CITY OF OMAHA
NPDES PERMIT FOR THE MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
NE0133698
2014 ANNUAL REPORT

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

April 1, 2015

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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."

Nina Cudahy
Signature of Authorized Representative or Cognizant Official

March 31, 2015
Date

Nina Cudahy
Printed Name

EQCD Manager
Title

Introduction

The second Omaha Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit (NE0133698/PCS 73881-P) was issued by the Nebraska Department of Environmental Quality (NDEQ) and became effective on October 1, 2008. The MS4 permit authorizes the City of Omaha to discharge storm water from all existing City of Omaha owned or operated MS4 outfalls to 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 expired on September 30, 2013. The NDEQ issued an administrative extension to this permit in October 2013. The MS4 permit identifies the current City of Omaha SWMP. The SWMP requires the City to submit an annual report and a semi-annual progress report to the NDEQ. In addition, reports will be made available to the public on the Papillion Creek Watershed Partnership web site (www.papiopartnership.org).

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

- Public Works Department
  - Environmental Quality Control Division
  - Street Maintenance Division
  - Sewer Maintenance Division
  - Construction Division
  - Design Division
- Parks, Recreation and Public Property Department
  - 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)
- Natural Resource Conservation Service (NRCS)

This report satisfies the annual reporting requirement for permit year 6 and covers the calendar year from January 1, 2014 through December 31, 2014

The report is laid out as follows: the program elements are shaded, the permit requirements are underlined, and the City's description of permit compliance is in plain text.

I. Public Education & Outreach

A. Distribute informational brochures on the proper disposal of household hazardous wastes and the availability of the Household Hazardous Waste facility.

The City of Omaha contracted with Keep Omaha Beautiful, Inc. (KOB) to distribute educational information. In the annual report submitted to the City by KOB they reported distributing a total of 13,534 brochures at locations and community events throughout the year. The 13,534 brochures that were distributed covered 12 different topic areas concerning household hazardous waste. Brochures were delivered to commercial and public locations around the City for distribution. Additionally KOB distributed the brochures at outreach events that they attended. Below is a summarized list of the commercial and public locations and events where materials were distributed.

Neighborhood Association Workshop	MegaSaver 42nd & Center	Columbus Park Community Center
Starbucks	MegaSaver 42nd & Grover	Camelot Community Center
Keep Nebraska Beautiful Conference	Bucky's 42nd & Center	A.V. Sorenson Community Center
OBD Resource Group	Bucky's 42nd & Grover	Harrison Elementary School
Our Lady of Lourdes	Lutheran Family Services	Girls Inc. Teem Summit
Earth Day Omaha – Elmwood Park	Salvation Army Adult Rehab Center	Teen Summit
KNB Family Fun Walk	Salvation Army Store 28th & Dodge	Walgreens 204th & Maple
Heartland Christian	Walgreens 32nd& Douglas	Walgreens 3001 Dodge Street
Bryan Senior High School	DINOS Storage 28th & Douglas	Walgreens 84th & Harrison
Saddlebrook Elementary: Girl Scout Troop	YMCA S. Omaha 30th & Q	Walgreens 51st & Center
Bryan Senior High School	Omaha Public Library at Metro College	Florence Community Center
Walnut Hill	Bag 'N Save 144th St	Common Grounds
UNO Serve Office of Civic & Social Responsibility	Lautizen Gardens	Girl Scouts Offices & Buildings (6 locations)
Elkhorn Rotary	Sarah May OPS Media Technology Center	Will A. Cather Branch Omaha Public Library
Minne Lusa Family Health Fair	Wohlner's Grocery	Christi Heights Park
LaVista Bioblitz	BSA Mid America Council	Montclair Community Center
Lauritzen Gardens	Nebraska Watershed Network	Mockingbird Community Center
Gateway Elementary	Lutheran Family Services	Sherman Elementary
Cubby's (Old Market)	Omaha Chamber of Commerce	Saddlebrook Community Center
Zio's Pizza (Old Market)	Billy Frogs (Old Market)	Pipal Park
Old Market Sundries (Old Market)	Drastic Plastic (Old Market)	Spring Lake Park Cleanup
City Limits (Old Market)	Imaginarium (Old Market)	W. Dale Clark Library
The Tea Smith (Old Market)	Homers (Old Market)	

In addition to the distribution of brochures, the City maintains a website www.underthesink.org that presents a variety of information about the site, materials accepted and not accepted, hours of operation, and alternative use products.
In the 2014 calendar year UnderTheSink, the household hazardous waste facility, had a total of 15,013 drop offs resulting in a total 954,026 lbs of material, an average of 4,631 lbs/day (of days accepting waste). A total weight of 229,042 lbs of HHW was shipped offsite by our disposal contractor. Those drop-offs and that total weight can be further broken down into:

Recycling Totals in 2014:

Steel from paint and aerosol cans: 61,000 lbs
Latex paint used with Posi-Shell at Sarpy County Landfill: 17,380 gal
Oil-based paint and flammable liquids used as industrial fuel: 11,990 gal
Antifreeze recycled: 1,790 gal
Automotive batteries: 11,910 lbs
Fluorescent bulbs: 8,257 bulbs

Oil Totals in 2014:

Collected approximately 9,150 gal from 3,580 people
Sold a total of 1,500 gal during the summer to Tri-State Oil Reclaimers, Inc.
The remaining oil, was/is being burned in the waste-oil boiler

ReStore Totals in 2014:

People who took free usable items for their own use: 10,067 persons
Weight of non-paint items taken: 157,463 lbs
Gallons of free paint taken: 27,011 gal

17 tours were conducted in 2014

This permit requirement continues to be met.

B. Issue public service announcements related to storm water protection on local TV, radio or print outlets, which will address TMDL pollutants of concern.

In addition to the distribution of educational brochures and public outreach events, Keep Omaha Beautiful, Inc. contracted with Clear Channel, a firm that manages local radio station, to broadcast 6 public service announcements in April, June, July, August and September on KFAB-AM and RFAB-AM. In total the PSA's were aired 52 times.

This permit requirement continues to be met.

C. Continue existing drain marking program to improve public awareness concerning illegal dumping utilizing volunteer services, which will address TMDL pollutants of concern.

Keep Omaha Beautiful, Inc. coordinated neighborhood groups and eagle scouts in 2014 to mark and clean storm sewer inlets. In total, 750 disks were placed.

KOB, Inc also uses a GIS tracking system to better direct the volunteers to areas that have not been marked. The City has approximately 110,000 storm drains, using the GIS system should make tracking those inlets which have been marked or need marking easier to manage.

This permit requirement continues to be met.

D. Hold a Sediment and Erosion Control Seminar for the developers, builders, engineers, vendors, and graders, which will address TMDL pollutants of concern.

The City worked with the P-MRNRD, Douglas-Sarpy County Extension Office, NDEQ, NRCS, PCWP, and USACE to present the annual sediment and erosion control seminar on February 6, 2014. There were 274 people that signed in at the seminar. Topics that were covered included:

- City of Omaha's 2014 Compliance Issues
- New Development vs. Redevelopment SWPPP Design and Implementation
- Common Installation Errors and BMP Selection at the Lot Level
- Construction to Post-Construction in the Field and on Permix
- 2014 Post-Construction BMP Inspection Summary
- Migratory Bird Treaty Act and Construction Projects

This permit requirement continues to be met.

E. Schedule outreach events with industry trade organizations to educate the regulated community regarding Omaha's Industrial Permitting Program.

EQCD presented at 4 different outreach events attended by the permitted community. Events were held throughout the State of Nebraska but primarily in the Omaha area. Audiences varied from business owners to consultants and NRD staff. The table below is a summary of these events and activities.

Date	Location	Attendees	Activity	Comments
11/22/2013	Metropolitan Community College – Fort Omaha	2	Toured MCC with NRD's Patrick Leahy.	Learned about what they are doing with sustainability and green infrastructure.
11/27/2013	Davis Elementary	7	Bioretention basin maintenance review	Educate staff about maintenance of post-construction BMPs.
2/6/2014	Omaha Marriott - Regency	274	Sediment & Erosion Control Seminar	Annual seminar regarding erosion and sediment control.
3/12/2014	Georgetowne Conference Center - Omaha	60	Sediment & Erosion Control	Stetson seminar on sediment & erosion control in the PCWP

This permit requirement continues to be met.

F. Work collaboratively with other community organizations to develop a campaign aimed at picking up pet waste which will address TMDL pollutants of concern.

The City of Omaha hired a marketing firm in 2009, MINT Design Group, to assist in the development and implementation of the pet waste campaign. Advertisements were developed and published in several area newspapers, billboard space was used, mass mailings distributed, theater advertising purchased, posters placed on litter cans, radio announcements broadcast, a television commercial produced, and other media printed. We continue to use these materials today. 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. Additionally, EQCD attended four events where flyers were handed out along with pet waste bag dispensers, as shown in the table below;

Date	Location	Dispensers	Activity
4/26/14	Hefflinger Park	450	Spring Bark in the Park
5/9/14	Elmwood Park	150	Spring into Summer
7/19/14	Meadow at NHS	300	Canine Carnival
9/28/14	NHS	600	NHS - Walk for the Animals

The City of Omaha has also 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 73,000 bags were used during this permit year.

This permit requirement is on schedule to be met.

G. Develop materials and displays associated with BMP demonstration projects installed with Storm Water Management Program Plan funds from NDEQ.

Educational signage was placed at the UnderTheSink Facility, Orchard Park, and Metropolitan Community Collge (MCC) Fort Omaha Campus, all are accessible by the public. The signage explains the design and function of the BMP's onsite. The green and traditional roofs at the Saddlebrook Joint Use facility have two weather monitoring stations installed. The public can view the differences between the two on two separate screens; one located in the library the other located in the stairwell outside of the indoor track. There are also webcams directed toward the green roof which will also be displayed on the screens. We also have the weather information of the green roof available on our website www.omahastormwater.org.

This permit requirement continues to be met.

H. Develop a City Storm Water Program Web Site, including but not limited to storm water related information and provide educational information targeted for residents, children, and industries, which will address TMDL pollutants of concern.

The City of Omaha has developed and deployed a website, www.omahastormwater.org dedicated to our Stormwater Management Program. From the website industries can access the necessary documents to apply for a permit as well as access resources to help them maintain compliance. Developers and engineers can access the necessary documents to apply for Construction and Post-Construction Stormwater permits.

Residents can access information as to how they can improve water quality by actions they take at home. Children's activities are also available on the website. There is also public information available on the demonstration storm water best management practices that have been implemented in areas of the city. The public can access information related to the monitoring program. Additionally there is an online complaint or comment form available to the public.

The website was significantly updated in early 2014 to improve navigation and to increase resources and content to residents, industries, and developers. During the upgrade, statistics on traffic, users, etc… was inadvertently disabled and statistics for 2014 are not available. However, downloads for forms and resources on the website were tracked, indicating continued high use of the website. For example, the Omaha Industrial Stormwater Permit was downloaded 3,082 times and our various Green Infrastructure Fact Sheets 2,000. The site currently is being monitored with Google Analytics.

This permit requirement continues to be met.

II. Public Participation & Involvement

A. Operate a storm water hotline and web based complaint system for Watershed (general information, complaints, reports of illegal dumping, etc.)

The City of Omaha's Environmental Quality Control Division investigated 55 complaints of illegal dumping and/or illicit discharges in the 2014 Permit Year. Complaints ranged from excess sediment in the street to suspicious discharges into a creek. A table compiling the complaints, investigations and resolutions of these reports can be found in Attachment B.

This permit requirement continues to be met.

B. Participate in organizing to hold open houses on Papillion Creek Watershed Plan activities.

The Papillion Creek Watershed Partnership holds monthly meetings, which are open to the public, to discuss watershed and water quality policies. There were six meetings held in the 2014 calendar year. The following table summarizes the times and attendance for the meetings.

Date	Count	Target Market	Comments
2/27/2014	15	Partnership Members	Partnership Meeting
3/14/2014	16	Partnership Members	Subcommittee Meeting
3/27/2014	14	Partnership Members	Partnership Meeting
4/24/2014	6	Partnership Members	Partnership Meeting
9/25/2014	15	Partnership Members	Partnership Meeting
10/23/2014	15	Partnership Members	Partnership Meeting

This permit requirement continues to be met.

C. Continue to implement a stream Cleanup Day. Utilize Keep Omaha Beautiful, Inc. to identify stream segments in need of cleanup and recruit volunteers from the local area, public groups, and representatives from local area business and developments.

Keep Omaha Beautiful, Inc. (KOB) organized the 2014 Stream Clean ups. There were a total of 11 clean-up efforts throughout the year. The water courses that KOB targeted were; Standing Bear Lake, Lake Zorinsky, Cunningham Lake, Carter Lake, Elk Creek, & the Riverfront.

This permit requirement continues to be met.

D. Provide tours of UnderTheSink, household hazardous waste facility for schools and neighborhood organizations to learn about the proper way to manage household chemicals and about storm water treatment systems installed at the site.

A total of 16 tours were conducted at the UnderTheSink Facility in 2014. Stormwater Best Management Practices (BMPs) have also been installed at the facility along with educational signage. The BMPs were completed in the Fall of 2009 and are meant to serve as a demonstration project to the public.

This permit requirement continues to be met.

E. Hold World O! Water Festival focused on elementary school aged children to celebrate Clean Water and engage in water quality related activities.

The World O! Water Festival was held on September 6, 2014 from 12 PM until 4PM at Wehrspann Lake / Chalco Hills Recreation Area. There were over 50 organizations that participated by handing out information, conducting an activity or providing demonstrations. An estimated 1,000 visitors attended the event. Information that was handed out included water stewardship, recycling, water quality, and water conservation. Activities included putting a watershed pollution demonstrative model, canoe rides, nature hikes, and science experiments. This was the 10th successful year the event was held.

This permit requirement continues to be met.

F. Participate in community organizations, conferences workshops, and web casts related to water quality and storm water management.

City of Omaha EQCD staff attended or participated in 39 workshops or webcasts in the 2014 permit year. The following table is an accounting of the seminars attended.

Date	Title	Associated Program	Attendees
10/03/13	UNO Bioretention Garden Filling Event	Post-Construction	3
10/09/13	ACEC Omaha Engineering Partnership Workshop	Construction	5
10/09/13	Toolbox Safety Meeting	Good Housekeeping	1
11/13/13	Toolbox Safety Meeting	Good Housekeeping	6
11/27/13	Davis Middle School Bioretention Maintenance Training	Post-Construction	4
12/11/13	Toolbox Safety Meeting	Good Housekeeping	2
01/07/14	O&M and Green: Best Practices for GI Operation & Maintenance webcast	Post-Construction	5
01/08/14	Toolbox Safety Meeting	Good Housekeeping	2
01/14/14	EPA's Healthy Watersheds Program Presents Planning for GI at Landscape Scale – A Case Study for New York	Post-Construction	1
01/24/14	Cold Climate BMPs & LID at Big Muddy Workshop	Post-Construction	3
01/31/14	Permeable Pavement Master Class - Introduction	Post-Construction	8
02/04/14	Green Infrastructure Workshop #5	Post-Construction	21
02/05/14	City of Omaha Sediment and Erosion Control Seminar	Construction	18
02/07/14	MS4Web Training	Multiple	5

Date	Title	Associated Program	Attendees
02/07/14	Permeable Pavement Master Class - Design & Construction of Perm. Pavements	Post-Construction	7
02/12/14	Toolbox Safety Meeting	Good Housekeeping	5
02/14/14	Permeable Pavement Master Class - Impact of Design & Construction on Performance	Post-Construction	7
02/19/14	Urban Waters Outreach – Engaging Minority Audiences	Public Education	1
02/21/14	Permeable Pavement Master Class - Live Case Studies. Key Factors in Design & Construction	Post-Construction	7
02/25/14	US EPA Faster-Cheaper-Greener & Public Private Partnerships in Philadelphia	Post-Construction	2
03/04/14	Case Studies: Implementing Green Infrastructure Under Enforcement Orders	Post-Construction	2
03/06/14	Innovative Transportation Stormwater Management: Green Infrastructure in Road Projects	Post-Construction	6
03/11/14	ASP Clean and Green Seminar	Good Housekeeping	7
03/12/14	Toolbox Safety Meeting	Good Housekeeping	3
03/27/14	Stream Restoration	Post-Construction	6
04/07/14	Waters of the US Proposed Rule webinar	Multiple	3
04/09/14	Toolbox Safety Meeting	Good Housekeeping	5
05/09/14	Green Infrastructure for EI's	Post-Construction	21
05/14/14	Toolbox Safety Meeting	Good Housekeeping	4
06/11/14	Toolbox Safety Meeting	Good Housekeeping	2
06/20/14	Omaha Green Infrastructure Tour	Post-Construction	13
06/27/14	Confined Spaces Training	Industrial Facilities	2
07/09/14	Toolbox Safety Meeting	Good Housekeeping	2
08/13/14	Toolbox Safety Meeting	Good Housekeeping	3
09/10/14	Toolbox Safety Meeting	Good Housekeeping	3
10/08/14	Toolbox Safety Meeting	Good Housekeeping	2
11/12/14	Toolbox Safety Meeting	Good Housekeeping	3
12/02/14	EI Permix Training	Post-Construction	20
12/10/14	Toolbox Safety Meeting	Good Housekeeping	2

This permit requirement continues to be met.

III. Illicit Discharge Detection & Elimination

A. Perform dry-weather inspections including Physical Characteristics Examinations of storm water outfalls 72" or greater and any outfalls with documented complaints.

The City of Omaha – EQCD staff inspected all outfalls identified the previous year as priority outfalls (those 72" or greater and/or documented illicit discharges). EQCD Staff completed all inspections by May 7th, 2014. Any outfall with an obvious or suspicious discharge was to be reported immediately to EQCD. No new outfalls were inspected based on the previous year's inspection. No suspicious discharges were found.

Outfall inspections were only conducted after 48 hours of dry weather. A Physical Characteristics Examination form was completed for each outfall, if flow was present sample was collected for pH testing in the field, if an illicit discharge was encountered EQCD Inspectors called supervisory staff immediately. Photographs were taken of outfalls to be kept as a record of outfall conditions during the inspection. Outfall inspections were entered into the City of Omaha's MS4 Web application. A total of 72 outfalls 72" & greater, or with documented illicit discharges were inspected.

This permit requirement continues to be met.

B. Investigate and seek resolution concerning any dry weather discharges potentially impacted by sources by notifying the source that they must discontinue discharging, and initiate enforcement action consistent with adopted ordinance which will address TMDL pollutants of concern. Any source that the applicant feels constitutes and immediate health or safety threat will be reported immediately to the NDEQ.

There were no confirmed illicit discharges from an outfall inspection during the permit year 2014.

This permit requirement continues to be met.

C. Dry Weather inspection of storm water outfalls, including smaller outlets and those that discharge to lesser tributaries or other storm conduits in response to suspect conditions and / or complaints.

There were 268 potential outfalls identified by EQCD using GIS information collected by sewer maintenance in 2009. All outfalls were inspected during dry weather. A total of 73 outfalls have now been identified as priority outfalls.

This permit requirement continues to be met.

D. Enforce Existing City Codes prohibiting illicit discharge connections to storm sewers.

A total of 36 code enforcement actions were taken in 2014. Most actions were "Requests for Voluntary Compliance". There were no fines levied or collected in 2014. A table summarizing the year's activities can be found in Attachment B.

This permit requirement continues to be met.

E. Maintain and prevent instances of sanitary sewer leakage into MS4 or waters of the state.

The Sewer Maintenance Division is responsible for preventing sanitary seepage into the storm sewer. They perform preventive and corrective maintenance to the system and are able to identify areas where seepage is occurring. Because of the way the MS4 system is designed, sanitary seepage to the MS4 is an extremely rare event. Storm water pipes are not located immediately below the sanitary line; they are almost always installed on the other side of the street or parallel to the sanitary line. There were five instances of sanitary seepage/leakage at five locations found in 2014; all instances were reported to the state under a separate NPDES Permit as a requirement to report Sanitary Sewer Overflows and Combined Sewer Overflows. The pipes were repaired and no further leaks occurred

This permit requirement continues to be met.

F. Maintain and update a sewer map of major storm water outfalls and identify the names of respective receiving waters.

The City maintains a GIS mapping application which can be updated in the field using handheld portable GPS units. These units then synchronize the data when they are returned to the office and connected to the GIS mapping application. Additionally the handheld GPS units are used to catalogue and record inspections of outfalls conducted by EQCD. The data from those inspections can be used to enter service requests into Sewer Maintenance's work order tracking software. The outfall data is also used for follow up inspections of potential illicit discharges.

In 2010, EQCD staff used the current GIS data collected by sewer maintenance in 2009 to direct our inspections. Two hundred and sixty eight points were inspected resulting in additional priority outfalls being identified. We are building on a database to better document outfall conditions so that future inspections will be comparative to the past inspections.

In 2014 EQCD inspected outfalls using the data collected during the inspections that took place in 2010. The data helped to better direct inspection and compare the previous year's condition with the current condition of the outfalls.

This permit requirement continues to be met.

G. Prevent, contain and respond to spills to the MS4. Review, as necessary, interdepartmental SOP's with respects to spills, dumping and illegal disposal that impacts the MS4.

The City of Omaha's Environmental Quality Control Division worked with the Omaha Fire Department (OFD) to develop a policy dealing with spills that the OFD responds to. Previously the OFD would chemically treat a spill to aid in the breaking down of petroleum products. The revised policy requires OFD to spread fly ash over a spill to absorb any petroleum products. They then collect the material and drop it off at one of several locations throughout the City. Each location has a dedicated 55 gallon drum for storage of the waste material. OFD monitors the use of the barrels and coordinates proper disposal with a hazardous materials processing contractor.

The Omaha Fire Department's Hazardous Materials Unit responded to 436 incidents in the 2014 calendar year.

This permit requirement continues to be met.

IV. Construction Site Program

A. Maintain the construction site inspection and reporting web site and continue to make enhancements.

The City of Omaha deployed its new permit tracking and reporting system, Permix, at the beginning of April 2014. The new system integrates Grading Permits, Linear Underground Projects, Post-Construction Stormwater Management Plans and Public Improvements, under one website and database system. The individual processes are linked by a common project name and number if applicable. This allows for a more comprehensive approach to managing these activities while creating an efficient means for project Applicants to apply for permits and have plans reviewed. The system is being used by all of the communities within the Papillion Creek Watershed Partnership for Grading Permits and Post-Construction Stormwater Management Plans.

This permit requirement continues to be met.

B. Maintain a construction site inspection program that includes procedures for reporting, resolving deficiencies, and taking appropriate enforcement action consistent with adopted ordinances.

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 hire an independent inspector to do inspections weekly and after 0.5 inches of rain. In the 2014 calendar year reports were submitted to Permix by City Inspectors as well as private firms hired to inspect construction sites as per the NPDES Stormwater Discharges from Construction Sites General Permit. Additionally enforcement actions were entered by City personnel. The table below accounts for the reports submitted for sites within the City of Omaha's jurisdiction.

	City Inspection Reports	Private Inspection Reports
Phase I Sites (>5 acres)	352	3884
Phase II Sites (<5 acres)	329	2732
Total	681	6616

During the transition to the new Permix system, a considerable effort was given to the training and support of the system users. This included video tutorials, email, and phone conversations with the users. Compliance assistance and project related questions were addressed as they came up during this effort.

A summary table of enforcements that were taken within the City of Omaha's jurisdiction can be found in Attachment C.

This permit requirement continues to be met.

C. Maintain regulations and design specifications for controlling erosion, sediment loss, and other TMDL pollutants of concern from construction sites that disturb areas of 1 acre or more.

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. On March 10, 2003 when the NPDES Phase II regulation became effective the City began enforcing the soil erosion and sediment control measures on sites that disturbed one acre or greater in the City's jurisdictional

area, which extends 3 miles beyond City limits in Douglas County. This allows the City to regulate many of the large developments (SIDs) that remain active for years and have a great potential to adversely impact water quality.

The City has incorporated the Sediment and Erosion Control Manual into the Omaha Regional Storm Water Design Manual as Chapter 9. The Omaha Regional Storm Water Design Manual was adopted by the City of Omaha in April 2006. The Omaha Regional Storm Water Design Manual was updated in 2014. Each chapter was updated with current information. Chapter 8, Stormwater Best Management Practices (BMPs), included updates to BMPs based on monitoring and performance and added new ones including permeable pavement and soil conditioning. Chapter 9, Erosion and Sediment Control, incorporated the Supplemental BMP Guide into it and updated existing BMPs. Formatting and graphics were also greatly improved with the update. Digital copies, in PDF format with links throughout, are available on our website at www.omahastormwater.org.

This permit requirement has been met.

D. Maintain a program for performing review of Grading Permit applications to ensure compliance with applicable regulations and design specifications.

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 received 34 permit requests and issued 22 permits for sites greater than 5 acres in the calendar year 2014. There were 61 permit request and 41 permits issued for sites less than 5 acres in size for the calendar year 2014.

This permit requirement continues to be met.

V. Post Construction Runoff Control

A. Develop a guidance document for Post Construction Storm Water Management Plan.

The City of Omaha finalized the guidance document titled *City of Omaha Post Construction Stormwater Management Planning Guidance* in July 2009. The document is available on the City's website www.omahastormwater.org. The guidance document was not revised in during this permit year..

This permit requirement continues to be met.

B. Participate with other City Departments to prepare an Environmental Element of City of Omaha Master Plan and include applicable storm water management provisions.

The Omaha City Council voted 7-0 to adopt the Environmental Element – a comprehensive environmental vision for the city – as a component of Omaha's master plan Dec. 14, 2010.

The document, developed through a two-year process led by the City of Omaha and Omaha by Design, includes more than 600 recommendations in five sections – the natural environment, urban form and transportation, building construction, resource conservation and community health. Each goal is accompanied by a set of objectives and strategies, and a set of measurements has been developed for each of the five sections.

This permit requirement continues to be met.

C. Develop a database of existing structural BMPs (private and public) that reduce the impact of urbanization on storm water run-off and improve water quality and enhance other amenities and activities such as green space, parks and recreation, urban planning, aesthetics, and public safety.

The City of Omaha reviews proposed post construction storm water BMPs for code compliance, functionality, and manageability. Once the proposed post construction BMP passes the review then a permit is issued which allows construction and implementation to begin. The management plan that is submitted along with the proposed BMP is then attached to the property deed to ensure long term compliance. The City has developed a database, Permix, for tracking purposes and has integrated the Construction program and Public Improvements into this new database.

A database has been developed to track post construction BMPs within the City of Omaha. Information being entered include; location, ownership, provided capacity, required capacity, contributing drainage area, type of BMP, date of installation and CSO area. Each BMP has the latitude and longitude included so that they can be easily mapped using our GIS.

This permit requirement continues to be met.

D. Inspect annually and maintain (as necessary) City owned storm water BMP structures.

All City owned stormwater BMP structures were inspected for any major maintenance issues in early spring and fall of 2014. A physical characteristics examination form was also completed during the inspection for structures that had flow or were wet. The table below indicates when the inspection occurred as well as any pending maintenance issues.

SITE	INSPECTION DATES	SEDIMENT REMOVAL	TRASH REMOVAL	DEBRIS REMOVAL	MOWING	PCE COMPLETE
Storz Expressway (East)	3/28/2014	No	Yes	Yes	Yes	No
	8/11/2014	No	Yes	Yes	Yes	No
Adams Park Lagoon	3/28/2014	No	No	No	No	No
	9/8/2014	No	Yes	No	No	No
Lake James Park	3/28/2014	No	No	No	No	No
	9/8/2014	No	No	No	No	No
Fontenelle Park Lagoon	3/28/2014	No	No	No	No	No
	9/8/2014	No	No	No	No	No
Pershing 1.5	3/3/2014	No	Yes	No	No	No
	9/8/2014	No	Yes	No	Yes	No
Miller Park	2/21/2014	No	No	No	No	No
	9/8/2014	No	No	No	No	No
10th & Nicholas	3/3/2014	No	No	No	No	No
	8/11/2014	No	No	No	No	No
Storz Expressway (West)	3/28/2014	Yes	Yes	Yes	No	No
	9/8/2014	Yes	Yes	Yes	Yes	No
13th & Carter Blvd	3/3/2014	No	No	Yes	No	No
	8/11/2014	No	Yes	Yes	No	No
13 & Fowler	3/3/2014	No	Yes	No	No	No
	8/11/2014	No	Yes	No	No	No
Carter Lake	3/3/2014	No	Yes	No	No	No
	8/11/2014	No	Yes	No	No	No
19 & Carter Blvd	3/3/2014	Yes	Yes	Yes	No	No
	8/11/2014	Yes	Yes	Yes	No	No
18th Street E & Ave H	3/3/2014	Yes	Yes	Yes	No	No
	8/11/2014	Yes	Yes	Yes	Yes	No
14th & Ida St	3/28/2014	No	No	No	No	No
	9/8/2014	No	No	No	Yes	No
John J. Pershing No. 1	3/3/2014	No	No	Yes	No	No
	9/8/2014	No	No	Yes	Yes	No
John J. Pershing No. 2	3/3/2014	No	No	No	No	No
	9/8/2014	No	No	No	Yes	No
Gifford Dr No. 1	3/3/2014	No	No	No	No	No
	8/11/2014	No	No	No	No	No
9th and Storz	3/28/2014	No	No	No	No	No
	9/8/2014	No	No	No	Yes	No

This permit requirement continues to be met.

E. Revise storm water BMP maintenance and inspection plan as needed.

There were three new projects completed or acquired in this permit year; South Omaha Industrial Area Lift Station (bioretention), Rockbrook Tributary Improvements (stream restoration and bioretention), and Sewer Maintenance Facility Demonstration Project (permeable pavement and bioretention). Each feature will be inspected annually at a minimum. All bioretention gardens are maintained on a monthly basis at a minimum during the growing season. Maintenance is mostly picking up litter and weeding.

This permit requirement continues to be met.

F. Implement strategies, which include a combination of structural and or non-structural BMPs appropriate for the watershed, which will address TMDL pollutants of concern. Evaluate these strategies and implement changes as necessary to improve water quality and address TMDL pollutants of concern.

The City of Omaha partnered with the Omaha Public Schools to provide the installation and monitoring of four discharge points from the Saddlebrook Joint Use Facility. That facility did not have a water quality sampling event taken in 2014. The bioretention system was not well maintained by the facility and sampling efforts were stopped till addressed. Repairs and planting of the bioretention system has been contracted out and is scheduled for early 2015. In 2015, it is anticipated that only the green and traditional roofs will be sampled at Saddlebrook. Once the data has been collected the City will then do comparative analyses of the traditional versus the green features in terms of volume and pollutant reduction. We hope to have enough data to provide a better understanding of how well BMP's can reduce pollutants of concern so as to better promote their use in new and re-development.

The City of Omaha performed rain event simulations at the 58th and Maple and UNO Welcome Center bioretention demonstration projects in late 2013. The valves on the underdrain systems were closed and water was directed into the systems from a nearby hydrant and MUD meter. The total amount of water from the hydrant was obtained from the meter when the bioretention reached capacity. The public was invited to participate in the simulations to learn about bioretention and could guess the volume it would take to fill them. Both projects performed as designed.

During the installation of the 58th and Maple and Rockbrook Tributary Projects, issues associated with the function of the bioretention systems occurred immediately. The investigations into the cause of their issues yielded significant insights into their installation and design elements, including construction sequencing and underdrain construction. These lessons learned were incorporated into the Omaha Regional Stormwater Design Manual update.

Furthermore the City of Omaha provided information and locations of demonstration projects for Andrew Bebee, a student with UNL, and Steve Rodie, Director for the UNO Center on Urban Sustainability, to assess plant performance in bioretention systems. The report is in rough draft at the time of this annual report and can be found in Attachment D.

This permit requirement continues to be met.

VI. Pollution Prevention/Good Housekeeping

A. Maintain Facility Runoff Control Plans (FRCP) for all City maintenance facilities to indentify BMPs implemented. Review FRCP annually and update as necessary. Inspect all facilities annually.

The City of Omaha conducted compliance audits at City Maintenance Facilities where FRCP's had been implemented. Five facilities scored poorly and need improvement, seven facilities scored satisfactory, and three were given an outstanding rating. The scores were based upon the inspection report log kept at the facility. The auditor not only looked to see that inspections were being conducted but that any corrective actions that were noted had been addressed in a timely manner.

The City conducted fifteen additional facility inspections where no FRCP had been recommended (primarily public parks/golf courses) to perform a "Hot Spot" evaluation. Two of those facilities need improvement, eleven were satisfactory, and one was rated as outstanding.

Copies of EQCD findings were forwarded to the department supervisors with suggested corrections where applicable.

This permit requirement continues to be met.

B. Inspect storm sewer conduits, channels and catch basins and remove and properly dispose of sediment and debris as needed to maintain an efficient system within permitted area.

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 the Sewer Maintenance and Street Maintenance Divisions' storm sewer system activity for the permit year of 2014.

Work Order Type (Description of Work):	Storm/Storm Combined:	Combined:	Task Total:
Bait - (Put bait in nearest sewer entrances)	13	18	31
BU-Holding - (No escape from system, holding or slow)	0	2	2
BU-SSO - (BU into property, City Caused, to NDEQ)	0	37	37
Bypass-SSO contained - (BP did not reach waters of State reported to NDEQ)	0	5	5
Bypass-SSO WOS - (Bypass reached waters of State, reported to NDEQ)	0	1	1
Clean FE - (Clean Flared End)	13	8	21
Clean Inlet - (Clean Inlet)	974	975	1,949
Clean MH - (Clean Manhole)	10	31	41
Clean Storm Struct - (Clean Stormwater Structure)	1	1	2
Dye Test - (Put Dye in Structure/Cavity to find flow)	171	137	309
I-Clean - (Clean the Inlet)	5	5	10
I-Flared End - (Reset/Daylight/New Grate)	3	0	3
Inlet Blown Off - (Inlet Grate was blown off but is not missing)	3	1	4
Inlet Broken - (Inlet Grate was broken and replaced)	23	8	31
Inlet Stolen - (Inlet Grate cannot be found)	8	3	11

Work Order Type (Description of Work):	Storm/Storm Combined:	Combined:	Task Total:
Insp Structure -(Inspect Sewer Structure ex.FE, MH, Inlet, Siphon)	145	193	338
I-Repair - (Seal box, reset hood, reset grate, replace aprons)	186	45	231
I-Replace - (Replace Inlet, Includes all inlet types)	17	15	32
L/S Locate - (Locate where line segment is.)	8	21	29
MH Blown Off - (Manhole was blown off but not missing)	22	29	51
MH Broken - (Manhole broken and replaced)	6	18	24
MH Locate - (Find the location of manhole)	69	93	162
MH Stolen - (Manhole cannot be found)	15	17	32
MH-Clean - (Clean the Manhole)	0	20	20
MH-New - (Install new Manhole)	1	1	2
MH-R/C - (Reset/Replace Ring & Cover)	18	30	48
MH-Repair - (Ex-seal riser/brick or pipe wall link, floor rehab)	11	33	44
MH-Replace - (Replace manhole and or risers)	0	2	2
Notified Utility - (Notified a utility about a problem they have)	1	3	4
O-Backfill Tamp - (Backfill a void that is not sewer related)	1	1	2
O-Ditchwork - (Open ditching, culvert daylighting, etc...)	1	0	1
Odor-Business - (Bad Odor in Business)	0	3	3
Odor-Inside - (Bad Odor in residence)	2	5	7
Odor-Outside - (Bad Odor outside)	0	4	4
O-Landscaping - (Doing any landscape work at the project area)	0	1	1
P-Abandon - (Abandon the Pipe)	1	2	3
P-Combo Repair - (Seal a Combined line)	0	5	5
P-Combo Replace - (Replace a Combined line)	0	6	6
Private - (Private Problem, notify owner)	17	56	73
P-Sanitary Repair - (Repair a Sanitary line)	0	3	3
P-Sanitary Replace - (Replace a Sanitary line)	0	2	2
P-Serv lat defect - (Repair/Replace the service line)	0	11	11
P-Sewer Walk - (Investigate/repair large sewers w/ a walk team)	0	1	1
P-Storm Repair - (Repair a Storm line)	40	13	53
P-Storm Replace - (Replace a Storm line)	12	10	22
Street Flooding - (Storm Water is flooding the street)	4	0	4
Test Hole - (Drill Test Hole)	1	0	1
TV Assessment - (Complete PACP Assessment)	3	2	5
TV Inspection - (TV line to find defect)	40	143	183
Unscheduled Jet - (Jetting a line reactively)	28	161	189
Unscheduled Jet Vac - (Jet Vac'ing a line reactively)	36	48	84
Unscheduled Saw - (Jet Sawing a line reactively)	1	9	10
Vac Facility Pit - (Jet Vac the Grit Pit at a City Facility location)	0	2	2
Vac Grit Pit - (Jet Vac a Grit Pit not at a facility location)	1	4	5
Culvert Cleaning	-	-	24
Culvert Installation	-	-	7
Culvert Repair	-	-	6
Ditch Maintenance/Cleaning	-	-	43

Work Order Type (Description of Work):	Storm/Storm Combined:	Combined:	Task Total:
Creek Maintenance	-	-	8
Debris Removal	-	-	1,053
Total:	1,911	2,244	5,297

This permit requirement continues to be met.

C. Training will be provided for employees to prevent pollutant runoff from municipal operations at City maintenance facilities and at field operations.

The City of Omaha employed the services of Felsburg Holt & Ullevig (FHU) in 2009 to develop a training program targeted toward municipal operations at City maintenance facilities. EQCD held 8 training sessions in 2014, there were a total of 140 employees in attendance combined.

This permit requirement continues to be met.

D. Provide for street cleaning in the following areas: Residential, Business, Major Streets, Other areas in conjunction with special projects.

There are approximately 4,594 lane miles within the City of Omaha. In 2014, the City mechanically swept a total of 6,877 curb miles. The table below gives a more detailed accounting of the City's street sweeping activities. The street sweeping operation no longer allows for debris to be separated by areas of the city.

Area of City	Curb Miles Swept	Tons of Debris Removed
Business District & Major Streets	2,275	1,180
Residential Areas	4,602	4,307
Totals	6,877	5,487

This permit requirement continues to be met.

E. City staff that applies pesticides will be trained in a certification program that complies with FIFRA regulations.

The City has two Divisions within the Parks and Recreation Department that have applicators who are required to be FIFRA certified. There are 45 certified applicators. There was eleven applicators whose certification expired all other individuals are current in their certification. All certifications are obtained from the Douglas–Sarpy County Extension Office.

This permit requirement continues to be met.

F. The City will continue to minimize pesticide and fertilizer use on publically maintained properties.

EQCD works with the Parks Department to encourage applicators to minimize pesticide and fertilizer use on publicly maintained properties. Additionally Keep Omaha Beautiful Inc., distributed two different brochures to events and locations. In total there were 460 brochures distributed.

This permit requirement continues to be met.

VII. Industrial Facilities

A. Issue City of Omaha Industrial Stormwater Permits. Permits to be issued to specific sectors to maximize effectiveness of education and outreach activities and utilize staff resources efficiently.

The City of Omaha contracted the services of Felsburg Holt & Ullevig to aid in the assessment and prioritization of industries required to obtain stormwater discharge permit coverage. A "Risk Assessment Checklist" was developed using information gathered from an article published in February 2008 in the *Journal of the American Water Resources Association.* The risk assessment allocates points based upon level of exposure to stormwater as well as any pollutants of concern. As more sites are permitted and assessed for stormwater exposure those sectors and/or industries which score high on the risk assessment will be given a priority status and will be inspected on a more frequent basis than those industries which receive a low score. There were 27 permits issued in 2014.

This permit requirement on schedule to be met.

B. Inspect 20% of facilities per year issued City of Omaha Industrial Stormwater Permits, taking appropriate enforcement action consistent with adopted ordinances.

E & A Consulting Group (E&A) was contracted to assist the City in inspecting industrial facilities during this permit year. A total of 20 facilities in Sector C (Chemical and Allied Products, Manufacturing, and Refining) were inspected for compliance during the calendar year of 2014. The facilities that were inspected are required to submit permit applications to the City of Omaha in order to remain in compliance with Omaha Municipal Code. Most of the facilities were not permitted by the NDEQ and have been informed of their obligation to comply with the NPDES Program. Additionally, there were 22 or 21% of the 103 facilities permitted previous to 2014 were inspected for compliance by the City of Omaha.

This permit requirement continues to be met.

C. Implement a permit tracking system.

The City purchased CBI Systems, Inc MS4Web software which is used to track permitted sites as well as site inspections. Previously purchased software, Cityworks can also be used to schedule regulatory inspections. As the City issues more permits to industries, these programs will become valuable tools in maintaining permit compliance.

This permit requirement continues to be met.

D. Review City of Omaha Industrial Stormwater Permit for consistency with Federal and State NPDES Industrial Stormwater Permit.

The City of Omaha finalized their Industrial Stormwater Permit on April 1, 2009. In drafting the permit the City used language from the most recent EPA Multi-Sector General Permit (MSGP). Most of the content of the EPA's MSGP was adapted into the City's permit.

This permit requirement has been met.

VIII. Storm Water Monitoring Plan

A. Conduct in-stream water quality monitoring of named creeks in the Papillion Creek Watershed. Collect samples from at least 4 sites located in the Papillion Creek Watershed. Samples will be collected from May through August one day a week and analyzed for the following parameters: BOD5, TSS, ammonia nitrogen, nitrate-nitrogen, total nitrogen, soluble and total phosphorus, turbidity, pH, E coli, and Physical Characteristic Examinations. The purpose of the monitoring will be to evaluate the effectiveness of storm water management practices in the City of Omaha as it relates to TMDL pollutants of concern.

The City of Omaha conducted in-stream monitoring once a week beginning on May 7 and concluding on August 27. The data collected has been compiled into Attachment E.

This permit requirement continues to be met.

B. Develop an assessment monitoring plan for demonstration BMPs. Evaluate the effectiveness of the selected BMPs to treat storm water for the TMDL pollutants of concern and other water quality benefits. Consider implementation of refinements to the BMPs, which would improve their effectiveness. One aspect of the monitoring plan will include the collection stream samples on the segment that runs through Orchard Park to establish baseline conditions for BMP assessment purposes. Additionally, the plan will address how the City proposed to use stream samples collected in dry weather and wet weather, as described in A above, to estimate the pollutant masses discharged on an event basis and an annual basis.

The construction of a green roof and a bioretention garden was completed in 2009 at the Saddlebrook Joint Use Facility. The bioretention garden receives runoff from part of the parking area at the facility. Monitoring stations were also installed at the green roof discharge point, traditional roof discharge point, bioretention garden discharge point and a point of discharge from a parking area without a BMP upstream.

Flow monitoring equipment has been installed at all four sampling sites as well as a rain gauge. The City will use the data gathered from each site to compare the BMP installed to a traditional parking lot and roof. The City can then analyze the effectiveness of each BMP.

Due to the nature of how and when storms occur EQCD was unable to obtain quality samples in 2014, which would have met the Quality Assurance Project Plan developed as part of this program element. However flow monitoring data has been obtained and based upon an initial assessment it can be determined that the green infrastructure at this facility delays the peak runoff from the drainage area that is being treated. It can also be inferred that a volume of the water has been detained by the BMPs based upon a predicted and observed volume measured after treatment occurs.

The 58th and Maple and UNO Welcome Center bioretention demonstration projects were constructed in 2012 and 2013 respectively. Rain event simulations took place in late 2013 to assess their function and storage capacities. The valves on the underdrain systems were closed and water was directed into the systems from a nearby hydrant and MUD meter. The total amount of water from the hydrant was obtained from the meter when the bioretention reached capacity. The design volume was to capture 0.5” of runoff from the contributing area.

UNO consists of two bioretention systems, only the north one was assessed. It was discovered during the simulation that the drain tile for the retaining wall adjacent to it was draining the system artificially, which

UNO is currently addressing. The UNO north bioretention system showed the actual capacity was approximately 81% of the design volume. The design capacity reflects ½" of runoff from the entire area, if you take into account land use into the equation; the equivalent storm event is 1.14". Even with the reduced capacity, the infiltration of the bioretention has been excellent, with most water drained within twelve hours of the end of the event and minimal evidence of overflow from the system.

Benson consists of a large rock infiltration zone supported by a limestone retaining wall which directs flow into a regenerative stormwater conveyance with it ending in the bioretention system. During the course of maintaining the project in 2013 and 2014, multiple details of bioretention systems were observed and incorporated into the Omaha Regional Stormwater Design Manual update that was occurring at the same time. The Benson bioretention system showed the actual capacity was approximately 108% of the design volume. In summary, both projects are performing well and are not significantly off from their designed capacities.

	Benson Bioretention	**UNO North Bioretention**
Design	5,685	3,067
Actual	6,134	2,470
% of Design	108%	81%

in gallons

The Rockbrook Tributary Project was constructed in 2013-2014, it replaced a degraded concrete swale with a vegetated system and three bioretention systems were installed at the adjacent Prairie Lane Park. During the installation of this project and the 58th and Maple one, issues with performance came up immediately after completion. The investigations into the cause of the issues yielded significant insights into their installation and design elements of bioretention, including construction sequencing and underdrain construction. These lessons learned were incorporated into the Omaha Regional Stormwater Design Manual update.

In 2013, monitoring equipment, including a rain gauge, ultrasonic water level, soil moisture, and temperature sensors at the 50th and Pine St demonstration project. Real-time controls were installed on the underdrain to improve the stormwater runoff volume management of the system. Information collected so far has helped to better understand BMP function and improve their performance, including reducing the amount of runoff from the site, realizing infiltration occurring beneath the parking lot, and the temperature at depth under the parking lot. Data gathered will be used to better understand performance and design elements of permeable pavement and bioretention systems.

In 2014, the Water Environment Research Federation released their final report titled, "Transforming Our Cities: High-Performance Green Infrastructure" and included information on the porous concrete parking lot demonstration project at the Southeast Police Precinct. Monitoring equipment and real-time controls are being utilized to provide greater management of stormwater runoff volumes and filtering of water as it passes through the system. An excerpt from this report discussing the project is in Attachment D.

Updating the BMP Assessment Plan began during 2014 to assess information gathered to date, what information would be of benefit to improving BMPs, and looking which of our demonstration projects provided the best opportunities. This plan is currently being finalized.

This permit requirement on schedule to be met.

IX. Additional Permit Reporting Requirements

1. Proposed SWMP Changes and Revisions

Attachment A is the SWMP for the City of Omaha; the City was granted an administrative extension to the existing permit and operates under this SWMP. The City annexed the following unincorporated areas in September 2014, and would now be considered part of the MS4 Permit coverage area.

Area Description	Population	Sq Miles	Acres
Altech Business Park	0	0.164	104.871
Arbor Oaks and Adjacent	1395	0.118	75.363
Baywood and Adjacent	307	0.134	85.603
Blondo 108 Business Park and Adjacent	0	0.046	29.426
Brookhaven	1642	0.266	170.143
Cambridge Estates and Adjacent	308	0.096	61.356
Eagle Run West and Adjacent	458	0.463	296.133
Harper Valley and Adjacent	287	0.187	119.866
I-80 Business Park and Adjacent	0	0.089	57.051
Linden Estates II	403	0.348	222.447
Mission Park and Adjacent	1941	0.427	273.493
Northeast of 60th and Harrison	0	0.240	153.577
Pacific Springs and Adjacent	451	0.254	162.584
Riverside Hills and Adjacent	86	0.062	39.592
Skyline Meadows	0	0.024	15.444
Southwestern Plaza and Adjacent Areas	0	0.092	58.622
Turtle Creek and Adjacent	1021	0.229	146.265
Woodbridge and Adjacent	453	0.100	63.967

2. 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 2014 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://www.ci.omaha.ne.us/departments/financeH. Storm water management activities are embedded in 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 2014 and appropriated 2015 budget amounts are listed below.

Administrative	2014 Expenditures	2015 Planned
Flood Control Administration	$385,874	$374,494
Baseline/BMP Monitoring[1]	$224,207	$465,262
Sediment/Erosion Control Program	$224,207	$465,262
Industrial Program[2]	$44,841	$93,052
Public Education/Outreach	$164,419	$341,192
MS4 Planning	$89,683	$186,105
Annual Administrative Total	$1,133,231	$1,925,366

[1] Includes outfall monitoring, outfall inspections, and illict discharge investigations

[2] Includes industrial inspections and permitting

2. Operation and Maintenance

The major MS4-related Operation and Maintenance 2014 expenditures and budgeted amounts for 2015 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.

Operation and Maintenance	2014 Expenditures	2015 Budgeted
Engineering Design	$401,707	$528,425
Pavement Maintenance	$410,817	$1,666,602
Creek/Open Channel Maintenance	$671,153	$849,271
Street /Right of Way Cleaning	$2,792,446	$3,161,256
OWP (debris removal)	$7,767	$13,501
Residential Street Rehabilitation	$339,012	$180,000
Bridge Maintenance and Rehab	$109,583	$57,000
Sewer Maintenance	$565,986	$448,277
Annual O&M Total	$5,298,471	$6,904,333

ATTACHMENT A

ATTACHMENT A

Stormwater Management Plan for the City of Omaha

#1: Public Education & Outreach

BMP #	SWMP Element Description	Measurable Commitments & Implementation Schedule
1.A	Distribute informational brochures on the proper disposal of household hazardous wastes and the availability of the Household Hazardous Waste facility.	Year 1 – 5: Print and distribute brochures. Include the following in Annual Report: the quantity of waste received at the drop-off facility; a summary list of the distribution outlets used for brochures; an estimate of the brochures distributed each year.
1.B	Issue public service announcements related to storm water protection on local TV, radio or print outlets which will address TMDL pollutants of concern.	Year 1 – 5: A summary of the activities will be included in the Annual Report.
1.C	Continue existing drain marking program to improve public awareness concerning illegal dumping utilizing volunteer services (Boy Scouts) which will address TMDL pollutants of concern.	Year 1 – 5: Mark approximately 1,000 inlets annually and include a summary in the Annual Report.
1.D	Hold a Sediment and Erosion Control Seminar for the developers, builders, engineers, vendors, and graders which will address TMDL pollutants of concern.	Year 1 – 5: Annual Sediment and Erosion Control Seminar. Include a summary of the approximate number of participants in Annual Report.
1.E	Schedule outreach events with industry trade organizations to educate the regulated community regarding Omaha's Industrial Permitting Program.	Year 1 – 2: Industrial Permit Outreach. Include a summary of the number of events and approximate number of participants in Annual Report.
1.F	Work collaboratively with other community organizations to develop a campaign aimed at picking up pet waste which will address TMDL pollutants of concern.	Year 1: Develop outreach material and partnerships. Year 2 - 5: Distribute information. Provide an estimate of number of brochures distributed and activities targeted.
1.G	Develop materials and displays associated with BMP demonstration projects installed with Stormwater Management Program Plan funds from NDEQ.	Year 1 -5: Provide a narrative and examples of materials developed in annual report.
1.H	Develop a City Stormwater Program Web Site, including but not limited to storm water related information and provide educational information targeted for residents, children, and industries which will address TMDL pollutants of concern.	Year 1-5: Develop, operate and maintain a City Stormwater Web site. Include a narrative in the Annual Report describing the functions of the website.

ATTACHMENT A

 # 2: Public Participation and Involvement

BMP #	SWMP Element Description	Measurable Commitments & Implementation Schedule
2.A	Operate a stormwater hotline and web based complaint system for Watershed (general information, complaints, reports of illegal dumping, etc.).	Years 1 - 5: Maintain system operation and include summary of received calls/emails in the Annual Report.
2.B	Participate in organizing and hold open houses on Papillion Creek Watershed Plan activities.	Years 1 - 5: A summary of activities will be included in the Annual Report.
2.C	Continue to implement a stream Cleanup Day. Utilize Keep Omaha Beautiful to identify stream segments in need of cleanup and recruit volunteers from the local area, public groups, and representatives from local area business and developments.	Years 1 – 5: Conduct one clean-up day each year. A summary of the clean-up day activities will be included in the Annual Report.
2.D	Provide tours of UndertheSink, household hazardous waste facility, for schools and neighborhood organizations to learn about the proper way to manage household chemicals and about stormwater treatment systems installed at the site.	Year 1 – 5: Provide a summary of the tours conducted on an annual basis for the annual report. Document when BMPs are installed and included in the tour.
2.E	Hold World O! Water Festival focused on elementary school aged children to celebrate Clean Water and engage in water quality related activities.	Year 1-5: Hold event annually. Report estimated number of participants in Annual Report.
2.F	Participate in community organizations, conferences, workshops, and web casts related to water quality and stormwater management.	Year 1- 5: Report number of staff attending, dates, location, and description of events.

 # 3: Illicit Discharge Detection and Elimination

BMP #	SWMP Element Description	Measurable Commitments & Implementation Schedule
3.A	Perform dry-weather inspections including Physical Characteristics Examinations of storm water outfalls 72" or greater and any outfalls with documented complaints.	Year 1 – 5: Inspect and record observations. Included a count of outfalls inspected in the Annual Report.
3.B	Investigate and seek resolution concerning any dry weather discharges of potentially impacted by sources by notifying the source that they must discontinue discharging, and initiate enforcement action consistent with adopted ordinance which will address TMDL pollutants of concern. Any source that the applicant feels constitutes an immediate health or safety threat will be reported immediately to the NDEQ.	Year 1 – 5: The following information will be included in the Annual Report: the number of potential process or wastewater sources found; the number of above resolved at local level; and the identity of any referred and/or unresolved discharge sources.
3.C	Dry weather inspection of storm water outfalls, including smaller outlets and those that discharge to lesser tributaries or other storm conduits, in response to suspect conditions and/or complaints.	Year 1 – 5: Inspect and record observations. Included a count for outfalls inspected in the Annual Report.
3.D	Enforce existing City codes prohibiting illicit discharge connections to storm sewers.	Year 1 -5: Summarize code violations and enforcement actions taken in annual report.
3.E	Maintain and prevent instances of sanitary sewer leakage into MS4 or waters of the state.	Year 1 -5: Summarize investigations of leakage and actions taken in Annual Report.
3.E	Maintain and update a sewer map of major storm water outfalls and identify the names of respective receiving waters.	Years 1 - 5: Map will be maintained electronically on City GIS.
3.G	Prevent, contain and respond to spills to the MS4. Review, as necessary, interdepartmental SOPs with respects to spills, dumping and illegal disposal that impacts the MS4.	Year 1-5: Summarize number of reports of spills and actions taken in Annual Report. Identify City Department SOP and review date in Annual Report.

 # 4: Construction Site Runoff Control

BMP #	SWMP Element Description	Measurable Commitments & Implementation Schedule
4.A	Maintain the construction site inspection and reporting web site and continue to make enhancements.	Year 1-5: Include a narrative in the annual report about major web site upgrades and the date implemented.
4.B	Maintain a construction site inspection program that includes procedures for reporting, resolving deficiencies, and taking appropriate enforcement action consistent with adopted ordinances.	Years 1-5: The Annual Report will contain the following information relative to this commitment: 1) the number of inspections conducted in each of the following size categories: < 5 acres and > 5 acres 2) the number of sites receiving enforcement actions.
4.C	Maintain regulations and design specifications for controlling erosion, sediment loss, and other TMDL pollutants of concern from construction sites that disturb areas of 1 acre or more.	Year 1 -5: Provide a narrative description of any changes implemented in the City's sediment and erosion control regulations or design specifications in the annual report.
4.D	Maintain a program for performing review of Grading Permit applications to ensure compliance with applicable regulations and design specifications.	Year 1 -5: Summarize the number of grading permit issued on an annual basis.

 # 5: Post-construction Runoff Control

BMP #	SWMP Element Description	Measurable Commitments & Implementation Schedule
5.A	Develop guidance document for Post-Construction Stormwater Management Plan.	Year 2: Develop guidance document for Post Construction Storm Water Management Plan Year 2-5: Revise as necessary.
5.B	Participate with other City Departments to prepare an Environmental Element of City of Omaha Master Plan and include applicable storm water management provisions.	Year 1-5: Summarize progress in annual report. Year 5: Present the Environmental Element to City Planning Board and Omaha City Council for their consideration to adopt into the Omaha Master Plan.
5.C	Develop a database of existing structural BMPs (private and public) that reduce the impact of urbanization on storm water run-off and improve water quality and enhance other amenities and activities such as green space, parks and recreation, urban planning, aesthetics, and public safety.	Year 2: Coordinate with engineering firms and the NRD to identify existing BMPs and their location. Year 3: Develop a database and GIS map of BMPs.
5.D	Inspect annually and maintain (as necessary) City owned storm water BMP structures.	Year 1 -5: List BMPs inspected and summarize maintenance activity in Annual Report.
5.E	Revise stormwater BMP maintenance and inspection plan as needed.	Year 1-5: Review maintenance plan annually and include new structures. Make revisions as necessary. Report revisions and new structures in Annual Report.
5.F	Implement strategies, which include a combination of structural and or non-structural BMPs appropriate for the watershed, which will address TMDL pollutants of concern. Evaluate these strategies and implement changes as necessary to improve water quality and address TMDL pollutants of concern.	Year 1 -5: Summarize strategies, findings, and any changes in the Annual Report.

 # 6: Pollution Prevention/Good Housekeeping for Municipal Operations

BMP #	SWMP Element Description	Measurable Commitments & Implementation Schedule
6.A	Maintain Facility Runoff Control Plans (FRCP) for all City maintenance facilities to indentify BMPs implemented. Review FRCP annually and update as necessary. Inspect all facilities annually.	Year 1 -5: Review logs of FRCP updates and inspections. Report dates in annual report.
6.B	Inspect storm sewer conduits, channels and catch basins and remove and properly dispose of sediment and debris as needed to maintain an efficient system within permitted area.	Year 1 - 5: Report maintenance activities in the Annual Report.
6.C	Training will be provided for employees to prevent pollutant runoff from municipal operations at City maintenance facilities and at field operations.	Years 1 – 5: Provide training annually for employees and include summary in Annual Report of when training was held and number of attendees.
6.D	Provide for street cleaning in the following areas: Residential Business Major Streets Other areas in conjunction with special projects	Year 1 – 5: Summarize street cleaning activities in annual report.
6.E	City staff that applies pesticides will be trained in a certification program that complies with FIFRA regulations.	Year 1 -5: Report total number of City Staff certified each year in the Annual Report.
6.F	The City will continue to minimize pesticide and fertilizer use on publically maintained properties.	Year 1 -5: Summarize efforts in Annual Reports.

ATTACHMENT A

 # 7: Industrial Facilities

7.A	Issue City of Omaha Industrial Stormwater Permits. Permits to be issued to specific sectors to maximize effectiveness of education and outreach activities and utilize staff resources efficiently.	Year 1: Develop priority system based on industrial sector for targeting industries to issue City of Omaha Industrial Stormwater Permits Year 2- 5: Issue permits Report number of permits issued and industrial sector/SIC in Annual Report.
7.B	Inspect 20% of facilities per year issued City of Omaha Industrial Stormwater Permits, taking appropriate enforcement action consistent with adopted ordinances.	Year 1 -5: Summarize number of facilities issued permits, number of facilities inspected, and number of enforcement actions in Annual Report.
7.C	Implement a permit tracking system.	Year 2: Implement a GIS based tracking system for permits, inspections, and compliance. Develop automated summary to be included in Annual Report. Year 3 – 5: Include summary in Annual Report
7.D	Review City of Omaha Industrial Stormwater Permit for consistency with Federal and State NPDES Industrial Stormwater Permit.	Year 1 – 5: Summarize updates to City of Omaha Industrial Stormwater Permits in Annual Report.

ATTACHMENT A

#8: Storm Water Monitoring Plan

SWMP Element #	SWMP Element Description	Measurable Commitments & Implementation Schedule
8.A	Conduct in-stream water quality monitoring of named creeks in the Papillion Creek Watershed. Collect samples from at least 4 sites located in the Papillion Creek Watershed. Samples will be collected from May through August one day a week and analyzed for the following parameters: BOD5, TSS, ammonia nitrogen, nitrate-nitrogen, total nitrogen, soluble and total phosphorus, turbidity, pH, E coli, and Physical Characteristic Examinations. The purpose of the monitoring will be to evaluate the effectiveness of storm water management practices in the City of Omaha as it relates to TMDL pollutants of concern. List of potential sites: 170 and Highway 36 (Big Papio) 77th and L Street (Big Papio) 64th and L Street (Little Papio) Ft. Crook Road – USGS station (Papillion Creek)	Year 1- 5: Conduct monitoring The following information shall be included in the Annual Activity Report: The monitoring data; A summary report on the findings relative to SWMP efforts; Any modifications of monitoring locations or procedures.
8.B	Develop an assessment monitoring plan for demonstration BMPs. Evaluate the effectiveness of the selected BMPs to treat storm water for the TMDL pollutants of concern and other water quality benefits. Consider implementation of refinements to the BMPs, which would improve their effectiveness. One aspect of the monitoring plan will include the collection stream samples on the segment that runs through Orchard Park to establish baseline conditions for BMP assessment purposes. Additionally, the plan will address how the City proposed to use stream samples collected in dry weather and wet weather, as described in 8.A above, to estimate the pollutant masses discharged on an event basis and an annual basis.	Year 1 – 2: Visually document and monitor the installation of the demonstration BMPs. Installation is expected to be complete by the end of Year 2. Provide a narrative to report progress in Annual Report. Year 2: Develop the BMP assessment monitoring plan and submit to NDEQ for approval as an attachment to the Annual Report. Years 3 - 5: Conduct monitoring. The following information shall be included in the Annual Activity Report: the location of the monitoring site the intensity and duration of the storm event monitored; the timing of sampling in comparison to the occurrence of the storm event and to the discharge of peak storm water flows; the monitoring data; and a summary report on the findings of the removal rates of the constituents monitored for the BMPs.

ATTACHMENT B

ATTACHMENT B

COMPLAINT INVESTIGATIONS

Date	Complaint Type	Address	IDDE Classification	Enforcement Type
10/2/2013	Suspicious discharge to street	9254 Ruggles St	Potential Illicit Discharge	Request for Voluntary Compliance - Verbal
10/18/2013	Erosion complaint	21525 Chancellor Rd	None	Referred to Street Maintenance
1/3/2014	Gas odor complaint	144th & Blondo	Potential Illicit Discharge	Investigated - No Source Located
1/15/2014	Debris in inlet	6304 N 46th Ave	Potential Illicit Discharge	Request for Voluntary Compliance - Written
1/23/2014	Leaking vehicle	2625 S 167 Av Cir	Potential Illicit Discharge	Request for Voluntary Compliance - Written
1/24/2014	Leaky vehicle	2618 S 167 St	Potential Illicit Discharge	Request for Voluntary Compliance - Written
2/18/2014	Debris in drainage ditches	L St 60th to 108th St	Potential Illicit Discharge	Investigated - Invalid Complaint
3/7/2014	Leaky vehicle	1819 Farnam St	Potential Illicit Discharge	Request for Voluntary Compliance - Written
3/10/2014	Grease container leak	Wing Stop 72nd & Pacific	Illicit Discharge	Request for Voluntary Compliance - Written
3/17/2014	Leaky vehicle	5110 S 121 St	Potential Illicit Discharge	Request for Voluntary Compliance - Written
4/1/2014	Leaking vehicle	133rd Avenue and Montclair Dr.	Potential Illicit Discharge	Investigated - Invalid Complaint
4/3/2014	Erosion complaint	345 Riverside Drive	Construction	Request for Voluntary Compliance - Verbal
4/16/2014	Erosion complaint	19010 Hamilton St	Construction	Request for Voluntary Compliance - Verbal
4/16/2014	Erosion complaint	5146 S 181 Plaza	Construction	Investigated - Invalid Complaint
4/21/2014	Erosion complaint	3303 S 168th St.	Construction	Request for Voluntary Compliance - Verbal
4/24/2014	Odor complaint	8155 Crown Point Ave	None	Investigated - Invalid Complaint
4/28/2014	Oil discharge	5645 S 23rd	Potential Illicit Discharge	Referred to Planning

ATTACHMENT B

5/9/2014	Sediment complaint	171st & Bohling Dr	Construction	Request for Voluntary Compliance - Verbal
5/12/2014	Erosion complaint	4030 N 101	Construction	Request for Voluntary Compliance - Written
5/12/2014	Erosion complaint	Mission Park	Construction	Request for Voluntary Compliance - Verbal
5/12/2014	Erosion complaint	16716 Elm Circle	Construction	Request for Voluntary Compliance - Verbal
5/16/2014	Runoff complaint	15013 G Cir.	None	Investigated - Invalid Complaint
5/22/2014	Erosion and flooding complaint	14514 Grover St	None	Investigated - Referred to Street Maintenance
5/23/2014	Suspicious discharge to street	6915 Cass Street	Potential Illicit Discharge	Investigated - No Source Located
5/30/2014	Erosion complaint	3719 S 202nd Ave	Construction	Request for Voluntary Compliance - Verbal
6/2/2014	Pool discharge	3340 S 105th Ave.	Illicit Discharge	Request for Voluntary Compliance - Written
6/6/2014	Suspicious discharge to street	9th & Dorcas	Potential Illicit Discharge	Investigated - Invalid Complaint
6/9/2014	Oil discharge	2317 South 17th St	Potential Illicit Discharge	Request for Voluntary Compliance - Verbal
6/12/2014	Drainage complaint	1326 N 97th Plaza	None	No Action Taken
6/16/2014	Pool discharge	16227 Elm St.	Illicit Discharge	Request for Voluntary Compliance - Verbal
6/23/2014	Sediment complaint	13839 L St.	None	Investigated - Referred to Street Maintenance
6/23/2014	Erosion complaint	11909 Frances Street	Construction	Request for Voluntary Compliance - Verbal
6/23/2014	Erosion complaint	1314 S. 50 St	Construction	Request for Voluntary Compliance - Verbal
6/24/2014	Odor complaint	7917 Miami St.	None	Investigated - Invalid Complaint
7/2/2014	Drainage complaint	16404 Hartman Ave	Potential Illicit Discharge	Investigated - Invalid Complaint
7/7/2014	Erosion complaint	4704 N. 192nd Ave	Construction	Request for Voluntary Compliance - Written

ATTACHMENT B

7/28/2014	Suspicious discharge	5800 S Remington Place #100	Illicit Discharge	Request for Voluntary Compliance - Written
8/4/2014	Motor oil in street	15522 Pine St.	Potential Illicit Discharge	Request for Voluntary Compliance - Verbal
8/5/2014	Erosion complaint	88th Ave and Sprague Circle	Construction	Request for Voluntary Compliance - Verbal
8/14/2014	Car washing complaint	7930 Raven Oaks Drive	Potential Illicit Discharge	Request for Voluntary Compliance - Verbal
8/15/2014	Erosion complaint	13068 Arbor St.	Construction	Request for Voluntary Compliance - Verbal
8/26/2014	Leaking dumpster	4821 Underwood	Potential Illicit Discharge	Request for Voluntary Compliance - Verbal
8/26/2014	Erosion complaint	408 S 201st Ave	Construction	Request for Voluntary Compliance - Verbal
8/26/2014	Erosion complaint	192nd Avenue Circle	Construction	Request for Voluntary Compliance - Verbal
8/27/2014	Erosion and track out	1425 N 191 St.	Construction	Request for Voluntary Compliance - Verbal
8/28/2014	Erosion complaint	60th & F St.	Construction	Request for Voluntary Compliance - Verbal
8/28/2014	Erosion complaint	1505 Ridgewood Avenue	Construction	Request for Voluntary Compliance - Verbal
8/29/2014	Erosion complaint	3234 S 66th Ave Cir	Construction	Request for Voluntary Compliance - Verbal
9/8/2014	Septic tank discharge to street	4503 Huntington Ave	Illicit Discharge	Request for Voluntary Compliance - Verbal
9/12/2014	Sump pump discharge	12906 Harney St.	Illicit Discharge	Request for Voluntary Compliance - Verbal
9/12/2014	Runoff complaint	4411 S 50 St	Construction	Request for Voluntary Compliance - Verbal
9/15/2014	Runoff complaint	11334 Leavenworth St	None	Investigated - No Action Taken
9/24/2014	Drainage	154th & Harrison	None	No Action Taken
9/26/2014	Drainage complaint	8809 N 48th St.	None	Referred to Sewer Maintenance
9/30/2014	Runoff complaint	5146 S 181 Plaza	Potential Illicit Discharge	Investigated - Invalid Complaint

ATTACHMENT C

Address	Status	Date Submitted	Outcome
345 Riverside Drive	Complete	4/3/2014	Request for Voluntary Compliance - Verbal
19010 Hamilton St	Complete	4/16/2014	Request for Voluntary Compliance - Verbal
3303 S 168th St.	Complete	4/21/2014	Request for Voluntary Compliance - Verbal
4227 North Crest Drive	Complete	4/26/2014	Request for Voluntary Compliance - Written
171st & Bohling Dr	Complete	5/9/2014	Request for Voluntary Compliance - Verbal
4030 N 101	Complete	5/12/2014	Request for Voluntary Compliance - Written
Mission Park	Complete	5/12/2014	Request for Voluntary Compliance - Verbal
16716 Elm Circle	Complete	5/12/2014	Request for Voluntary Compliance - Verbal
3719 S 202nd Ave	Complete	5/30/2014	Request for Voluntary Compliance - Verbal
11909 Frances Street	Complete	6/23/2014	Request for Voluntary Compliance - Verbal
1314 S. 50 St	Complete	6/23/2014	Request for Voluntary Compliance - Verbal
4704 N. 192nd Ave	Complete	7/7/2014	Request for Voluntary Compliance - Written
88th Ave and Sprague Circle	Complete	8/5/2014	Request for Voluntary Compliance - Verbal
13068 Arbor St.	Complete	8/15/2014	Request for Voluntary Compliance - Verbal
408 S 201st Ave	Complete	8/26/2014	Request for Voluntary Compliance - Verbal
192nd Avenue Circle	Complete	8/26/2014	Request for Voluntary Compliance - Verbal
1425 N 191st Avenue	Complete	8/27/2014	Request for Voluntary Compliance - Written
1425 N 191 St.	Complete	8/27/2014	Request for Voluntary Compliance - Verbal
60th & F St.	Complete	8/28/2014	Request for Voluntary Compliance - Verbal
1505 Ridgewood Avenue	Complete	8/28/2014	Request for Voluntary Compliance - Verbal
3234 S 66th Ave Cir	Complete	8/29/2014	Request for Voluntary Compliance - Verbal
4411 S 50 St	Complete	9/12/2014	Request for Voluntary Compliance - Verbal

ATTACHMENT D

3.1.9 Omaha, Nebraska: Pervious Pavement System

The pervious pavement system at the Omaha Police Department parking lot in Omaha, Nebraska is nearly 19,000 ft^2. Stormwater runoff enters the pervious pavement through surface sheet flow and passes through it into an underground aggregate, which then discharges to an underdrain system connected to the combined sewer system. The underground aggregate provides approximately 9,200 ft^3 of storage and discharges through two main outlets (8 inches and 10 inches in diameter).

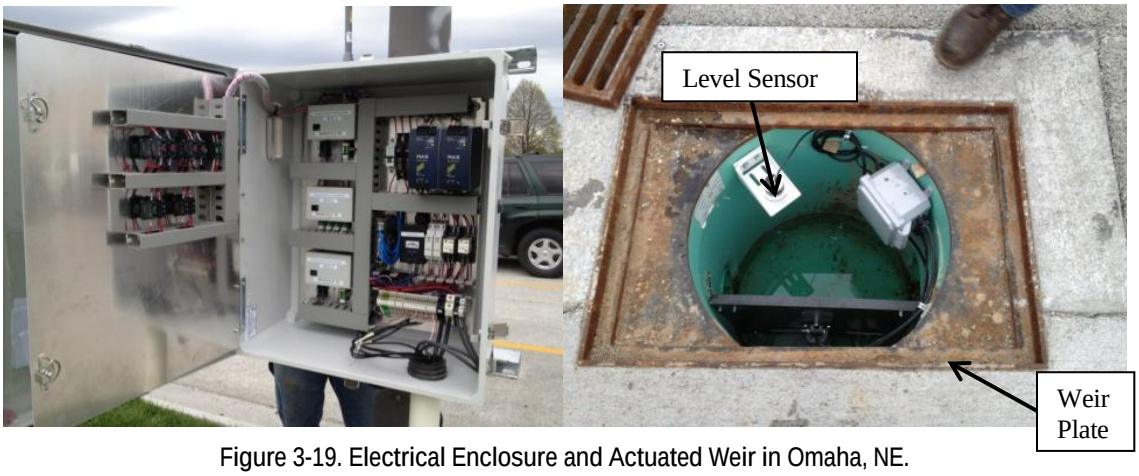


Figure 3-19. Electrical Enclosure and Actuated Weir in Omaha, NE.

The project involves two phases. Phase I was completed in early December 2012 and consisted of installing level sensors and weirs in two inlets of the porous pavement parking lot. The levels were calibrated with the weir, so both water level and flow were monitored. Phase II, which consisted of the installation of new level sensors in two additional inlets, actuated weir plates in all four inlets in the porous pavement, and control boxes were built during the week of May 6th-10th. In addition to the new level sensors, eight thermistors are installed at various depths in two pervious pavement cores (Figure 3-20). The thermistors record temperature changes beneath the pervious pavement. This data, when combined with water level data in the four pavement inlets, provides information on water depths and transport through the stone reservoir. Photos from the installation are shown in Figures 3-21 and 3-22. Real-time data is shown on the online dashboard in Figure 3-23. Logic that incorporates real-time forecast data was partially implemented in July 2013.

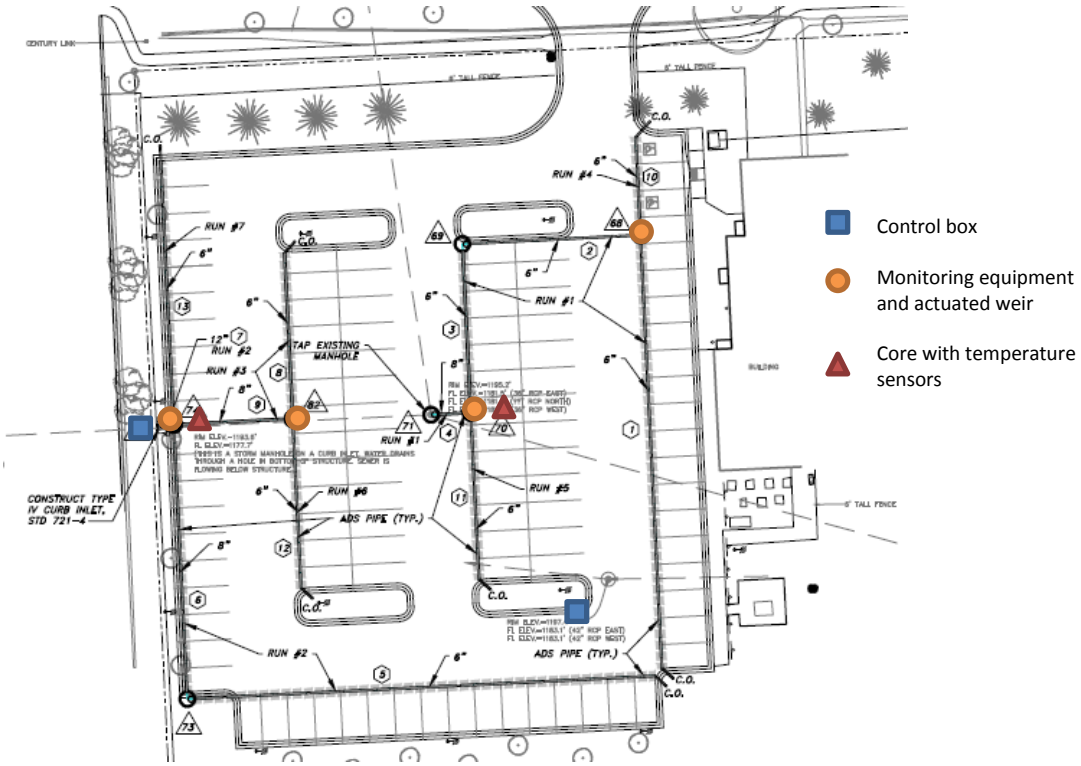


Figure 3-20. Site Plan of Monitoring and Control Components at Pervious Pavement System in Omaha, NE.

Figure 3-21. Eight-Inch Core Removed for Inserting Monitoring Wells with Temperature Sensors at Various Depths into Porous Pavement Surface.

Figure 3-22. Personnel Placing Sealant Around Newly Installed Real-Time Controlled Weir Plate.

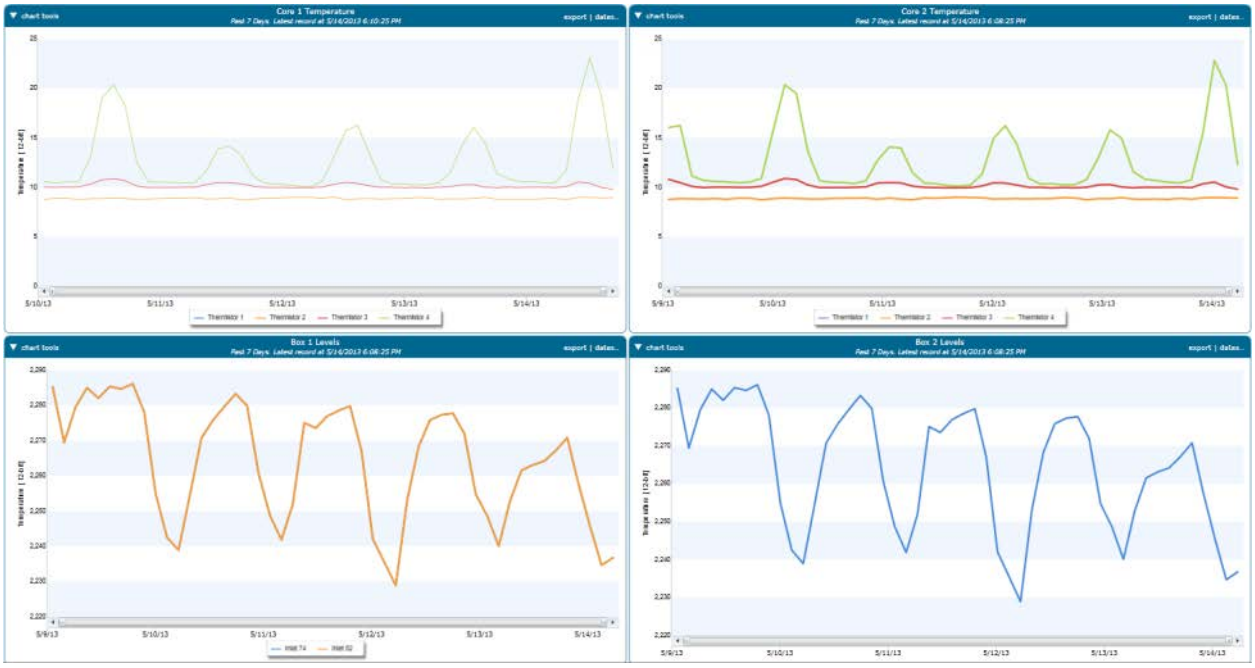


Figure 3-23. Dashboard at the Pervious Pavement Site in Omaha, NE.

3.2.6 Omaha, Nebraska: Pervious Pavement System

Nine storm events occurred from May 9, 2013 to June 18, 2013, equating to 4.77 inches of rain in Omaha. Storm events were defined as precipitation totals over 0.1 inches with a six hour antecedent dry period. Temperature and water level show response to precipitation events as shown in Figure 3-36. Additional plots of monitoring are provided in Attachment B.2.

Logic that incorporates real-time forecast data was implemented in the fall of 2013. At the time of this report the City is still contemplating the best use of the functionality for control of the system. Full use of the system will not be leveraged until spring 2014.

It is anticipated that during dry weather, the actuated weirs will remain open. When the forecast indicates a small storm that can be entirely captured by the system, the weir valves will close to allow for complete wet weather capture. When a forecast storm volume is greater than the total storage of the system, the weir valves will complete a sequence of open and closed states to reduce system outflow peaks while not overflowing the aggregate storage. This is the only pilot site that might incorporate peak shaving control logic (i.e., aims to capture the peak of large storm events that cannot be fully captured otherwise).

It is hypothesized that dynamically controlled pervious pavement will act similarly to the advanced rainwater harvesting cisterns. Anticipated data include volume and percent of wet weather runoff captured and seasonal infiltration rates. The City of Omaha is also interested in the performance of the pavement during cold weather, as well as the temporal depths of the freeze/thaw line throughout the pavement/aggregate system.

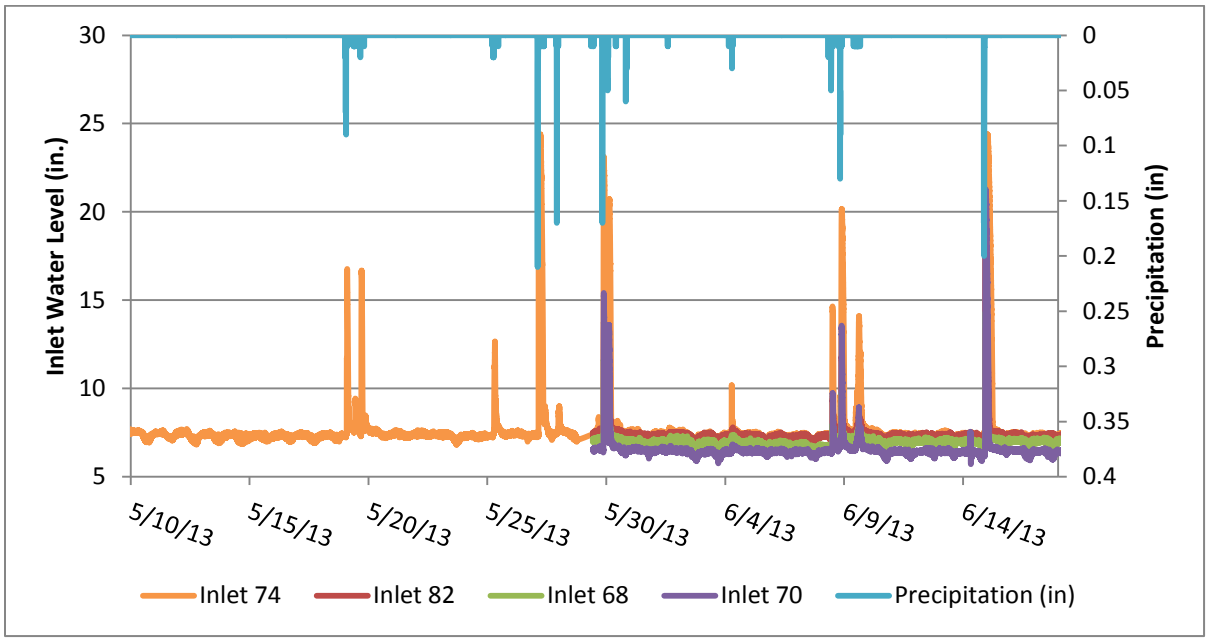


Figure 3-36. Porous Pavement Response to Precipitation Events in Omaha, NE.

Andrew Bebee
HORT 396 : F14
Current Projects and Topics in Horticulture

Bio-retention Plants : Omaha

The fabric of the land has been severely compromised by human development. The pre-existing landscape provided a series of systems of ecological services. These services include things like, water filtration, decomposition of waste, and soil stabilization. These systems worked in tandem to build, repair, and maintain an ecosystem. As grey infrastructure like pipes, pavement, and tanks were implemented during the rapid development of human space, these environmental systems became damaged and their functionality was compromised. Impermeable surfaces replaced trees, meadows, and wetlands, resulting in fragmented ecological systems.

To remediate the damage done to ecological services, Best Management Practices (BMPs) and Green Infrastructure (or Landscape Infrastructure) are being implemented into projects all over the world. Bio-retention projects are a large portion of these projects and offer many benefits. Bio-retention, often referred to as raingarden or bio-infiltration cells, are designed to collect rainwater from a storm event, allow the water to infiltrate, and release water over time to reduce the peak flow (Davis 2009). Bio-retention cells offer ecological services, wildlife habitat, and city beautification.
Based on these benefits, many cities are adopting these BMPS, but due to the local variability it is difficult to set specific guidelines for an entire state, region, or country. Municipalities, who adopt a dedication to this type of infrastructure, will need to dedicate time to research and test the design and implementation of bio-retention systems. Quality research will identify proper soil and structure design in combination with planting techniques and plant selection. Plants are in important component in the design of a cell. They can be aesthetically pleasing while absorbing water and contamination. Specific plants and planting strategies could be effective at remediating sites that have been physically damaged and chemically contaminated. The basic theory of phytoremediation is to place specific plants in a contaminated soil, then the plants will directly or indirectly absorb, sequester, or degrade the contamination (Cunningham 1996).

Cities all over the country have combined sewer systems that transport Stormwater and sewer water through the same drainage system. When large storms overwhelm the system, the sewage and stormwater overflow from the treatment plants, dumping to the closest body of water. Omaha, NE, and 771 other cities have these types of sewer systems and are required by the federal government to drastically reduce the amount of Combined Sewer Overflow (CSO) events every year. This is an unfunded federal ruling that is expected to be completed by the year 2027 (CoO). The project consists of 5 different types of implementation, sewer separation, high rate sewer treatment plants, storm sewer conveyance, deep tunnel, and underground storage. When the project is finished it will cost upwards of $2 Billion paid by taxpayers in the community. The cheapest and most easily applied

technique is bio-retention which will reduce the amount of water which enters the sewer system.

Most cities do not have the money or manpower to review completed projects and keep track of the health of the bio-retention gardens. Over the summer and fall of 2014, data on the gardens were collected to see how the gardens were functioning. The purpose of the research was to follow up with existing gardens and determine how well they are doing. The data collected consisted of the species name, quantity of plants, quality of plants, and position within the garden. There are many different varieties of species and knowing which cultivar was planted is paramount. Record of how many plants there are will show if some have died, maintaining, or are thriving and naturalizing. The quality of plants will tell if they are getting enough water, sunlight, or competition. The position of the plant within the garden is broken into 3 parts; the top, side, or bottom of the garden. The top does not receive as much moisture, the side receives a varied amount, while the bottom receives the most amount of water. Many plants were placed in multiple zones to determine if they are better suited for different zones.

Project: 50th and Pine Pervious Pavement Demonstration
Location: 50th and Pine, Omaha, NE
Owner: City of Omaha
Installation Date: Summer 2013

50th and Pine Pervious Pavement Demonstration Project is located on a former fire department building. The site was used to test the use of permeable concrete and to measure the reduction of run off from the replaced parking lot. The water drains into a fore bay, a vegetated swale then into the bio-retention garden. The plants are all native grasses including; little blue stem, switch grass, and palm sedge.

The plants selected are all native grasses to the Nebraska Region and appear to all quite healthy. The sedges and switchgrass are thriving within the retention cell. The plants have begun to naturalize and are thick enough to suppress any weeds. The Little Blue Stem is growing, but tends to flop over. This could be caused by too much water, either extra watering or from rain events.
58th and Maple Street Stormwater BMP Project is the result of the reworking of a large complicated intersection. 58th street was cut out from the intersection and redeveloped into a bio-retention system. The residential neighborhood drains down the street into a limestone fore bay, through a meandering bed of stone, into a remediated soil trench with an under drain. The site, being a former road is extremely compacted and needed lots of tilling and soil remediation.

Common Name	Scientific Name	Quantity	Quality	Location
Broom Sedge	Carex scoparia	11	1	Top
Broom Sedge	Carex scoparia	10	2	Bottom
Swith Grass	Panicium virgatum ‘Heavy Metal’	50	1	Bottom
Little Blue Stem	Schizachyrium scoparium	83	1	Bottom to Side

Figure 1.

Image 1. West View of the Cell

Image 2. South View of the Swale and Drain Outlet

Image 3. South View of the Swale

Image 4. Permeable Pavement, turf, and Little Blue Stem

The plants selected are all native grasses to the Nebraska Region and appear to all quite healthy. The sedges and switchgrass are thriving within the retention cell. The plants have begun to naturalize and are thick enough to suppress any weeds. The Little Blue Stem is growing, but tends to flop over. This could be caused by too much water, either extra watering or from rain events.

Project: 58th and Maple Street Stormwater BMP
Location: 58th and Maple, Omaha, NE
Owner: City of Omaha
Installation Date: Summer 2013

58th and Maple Street Stormwater BMP Project is the result of the reworking of a large complicated intersection. 58th street was cut out from the intersection and redeveloped into a bio-retention system. The residential neighborhood drains down the street into a limestone fore bay, through a meandering bed of stone, into a remediated soil trench with an under drain. The site, being a former road is extremely compacted and needed lots of tilling and soil remediation.

Common Name	Scientific Name	Quantity	Quality	Location
Thread Leaf Blue Star	Amsonia bubrichtii	10	2	Side
Woods Blue Aster	Aster cordifolious 'Woods Blue'	12	2	Top
Side Oats	Bouteloua curtipendula	68	1	Top
Blue Grama	Bouteloua gracilis	84	1	Side
Palm Sedge	Carex scoparia	19	1	Bottom
Red Twig Dogwood	Cornus sericea	15	1	Bottom
Joe Pye Weed	Eutrochium dubium 'Little Joe'	12	2	Bottom
Geranium	Geranium	22	2	Bottom
Winter Berry Holly	Ilex verticillata	12	3	Top
Blue Flag Iris	Iris versicolor	7	1	Bottom
Prairie Blazing Star	Liatris pycnostachya	14	2	Bottom
Crabapple	Malus 'Indian Magic'	3	1	Side
Summer Wine Ninebark	Physocarpus opulifolious 'Summer Wine'	5	1	Top
Knock Out Shrub Rose	Rosa x Radrazz'	12	3	Bottom
Golden Rod	Solidago rugosa 'Fireworks'	5	3	Side
Gro Low Sumac	Sumac aromatica 'Gro-Low'	15	2	Top
White Aster	Symphyotrichum ericoides	19	2	Top

Figure 2.

Image 5. Fore Bay and Rip Rap into the Cell

Image 6. Vegitation and Rip Rap

Image 7. Bottom of Cell Facing North East

Image 8. Bottom of Cell Facing North West

58th Street Garden has been installed for an entire season and many of the plants have survived and begun to spread. The only plants that seem to be struggling are the KnockOut Shrub Roses and Fireworks Golden Rod. The Blue Grama and Sideoats were installed as plugs and have grown significantly, beginning to spread and fill into the site. The plants that were planted in compacted areas that were not adequately tilled have survived. Maintenance of the site has kept the site from being overcome with weeds and invasive species.

Project: Florence Streetscape and Bio-retention
Location: N 30th Street and Willit Street to Clay Street, Omaha, NE
Owner: City of Omaha
Installation Date: Summer 2012

Florence Street Bio-retention and Planting resulted from the repaving of the sidewalks through the commercial core of Florence. It became an opportunity to test more urban bio-retention cells while bringing a beautification and community identity element into the project. After the concrete was laid, 6+ inches of a compost sand mix was placed over the entire bottom of the cell. There were several issues with the project that needed to be repair. Several large old wells, which did not show up on the survey, were not filled in very well and resulted in sink holes, reducing the integrity of the sidewalk. The construction contractor failed to install the underdrain correctly and it had to be relayed.

Common Name	Scientific Name	Quantity	Quality	Location
Serviceberry	Amelanchier ‘Grandifolia’	5	1	Top
Palm Sedge	Carex muskingumensis	5	1	Bottom
Fox Sedge	Carex vulpinoidea	7	1	Bottom
American Hornbeam	Carpinus carolinia	7	2	Top
Redtwig dogwood	Cornus sericea	5	1	Bottom
Dianthus	Dianthus ‘Firewitch’	3	2	Top
Day lily	Herocallis stella de oros	2	2	Top
Blue flag Iris	Iris versicolor	30	1	Bottom
Soft Rush	Juncus effusus	8	1	Bottom
Shenandoah Switchgrass	Panicum virgatum ‘Shenandoah’	47	1	Bottom
Hamlin Dwarf Fountain Grass	Pennisetum alopecuroidies	33	2	Top
Speedwell	Veronica	2	2	Top

Figure 3.

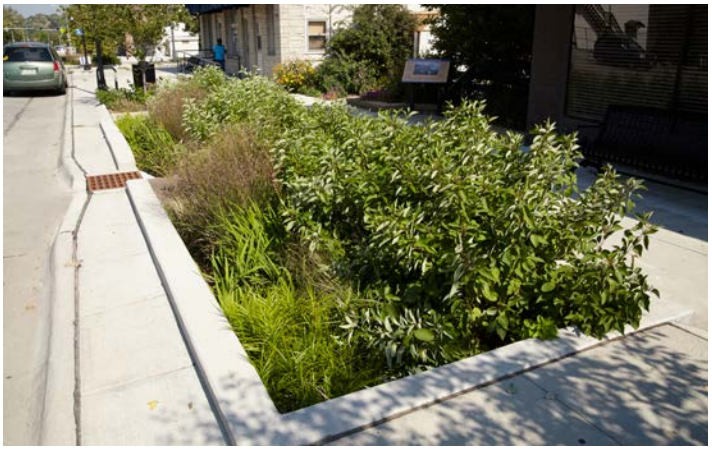


Image 9. Street View of Wet Cell

Image 10. Sidewalk View of Wet Cell

Image 11. Fore Bay Detail

Image 12. Curb View of Wet Cell

The issues with the structural stability of each cell has been fixed and the plants have filled into the cells well. The stand outs are Redtwig Dogwood and Shenendoaha Switchgrass, which have both grown to almost mature size. The Redtwig Dogwood selected has begun to obstruct part of the path and may be too large or too many of them within each cell. The cells that are not bio-retention, consisting of the Serviceberry trees, American Hornbeam, and Hamlin Dwarf Fountain Grass, have not been properly watered and the grasses have started to fail. Maintenance of the site has not kept up with the weeds, primarily in the dry cells.

Project: Metro Community College - Fort Campus Raingarden
Location: 5300 North 30th Street, Omaha, NE
Owner: Metro Community College
Installation Date: Summer 2012

Metro Community College - Fort Campus Raingarden was funded by the Environmental Trust in conjunction with MCC's Horticulture department. The project catches the run off from several of the campus' buildings and parking lots and has two main components, the Bio-retention Cell and a demonstration roof garden. The roof garden was planted with prairie grasses and flowers. It is the subject of research in bio-retention and horticulture maintenance. The garden features many different varieties of plants with a focus on sedges due to their low maintenance, drought resistance, and standing water tolerance.

Common Name	Scientific Name	Quantity	Quality	Location
Silver maple	Acer saccharium	1	1	Top
Black Chokeberry	Aronia melanocarpus ‘Iroquois Beauty’	3	4	Top
Butterfly Milkweed	Asclepias Tuberosa	2	1	Top
Blue False Indigo	Baptisia australis	6	2	Side
Side Oats	Bouteloua curtipendula	60	1	Top
Buffalo Grass	Bouteloua dactyloides		3	Top
Blue Grama	Bouteloua gracilis	1	1	Top
American Beauty Berry	Callicarpa americana	1	1	Top
Grey Sedge	Carex grayi	19	1	Bottom
Palm Sedge	Carex muskingumensis	43	1	Bottom
Broom Sedge	Carex scoparia	10	1	Bottom
Button bush	Cephalanthus occidentallis ‘Sputnik’	3	1	Bottom
Purple Coneflower	Echinacea purpurea	9	3	Top
Geranium	Geranium maculatum	8	1	Side
Blood Red Geranium	Geranium Sangulneum	125 SF	1	Top
Blue Flag Iris	Iris versicolor	12	1	Bottom
Sweet Spire	Itea virginica ‘Henry’s Garnet’	7	3	Top
Prairie Blazing Star	Liatris pycnostachya	12	4	Bottom
Lily Turf	Liriope muscari	32	1	Side
Switch Grass	Panicum virgatum	5	1	Bottom
Sand cherry	Prunus besseyi	3	1	Top
Fireworks Golden Rod	Solidago rugosa ‘Fireworks’	12	3	Side
Indian Grass	Sorghastrum natans	6	3	Bottom
Prairie Dropseed	Sporobolus heterolpis	13	1	Side
Hancock coral berry	Symphorcarpus x chenautll ‘Hancock’	2	2	Top
Prairie Classic Viburnum	Viburnum x ‘Prairie Classic’	1	1	Top

Figure 4.

The wide variety of plants have all thrived through the whole project. The sedges lining the center of the swale have begun to spread and fill in between other plants. The Lily Turf has proved to help stabilize the edges of the swale and are spreading. It will need to be watched to assure it does not become invasive and take over the garden. Maintenance has kept the Bio-retention system healthy, but there are several large patches of weed grasses. The roof garden demonstration appears to have been taken over by weeds.

Image 13. Raingarden and Roof Garden

Image 14. North View into Cell

Image 15. North View of Berm and No-Mow Grass

Image 16. Fore Bay Detail

As Omaha Continues to implement Bio-retention products, each garden or system can lend lessons on how to design, or how not to design them. The inventoried gardens vary in size, style, and purpose. Continued research on these gardens, and many others in Omaha, will help to produce a list of quality plants that will thrive in bio-retention systems. This list should include plants that are lower maintenance, standing water tolerant, drought tolerant, and have an aesthetic appeal. Suggested plant list for the bottom of the cell should include the following; sedges, switchgrass, Blue Flag Iris, and Redtwig Dogwood.

Resources:

Bebee, Jeffrey P. BIO-RETENTION IMAGES, FIGURE 1-8. 2014

City of Omaha. Clean Solutions for Omaha : Media Kit. Web, 2014.

Cunningham Scott D. and David W. Ow, Promises and Prospects of Phytoremediation (Plant Physiology, Vermont, 1996)

Davis, Allen P; William F. Hunt; Robert G. Traver; and Michael Clar. Bioretention Technology: Overview of Current Practice and Future Needs. JOURNAL OF ENVIRONMENTAL ENGINEERING. MARCH 2009.

ATTACHMENT E

ATTACHMENT E

2014 Precipitation Data							
DATE	PRECIP (in)	DATE	PRECIP (in)	DATE	PRECIP (in)	DATE	PRECIP (in)
5/1/2014	0.01	6/1/2014	1.18	7/1/2014	0.00	8/1/2014	0.01
5/2/2014	T	6/2/2014	0.00	7/2/2014	T	8/2/2014	0.11
5/3/2014	0.00	6/3/2014	5.30	7/3/2014	0.00	8/3/2014	1.07
5/4/2014	0.00	6/4/2014	T	7/4/2014	0.00	8/4/2014	0.00
5/5/2014	0.00	6/5/2014	0.28	7/5/2014	1.40	8/5/2014	0.12
5/6/2014	0.00	6/6/2014	0.00	7/6/2014	0.00	8/6/2014	0.46
5/7/2014	0.12	6/7/2014	0.28	7/7/2014	0.32	8/7/2014	0.06
5/8/2014	0.06	6/8/2014	0.00	7/8/2014	0.00	8/8/2014	T
5/9/2014	0.00	6/9/2014	0.00	7/9/2014	0.00	8/9/2014	0.01
5/10/2014	T	6/10/2014	0.00	7/10/2014	0.00	8/10/2014	0.24
5/11/2014	2.21	6/11/2014	0.00	7/11/2014	0.00	8/11/2014	0.00
5/12/2014	0.13	6/12/2014	0.00	7/12/2014	0.00	8/12/2014	0.00
5/13/2014	0.00	6/13/2014	0.00	7/13/2014	T	8/13/2014	0.00
5/14/2014	T	6/14/2014	0.00	7/14/2014	T	8/14/2014	0.00
5/15/2014	0.00	6/15/2014	0.20	7/15/2014	0.00	8/15/2014	0.01
5/16/2014	0.00	6/16/2014	T	7/16/2014	0.00	8/16/2014	T
5/17/2014	0.00	6/17/2014	T	7/17/2014	0.00	8/17/2014	T
5/18/2014	0.00	6/18/2014	T	7/18/2014	0.00	8/18/2014	T
5/19/2014	0.00	6/19/2014	0.00	7/19/2014	0.00	8/19/2014	0.00
5/20/2014	0.00	6/20/2014	1.30	7/20/2014	0.00	8/20/2014	T
5/21/2014	0.00	6/21/2014	0.58	7/21/2014	0.00	8/21/2014	0.29
5/22/2014	0.17	6/22/2014	0.04	7/22/2014	T	8/22/2014	0.78
5/23/2014	0.00	6/23/2014	0.00	7/23/2014	0.00	8/23/2014	0.59
5/24/2014	T	6/24/2014	0.00	7/24/2014	T	8/24/2014	0.00
5/25/2014	0.23	6/25/2014	0.00	7/25/2014	T	8/25/2014	T
5/26/2014	T	6/26/2014	0.14	7/26/2014	0.00	8/26/2014	1.71
5/27/2014	T	6/27/2014	0.23	7/27/2014	0.00	8/27/2014	1.84
5/28/2014	0.00	6/28/2014	0.90	7/28/2014	0.00	8/28/2014	1.55
5/29/2014	0.00	6/29/2014	0.07	7/29/2014	0.00	8/29/2014	0.64
5/30/2014	0.00	6/30/2014	0.02	7/30/2014	0.00	8/30/2014	0.00
5/31/2014	0.00			7/31/2014	0.00	8/31/2014	0.10
*Bold = sampling Day							

ATTACHMENT E

Data quality control is done "in house" for the following tests: COD, BOD, TSS, TDS.

A = Value is an average results obtained from multiple analyses
L = The actual value is greater than the value given.
U = Value below detection limit.
X = Value exceeds instrument range.

Site B 168th and HWY 36

	5/7	5/14	5/21	5/28	6/4	6/11	6/18	6/25	7/2	7/9	7/16	7/23	7/30	8/6	8/13	8/20	8/27	
Total Coliform	4835	68670	22168	26130	241960	64880	32550	48840	14210	27550	20980	17348	8390	23820	16580	10100	241960	**SM 9222 D** MDL = 1 cfu / 100 mL
e coli	148	16227	1778	1915	46110	785	1939	1558	956	1407	726	829	931	2745	788	690	98040	**Colilert Method** MDL = 1 cfu / 100 mL
pH (lab)	8.22	8.08	8.0	8.16	7.53	8.16	8.09	8.01	8.24	8.02	8.14	8.14	8.17	8.13	8.12	8.11	8.1	**SM 4500-H^+ B**
BOD (mg/L)	2	2	U	4	8	U	2	1	1	U	1	1	U	1	1	2	4	**SM 5210 B** MDL = 2 mg/L
Total Suspended Solids (mg/L)	75	172	121.00	196	3660	161	183	215	232	276	94	91	103	111	124	91	194	**SM 2540 D** MDL = 1 mg/L
Total Solids (mg/L)	460	680	534	646	5256	696	626	726	748	760	538	562	552	530	642	576	646	**?**
Total Dissolved Solids (mg/L)	385	508	413	450	1596	535	443	511	516	484	444	471	449	419	518	485	452	**SM 2540 C** MDL = 1 mg/L
Ammonia Nitrogen (mg/L)	0.68	0.64	0.39	0.18	1.18	--	0.12	0.58	0.45	0.12	0.11	0.64	0.63	0.07	0.14	0.40	0.14	**SM 4500-NH_3 D** MDL = 1 mg/L
Nitrate/Nitrite Nitrogen (mg/L)	2.06	6.4	4.10	3.60	6.40	8.90	8.00	9.80	9.60	9.60	0.10	8.00	8.30	6.90	7.60	6.80	5.20	**EPA 353.2** MDL = 0.2 mg/L
Kjeldahl Nitrogen (mg/L)	0.63	1.43	1	1	10	1	1	1	1	1	<0.5	<0.5	<0.50	1	<0.50	1	2	**EPA 351.3** MDL = 0.5 mg/L
Total Phosphorus (mg/L)	0.17	0.39	<0.05	0.35	4.14	0.4	0.41	0.36	0.43	0.42	0.26	0.3	0.31	0.32	0.31	0.32	0.61	**SM 4500 P F** MDL = 0.05 mg/L
Dissolved Phosphorus (mg/L)	0.09	0.19	0.18	0.21	0.23	0.19	0.2	0.16	0.15	0.18	0.16	0.16	0.17	0.17	0.18	0.18	0.29	**SM 4500 P F** MDL = 0.05 mg/L
Nitrite Nitrogen (mg/L)	0.07	0.1	0.13	0.16	0.12	0.1	0.15	0.07	0.09	0.08	9.05	0.08	0.05	0.07	0.05	0.06	0.15	**SM 4500-NO_2^- B** MDL = 0.02 mg/L
Temperature C	17.51	12.55	11.5	19.6	16.58	16.42	22.43	17.02	16.3	18.26	16.22	21.17	16.65	21.41	16.58	21.59	19.71	Field Measurment
DO (mg/L)	8.9	9.64	9.66	8.51	9.18	9.05	8.07	9.07		9.16	9.59	8.82	9.44	8.75	9.59	8.42	8.37	Field Measurment
SpCond (æS/cm)	611.70	689.50	656.4	690.40	407.0	720.2	706.5	716.0	726.1	706.2	706.9	686.1	693.7	683.3	702.9	703.2	595.0	Field Measurment
Turb (NTUs)	49.0	133.00	75.0	4163.80	1283.8	130.4	109.5	136.4	8.1	176.2	68.1	69.5	60.2	85.5	88.4	8.2	193.9	Field Measurment
pH (Manta II)	7.83	8.31	8.25		7.65	8.03	8.09	8.11	123.20	8.07	8.24	8.24	8.13	8.28	8.17		7.98	Field Measurment

ATTACHMENT E

Site S 78th and L St

	5/7	5/14	5/21	5/28	6/4	6/11	6/18	6/25	7/2	7/9	7/16	7/23	7/30	8/6	8/13	8/20	8/27	
Total Coliform	3268	241960	18701	241960	241960	57940	36540	61310	72700	64880	25750	18033	10500	27550	24085	6852	241960	**SM 9222 D** MDL = 1 cfu / 100 mL
e coli	88	92080	1702	954	57940	1590	2948	3441	2136	3193	1895	620	410	1554	1084	1532	22168	**Colilert Method** MDL = 1 cfu / 100 mL
pH (lab)	8.21	8.05	8.1	8.02	7.6	8.21	8.1	8.13	8.2	8.15	8.2	8.2	8.26	8.1	8.17	8.16	7.9	**SM 4500-H^+ B**
BOD (mg/L)	3	3	U	4	7	U	3	4	U	U	1	1	U	1	1	1	5	**SM 5210 B** MDL = 2 mg/L
Total Suspended Solids (mg/L)	18	114	67.00	46	3660	200	139	148	188	156	79	95	92	73	88	81	328	**SM 2540 D** MDL = 1 mg/L
Total Solids (mg/L)	476	568	584	484	4238	618	534	620	644	604	560	602	572	526	596	584	652	**?**
Total Dissolved Solids (mg/L)	458	454	517	438	578	418	395	472	456	448	481	507	480	453	508	503	324	**SM 2540 C** MDL = 1 mg/L
Ammonia Nitrogen (mg/L)	0.05	0.68	0.20	0.13	0.78	--	0.12	0.15	0.50	0.07	0.06	0.13	0.21	0.13	0.08	0.13	0.07	**SM 4500-NH_3 D** MDL = 1 mg/L
Nitrate/Nitrite Nitrogen (mg/L)	1.29	4.9	3.00	2.50	3.60	6.50	5.40	6.70	6.30	6.70	0.04	5.80	6.20	4.20	5.20	4.50	1.40	**EPA 353.2** MDL = 0.2 mg/L
Kjeldahl Nitrogen (mg/L)	1.37	2.29	<0.50	<0.50	7	1	1	1	1	1	<0.50	<0.5	1	1	1	1	2	**EPA 351.3** MDL = 0.5 mg/L
Total Phosphorus (mg/L)	0.11	0.34	<0.50	0.23	3.33	0.35	0.38	0.37	0.38	0.3	0.26	0.26	0.26	0.27	0.3	0.24	0.46	**SM 4500 P F** MDL = 0.05 mg/L
Dissolved Phosphorus (mg/L)	<0.05	0.18	0.13	0.16	0.13	0.16	0.15	0.14	0.17	0.15	0.16	0.15	0.15	0.14	0.16	0.15	0.09	**SM 4500 P F** MDL = 0.05 mg/L
Nitrite Nitrogen (mg/L)	0.05	0.1	0.09	0.14	0.08	0.1	0.15	0.07	0.08	0.07	6.9	0.04	0.03	0.05	0.04	0.03	0.03	**SM 4500-NO_2^- B** MDL = 0.02 mg/L
Temperature C	18.32	13.01	19.17	22.2	17.94	17.92	23.47	19.27	18.78	20.88	18.67	24.29	20.09	23.44	19.97	24.35	21.99	Field Measurment
DO (mg/L)	9.4	9.30	8.62	7.64	7.09	9.24	8.04	8.85	9.70	8.77	9.27	8.37	9.31	8.27	9.19	7.88	7.80	Field Measurment
SpCond (æS/cm)	724.40	696.60	747.1	705.30	292.2	723.7	666.8	708.5	687.6	689.4	738.0	733.9	738.4	706.7	725.8	755.4	413.2	Field Measurment
Turb (NTUs)	128.0	111.10	43.2	1552.00	2232.5	141.7	193.9	8.1	148.6	162.3	65.8	60.1	72.9	95.5	91.0	41.8	310.4	Field Measurment
pH (Manta II)	7.99	8.05	8.13		7.55	8.02	8.03	142.30	8.18	8.01	8.18	8.18	8.08	8.06	8.02	8.13	7.71	Field Measurment

ATTACHMENT E

Site D Hwy 75 and Capehart

	5/7	5/14	5/21	5/28	6/4	6/11	6/18	6/25	7/2	7/9	7/16	7/23	7/30	8/6	8/13	8/20	8/27	
Total Coliform	2399	198630	10402	241960	241960	81640	19103	54750	48840	104620	22273	3983	9984	11980	12582	3268	241960	**SM 9222 D** MDL = 1 cfu / 100 mL
e coli	229	41060	392	7297	16080	1074	1212	3317	1954	3502	2300	211	238	1091	238	514	23508	**Colilert Method** MDL = 1 cfu / 100 mL
pH (lab)	8.21	7.9	8.1	7.69	7.61	8.14	8.01	7.89	8.07	8	8.09	8.16	8.2	8.02	8.06	8.09	7.85	**SM 4500-H^+ B**
BOD (mg/L)	3	3.00	2.0	6	7	U	2	4	2	U	1	1	U	1	1	2	4	**SM 5210 B** MDL = 2 mg/L
Total Suspended Solids (mg/L)	33	192.00	66.00	128	1940	164	95	340	142	166	61	86	68	55	43	55	570	**SM 2540 D** MDL = 1 mg/L
Total Solids (mg/L)	504	644	544	408	2380	650	463	732	534	556	524	622	542	470	506	573	1042	**?**
Total Dissolved Solids (mg/L)	471	452	478	280	440	486	368	392	392	390	463	536	474	415	463	518	472	**SM 2540 C** MDL = 1 mg/L
Ammonia Nitrogen (mg/L)	0.02	0.65	0.21	0.25	0.79	--	0.13	0.18	1.01	0.09	0.08	0.20	0.34	0.02	0.08	0.22	0.07	**SM 4500-NH_3 D** MDL = 1 mg/L
Nitrate/Nitrite Nitrogen (mg/L)	0.98	2.10	2.00	1.00	2.10	3.80	3.50	2.50	3.30	3.50	0.04	3.80	3.80	2.80	3.20	2.90	1.20	**EPA 353.2** MDL = 0.2 mg/L
Kjeldahl Nitrogen (mg/L)	0.62	2	1	1	8	1	1	1	1	1	1	1	<0.50	1	<0.50	1	2	**EPA 351.3** MDL = 0.5 mg/L
Total Phosphorus (mg/L)	0.13	0.38	0.2	0.3	2.94	0.34	0.28	0.34	0.33	0.37	0.22	0.24	0.22	0.23	0.24	0.28	0.84	**SM 4500 P F** MDL = 0.05 mg/L
Dissolved Phosphorus (mg/L)	0.05	0.11	0.11	0.09	0.13	0.14	0.15	0.09	0.15	0.14	0.16	0.13	0.13	0.13	0.16	0.13	0.12	**SM 4500 P F** MDL = 0.05 mg/L
Nitrite Nitrogen (mg/L)	0.03	0.05	0.03	0.06	0.05	0.07	0.1	0.03	0.06	0.06	4.14	0.03	0.03	0.04	0.03	0.03	0.03	**SM 4500-NO_2^- B** MDL = 0.02 mg/L
Temperature C	18.45	13.06	19.4	21.96	18.66	18.87	24.48	21.56	19.79	21.45	19.54	24.96	21.01	24.44	20.75	25.9	21.81	Field Measurment
DO (mg/L)	7.6	9.24	9.43	7.15	8.56	9.37	7.77	8.34	9.10	8.66	9.01	8.24	8.55	8.70	8.84	7.41	8.36	Field Measurment
SpCond (æS/cm)	725.30	633.40	748.6	469.20	261.5	695.8	598.0	597.3	621.7	611.8	735.5	764.8	783.2	703.9	691.9	773.7	399.1	Field Measurment
Turb (NTUs)	18.7	171.90	39.8	59.70	2614.3	145.0	102.2	161.4	113.7	204.0	48.2	47.7	43.8	127.2	41.4	29.5	667.0	Field Measurment
pH (Manta II)	7.94	7.88	8.05		7.26	7.84	7.91	7.83	7.65	7.74	7.98	8.04	7.85	7.34	7.40	8.02	7.23	Field Measurment

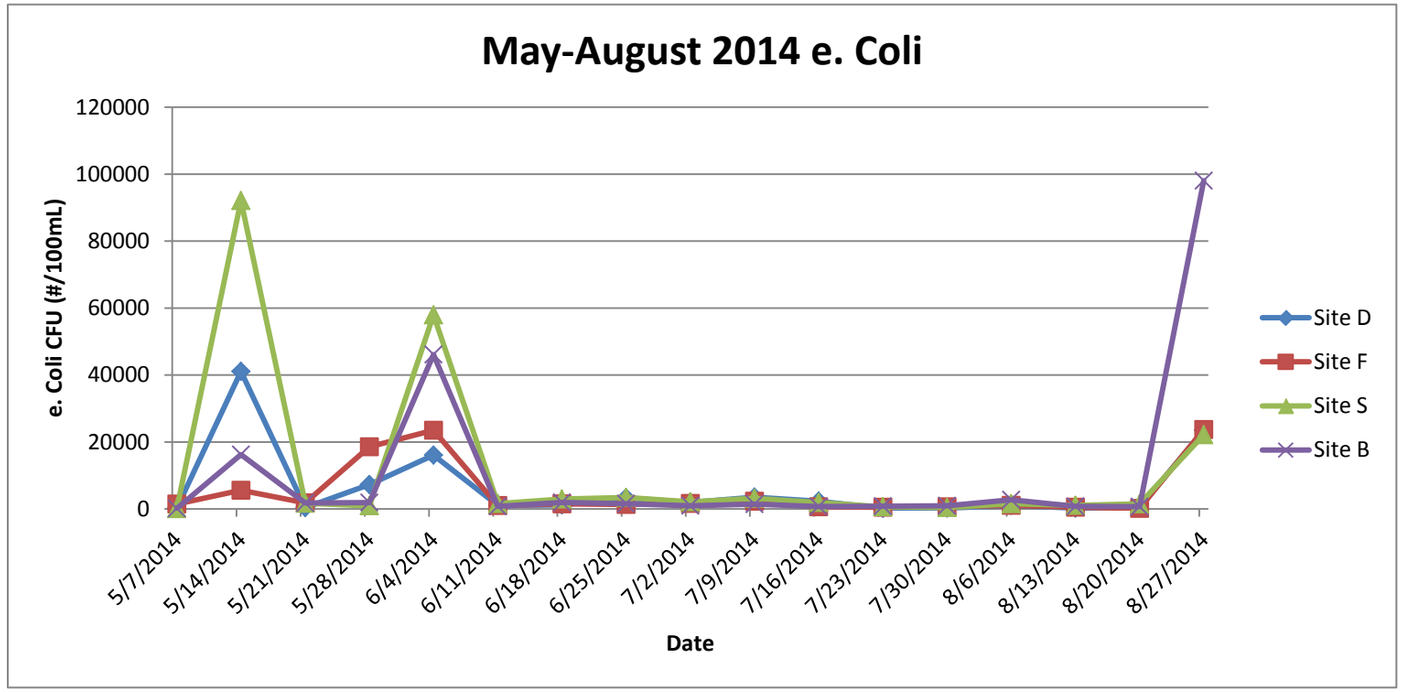
ATTACHMENT E

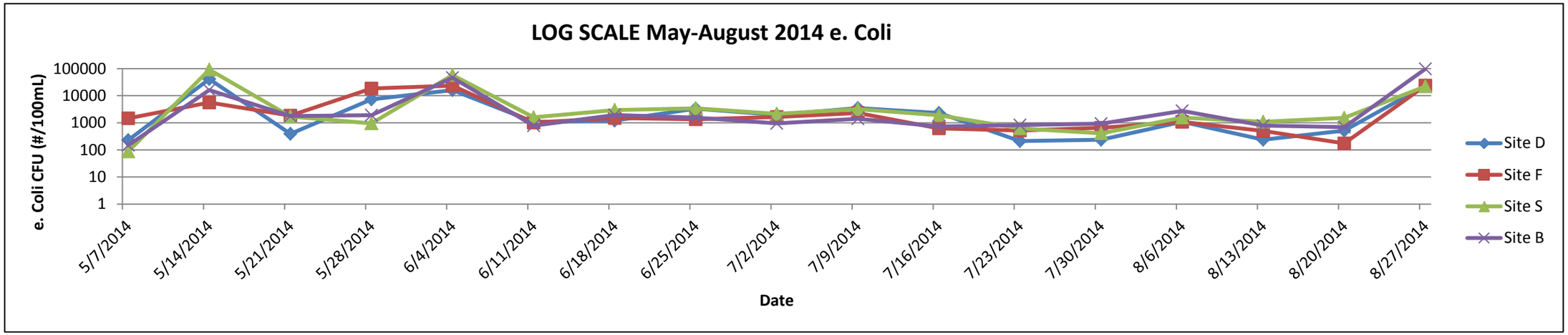
Site F 66th and L St

	5/7	5/14	5/21	5/28	6/4	6/11	6/18	6/25	7/2	7/9	7/16	7/23	7/30	8/6	8/13	8/20	8/27	
Total Coliform	12007	198630	10417	241960	241960	61310	32550	64880	64880	72700	14568	4733	12890	19180	10792	4687	241960	**SM 9222 D** MDL = 1 cfu / 100 mL
e coli	1465	5586	1838	18542	23508	1016	1505	1353	1639	2299	619	521	654	1079	500	173	23706.5	**Colilert Method** MDL = 1 cfu / 100 mL
pH (lab)	7.99	7.9	8.0	7.59	7.69	8.12	7.92	7.99	8.09	7.92	8.02	7.93	8.01	7.81	7.83	7.75	7.86	**SM 4500-H^+ B**
BOD (mg/L)	2	4	2.0	8	6	3	3	3	2	U	1	1	U	1	1	2	3	**SM 5210 B** MDL = 2 mg/L
Total Suspended Solids (mg/L)	2	28	28.00	78	3040	82	151	77	54	40	26	37	29	7	6	27	166	**SM 2540 D** MDL = 1 mg/L
Total Solids (mg/L)	512	496	506	296	4420	482	496	514	422	384	464	534	519	440	510	598	538	**?**
Total Dissolved Solids (mg/L)	510	468	478	218	1380	400	345	437	368	344	438	497	490	433	504	571	372	**SM 2540 C** MDL = 1 mg/L
Ammonia Nitrogen (mg/L)	0.05	0.46	0.17	0.44	0.58	--	0.19	0.24	0.79	0.10	0.11	0.18	0.26	0.13	0.09	0.15	0.10	**SM 4500-NH_3 D** MDL = 1 mg/L
Nitrate/Nitrite Nitrogen (mg/L)	0.43	2	0.80	0.70	1.90	1.20	1.30	1.30	1.20	1.20	0.05	1.60	1.40	1.50	1.40	1.10	1.00	**EPA 353.2** MDL = 0.2 mg/L
Kjeldahl Nitrogen (mg/L)	0.53	1.16	1	1	5	1	1	1	1	1	1	<0.5	<0.50	1	1	1	1	**EPA 351.3** MDL = 0.5 mg/L
Total Phosphorus (mg/L)	0.05	0.13	<0.05	0.23	2.53	0.2	0.28	0.18	0.15	0.16	0.13	0.16	0.14	0.2	0.17	0.11	0.32	**SM 4500 P F** MDL = 0.05 mg/L
Dissolved Phosphorus (mg/L)	<0.05	0.06	<0.05	0.06	0.1	0.06	0.08	0.06	0.08	0.08	0.08	0.08	0.07	0.1	0.1	<0.05	0.12	**SM 4500 P F** MDL = 0.05 mg/L
Nitrite Nitrogen (mg/L)	0.02	0.06	0.04	0.07	0.07	0.08	0.12	0.06	0.08	0.08	1.47	0.06	0.03	0.08	0.05	0.07	0.04	**SM 4500-NO_2^- B** MDL = 0.02 mg/L
Temperature C	18.54	12.82	18.87	21.41	18.72	19.66	23.41	20.96	19.24	21.52	18.94	23.5	20.05	23.29	19.53	24.69	21.06	Field Measurment
DO (mg/L)	8.3	8.74	9.19	6.67	9.79	8.39	7.32	8.51	8.90	8.85	8.93	7.83	9.07	7.95	8.78	8.07	9.10	Field Measurment
SpCond (æS/cm)	787.20	720.40	769.1	363.00	270.6	631.9	601.2	679.9	618.4	570.3	698.9	763.7	773.1	706.6	704.7	810.0	491.8	Field Measurment
Turb (NTUs)	2.9	33.80	18.7	4317.80	1743.5	63.0	134.4	64.5	47.6	48.6	29.5	30.0	25.2	13.8	8.4	7.5	190.0	Field Measurment
pH (Manta II)	7.79	7.89	8.10		7.62	7.92	7.86	7.94	7.96	7.83	7.98	7.91	7.85	7.81	7.70	7.71	7.66	Field Measurment

ATTACHMENT E

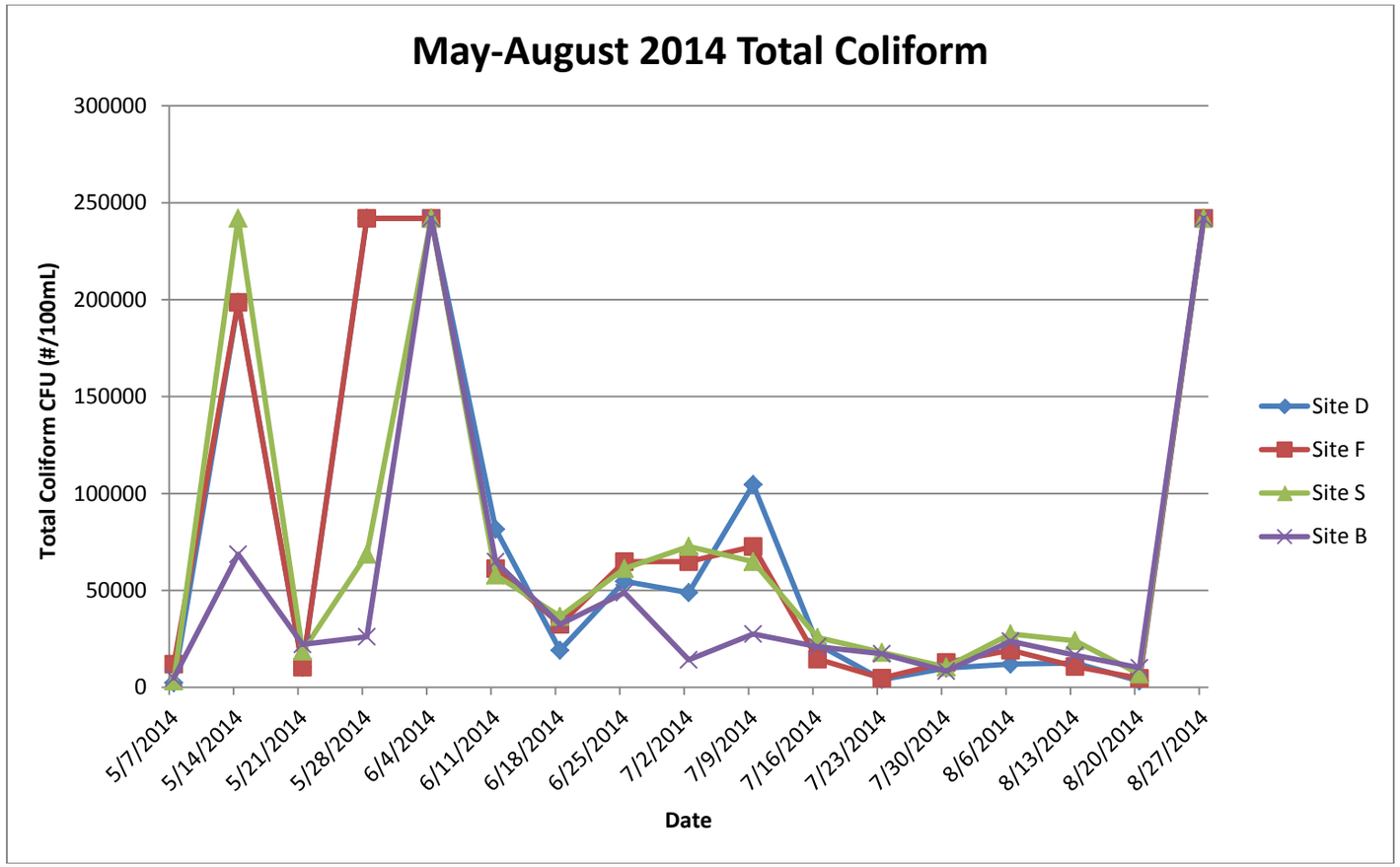
e. Coli 2014	Site D	Site F	Site S	Site B
5/7/2014	228.8	1464.8	87.9	147.7
5/14/2014	41060	5585.5	92080	16226.5
5/21/2014	392.4	1838	1702.1	1777.6
5/28/2014	7297	18541.5	954	1915
6/4/2014	16079.5	23508	57940	46110
6/11/2014	1074.2	1015.5	1590.4	785.1
6/18/2014	1212	1505.2	2948	1938.9
6/25/2014	3316.5	1353	3441	1557.8
7/2/2014	1953.9	1638.7	2135.9	955.5
7/9/2014	3501.5	2298.5	3193	1406.7
7/16/2014	2299.7	619.1	1894.9	726.1
7/23/2014	211	520.5	619.9	829.1
7/30/2014	237.5	653.9	410.4	930.9
8/6/2014	1090.9	1078.9	1554.5	2744.9
8/13/2014	237.9	500.2	1084	787.6
8/20/2014	513.7	173.1	1532.4	689.9
8/27/2014	23508	23706.5	22168	98040
GEOMEAN	1642.628	1809.144	2367.843	1966.382



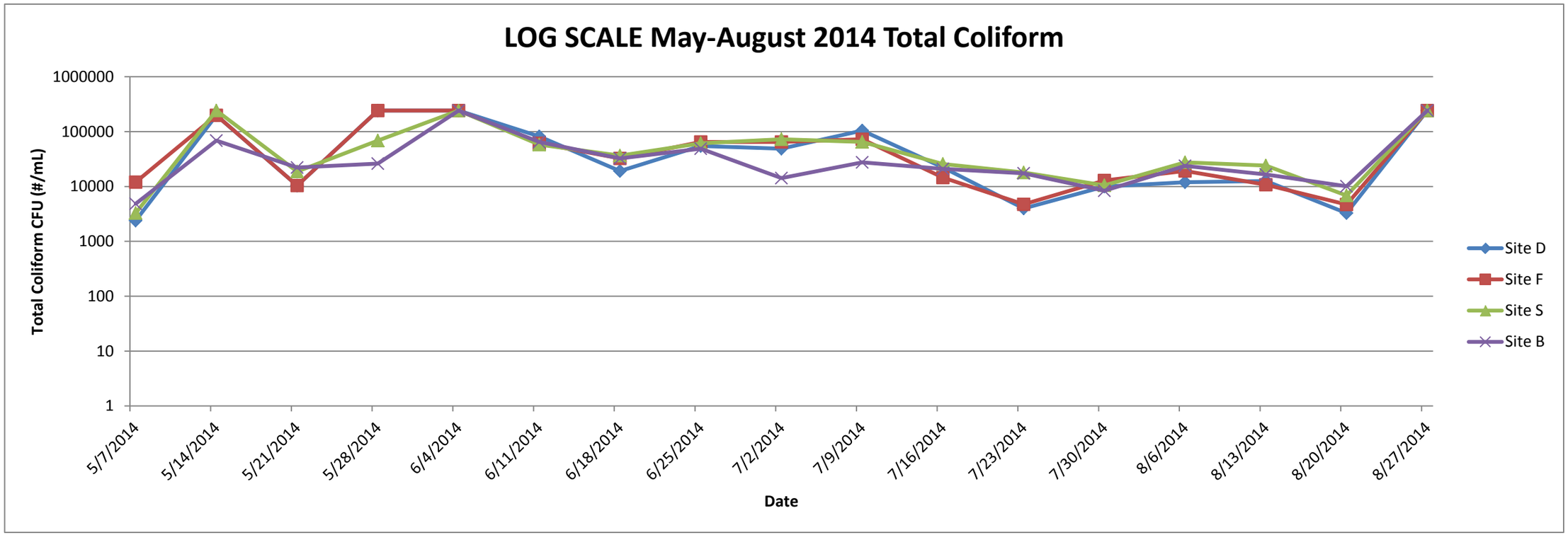


ATTACHMENT E

Total Coliform 2014	Site D	Site F	Site S	Site B
5/7/2014	2399	12006.5	3268	4835
5/14/2014	198630	198630	241960	68670
5/21/2014	10402	10416.5	18700.5	22168
5/28/2014	241960	241960	68670	26130
6/4/2014	241960	241960	241960	241960
6/11/2014	81640	61310	57940	64880
6/18/2014	19103	32550	36540	32550
6/25/2014	54750	64880	61310	48840
7/2/2014	48840	64880	72700	14210
7/9/2014	104620	72700	64880	27550
7/16/2014	22273	14568	25750	20980
7/23/2014	3982.5	4732.5	18033	17348
7/30/2014	9983.5	12889.5	10500	8390
8/6/2014	11980	19180	27550	23820
8/13/2014	12581.5	10792	24084.5	16580
8/20/2014	3268	4687	6852	10100
8/27/2014	241960	241960	241960	241960
Geomean	30060.32	35088.61	38260.54	28542.38
Bold indicates the actual value is greater than the value given.				

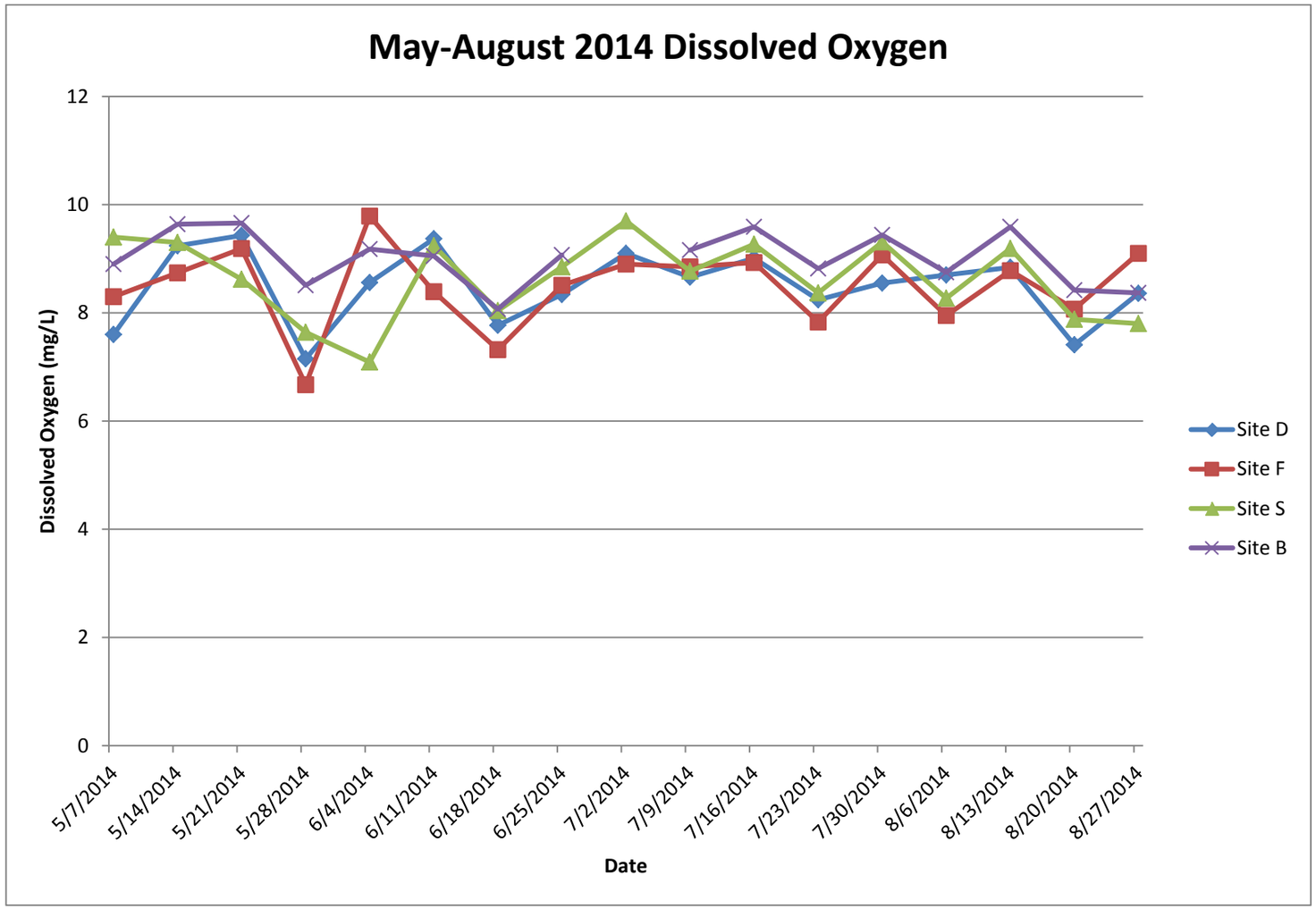


ATTACHMENT E

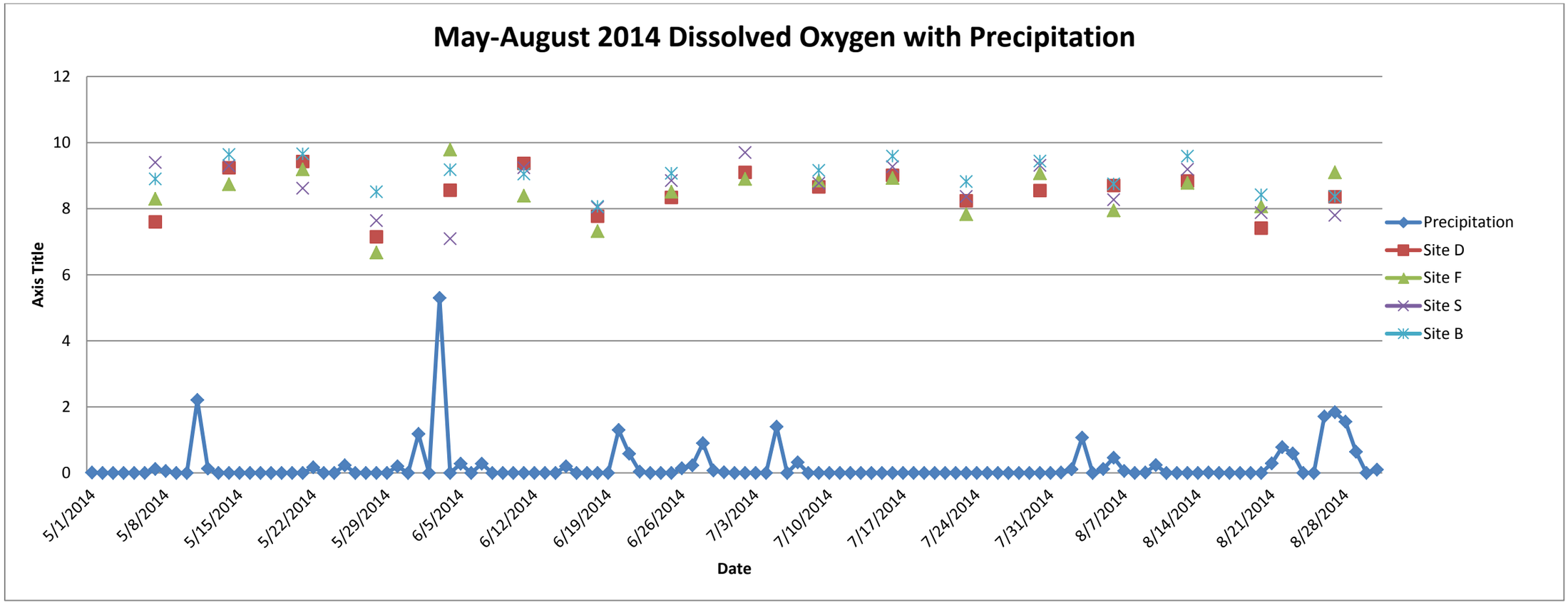


ATTACHMENT E

Dissolved Oxygen 2014	Site D	Site F	Site S	Site B
5/7/2014	7.6	8.3	9.4	8.9
5/14/2014	9.24	8.74	9.3	9.64
5/21/2014	9.43	9.19	8.62	9.66
5/28/2014	7.15	6.67	7.64	8.51
6/4/2014	8.56	9.79	7.09	9.18
6/11/2014	9.37	8.39	9.24	9.05
6/18/2014	7.77	7.32	8.04	8.07
6/25/2014	8.34	8.51	8.85	9.07
7/2/2014	9.1	8.9	9.7	--
7/9/2014	8.66	8.85	8.77	9.16
7/16/2014	9.01	8.93	9.27	9.59
7/23/2014	8.24	7.83	8.37	8.82
7/30/2014	8.55	9.07	9.31	9.44
8/6/2014	8.7	7.95	8.27	8.75
8/13/2014	8.84	8.78	9.19	9.59
8/20/2014	7.41	8.07	7.88	8.42
8/27/2014	8.36	9.1	7.8	8.37
DO AVERAGE	8.49	8.49	8.63	9.01

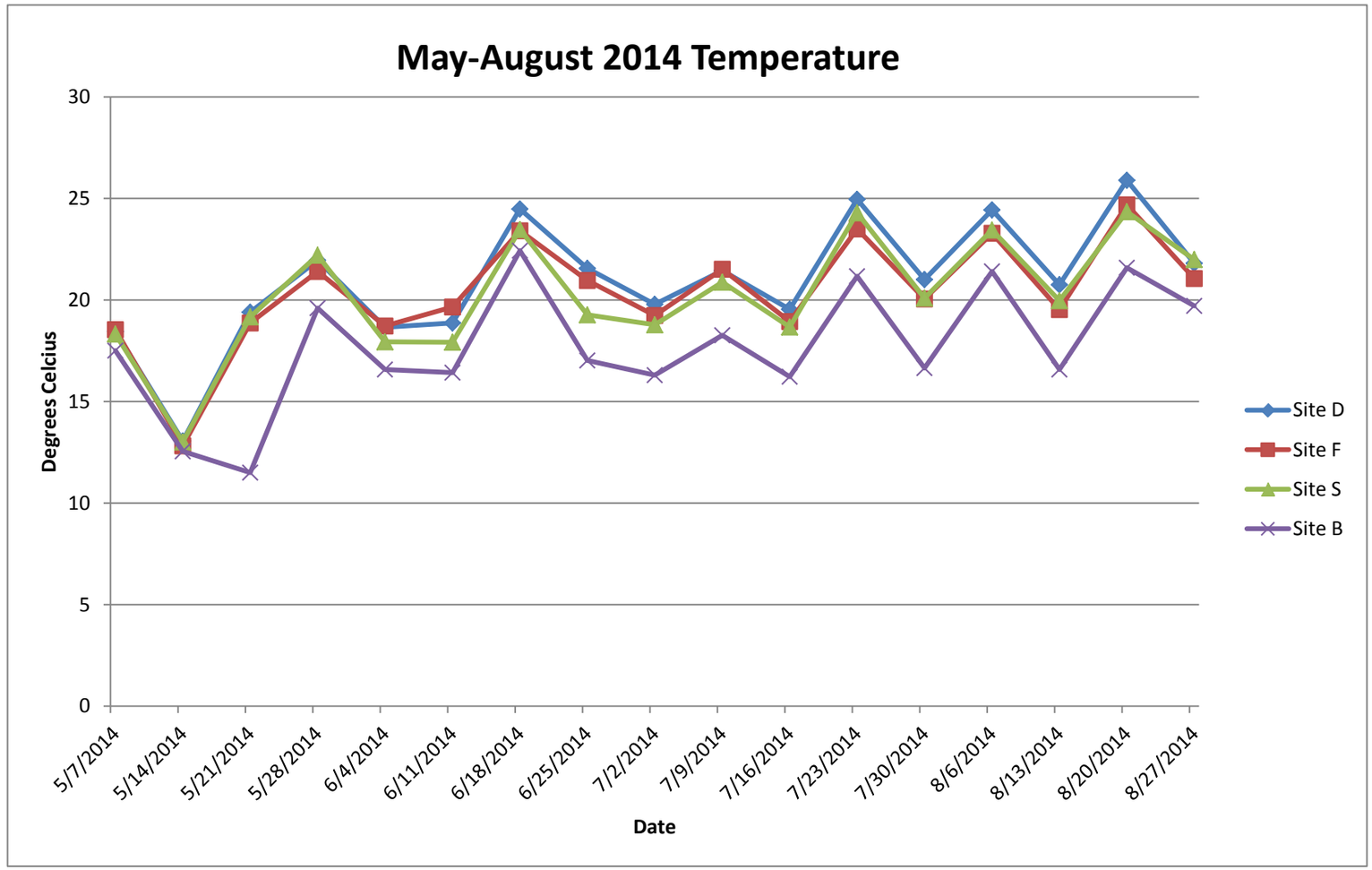


ATTACHMENT E



ATTACHMENT E

TEMP 2014	Site D	Site F	Site S	Site B
5/7/2014	18.45	18.54	18.32	17.51
5/14/2014	13.06	12.82	13.01	12.55
5/21/2014	19.4	18.87	19.17	11.5
5/28/2014	21.96	21.41	22.2	19.6
6/4/2014	18.66	18.72	17.94	16.58
6/11/2014	18.87	19.66	17.92	16.42
6/18/2014	24.48	23.41	23.47	22.43
6/25/2014	21.56	20.96	19.27	17.02
7/2/2014	19.79	19.24	18.78	16.3
7/9/2014	21.45	21.52	20.88	18.26
7/16/2014	19.54	18.94	18.67	16.22
7/23/2014	24.96	23.5	24.29	21.17
7/30/2014	21.01	20.05	20.09	16.65
8/6/2014	24.44	23.29	23.44	21.41
8/13/2014	20.75	19.53	19.97	16.58
8/20/2014	25.9	24.69	24.35	21.59
8/27/2014	21.81	21.06	21.99	19.71
TEMP AVE	20.95	20.37	20.22	17.74



Turbidity 2014	Site D	Site F	Site S	Site B
5/7/2014	18.7	2.9	128	49
5/14/2014	171.9	33.8	111.1	133
5/21/2014	39.8	18.7	43.2	75
5/28/2014	59.7	4317.8	1552	4163.8
6/4/2014	2614.3	1743.5	2232.5	1283.8
6/11/2014	145	63	141.7	130.4
6/18/2014	102.2	134.4	193.9	109.5
6/25/2014	161.4	64.5	8.1	136.4
7/2/2014	113.7	47.6	148.6	8.1
7/9/2014	204	48.6	162.3	176.2
7/16/2014	48.2	29.5	65.8	68.1
7/23/2014	47.7	30	60.1	69.5
7/30/2014	43.8	25.2	72.9	60.2
8/6/2014	127.2	13.8	95.5	85.5
8/13/2014	41.4	8.4	91	88.4
8/20/2014	29.5	7.5	41.8	8.2
8/27/2014	667	190	310.4	193.9
Turbidity Average	272.7	398.8	321.1	402.3