in rain gardens (31.82 in/hr) and bioretention systems (18.05 in/hr) were significantly higher than those acquired over adjacent turf grasses (4.37 in/hr) (Table 4).

Saturated hydraulic conductivity monitoring will continue in 2020 at all sites in spring, and fall to continue analysis of seasonal and annual K_{sat} variation in green infrastructure.

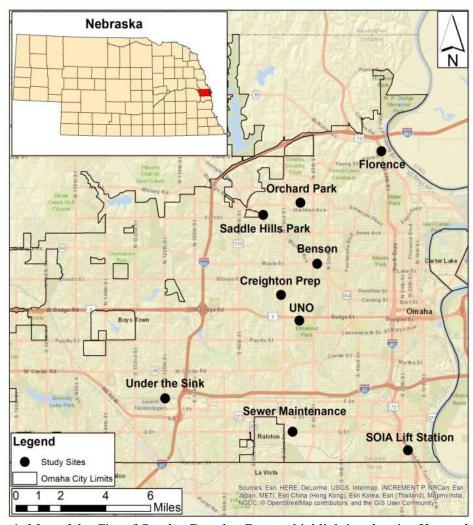


Figure 1: Map of the City of Omaha, Douglas County, highlighting the nine K_{sat} study sites.

Site	Install	Type*	Footprint (ft²)	Contributing Area (acres)	% Footprint to Contributing Area	Design Volume (gal)	Pretreatment	Under-drain Outlet Control	Under-drain	Overflow	Bioretention Soil Mix
Saddle Hills Park	2014	RG	2,310	2.5	2.2	N/A	Utility box curb- wells	None	None	Soft weir in berm	Compost amended in-situ soils
University of Nebraska- Omaha	2012	В	1,345	0.6	5.5	2,469	None	4" Polyball valve	4" perforated HDPE	Soft weir in berm	50/50 sand/ compost
Orchard Park	2009	В	3,180	0.8	9.2	14,270	Vegetated Forebay	2" Brass Curb- Stop Valve	4" perforated PVC	Offline system	50/50 sand/ compost
Florence	2012	В	440	0.7	1.5	2,825	Stainless steel sediment trap w/ Permeable Base	2" Brass Curb- Stop Valve	4"perforated HDPE	Offline system	50/50 sand/ compost
Benson	2013	В	1,225	1.0	2.8	5,535	2 Forebays & Dry Creek Bed	2" Brass Curb- Stop Valve	4" perforated PVC	High flow structure & soft weir	50/50 sand/ compost
Under the Sink Facility	2008	В	1,540	2.5	1.4	9,620	Bioswale	4" Polyball valve	4" perforated HDPE	Soft weir in berm	50/50 sand/ compost
Creighton Prep	2014	В	5,720	2.7	4.9	40,395	Permeable patio (East) & manhole sump w/Envirohood (West)	4" Slide Gate Valve	4" perforated PVC	Soft weir in berm	80/20 sand/ compost
South Omaha Industrial Area	2014	В	3,400	0.7	11.5	25,430	Turf swale	4" Polyball valve	4" perforated PVC	High flow structure & soft weir	100% 1" washed limestone
Sewer Maintenanc e Facility	2014	В	2,200	0.95	5.3	39,085	Permeable paver parking lot (East) & Forebay (West)	4" Slide Gate Valve	4" perforated PVC	High flow structure	100% pea gravel

^{*}RG = Rain Garden; B= Bioretention System

Table 1: Summary of project details for the nine sites examined in this study

	Fall		Spring		Summer		Fall		Summer		Fall			
Site	2016	N	2017	N	2017	N	2017	N	2019	N	2019	N	Cumulative	N
SHP	55.31	16	13.92	25	25.59	7	34.15	29	-	0	43.69	4	31.82	81
OP	11.77	4	13.68	13	-	0	15.99	12	15.39	9	8.51	9	13.44	47
BEN	27.55	6	4.56	18	-	0	25.66	18	-	0	29.49	4	17.98	46
UNO	55.35	6	5.37	20	40.69	17	15.63	18	25.33	5	6.89	7	21.75	73
FL	18.28	6	8.84	17	-	0	24.61	17	6.92	6	13.65	10	15.29	56
CRP	4.01	8	10.12	25	16.47	25	15.57	26	-	0	1.92	9	12.03	93
UTS	12.57	7	-	0	-	0	16.48	9	-	0	4.88	6	12.07	22
SOIA	29.14	15	17.19	34	-	0	33.31	33	ı	0	16.88	4	25.45	86
SMF	20.83	7	7.73	11	21.36	13	37.62	13	10.04	7	2.57	7	18.72	58

Table 2. Summary of mean Ksat values (in/hr) and number of samples acquired (N) for study sites during sample periods.

	Fall		Spring		Summer		Fall		Summer		Fall			
Site	2016	N	2017	N	2017	N	2017	N	2019	N	2019	N	Cumulative	N
SHP	55.31	16	13.92	25	25.59	7	34.15	29	-	0	43.69	4	31.82	81
SHP-E	65.41	10	17.28	11	29.36	3	35.66	12	-	0	50.66	2	38.46	38
SHP-W	38.48	6	11.27	14	22.76	4	33.08	17	-	0	36.72	2	25.94	43
UNO	55.35	6	5.37	20	40.69	17	15.63	18	25.33	5	6.89	7	21.75	73
UNO-N	76.46	3	2.43	9	50.36	8	4.89	8	12.49	2	3.68	4	21.56	34
UNO-S	34.25	3	7.78	11	32.09	9	24.23	10	33.9	3	11.18	3	21.91	39
FL	18.28	6	8.84	17	-	0	24.61	17	8.07	5	13.65	10	15.55	55
FL-E	30.56	3	8.2	12	-	0	18.72	12	1.31	2	6.91	5	13.29	34
FL-W	6	3	10.39	5	-	0	38.73	5	12.58	3	20.38	5	19.20	21
CRP	4.01	8	10.12	25	16.47	25	15.57	26	-	0	1.92	9	12.03	93
CRP-W	3.09	4	9.37	13	12.25	14	13.84	14	-	0	ı	0	11.10	45
CRP-E	4.93	4	10.94	12	21.85	11	17.59	12	-	0	-	0	15.45	39
UTS BG	12.57	7	-	0	-	0	16.48	9	-	0	4.88	6	12.07	22
UTS														
BG3	10.88	3	-	0	-	0	7.05	4	-	0	1.47	3	6.53	10
UTS BG4	18.12	3	34.93	7	-	0	24.02	5	-	0	8.29	3	24.66	18

Table 3. Summary of mean Ksat values (in/hr) and number of samples acquired (N) for individual bioretention systems and/or rain gardens at the nine study sites during sample periods.

Site	Fall		Spring		Summer		Fall		Summer		Fall			
Description	2016	N	2017	N	2017	N	2017	N	2019	N	2019	N	Cumulatve	N
Turf	6.30	14	3.23	13	-	0	7.45	14	1.80	6	1.57	14	4.38	61
Bioretention														
- All	23.00	59	11.62	145	25.11	55	23.94	146	13.96	27	9.13	56	18.05	488
Bioretention-														
Infiltration														
Cell (IC)	19.42	13	14.38	37	22.66	15	20.99	39	8.85	8	14.94	15	17.62	127
Bioretention-														
Outside IC	24.01	46	10.68	108	26.03	40	25.01	107	16.12	19	7.01	41	18.20	361
Rain Garden	55.31	16	13.92	25	25.59	7	34.15	29	-	0	43.69	4	31.82	81

Table 4. Summary of mean Table 4 – Summary of mean Ksat values (in/hr) and number of samples acquired (N) from all nine study sites

Project Title: Green Infrastructure Monitoring at the Omaha Sewer Maintenance facility

David Rus & Kellan Strauch, USGS Nebraska Water Science Center

Monitoring Objectives:

- To characterize the water balance components of a green infrastructure project during storm events.
- To demonstrate green infrastructure performance in the soils and climate of Omaha, Nebraska for comparison to other sites nationwide.

Monitoring Approach: The project site was selected through consultation with the City of Omaha in anticipation of the design and construction of a green infrastructure project at their Sewer Maintenance Facility near 69th and Q Streets. The project included permeable pavers in sequence with a bioretention cell, and monitoring equipment was incorporated into the design. The project was designed in 2013, constructed in 2014, and non-winter monitoring occurred from 2015-19.

The water balance was measured in the bioretention cell in the following manner: inflow into the bioretention cell was measured by a cutthroat flume at one entrance to the cell and by a Palmer Bowlus flume to capture the flow entering the cell through the permeable pavers. Flow out of the cell through an underdrain was measured by a Palmer Bowlus flume installed on the underdrain pipe. Due to construction of the underdrain pipe at a slope greater than that specified in the design, the data from this underdrain flume was often compromised by critical velocities. More recently, this flume has also been impacted by leakage into the monitoring chamber. Overflow leaving the cell through a standpipe during high-volume events was estimated by treating the standpipe opening as a weir and measuring the depth of water above the standpipe. Potential evapotranspiration was measured by a Campbell Scientific ET107 system, and rainfall was measured using a tipping bucket mechanism. Infiltration was estimated as the residual of that water balance.

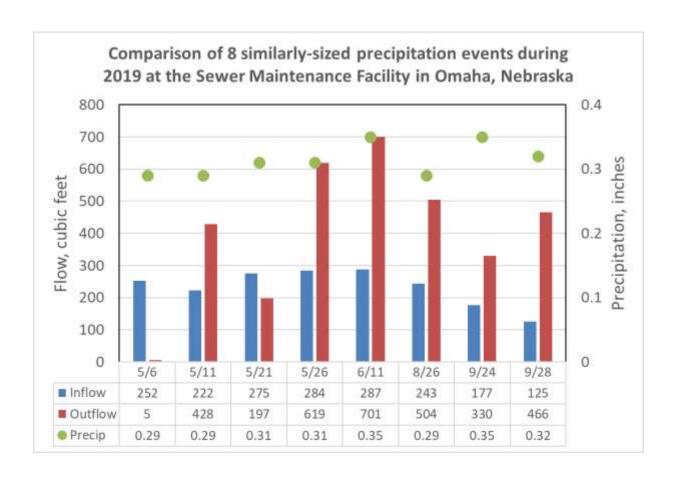
Soil moisture was monitored using Time Domain Reflectometry probes distributed within and adjacent to the bioretention cell in an attempt to identify wetting fronts moving vertically as well as laterally. However, these data were problematic in their collection and interpretation, likely as a result of preferential flow-paths being introduced by the sensor cables in the clay-loam soils, especially when standing water was occurring. The utility of these data is still being assessed, and only a subset of the probe data will likely be published in the USGS National Water Information System.

Preliminary Results:

Monitoring at the site characterized the water balance components of 187 metered stormwater events from 2015-19. These monitoring data are published in the <u>USGS National Water Information System under station number 411219096010601</u>. On average, during metered events the bioretention cell redirected approximately 43-percent of the stormwater volume away from the storm sewer through infiltration and evaporative processes. This and other metrics will be considered locally when trying to identify ways to improve performance in other green infrastructure projects. Regionally, those metrics will be put in the

context of other cities to evaluate how different soils and climatic conditions may influence the design and performance of otherwise similar green infrastructure projects.

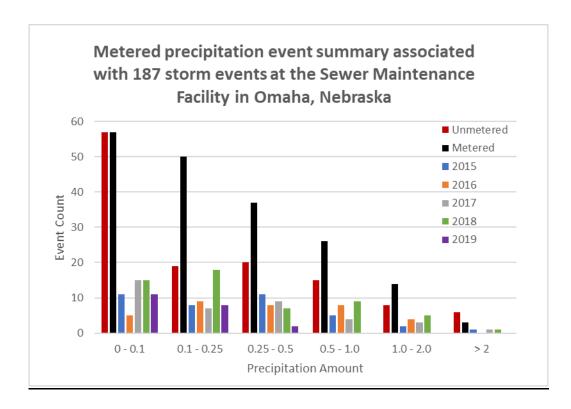
The 2019 monitoring season had several monitoring challenges, most notably and long-lasting of which were the leaks into the chamber surrounding the underdrain flume. The leaking prevented the inclusion of many events, including all but 2 events larger than ¼" of precipitation, in the metered event analysis because the altered flow patterns were bypassing the bioretention cell and causing errant readings and excess flow in the underdrain. It is believed that this unmeasured flow originates in the paver aggregate and is following preferential flow paths through the subsurface. Although attempts were made in late August to seal the chamber to prevent these flows, the data show that this unmeasured flow continued throughout the remainder of the monitoring season.

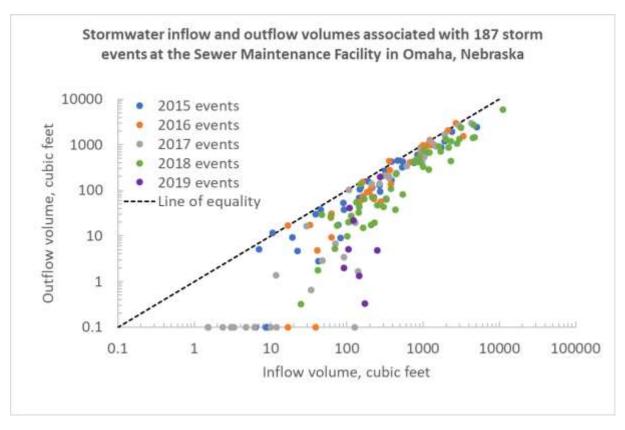


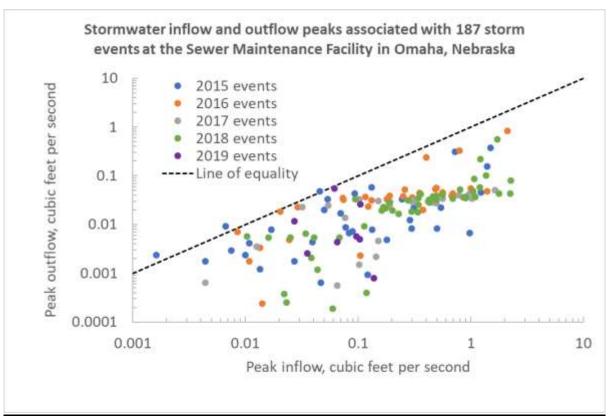
Measured stormwater removed from the storm sewer system by the bioretention cell at the Omaha Sewer Maintenance Facility.

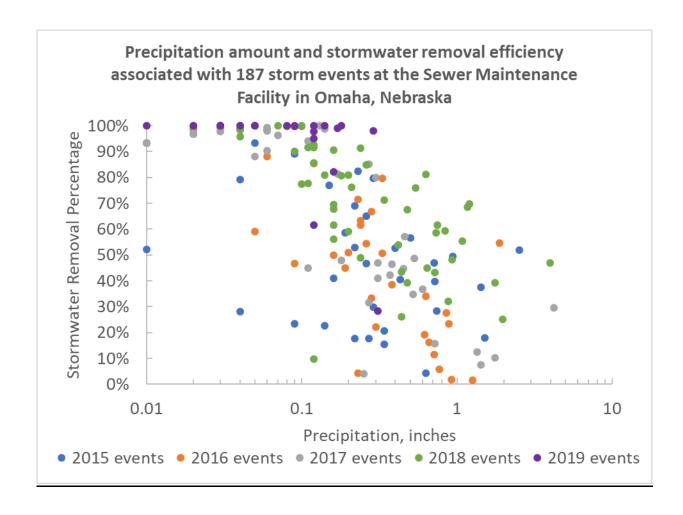
	Number of metered events	Number of unmetered events	Metered Inflow volume, cubic ft	Metered Outflow volume, cubic ft.	Removal, cubic feet	Removal, percentage	Average peak reduction, percent	Maximum peak reduction, percent
Total	187	125	119,292	68,531	50,761	43%	79%	100%
2015	38	24	19,063	11,360	7,703	40%	73%	100%
2016	34	28	22,512	17,532	4,980	22%	76%	100%
2017	39	22	19,562	13,335	6,227	32%	89%	100%
2018	55	4	58,154	26,303	31,851	55%	91%	100%
¹ 2019	21	38	1,813	274	1,539	85%	91%	100%

¹External leakage into the underdrain flume in 2019 compromised water balance measurements on precipitation events generally greater than 0.3 inches, and so the 2019 metrics represent only small events.









TRPP Report – Rodie/Arens November 1, 2019

Project Title

Evaluating the Infiltration, Permeability and Pollutant Removal Characteristics of Bioretention Garden Underdrain Systems

Team Members: Steven Rodie, Department of Biology, UNO Rachael Arens, Omaha Northwest High School (ONW), OPS Andy Szatko, MS4 Coordinator, City of Omaha Stormwater Program

Summary of the Funded Work/TRPP Support

This TRPP research was focused on helping the City better understand the infiltration characteristics, pollutant removal capabilities, and potential clogging of various combinations of media and filter fabrics within the underdrain systems. The City of Omaha has been a leader in innovative "trench" biosystem underdrains that provide for enhanced plant establishment in native versus engineered soils and reduced costs. Limited research has been completed that attempts to compare variable trench configurations, soil textures, organic matter content, woven and non-woven filter fabrics, etc. in a laboratory setting. Research hypotheses developed by the City of Omaha are currently being tested (see below); hypotheses developed by Omaha Northwest AP Environmental Studies students will be tested in the future (through classroom experiences starting in Fall 2019). Testing is expected to lead to 1) better understanding of systems by City staff that will lead to more focused engineering design requirements for future systems, and 2) opportunities for students to apply knowledge of soils, water quality, environmental issues, etc. in research that both reinforces student learning/research experience and supports better design of community infrastructure.

TRPP support was critical to our ability to experiment with the design of the pipe racks in both 2018 and 2019. We mocked up infiltration tubes with media and fabrics in 2018 and found that we would need to resize and reconsider weight and accessibility to move forward in 2019. TRPP funding allowed us to invest in the lumber, acrylic tubes, media, fabrics, scale, and other equipment necessary to conduct experiments. Mini-infiltrometers recommended by the EPA Office of Research and Development and purchased in 2018 were used in 2019 to measure infiltration rates among media types. Given I do not have a research lab at UNO and an established funding stream for green infrastructure research, the TRPP money enables research that would otherwise be difficult to complete.

Significant Findings

Hypothesis: Non-woven fabric has a slower infiltration rate than woven fabric given similar conditions and media.

• The non-woven fabric was relatively slower in the flat 50%-50% media mix, in particular when the media was already saturated. This was likely caused by the additional organic matter and sediment build-up from the media. In the 75%-25% mix, there was no clear distinction between infiltration rates when comparing fabrics.

• Given the flat non-woven fabric has clogged in field installations with higher topsoil/compost ratios, the testing was continued for an additional five rounds (equating to approximately 100 inches of total precipitation) and although the slow infiltration rates continued over time, the fabric did not clog.

Hypothesis: Mounded gravel/fabric lessens potential for clogging and improves infiltration rates.

• Mounded fabric tended to drain faster for the 75%-25% media (especially for saturated or moist media). It also tended to increase infiltration rates when compared to the non-woven flat conditions; the woven flat condition had a faster infiltration rate on average.

Hypothesis: Mini-infiltrometer measurements of hydraulic conductivity (K or permeability) will not correlate to measured tube infiltration across media or soil texture types.

• K values were higher on average for the 50% sand/50% compost and the sand soil texture. There doesn't appear to be a correlation between permeability and infiltration.

Hypothesis: Media with organic matter will increase filtering of nutrients (nitrates and phosphorus).

Initial nitrate test strip results were limited to 100% non-organic sand media. The sand media test reflected a
slight reduction in nitrate concentration after water containing liquid fertilizer passed through the media.
Future testing will include variable organic content for media, and addition of phosphorus strips and a nitrate
ion-selective electrode to assess relative accuracies, student ease-of-use, and application to student
hypotheses development.

Post-Project K-12 Classroom Translation and Engagement

Rachael and I communicate regularly on TRPP project work as well as Service Learning projects conducted every semester. Rachael has begun the use of the testing equipment for Fall Semester. This labwork applies to a variety of curriculum objectives covering ecology, soils, etc., and will allow students to gather and assess data after formulating hypotheses about how the various soil media and tube configurations will compare relative to infiltration rates and pollutant removal. Thus far, students have developed their own inquiry process and have chosen to address questions focusing on infiltration rates (which soil textures or media combinations will infiltrate quicker or have higher K values..and why?). They needed some guidance to get started, but have stated that they are enjoying the hands-on nature of the experiments. Students are also hypothesizing which kinds of seeds/plants would grow best in which soil mixture (questions that will be addressed during spring semester when curriculum on nutrient recycling is covered). I am working with Rachael on a service-learning project this fall with her next group of AP Environmental Studies students, so will be on the ONW campus and anticipate helping with the soil experiments and they progress.

Mentor Impact

The ongoing mutual collaboration with Rachael continues to expand my awareness of high school science curriculum issues and the importance of interactive student learning opportunities at all levels. It allows me to gather a considerable amount of data which helps support my strong relationship with the City of Omaha, and it furthers City understanding of green infrastructure function and opportunities for data/analysis publication and sharing with other communities. The logistical problems that have

arisen with the design of the infiltration lab testing equipment has been a good reminder of the creative side of research and the problem-solving that is embedded in research design.

Teacher Impact

Rachael has received significant recognition for her OPS science teaching, and she often credits her teaching success and productivity in part to TRPP project work. Her most recent recognition was selection as a National Geographic Grosvenor Teaching Fellow which included research in the Galapagos Islands this past summer. She is continuing her Ed.D program at UNL, and is planning to focus her research on the documentation of student benefits that are derived from hands-on research in high school science courses (as has been provided by TRPP training). Our approach this summer was much more focused on a "lab" versus "field" context, and it has provided her with numerous ideas for integrating curriculum into a lab/research setting beyond our initial efforts to help the City answer questions on infiltration (comparing basic differences in soil texture, for instance). In addition, the lab equipment that has been designed/built or purchased (testing tubes and racks, scale, nitrate probe, soil media, etc.) would not be available to ONW without TRPP support.

Student Impact

We both believe that the application of research and field-related information in sciences courses at ONW has benefitted student interest and involvement with science. I am able to work with her AP Environmental Studies students every semester in our combined UNO/ONW Service Learning projects, and even though we don't work on rain gardens directly, I believe I do see a higher level of student interest and problem-solving as we have partnered in summer TRPP research. In discussions with Rachael, students are engaged, applicable... seem genuinely interested, hands-on.

Publications/Presentations/Grants

Andy Szatko, Stormwater Program Supervisor (City of Omaha) presented at the 2019 Operation and Maintenance of Stormwater Control Measures Conference (Environment & Water Resources Institute) in Minneapolis in August. Information taken from the past five summers of research was included in discussions on maintenance of green infrastructure best management practices.

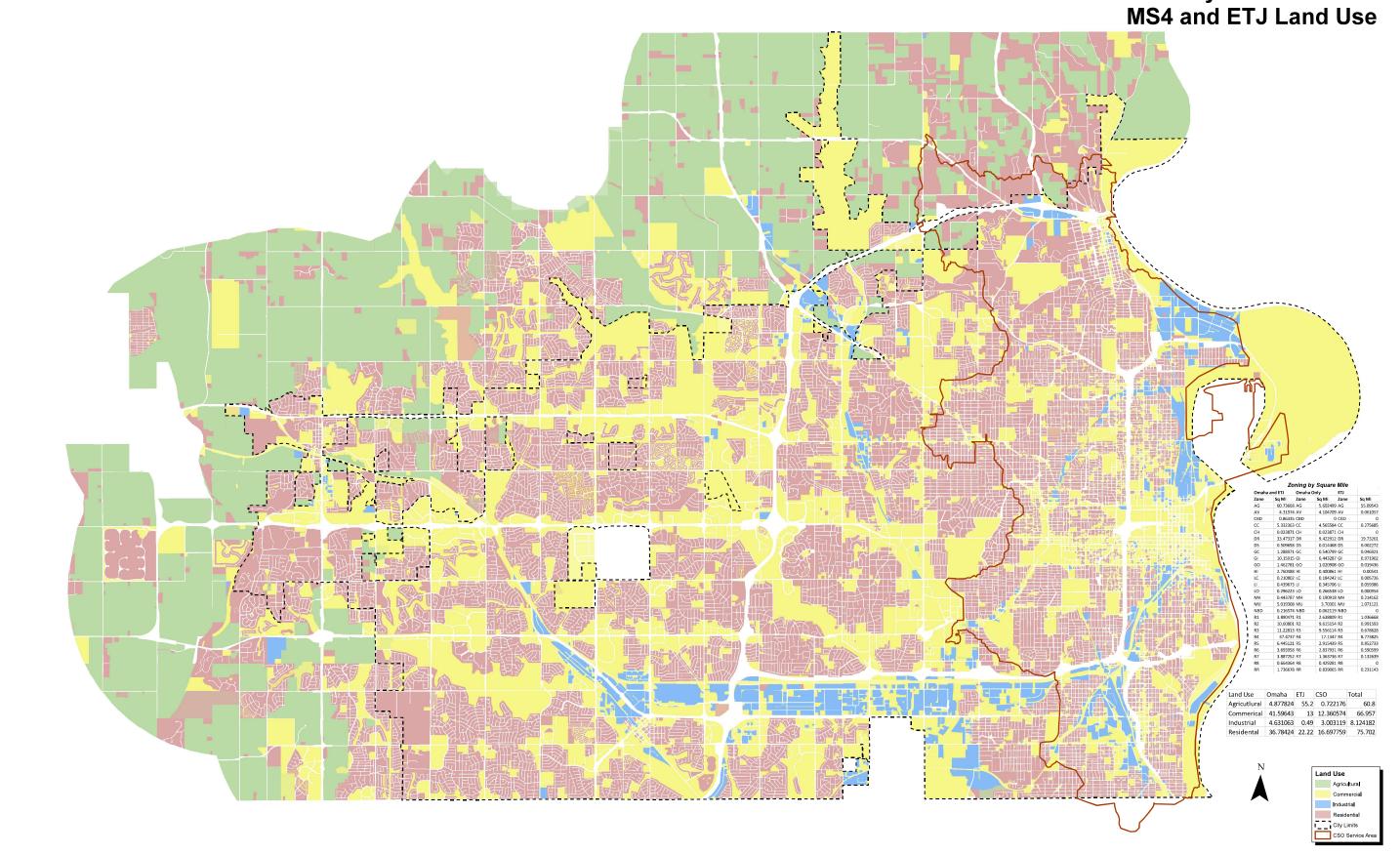
Future Plans

I will be retiring as of Spring Semester 2020, so will not formally continue a research program. I will informally continue to provide feedback to 1) Rachael as she continues to use the neighborhood rain gardens and testing equipment to provide students with research opportunities, and 2) the Omaha Stormwater Program as they continue to study bioretention design and research enhancements for underdrain design, media mixes and geotextiles. I will not be able/do not plan to participate in the TRPP in summer 2020.

ATTACHMENT I

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City of Omaha MS4 and ETJ Land Use



ATTACHMENT J

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Education and Outreach Plan 2018 - 2022

Compiled by: City of Omaha Environmental Quality Control Division



Revision Date: December 5, 2019

As part of its Stormwater Management Plan (SWMP), the City of Omaha Stormwater Program (hereinafter referred to as "Program") has developed a 5-year plan for education and outreach efforts.

GOALS:

The Program strives to prevent stormwater pollution through the education and increased awareness of Omaha-metro residents, businesses, and industries about stormwater issues. Education and outreach efforts have, and will continue to be, a priority of the Program. Each year, new outreach opportunities and issues arise. As a result, the Program creates new resources, activities, and efforts to adapt. This Education and Outreach Plan will continue this adaptive approach into the next five years and in to the future. The plan is laid out in five sections:

- 1. Target Audience
- 2. Materials, Resources, and Events
- 3. Distribution Methods
- 4. Tracking
- Assessment and Reporting

TARGET AUDIENCE:

Stormwater pollution prevention efforts can be implemented by residents both at home and work. The Program has created and implemented awareness materials that are applicable to a diverse range of people in a variety of daily roles. They have been categorized into the following target audiences that include, but are not limited to, the specific groups listed:

<u>Residential:</u> homeowners, pet owners, schools, neighborhood associations, social groups and religious organizations

<u>Construction</u>: developers, builders, contractors, material supply vendors, professional organizations, erosion control professionals, engineering professionals

<u>Commercial:</u> consultants, property managers, grounds maintenance companies, restaurants and food preparation facilities, retail vendors, power washing companies

<u>Industrial:</u> manufacturing facilities, printing facilities, metal fabrication, recyclers, and other facilities that have been or need to be permitted under the National Pollutant Discharge Elimination System (NPDES).

As other target audience groups are identified, efforts will be made to reach out to those groups.

MATERIALS, RESOURCES, and EVENTS:

Outreach materials and resources can be classified into the following categories with listed examples:

- <u>Printed informational pieces</u>: Brochures, manuals, guidebooks, fact sheets, activity guide
- <u>Promotional pieces</u>: Printed sports discs, pet waste bag dispensers, magnets, patches
- Websites and Social Media: OmahaStormwater.org, UnderTheSink.org, WorldOWater.org, OmahaPlants.org, OmahaPermix.com
- <u>Presentations</u>: Sediment and Erosion Control, Post-Construction BMPs, Green Infrastructure
- <u>Educational Events</u>: Home shows, Earth Day, topic-specific fairs, World O! Water Festival,
- Instructional Workshops: Rain garden design and installation, rain barrel building
- <u>Tours</u>: Green infrastructure, UnderTheSink

The Program incorporates recycled content in printed materials and give-away items whenever possible. When designing and purchasing give-away items, factors including minimizing packaging waste and recyclability and reuse are intentionally reviewed. This practice will continue as part of this plan. A list of the current education and outreach materials are listed at the end of this plan.

DISTRIBUTION METHODS:

In order to reach the greatest number of people, the City of Omaha Stormwater Program employs a multifaceted community engagement approach. The Program actively reaches out to the community but also supplies resources for people and businesses to learn about stormwater on their own. Listed are the main categories in which the Program connects with the Omaha community.

Websites and Social Media:

The Program will maintain and contribute content to several websites available to the public. These include:

www.OmahaStormwater.org is the main website for the Program. It includes information for residents, industries, and contractors about rules and regulations, and green infrastructure. The site contains a feature for the public to submit questions and report illegal dumping. Details of upcoming training and educational events are posted. Relevant documents are available for download. Over the next 5 years and into the future, the Program will maintain this website so that it is up to date and easily navigable.

- 2. www.WorldOWater.org is an informational website about the Program's largest annual public event, the World O! Water festival. Event details, including time and date, supporters, and activities are posted to raise interest and to get both the public and organizations involved.
- www.OmahaPlants.org is a plant database for residents, contractors, and landscapers. This site lists the name, photo, and planting instructions for plants that are ideal for green infrastructure installations and grow well in the Omaha area. A query feature allows visitors to narrow their search to plants that fit specific environments or plant characteristics.
- 4. www.UnderTheSink.org is the official website for the Under the Sink facility that accepts household hazardous waste from the residents of Omaha as well as Douglas and Sarpy Counties. Accepted materials, directions and hours of operations are posted along with instructions for handling household hazardous waste.

The Program also utilizes social media to connect with the public. The Program regularly posts a variety of information including green tips, future events, and important notifications through three main social media outlets accounts:

- 1. The Omaha Stormwater Facebook page: @OmahaStormwater
- 2. World O! Water Facebook page: @WorldOWater
- 3. World O! Water twitter account: @WorldOWater
- 4. Omaha Public Works twitter account: @OmahaPublicWrks

The Program recognizes that online outreach is key to reaching many people in the Omaha area. It is committed to maintaining an online presence by sharing relevant and interesting information as part of our 5-year plan. Efforts will be made to ensure information on these platforms is accurate and up to date. The addresses for these websites are included on outreach materials for further promotion and reference.

Outreach Opportunities:

The Program participates in a diverse array of outreach events that range from small school classes to larger conferences, and cover the span of targeted audiences. Methods for outreach are tailored to the event audience and setting. Hands-on activities are often incorporated for events geared to school-age children, while topic-specific informational brochures are distributed at events with adult audiences. Other outreach includes public awareness campaigns such as inlet marking, hanging door tags, hosting workshops, and handing out stormwater information at construction sites to directly educate the public about specific issues and ways they can help prevent stormwater pollution.

The Program will continue to seek new opportunities for outreach each year that promote further stormwater pollution prevention awareness. Outreach efforts will

be tailored as topics and concerns needing additional emphasis arise. The Program will continue to participate in relevant events including fairs, expos, conventions, and trade shows. As new events are introduced to the Omaha community, the Program will take advantage of those opportunities by partnering with them, thus fostering new relationships and expanding our audience.

The Program recognizes that these opportunities are key to distributing relevant information and staying in the public's eye. A list of attended outreach events will be included in our Annual Report each year.

Coordination with Partnering Organizations and Groups:

The Program collaborates with Keep Omaha Beautiful, Inc. (KOB) on outreach events including school presentations, neighborhood cleanups, printed material distribution, campaigns, and social media announcements. Coordination with KOB will continue as part of the 5-Year Plan.

In addition to KOB, the Program partners with and coordinates on outreach events with many other organizations, including, but not limited to:

- University of Nebraska at Omaha
- University of Nebraska at Lincoln
- Papio-Missouri River NRD
- Papillion Creek Watershed Partnership
- Omaha Public Schools
- Millard Public Schools

- Omaha Permaculture
- Metro Community College
- Lauritzen Gardens
- Green Omaha Coalition
- Florence Futures
 - Douglas County Environmental Services

As this list grows, the Program will have the opportunity to co-sponsor, contribute, and participate in more events and spread information more effectively. Creating and maintaining these relationships is a priority for the Program over the next five years.

Television and Radio Announcements:

The Program uses broadcast media to promote events and bring public awareness through topic-specific campaigns. Previous campaigns have included television and radio announcements emphasizing proper used firework disposal, and the importance of picking up pet waste.

A principle of the Program is to minimize waste and litter whenever possible. When participating in outdoor events where printed materials could easily become litter, alternative outreach materials are often substituted and the Omaha Stormwater website (and other websites as applicable) are promoted for attendees to visit after the event.

The City of Omaha Stormwater Program is highly active with public education and outreach throughout the year. It will continue its diverse outreach efforts as part of its fulfillment of the 5-Year Plan and into the future.

TRACKING:

The Program maintains an inventory of outreach materials that includes the quantity on hand, as well as what is distributed at events. Knowing the quantity on hand eases reordering and aids in identifying more frequently used materials and topics. This tracking occurs in a dynamic spreadsheet that is kept current with each outreach effort.

The Program also tracks outreach events. Tracked event metrics can include name, date, location, attendance, and quantity of outreach materials distributed depending on the type of event and the Program's role. Tracking attendees and materials at events allows the Program to compare the success of events year to year and ensures that outreach efforts are reaching all audiences.

Finally, the Program tracks website and social media reach. The number of social media posts, social media engagements and website visitors will be compiled each year. This information can be used to measure the effectiveness of our online presence.

Tracking education and outreach activities is key to achieving the goals of the Program. Accurate and thorough tracking will continue to be prioritized as the Program adapts to changes in education and outreach efforts over the next 5 years. Summaries of distributed materials, events, and social media reach can be found each year in the MS4 Annual Report.

ASSESSMENT and REPORTING:

To maintain thorough and effective outreach, the Program will continue to evolve based upon the trends of how the public prefers to receive information. For instance, the Program recognizes that currently there is a need for a larger social media presence. Social media and website information will be updated regularly and the Program will partner with more organizations so that messaging can be shared with a larger audience.

The inventory of outreach materials will regularly be reviewed for quantity as well as content. As topics and concerns are identified, new outreach will be developed. An example of new outreach materials will be included with the submittal of the City of Omaha's MS4 Annual Report to the Nebraska Department of Environment and Energy (NDEE).

Details of the Program's education and outreach efforts for each calendar year will be included in the City of Omaha's MS4 Annual Report submitted to the NDEE. The report will summarize all outreach efforts, materials distributed, and number of people reached.

OUTREACH MATERIALS LIST

Official Name to Use	Title on Piece	Target Audience
Water Pollution Brochure	Water Pollution Comes In Many Forms	Residential
Rain Barrel Brochure	Building A Rain Barrel	Residential
Storm Drain Awareness Brochure	Keeping Pollution Out Of Our Storm Drains	Residential
Proper Paint Disposal Brochure	Know Your Role In Protecting The Environment	Residential
Pet Waste Flyer	Some Things Are Better Not Left Behind!	Residential
Rain Garden Fact Sheet	Rain Gardens	Residential
Downspout Disconnection Fact Sheet	Downspout Disconnections	Residential
Rain Harvesting Fact Sheet	Rain Harvesting	Residential
Storm Drain Fact Sheet	Storm Drain	Residential
Sustainable Landscapes Manual	Sustainable Landscapes	Residential
OmahaPlants.com Postcard	Omahaplants.org	Residential
Grass Clipping Door Hanger	Properly Dispose of Grass Clippings and Yardwaste	Residential
Rain Barrel Door Hanger	Omaha's Rain Barrel Program	Residential
OSW Frisbees	-	Residential
Pet Waste Bag Dispensers	-	Residential
WOW! Activity Books	WOW! Activity Books	Residential
WOW! Crayon Boxes	WOW! Crayon Boxes	Residential
Clean Water Team Certificate	Clean Water Team Certificate	Residential
Little Steps. Big Impact. Brochure		Residential
Little Steps. Big Impact. Index Card		Residential
World O! Water patches		Residential
Inlet Marking Door Hanger	Only Rain Down the Storm Drain	Residential
Landscape Brochure	Keep It Clean On Your Golf Course or Landscape Projects!	Commercial
Stormwater & Dust Control Brochure	Stormwater & Dust Control	Commercial
Pressurewashing Brochure	Take Some Pressure Off Our Environment	Commercial
Restaurant Brochure	Keep It Clean At Your Restaurant!	Commercial
Outdoor Event Brochure	Keep It Clean At Your Outdoor Event!	Commercial
Bioretention Garden Fact Sheet	Bioretention Systems	Commercial
Bioswale Fact Sheet	Bioswales and Filter Strips	Commercial
Green Roof Fact Sheet	Green Roofs	Commercial
24th St Bioretention Project Sheet	24th Street Bioretention Gardens	Residential/ Commercial
50th and Pine Project Sheet	OFD Pervious Concrete and Bioretention Garden	Residential/ Commercial
50th and Maple Project Sheet	Benson East Gateway Bioretention Garden	Residential/ Commercial

Revision Date: December 5, 2019

Official Name to Use	Title on Piece	Target Audience
Adams Park Project Sheet	JCB & Miami Sewer Separation and Adams Park Wetlands Improvement Project	Residential/ Commercial
Baxter Arena Project Sheet	UNO Baxter Arena Bioretention Gardens	Residential/ Commercial
Country Club Project Sheet	Country Club Bioretention Gardens	Residential/ Commercial
Creighton Prep Project Sheet	Creighton Prep Bioretention & Permeable Pavement	Residential/ Commercial
Douglas Streetscape Project Sheet	Douglas Streetscape Rain Gardnes	Residential/ Commercial
Dundee Elementary Project Sheet	Dundee Elementary Green Infrastructure Outdoor Classroom	Residential/ Commercial
Elmwood Park Diversion Project Sheet	Elmwood Park Diversion	Residential/ Commercial
Florence Streetscape Project Sheet	Florence Streetscape Urban Bioretention Gardens	Residential/ Commercial
Fontenelle Park Project Sheet	Fontenelle Park Green Infrastructure	Residential/ Commercial
150th & Hillsdale Project Sheet	Hillsdale Vegetated Channel & Sediment Removal Structure	Residential/ Commercial
MCC Project Sheet	Metropolitan Community College Green Infrastructure Classroom	Residential/ Commercial
Orchard Park Project Sheet	Orchard Park Bioretention & Cole Creek Restoration	Residential/ Commercial
Rockbrook & Prairie Lane Park Project Sheet	Rockbrook Tributary Stream Restoration & Prairie Lane Park Bioretention	Residential/ Commercial
Saddle Hills Project Sheet	Saddle Hills & TV Towers Neighborhood Project	Residential/ Commercial
Saddlebrook Project Sheet	Saddlebrook Green Roof & Bioretention Project	Residential/ Commercial
SE Police Precinct Project Sheet	Southeast Police Precinct Pervious Concrete	Residential/ Commercial
SOIA Project Sheet	South Omaha Industrial Area Lift Station Bioretention System	Residential/ Commercial
Spring Lake Project Sheet	Spring Lake Park (Phase I)	Residential/ Commercial
UNO Welcome Center Project Sheet	UNO Welcome Center Bioretention Garden	Residential/ Commercial
Under the Sink Facility Project Sheet	Under the Sink Demonstration Project	Residential/ Commercial

Official Name to Use	Title on Piece	Target Audience
Vehicle Impound Facility Project Sheet	Omaha Vehicle Impound Facility Bioswale	Residential/ Commercial
Zorinsky Lake Project Sheet	Zorinsky Lake Aquatic Center Demonstration Project	Residential/ Commercial
Concrete Brochure	Best Management Practices for Concrete Masonry and Ready Mix Professionals	Construction
Metal Fabrication Brochure	Shape Your Plans to Control Wastewater	Construction
LUPs Brochure	Linear Underground Projects & Stormwater Best Management Practices	Construction
10 Important Things Flyer	10 Important Things To Remember On The Job Site	Construction
Permeable Pavement Fact Sheet	Permeable Pavement	Construction
Soil Conditioning Fact Sheet	Soil Conditioning	Construction
Bioretention Manual	Bioretention Gardens	Construction
City of Omaha Environmental Field Guide	City of Omaha Environmental Field Guide	Construction
SEC Flip Book		Construction
Sector A - Timber Products	Sector A - Timber Products	Industrial
Sector B - Paper and Allied Products	Sector B - Paper and Allied Products	Industrial
Sector C - Chemical and Allied Products	Sector C - Chemical and Allied Products	Industrial
Sector D - Asphalt Paving and Roofing	Sector D - Asphalt Paving and Roofing	Industrial
Sector E - Glass, Clay, Cement, and Gypsum	Sector E - Glass, Clay, Cement, and Gypsum	Industrial
Sector F - Primary Metals	Sector F - Primary Metals	Industrial
Sector J - Mineral Mining and Dressing	Sector J - Mineral Mining and Dressing	Industrial
Sector K - Hazardous Waste Treatment, Storage, and Disposal Facilities	Sector K - Hazardous Waste Treatment, Storage, and Disposal Facilities	Industrial
Sector M - Automotive Salvage Yards	Sector M - Automotive Salvage Yards	Industrial
Sector N - Scrap Recycling	Sector N - Scrap Recycling	Industrial
Sector O - Steam Electric Generating Facilities	Sector O - Steam Electric Generating Facilities Sector B Land Transportation and	Industrial
Sector P - Land Transportation and Warehouse Sector R - Ship and Boat Building	Sector P - Land Transportation and Warehouse Sector R - Ship and Boat Building	Industrial
Oction IX - Only and Doar Dulluling	Sector IX - Ship and Boat Building	Industrial

Summary of Printed Outreach Materials and Target Audiences

Official Name to Use	Title on Piece	Target Audience
Sector S - Air Transportation Facilities	Sector S - Air Transportation Facilities	Industrial
Sector U - Food and Kindred Products	Sector U - Food and Kindred Products	Industrial
Sector W - Furniture and Fixtures	Sector W - Furniture and Fixtures	Industrial
Sector X - Printing and Publishing	Sector X - Printing and Publishing	Industrial
Sector Y - Rubber, Misc Plastics Industries	Sector Y - Rubber, Misc Plastics Industries	Industrial
Sector Z - Leather Tanning and Finishing	Sector Z - Leather Tanning and Finishing	Industrial
Sector AA - Fabricated Metal Products	Sector AA - Fabricated Metal Products	Industrial
Sector AB - Industrial Machinery and Auto Repair	Sector AB - Industrial Machinery and Auto Repair	Industrial
Sector AC - Electrical Photographic and Optical Goods	Sector AC - Electrical Photographic and Optical Goods	Industrial

ATTACHMENT K

City of Omaha Grading Permit Inspection Strategy

I. Project Inspection Submittal:

- A. Project Inspection Reports cover different periods depending on the Stage the Grading Permit is in:
 - 1. Stage I Weekly inspections and reports (inspection period ends every Saturday)
 - 2. Stage II Bi-weekly inspections and reports (inspection period ends 2nd & 4th Saturday)
 - 3. Stage III Monthly inspections and reports (inspection period ends the 2nd Saturday)
 - 4. Winter Stage Monthly (Dec. Jan. Feb.) inspections and reports (inspection period ends the 2nd Saturday)
- B. All reports are to be submitted no later than the Friday following the end of the inspection period
- C. All reports must have the:
 - 1. Inspection date(s) and time
 - 2. Date of any rainfall over ½" and rain event amount
 - 3. Weather conditions at time of inspection
 - 4. Inspection details on each BMP in the SWPPP
 - 5. A narrative of disturbed areas not actively being worked
 - a. In the last 14 days
 - b. In the next 14 days
 - c. A stabilization schedule of the idle, disturbed areas
- D. All BMPs with Corrective Actions (CAs) need to be listed, scheduled and activities fully described

II. City Inspectors Review of Project Inspections:

- A. All reports submitted will be reviewed for completeness within 5 working days of receipt.
- B. Reviewed Reports no or minor issues
 - 1. All information is complete and credible
 - 2. Additional information is requested from the Project Inspector (Remark on inspection report and/or additional communications with Project Inspector such as phone or email) on:
 - a. Preventative maintenance scheduled / re-scheduled
 - b. No date assigned to repair schedule (typically max of 7 days from discovery)
 - 3. Request for Voluntary Compliance (RVC)
 - a. Late, but complete and accurate report no more than two requests
 - b. If repair scheduled date unjustifiably missed
 - c. If actions occur compromising SWPPP, by General/ Grader/ or other contractor
- C. Reviewed Reports moderate and major issues
 - 1. Additional information is requested from the Project Inspector (Remark on inspection report and/or additional communications with Project Inspector such as phone or email) on:
 - a. Inaccurate reports
 - b. If repair date is too remote (typically 7 days from discovery weather permitting)
 - c. Missed repair dates if information is incomplete
 - d. Other moderate or major issues as they arise
 - 2. Request for Voluntary Compliance (RVC)
 - a. Report is inaccurate (i.e. BMP description does not reflect site conditions)
- D. Violation outlined in Project Inspection Report
 - 1. On issues of clear violation which jeopardize the environment (Basin breached or removed without approval), the public (excessive dirt on the street, or excessively dusty haul road) or program integrity (starting without permit), a City Inspection should be scheduled ASAP to assess the situation and referred to the Permit Reviewer for the jurisdiction.

III. Correspondence:

A. All report reviews will reference any correspondence (e-mail, phone, or site meeting) with the Project Inspector, Owner / Applicant, or General or Grading contractor since the last report

- B. Correspondence not referenced in a report must be filed in the Grading Permit's Project Diary or in a Remark for an inspection on Permix, this includes phone calls and face to face communications
- C. The Subject line of all e-mail correspondence regarding a Grading Permit should start with the Grading Permit's Number, then the topic
- D. All enforcement e-mail correspondence should include:
 - i. Jurisdiction's Permit Reviewer (if different from below names)
 - ii. Omaha: Jim Kee, Andy Szatko, and Therese Pogge

IV. Enforcement Actions

- A. Requests for enforcement actions need to be timely 3 weeks or less from time of discovery
- B. If the "Request for Voluntary Compliance" is not met (as noted on City Inspection Report), the subsequent inspection report should indicate Yes for "Is Enforcement Action recommended?"
- C. Enforcement requests are to be submitted on Permix and followed-up with Permit Reviewer
- D. Request for Voluntary Compliance (RVC)
 - i. This is the City's first course of action, usually in the form of emails, phone calls, and/or inspection reports
 - ii. Must clearly outline the issue(s) and timeline to resolve
- E. Letter of Warning (LOW)
 - i. Issued when:
 - 1. Company has failed to meet the Request for Voluntary Compliance
 - 2. Companies have little to no history of non-compliance
 - 3. Minor non-compliance issues
 - ii. Requires a written letter outlining how the issues will be resolved and how Standard Operating Procedures will be modified to insure compliance going forward
- F. Notice of Violation (NOV)
 - i. Issued when:
 - 1. Company has already been issued Letter of Warning for violation
 - 2. Company has history of non-compliance
 - 3. Major Violations
 - a. Start without a permit and/or not filing inspection reports
 - b. Remove Basin without a reviewed modification request
 - c. Significantly lacking BMP maintenance
 - d. Grading without water trucks on Wind Advisory Days
 - e. No structural diversion structure present in Storm Sewer, if applicable
 - ii. May or may not have a monetary fine assessed
 - iii. Requires a written letter outlining how the issues will be resolved and how Standard Operating Procedures will be modified to insure compliance going forward

V. City of Omaha Inspector's Report

- A. Site inspection reports must be submitted within 2 working days of inspection
- B. Deficiencies (City Findings, CF) must have a deadline for compliance (no more than 7 days)
 - i. If deficiency is not corrected by deadline and site conditions were reasonable
 - 1. Request enforcement action
 - 2. File follow up report and require deficiency be repaired immediately
 - ii. If deficiency is not corrected by deadline but site conditions were not reasonable
 - 1. File follow up report outlining acceptable reason for missed compliance
 - 2. Set new deadline for compliance
 - iii. Follow-up inspection dates must be defined in City Inspection Reports as needed and followed to document compliance
- C. City Inspection frequency should be:
 - i. Stage 1 Visit site once a month, unless there are non-compliance issues
 - ii. Stage 2 Visit site every other month unless there are non-compliance issues
 - iii. Stage 3 Visit site quarterly unless there are non-compliance issues

ATTACHMENT L

POST-CONSTRUCTION CERTIFICATION, MAINTENANCE & INSPECTION STRATEGIES

Compiled by: City of Omaha Environmental Quality Control Division



City of Omaha Post-Construction Program – Maintenance & Complaints

Goal

Ensure certified structural stormwater control measures installed and implemented are maintained in perpetuity. Respond to complaints regarding them to ensure they are being maintained in the long-term.

Certification

Upon construction completion, all stormwater best management practices (BMPs) that are part of a project's final Post-Construction Stormwater Management Plan (PCSMP) shall be certified by a licensed professional civil engineer registered in the State of Nebraska or other professional approved by the City of Omaha Public Works Department.

For BMP Certification, the Designer shall submit the following documents to the City of Omaha's Quality Control Division of Public Works (QCD).

- Record Drawings of the Final Post-Construction Stormwater Management Plan Sheets
- BMP Certification Document

Long-Term Maintenance

Long-term maintenance of post-construction stormwater BMPs is important to keep them functioning as designed. To help ensure this occurs, it is required by Omaha Municipal Code Chapter 32-124, that a maintenance plan for each post-construction BMP is created, with activities specific to the type of BMP used. This plan is incorporated into a maintenance agreement that is filed with the property deed to ensure it is maintained in perpetuity.

Such agreements shall document the responsibilities of the owner, the Home Owner's Association or other designated party, and the City of Omaha. The maintenance agreement shall be approved by the Public Works Department as part of the Final PCSMP and recorded with the Register of Deeds. A sample copy of a Maintenance Agreement can be downloaded at OmahaStormwater.org.

Maintenance Agreement exhibits shall include the following at a minimum:

- Real Property Depiction Provide lot certificate or platted subdivision with legal description, or PCSMP plan sheet if that information is contained on the sheet already (11"x17")
- BMP Maintenance Requirements as described in Section 2.5 of the PCSMP Guidance Document

Post-Construction Inspections

Post-construction inspections of certified BMPs will be conducted on a complaint basis. Below is a description of this strategy.

Complaints are generally received by QCD using the following means:

- Reporting Hotline, 402-444-3908
- OmahaStormwater.org online report form
- OmahaPermix.com
- Mayor's Hotline, 402-444-5555
- OmahaHotline.com
- Direct phone calls and emails to staff

City of Omaha Post-Construction Program – Maintenance & Complaints

Initial notification from these sources can be by conversation, email, phone call, voicemail, Service Request (SR) in CityWorks, or written correspondence.

CityWorks is an asset management system that QCD and other City Departments use to track various activities. Any complaint that is received will be entered into CityWorks as a SR.

Once a complaint is received, they are reviewed by a Stormwater Program administrator to ensure they are applicable to the Stormwater Program and to a post-construction BMP by doing a desktop review of the area. The desktop review of the area should include but not limited to the list below.

- Property owner(s)
- Layout of the area
- Post-construction documentation submitted in Permix for the site
- Waterbodies
- Sewer lines and nodes
- Previous complaints

If applicable to a post-construction BMP, a Work Order (WO) is created in CityWorks which is tied to the initial SR, noted as being associated with a PCSMP BMP, and pertinent information from the desktop review is included. The WO is assigned to a QCD Environmental Inspector (EI) who will inspect the site. Specific assessment forms have been developed for many of the PCSMP BMP types to guide the inspection of the PCSMP BMP(s). If the issue(s) is not resolved, further enforcement will follow the Omaha Environmental Enforcement Manual. Below is the inspection strategy.

- Els have tablets and phones with cellular data plans to provide access in the field to the above mentioned data and other online resources to aid in their inspection
- Issues found that pose an immediate risk to health and safety of the public or the environment should be reported immediately to the El's supervisor
- El visits the site and will attempt to make contact with a person on-site prior to inspecting the PCSMP BMP to explain the reason for the visit, request access, and ask to speak with the owner or manager of the property
- EI may request the maintenance records for the BMP in question from the owner or manager
- The applicable BMP assessment form will be used when inspecting the site. Additionally the EI will complete WO inspection form
- Complaints will be evaluated for validity
 - If the issue(s) reported in the original complaint are identified by the EI during the inspection, the complaint is considered valid and is followed up as needed until all issues are resolved.

City of Omaha Post-Construction Program – Maintenance & Complaints

- If issues are found but they are not related to the original complaint, it can still be considered valid but should be noted in the WO inspection report and is followed up until all issues are resolved.
- o If no issues are found and the complaint cannot be verified, it would be considered invalid.
- Issues identified during a PCSMP inspection will be shared with the responsible party, a
 timeline established for bringing the site into compliance, and the complaint will remain
 open in CityWorks until it is resolved.
- Review PCSMP BMP project information and document any changes in the WO. Provide the information to a Stormwater Program administrator to update the project in Permix.

Compliance Assistance

Compliance assistance is providing education on regulatory requirements and how to comply with them. As part of the inspection process of PCSMP BMPs, this will be the first step that QCD will use in working with the responsible party. This will include but not limited to:

- Distributing outreach materials such as brochures, fact sheets, and manuals
- Providing applicable code references
- Forms to help with tracking maintenance

Responsible parties that have repeated complaints and do not maintain compliance will be handled on a case-by-case basis. If the responsible party does not come into compliance, additional compliance actions will be taken as described in the Omaha Environmental Enforcement Manual

ATTACHMENT M

POLLUTION PREVENTION AND GOOD HOUSEKEEPING: MUNICIPAL FACILITY ASSESSMENT

Compiled by the City of Omaha Environmental Quality Control Division



Municipal Facility Assessment for Pollution Prevention and Good Housekeeping

Objective

Municipal facilities, through their routine activities and the nature of their operations, have the potential to expose stormwater to pollution. These facilities are the operational bases that provide equipment, materials, and staff for essential city services related to the maintenance of streets, sewer, parks, and vehicles throughout the City of Omaha.

Strategy

Efforts have been underway since 2008 to visit individual facilities and make recommendations for improved Good Housekeeping and Pollution Prevention Best Management Practices. In 2009, the City further evaluated the program and developed the implementation tools to begin rolling out a comprehensive program. It is anticipated that the program will continue to evolve as the City builds capacity and an understanding among the various Departments whose activities or operations have an exposure to stormwater.

The 2009 program evaluation adopted an approach that defines the level of stormwater pollution risk at each facility. This approach uses a strategy referred to as Hot Spot evaluations, which has been prepared by the Center for Watershed Protection in cooperation with the U.S. Environmental Protection Agency. The "Urban Subwatershed Restoration Manual Series #9: Municipal Pollution Prevention/ Good Housekeeping Practices" was published in September 2008. It established the methodology which targets maintenance facilities as Hot Spots if a critical mass of specific activities occur within the facility boundary.

Using this methodology allows the City to prioritize facility inspections, education, and pollution prevention planning. For facilities that have a very low Hot Spot score, staff at that facility receive basic education about good housekeeping and pollution prevention practices. The education about basic stormwater awareness is also used to instruct employees about illicit discharges in an effort to increase the likelihood that problems within the community will be addressed quickly and appropriately. For facilities that have a "Potential Hot Spot" score, the City provides education and also considers and suggests any standard operating procedures that should be put in place. It is the discretion of the City to determine if a moderate Hot Spot is in need of a site specific stormwater control plan, called a Facility Runoff Control Plan (FRCP).

An FRCP is a site specific tool put in place at "Hot Spot" facilities and certain "Potential Hot Spot" facilities. The tool is used to provide education on basic recommended practices as well as inspection guidance and appropriate corrective actions for areas of concern for stormwater pollution. It is important to note that the term "Hot Spot" is a subjective reference to the types of activities that occur at each location. It bears no reference to how the facility is operated. Facilities are merely evaluated on the types of activities, such as vehicle and equipment maintenance, outdoor storage, fueling, landscape maintenance, etc., as well as the frequency or intensity of those activities.

Municipal Facility Assessment for Pollution Prevention and Good Housekeeping

Inspections and Outreach

The Environmental Quality Control Division (EQCD) will conduct regular inspections of facilities with a frequency based on their Hot Spot Score. All profiled facilities will be visited at least once in a 3 year cycle, with "Hot Spot" facilities being reviewed annually.

Each facility evaluation will include a facility walk through, noting effective implementation of Best Management Practices (BMPs) and areas needing improvement. When possible, the evaluation will be conducted with facility staff present so they can answer questions and provide clarifications as needed.

At the time of facility evaluation, a document review will be included for those with an FRCP. The document review includes assessment of the monthly inspections forms for thoroughness and completeness, training logs, and that qualified personnel are conducting the monthly inspections.

A written report and photo log are then provided to the facility management after the facility inspection. The report notes observations of conditions on site, and recommendations as applicable for BMP implementation.

Facility contacts are encouraged to implement recommended BMPs over a period of time. EQCD will return to the facility or call to determine if the BMPs have been implemented and if new ones need to be suggested. It is the responsibility of each facility to implement recommended BMPs. EQCD is available as a resource to facilities when needed, but is not able to budget or schedule implementation of any BMPs.

The site evaluations will also serve as an opportunity for ongoing education of facility personnel, provide suggestions, and to answer their questions as part of the City of Omaha's continued efforts to improve Good Housekeeping practices at our municipal facilities, minimizing potential pollution.

ATTACHMENT N

CITY OF OMAHA MUNICIPAL EMPLOYEE TRAINING STRATEGY GOOD HOUSEKEEPING & POLLUTION PREVENTION

Compiled by: City of Omaha Environmental Quality Control Division



Revision Date: October 29, 2019

City of Omaha Employee Pollution Prevention Training Strategy

Goal

The City of Omaha Stormwater Program recognizes the importance of having a broad base of educated and informed personnel in efforts to minimize stormwater pollution. With this, the Program not only focuses on stormwater education to residents and the regulated community, but also coordinates education for applicable municipal employees, in an effort to achieve program goals through increased awareness. Training and education is to be focused on increasing comprehension and application of Good Housekeeping and Pollution Prevention (GH & PP) strategies that will protect the quality of stormwater runoff.

Target Audiences

Training is provided to the employees who, through their routine activities, have the most potential to encounter stormwater pollution. These municipal employees can include:

- City maintenance facility staff and field crews
- City staff associated with Municipal Separate Storm Sewer System (MS4) maintenance activities
- Environmental Quality Control Division (EQCD) field staff Environmental Inspectors, Landscape Gardener

Municipal employees in other divisions and departments that may encounter potential sources of stormwater pollution in some form as part of their job duties will be made aware of training opportunities as they are provided, such as the annual Sediment & Erosion Control Seminar.

The primary message of the municipal staff training program is that each employee has a personal responsibility to protect water quality by making smart decisions, and to look for potential pollution sources, minimize sources, and address sources as applicable, as part of their standard operations.

Training Resources

Trainings will be provided in a variety of forms, including but not limited to:

- Training videos: 15-30 minute videos on a variety of GH & PP topics
- Presentations: tailored presentations to cover topics specific to audience
- Conferences and seminars: City-sponsored and professional organization-sponsored events with tailored presentations, and often, applicable vendors for the subject matter and audience
- Printed materials: brochures, posters, and field guides
- Web resources: City-managed websites with electronic resources, including OmahaStormwater.org, and web-based educational programs and tools

Training Topics

From year to year, various topics will be highlighted and prioritized to broaden the knowledge base of municipal staff. Topics to be covered include, but are not limited to:

Revision Date: October 29, 2019

City of Omaha Employee Pollution Prevention Training Strategy

- Illicit discharge detection and elimination
- Construction site runoff
- Good housekeeping measures and practices
- Post-construction Best Management Practices (BMPs)
- Spill prevention and countermeasures
- General pollution prevention
- Stormwater management

Training Descriptions

- Training for City maintenance facility staff and field crews is provided in the Facility Runoff Control Plan (FRCP) Program document if one has been developed for their reporting location.
- Training specific to MS4 maintenance activities is provided in the City of Omaha MS4 Maintenance Activity Descriptions document. The departments and divisions who are a part of these activities provided their training descriptions.
- EQCD staff receives initial training on GH & PP topics, including in-field training for inspection and maintenance activities, as well as ongoing trainings for continued education.

Training Tracking

- Attendance and subject matter will be documented for each formal training coordinated and/or attended by EQCD staff.
- As part of their Facility Runoff Control Plans (FRCPs), maintenance facilities are to document their trainings. Site supervisors are encouraged to review and incorporate stormwater related topics into less formal educational settings, including staff meetings, safety meetings, and employee orientation.
- MS4 maintenance activity trainings are the responsibility of the respective department/division.

Evaluation

Providing education opportunities and materials relevant to municipal staff is an ongoing consideration. The employee training strategy will be evaluated annually to determine appropriate topics and groups of staff that need further education or increased levels of awareness. Upon review, training format and content will be adjusted for applicability and greatest effectiveness. EQCD will continue to develop GH & PP educational materials as needs are recognized and/or staff feedback identifies a relevant topic that could reduce the risk of stormwater pollution citywide.

Revision Date: October 29, 2019

ATTACHMENT O

CITY OF OMAHA MS4 MAINTENANCE ACTIVTY DESCRIPTIONS GOOD HOUSEKEEPING & POLLUTION PREVENTION

Compiled by: City of Omaha Environmental Quality Control Division



Introduction

The City of Omaha Environmental Quality Control Division has coordinated with the City of Omaha's Public Works, and the Parks, Recreation, & Public Property Departments to describe and track MS4 maintenance activities, as part of the City of Omaha's MS4 permit. This document is laid out by maintenance activity type with a description of who is involved, the maintenance activity, monitoring, waste disposal, documentation, and training.

Stormwater Catch Basin & Inlets

- Who City of Omaha Public Works Department, Sewer Maintenance Division
- *Monitoring Strategy* Stormwater inlets that have been identified as high priority due to flooding potential or history of complaints are cleaned on a preventative maintenance schedule. All other inlets are cleaned on a complaint based schedule.
- *Maintenance* Manually remove debris from structure with hand tools and/or vacuum truck
- **Documentation** When maintenance is performed, it is tracked in CityWorks with a work order. If illegal dumping is suspected, it will be investigated by the City of Omaha's Environmental Quality Control Division to determine the responsible party, initiate a compliance action, and confirm it is no longer occurring.
- Waste Disposal Water removed during maintenance activities is decanted into the sanitary or combined collection system and materials extracted are taken to a water resource recovery facility for processing before being taken to a landfill. Manually collected debris is loaded into truck beds and disposed of at City maintenance yards into their waste piles. These piles are maintained in collection bins and regularly disposed of by taking them to a landfill.
- *Training* Employees receive training periodically to ensure catch basins and inlets an inlet is on PM or based on complaints received by the public are properly cleaned using updated SOP.

City-Owned Open Channels

- *Who* City of Omaha Public Works Department, Street Maintenance Division and Sewer Maintenance Division, if drainage structures are involved.
- Monitoring Strategy
 - o Street Maintenance Channels are inspected on a complaint basis.
 - Sewer Maintenance Monitors stormwater controls along open channels per their designed maintenance schedule.
- *Maintenance* Determination is made regarding severity and extent of debris and necessary maintenance is scheduled accordingly.
- **Documentation** City-owned channels and drainage structure maintenance activities are documented using the CityWorks asset management system. If illegal dumping is suspected, it will be investigated to determine the responsible party, initiate an enforcement action, and confirm it is no longer occurring, this is typically done by the Environmental Quality Control Division.
- *Waste Disposal* Debris removed is disposed of properly.
- Training
 - Street Maintenance Periodic training is provided to the operators performing the work to ensure proper operation and processing of the appropriate issues.

- Foreman are trained on the proper maintenance of drainage ways and structures periodically through review with management and engineering staff. The training is conducted at least quarterly.
- Sewer Maintenance Staff is trained to inspect and or repair storm water outfalls on a complaint basis. Inspection of structures has been done in the past at a 5 year cycle. If defective parts of an outfall are found, a work order is created and the problem is mitigated based on priorities set by the Division Manager and Superintendent.

Street Sweeping and Cleaning

- *Who* City of Omaha Public Works Department Street Maintenance Division, and Parking Division
- *Monitoring Strategy* Activities are on a schedule. If conditions warrant additional sweeping and/or cleaning, it is done on a complaint basis.

• Maintenance -

- Street Maintenance Sweep all streets twice annually. Business Districts and major streets are swept more frequently, approximately monthly.
- Parking Mechanically sweep 7 parking facilities and 3 surface lots, all
 municipally owned parking structures. All facilities are swept down twice a year,
 in the spring and fall. Municipally owned parking structures are also washed
 twice per year in conjunction with sweeping. These services are contracted out.

• Documentation –

- Street Maintenance Lane miles and tonnage of collected materials is maintained by Street Maintenance Division.
- o Parking Amounts are not tracked as they have no means to weigh the material.

• Waste Disposal –

- Street Maintenance For street sweeping, the street sweepers collect the material, temporarily store the material at a City municipal facility for drying, and then disposed of at the landfill. A portion of the sweepings are screened for recoverable material that can be reused, material not suitable for reuse is landfilled.
- Parking For parking structures and lots, the swept material is collected and disposed of at the landfill. When parking structures are washed, practices are used to capture the solids from the wash down which are then disposed of at the landfill.

• Training –

- Street Maintenance Periodic training is provided to the operators performing the work to ensure proper operation and processing of the appropriate issues. The training is conducted at least quarterly.
- Parking Services are contracted out and no training is directly provided to the contractor. It is expected that the contractor operates in accordance with local and state regulations.

Structural Stormwater Controls

- City-Owned Stormwater Basins
 - Who City of Omaha Public Works Department, Sewer Maintenance and Environmental Quality Control Division. City of Omaha Parks Recreation and Public Property Department.
 - Monitoring Strategy Inspections are conducted twice a year by the Environmental Quality Control Division, once in the Fall after vegetation has dropped and once in early Spring prior to vegetation becoming full grown. Inspections are documented in CityWorks.
 - Maintenance Maintenance summary sheets have been created for the basins that summarizes maintenance activities, what triggers maintenance, and who is responsible for conducting the maintenance. Maintenance noted during an inspection or on a complaint-basis are forwarded over to the department or division is responsible for that maintenance activity. Maintenance that isn't clearly defined is discussed with appropriate departments and divisions to coordinate. Parks Department utilizes re-occurring Work Orders for scheduling and recording of the basins.
 - Documentation Maintenance activities are documented in CityWorks by the respective department or division.
 - Waste Disposal All waste materials are properly decanted, if needed, into the sanitary or combined collection system and remaining material is disposed of at a landfill.
 - Training
 - EQCD Training on performing inspections is provided to new employees. This includes one-on-one training of forms, workflows, etc... and field training by accompanying a current inspector on an inspection.
 On-going training is done as-needed to review processes.
 - Street Maintenance Periodic training is provided to the operators performing the work to ensure proper operation and processing of the appropriate issues. The training is conducted at least quarterly.
 - Sewer Maintenance Operators are trained to know the proper inspection and cleaning methods of each designed control system per the maintenance specifications laid out in the design engineer's maintenance plan. Operators complete a site visit with a supervisor to walk through the plan and inspect the structures to be maintained. Follow up or onboarding training of new employees is conducted periodically.
 - Parks Department Pesticides are used by PRPP on an "only as needed" basis. Extensive efforts are taken to minimize run off into surrounding water sheds. Pesticides are handled and applied by a select number of individuals holding a NE Pesticide Applicators License. The certification and CEU process is documented annually by the PRPP Office Manager. New certifications, Training and CEU accrual are generally accomplished over the winter months via testing or conferences conducted by the Douglas County Extension Service, UNL Agriculture and NE Forest Service. All PRPP employees are required to attend annual Storm Water training administered by the EQCD.

• City-Owned Green Infrastructure

- Who City of Omaha Public Works Department, Environmental Quality Control Division
- o *Monitoring Strategy* Inspections are conducted annually by the Environmental Quality Control Division. Inspections are filed on CityWorks.
- Maintenance City-owned green infrastructure practices are maintained by the Environmental Quality Control Division. They are maintained throughout the season. If maintenance activities are identified in the annual inspection, work orders are created to track maintenance performed.
- Documentation Maintenance activities are tracked in CityWorks.
- Waste Disposal All waste materials are temporarily stored at City facilities
 where landscape wastes, i.e. plant material and sediment, can be deposited into
 storage areas until they are disposed of at a landfill.
- o *Training* Training on performing inspections is provided to new employees. This includes one-on-one training of forms, workflows, and field training by accompanying the stormwater program coordinator on an inspection. On-going training is done as-needed to review processes.

ATTACHMENT P

INDUSTRIAL STORMWATER (ISW) PERMITTING: COMPLIANCE COORDINATION FOR FACILITIES

Compiled by the City of Omaha Environmental Quality Control Division



ISW-Permitted Facilities Compliance Coordination Strategy

Objective

Industrial facilities, through their routine activities and the nature of their business, have the potential to expose stormwater to pollution. In an effort to provide the regulated community a clear path to compliance and eliminate redundancies, the City of Omaha's Quality Control Division of Public Works (QCD) is coordinating with the Nebraska Department of Environment and Energy (NDEE) to assist with compliance and outreach with the NDEE National Pollutant Detection and Elimination System (NPDES) General Permit for Storm Water Discharges from Industrial Activity – NER910000.

Strategy

As part of coordination efforts, the City of Omaha Stormwater Program will maintain an inventory of permitted industrial facilities within the City of Omaha's corporate city limits, or discharge into a separate storm sewer system owned and operated by the City of Omaha, which fall into the Sectors identified in the Industrial Storm Water (ISW)-NPDES Permit, and their compliance with the Permit.

Identification and tracking of applicable industries occurs via three primary methods:

- 1) The NDEE provides an annual updated list of ISW-permitted industrial facilities, and industrial facilities that need to be ISW-permitted.
- 2) Industries reach out about obtaining a permit or are discovered to not have a permit through inspections or complaints.
- 3) The City compares its list of industrial facilities, which had applied for and issued a City permit under a previous but no longer active program, with the NDEE list of ISW-permitted facilities to determine which ones must obtain a permit with the state.

As part of its effort to maintain a current inventory, the City will make updates as needed upon receipt of the annual NDEE list of current permitted facilities and as notifications or other correspondence are received throughout the year. The updated inventory will be tracked in a geodatabase and reflected in the associated GIS layer maintained by the Program.

Inspections and Outreach

As part of compliance efforts, the following outreach efforts will be implemented:

- 1) Industrial facilities identified through the strategy above will be inspected once per the Permit cycle to review the site by trained and qualified inspectors; findings and concerns identified will be shared with the industry through a formal report, as well as with the NDEE when applicable.
- 2) Industries not in compliance due to site conditions or lack of permit coverage will be contacted by QCD. Outreach to these industries includes education about permitting and pollution prevention as well as support so they may secure a permit and come into compliance.
- 3) QCD will receive and investigate complaints received pertaining to local industrial facilities, with appropriate follow up efforts to prompt the facility being brought into compliance, as applicable.
- 4) The Omaha Stormwater Program will continue to serve as a resource to local industries. Additional emphasis on certain facilities or Sector-associated facilities will be implemented as needs and concerns are identified as part of the Program's efforts to minimize stormwater exposure to pollution sources Citywide.