CITY OF BEND

2016-2017 ANNUAL REPORT

STORMWATER NPDES PERMIT NO. 102901
STORMWATER UIC WPCF PERMIT NO. 103052

National Pollutant Discharge Elimination System Municipal Separate Storm Sewer Annual Report

Underground Injection Control System Annual Report

November 1, 2017

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FY 2016-2017 NPDES Annual Report

CITY OF BEND

Certification Regarding the City of Bend NPDES Municipal Stormwater Annual Report

"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 ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information 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 knowing violations."

Jon Skidmore
Assistant City Manager, Operations
City of Bend
October 26, 2017

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ACRONYMS AND ABBREVIATIONS

ACWA	Association of Clean Water Agencies
APWA	Association of Public Works Agencies
ASCE	American Society of Civil Engineers
AWWA	American Water Works Association
BEDAB	Bend Economic Development Advisory Board
BMPs	Best Management Practices
BOPA	Batteries, Oil, latex Paint, and Antifreeze
City	City of Bend, Oregon
CMP	Congestion Management Plan
CPESCL	Certified Professional in Erosion and Sediment Control Lead
COBA	Central Oregon Builders Association
COIC	Central Oregon Intergovernmental Council
COSM	Central Oregon Stormwater Manual
CTF	Stormwater Utility Fee Citizen's Task Force
DEQ	Oregon Department of Environmental Quality
DHS	Oregon Department of Health Services
DWPA	Drinking Water Protection Areas
EPA or US EPA	United States Environmental Protection Agency
ERU	Equivalent Residential Unit
FOG	Fats, Oil, Grease
FTE	Full Time Equivalent
FY	Fiscal Year
GIS	Geographic Information System
GPS	Geographical Positioning System
HHW or HHHW	Household Hazardous Waste
IAC	Utility Infrastructure Advisory Committee
IECA	International Erosion Control Association
IPM	Integrated Pest Management
ISWMP	Integrated Stormwater Management Plan
LID	Low Impact Development
MEP	Maximum Extent Practicable
Monitoring Plan	*City of Bend Water Quality Monitoring Plan*
MS4	Municipal Separate Storm Sewer System
NHD	High-Resolution National Hydrography Data Set
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O & M	Operation & Maintenance
OEC	Oregon Environmental Council
OLCA	Oregon Landscape Contractors Association
PAG	Stormwater Quality Public Advisory Group
PCBs	Polychlorinated Biphenyls

PCOs	Pest Control Operators
PEO	Professional Engineers of Oregon
PIP	Public Involvement and Participation
PNCWA	Pacific Northwest Clean Water Agencies
POCs	Pollutants of Concern
	City of Bend Ambient Water Quality Monitoring Project
QAPP	Quality Assurance Project Plan
SWAT	Stormwater Action Team
SWMP	Storm Water Management Plan or Program
SWPPP	Storm Water Pollution Prevention Plan
TDM	Transportation Demand Management
TMDL	Total Maximum Daily Load
UDWC	Upper Deschutes Watershed Council
UGB	Urban Growth Boundary
UIC	Underground Injection Control; drywell or drill hole
USGS	United States Geologic Survey
WHPA	Wellhead Protection Area
WPCF	Water Pollution Control Facility

1.0 INTRODUCTION

Background

The City of Bend is both a National Pollutant Discharge Elimination System (NPDES) designated small Municipal Separate Storm Sewer System (MS4) owner and operator, and a stormwater underground injection control (UIC) owner and operator. As such, the City is required to meet the requirements of NPDES Permit No. 102901 (DEQ File No. 113602) that it received on February 26, 2007 from the Oregon Department of Environmental Quality (DEQ) and of Water Pollution Control Facility-Underground Injection Controls (WPCF-UIC) Permit No. 103052 (DEQ File No. 112361) that it received on May 14, 2013.

NPDES Permit. The NPDES permit requirements are based on the federal Clean Water Act (33.U.S.C. §1342(p)), as amended, along with federal Environmental Protection Agency (EPA) regulations for MS4 discharges. The permit authorizes the discharge of stormwater from all municipal separate storm sewer system outfalls owned and operated by the City. The City has 30 outfalls to the river that serve a portion of the City along the Deschutes River and West Hills. Privately owned and maintained entities, such as the Old Mill District and specific subdivisions in town that do not discharge to the City's MS4 system, are outside of the City's direct jurisdiction with respect to the NPDES permit. The City has applied for renewal of its NPDES permit and is working with DEQ to negotiate the terms for the next five-year permit, which is expected to be a statewide general permit. In the meantime, DEQ has administratively extended the City's NPDES permit coverage, so the City must continue to implement the Integrated Stormwater Management Plan (2006) during this time.

Per item 1 of the NPDES permit's Schedule C, Compliance Conditions and Schedules, initial implementation of the approved stormwater management plan (the City's *Integrated Stormwater Management Plan* (ISWMP)), was required to begin by July 31, 2007. The ISWMP (2006) described the activities the Program would implement during the City's first 5-year NPDES permit period. These activities are divided among the following major components of the Program:

- Overall Program Administration, Planning and Financing;
- Public Education and Outreach;
- Public Involvement and Participation;
- Illicit Discharge Detection and Elimination;
- Construction Site Stormwater Management;
- Post-Construction Stormwater Management in New and Redevelopments;

- Municipal Operations and Maintenance—Pollution Prevention and Good Housekeeping;
- Monitoring;
- Drinking Water Protection Areas: Investigation, Re-Delineation and Management.

WPCF UIC Permit. On May 14, 2013, the City received its first Water Pollution Control Facility Permit (WPCF) for Underground Injection Controls (UIC) under the federal Safe Drinking Water Act and Oregon Administrative Rules. This permit covers the City's drywells and drill holes that inject stormwater into the ground. The WPCF permit allows the City to operate Underground Injection Control systems to manage stormwater. Starting in FY2013-14, the City began implementing the Integrated Stormwater Management Plan 2022 (2012) that was accepted under the City's WPCF-UIC permit and is being considered for the NPDES permit reissuance negotiation.

Contents of the Annual Report

This represents the eleventh Annual Report submitted to the DEQ and describes stormwater quality and pollution prevention activities implemented by the City during Fiscal Year (FY) 2016-2017 (July 2016 through June 2017). As quoted from item 2 of the NPDES permit's Schedule B, Monitoring and Reporting Requirements, the annual report must contain the following:

> a) The status of compliance with permit conditions, an assessment of the appropriateness of the identified BMPs, progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP (maximum extent practicable), and the measurable goals for each of the minimum control measures;
>
> b) Results of information collected and analyzed, if any, during the reporting period, including evaluation criteria used to assess the success of the program at reducing the discharge of pollutants to MEP;
>
> c) A summary of the stormwater activities the permittee plans to undertake during the next reporting cycle, including a schedule for implementation;

d) A description of changes made to the SWMP, including changes to BMPs or measurable goals identified in the SWMP;

e) Information on all new additions or removals of annexed areas that result in an expansion or contraction of the MS4's boundaries;

f) Notice that the permittee is relying on another government entity to satisfy some of the permittee's permit obligations (if applicable); and,

g) Number and nature of enforcement actions taken.

Per subsection 4. of the City WPCF-UIC permit, the annual Underground Injection Control System Report must:

a. Include stormwater monitoring reports conducted in accordance with their Stormwater Monitoring Plan, including a spreadsheet of all data from sampled UICs provided in the analytical laboratory reports;

b. Discuss any action level exceedances (outlined in Permit Table 1) and actions taken to address the exceedances;

c. Describe any actions taken to implement the Underground Injection Control System Management Plan required in Schedule D, condition 5, any proposed modifications to the Underground Injection Control System Management Plan, and any additional actions taken to manage the City's injection systems to ensure groundwater protection;

d. Describe any actions described in your Underground Injection Control System Management Plan that you were not able to complete and why;

e. Identify any injection systems that you closed, retrofitted, or installed during the year;

f. Describe your future (in the next year) known plans to install, modify, convert, or close any underground injection systems; and

g. Provide one hard copy and one electronic copy of the annual Underground Injection Control System Report to DEQ.

The Annual Report contains detailed information on each component required by both permits, including the purpose and general strategy of the component; the tasks completed; an assessment of the effectiveness of activities conducted in reducing or preventing stormwater pollution; and a summary, by individual component, of modifications proposed to the ISWMP per the review conducted this fiscal year. Supporting documents produced under each task are presented in an appendix at the end of each component section. At the end of each task header throughout the report, a notation is included as to whether the task applies to the City's Municipal Separate Storm Sewer System (MS4), which is the piped system that drains to the Deschutes River or other surface waterbody, or to Underground Injection Controls (UIC) or both. The stormwater quality regulatory requirements are different depending on whether the stormwater discharges through an MS4 or UIC system.

2.0 OVERALL PROGRAM MANAGEMENT AND LEGAL AUTHORITY

Introduction

This section describes the overall administrative and management support functions that the City provides to operate and manage the stormwater quality program. This section also describes activities to ensure adequate legal authority and facilitate enforcement of the City's environmental codes related to water quality. In general, the City's stormwater staff are responsible for the overall coordination of the Integrated Stormwater Management Plan (ISWMP) (2006) and ISWMP 2022 (2012). However, several City departments assist the stormwater utility staff with the coordination and implementation of the tasks, taking direct responsibility for some tasks.

Tasks Completed (ISWMP (2006))

The following ISWMP standard and steady improvement tasks have been completed or are ongoing:

Task II.1 Administration and Coordination (MS4/UIC)

Stormwater Coordinators. The City met the requirement of having interdepartmental stormwater coordination meetings at least four times per year in FY2016-17. Stormwater Coordinators consist of multiple interdepartment groups within the City that focus on coordinating on stormwater issues, taking the duties of the now-defunct Stormwater Action Team (SWAT) that was active in the initial years of the utility. Stormwater Coordinators are comprised of:

(a) Stormwater Liaisons consisting of representatives from multiple departments that focus on stormwater issues,

(b) separately those department heads and in higher management attending a direct reports meeting to the assistant City Manager, Jon Skidmore, discussing topics including stormwater as related to utility budgeting and rates, UGB expansion, and Mirror Pond that would previously be covered by the now-defunct Economic Development and Infrastructure Strategic Management (EDISM) team, and,

(c) subgroups of these.

Stormwater Coordinators meetings included:

- Stormwater Liaisons Meetings (08/02/16, 10/19/17; 11/28/2017; 6/29/17)
- Stormwater Coordinators Subgroups—Legal/CDD (10/26/17); Regulatory/Street/Storm Ops (12/01/16, 5/22/17)

Meeting agendas and sign-in sheets for Stormwater Liaisons meetings are included in Appendix A.

City staff also continued to participate in the:

- 14th Street (http://www.bendoregon.gov/city-projects/city-infrastructure-projects/transportation-go-bond), and
- South Awbrey Butte (http://www.bendoregon.gov/city-projects/city-infrastructure-projects/s-awbrey-butte-drainage-study) stormwater planning efforts.

Organization charts of stormwater utility staff are included in Appendix A.

City Council. In FY2016-17, the City Council:

- Considered stormwater management in addressing UGB expansion (February 10, 2017 Memorandum from Assistance City Manager and Direct reports to the Bend City Council)
- Received information on the City Edition Video related to sediment reduction (March 3, 2017 Weekly Memo)
- Partook in the Good of the Order Clean Water Works Student Video and Poetry Awards (June 21, 2017 Session). (See Appendix A).

Other. Coordination also occurred external to City staff. This included coordination of the Stormwater Quality Public Advisory Group and participation in other local, regional and statewide groups.

Public Advisory Groups. The City's Stormwater Quality Public Advisory Group (PAG) provided input to staff on stormwater quality issues and projects during the year; see Task IV-1 for more details.

Regional and Statewide Groups. City staff served on the Board of the Oregon Association of Clean Water Agencies (ACWA) as the Groundwater Committee co-chair, and staff participated on the Groundwater Committee, Stormwater Committee, and Public Education committees. Staff also continued to lead the illicit discharge detection and elimination outreach subgroup that is working to revise and develop multiple best management practices fact sheets and booklets to aid in minimizing illicit discharges. Work in FY2016-17 focused on graphic outlay preparation.

Additionally, City managerial staff actively participated in the Pacific Northwest

Clean Water Association (PNCWA) with the City's Utilities Operations and Maintenance Manager Shannon Ostendorff serving as PNCWA president through the hosting of the fall conference that included a pre-conference workshop focused on creating a rain garden on City property; and a during conference tour of stormwater better site design facilities. City staff also participated in a DEQ advisory process for the Phase II NPDES MS4 permit development.

The City of Bend is an Accredited Public Works Agency, which it earned through the American Public Works Association. The accreditation process includes review of the City of Bend's stormwater activities and processes.

Effectiveness. As described above, there continued a large amount of coordination in FY2016-17. A combination of the larger coordination meetings together with a continued emphasis on more focused meetings for efficiency appears to work well. Together the Stormwater Coordinators (which have taken the place of the former Stormwater Action Team) well exceeded the measurable goals for FY2016-17.

Task II.2 Legal Authority (MS4/UIC)

The goal of this task is to ensure that the City has the legal authority to implement the various elements of the ISWMP. Securing adequate legal authority has been a top priority in developing the stormwater quality program. On December 6, 2006, the Bend City Council adopted the Integrated Stormwater Management Plan. Since the adoption of the ISWMP, the Bend City Council has passed several resolutions establishing the stormwater utility and ensuring adequate funding will be available to the stormwater utility.

In 2011, the City adopted an updated Standards and Specifications that strengthened and clarified stormwater requirements and adopted the Central Oregon Stormwater Manual (August 2010). On January 4, 2012, the City Council adopted Bend Code Title 16 a comprehensive management stormwater ordinance covering clearing, grading and erosion control on construction sites; stormwater management design standards and maintenance controls; illicit discharge controls; well drilling; and stormwater drainage utility. (See Appendix A of the FY2011-12 Annual Report for the full title).

The City finalized the City's first formal Stormwater Master Plan on August 6, 2014 by unanimous decision. The Stormwater Master Plan formed the basis for the City's first Stormwater Public Facilities Plan, developed by the City to meet State land use OARs Goal 11. The City adopted its first Stormwater Public Facilities Plan (PFP) and Findings at the December 17, 2014 City Council meeting and has been acknowledged by the Oregon Department of Land Conservation and Development (DLCD). These documents have both helped the

City meet State Goal 11 requirements. On August 14, 2015, a Bend Code 11.16.120 provision became effective related to requiring secure, lockable, leak-proof oil and /or grease containers to prevent spillage and dumping.

In spring 2017, the City of Bend Engineering and Infrastructure Planning Department hired a professional landscape architect to conduct a review of the City's existing landscape and design maintenance practices for improvement recommendations for future standards and specifications updates. A technical memorandum will be completed in FY2017-18.

Effectiveness. The City has met its measurable goals for all subtasks. Over the initial NPDES MS4 permit term, the City has successfully passed resolutions and an ordinance to set up the stormwater utility, adopted the improved standards and specifications, and adopted the new stormwater ordinance, Bend Code Title 16. The City continues to work towards continual improvement with review and update of its rules and policies.

Over the course of the Integrated Stormwater Management Plan (2006) planning period, the City has adopted several resolutions and Title 16 that established a stormwater utility with enterprise funding through monthly service charges based on impervious surface coverage. The rate in FY2016-17 was increased to $5.15/ equivalent residential unit (ERU), and the City Council passed a rate of $5.30/ ERU for FY2017-18 in June 2017. The increases are in line with the funding needed for the projects outlined in the City's Stormwater Master Plan, adopted by City Council on August 6, 2014. The fee is designed to cover quantity and quality issues.

The City operates on a biennial budget. The FY2017-19 budget report related to stormwater is included in Appendix A. The City also continues to address changes caught in audits

Effectiveness. The City has successfully established a stormwater utility service charge, and began collecting fees of $4/ERU in July 2007. Fees were effectively raised for the first time to $5/ERU starting in July 2015 to meet the needs of the adopted Stormwater Master Plan, and yearly since to $5.15/ERU in July 2016 and to $5.30/ERU starting in July 2017. The FY2016-17 anticipated revenue was $3.4 Million, and actual stormwater fees brought in $3.47M. The City Budget Committee and City Council supported the budget and rate increases for the FY2017-19 biennium. The fees cover stormwater quality and regulatory compliance activities, stormwater facility operation and maintenance, half the City's street sweeping program due to the stormwater quality benefits of street sweeping, as well as capital improvement projects and maintenance projects.

The City continues making updates as part of its periodic audit of its billing using

the last aerial photograph for quality assurance. As of September 2017, 1,040 audit-related changes to the billing system have been made as a result to ensure accuracy. In late spring 2017, the City paid for another aerial, which will be used in part to conduct an additional audit to continue to ensure implementation equity.

Task II.4 Planning (MS4/UIC)

In July 2016, DEQ posed the public draft MS4 Phase II General Permit. City stormwater staff distributed the draft to Stormwater Coordinators and consolidated comments, which the City submitted on time. DEQ began redrafting the permit to address the comments it received and the City participated in the subsequent listening session that DEQ held on April 27, 2017. The DEQ tentatively plans to release a revised public draft general permit on September 30, 29017. Although given budgetary and staffing constraints, tis anticipate that DEQ will not release the draft until after that date.. The City will continue to track and [participate as per DEQ's schedule.

In the fall of FY 2006-07, the City underwent a thorough review and rewrite of its original stormwater management plan. City Council adopted the revised Integrated Stormwater Management Plan on December 6, 2007. Per the NPDES permit requirements, implementation of the Integrated Stormwater Management Plan had to begin by July 31, 2007. In July 2011, the City submitted a draft Integrated Stormwater Management Plan 2022 as part of its NPDES permit reissuance renewal application for DEQ review. The City released the draft in October 2011 for full public review through January 2012. The City incorporated those comments along with modifications based on changes to the WPCF-UIC permit template. The City resubmitted the revised draft ISWMP 2022 to DEQ for consideration as the management plan for both its piped system to the river (NPDES permit SWMP) and for drainage to dry wells and drill holes (UIC management plan) in December 2012. DEQ accepted the ISWMP 2022 for the WPCF-UIC permit after holding its own public review period, and is still reviewing it for the City's NPDES Phase II permit reissuance. Therefore this annual report summarizes efforts to implement both ISWMPs. A review of the ISWMP this year resulted in no recommended changes.

The City continues to prepare for future regulations by participating on pertinent DEQ NPDES Phase II MS4 advisory committees and groups, and by staying appraised of TMDL regulatory issues.

Since July 2007, the City of Bend voluntarily retains American Public Works Association (APWA) Accreditation, a certification that the City complies with the recommended practices in the APWA Public Works Management Practices Manual. One full chapter in the APWA Manual focuses on stormwater and includes several water

quality-related sections.

Annexations. In FY2016-17, there were no annexations. As a UGB expansion did occur, annexations may be expected to occur in the future.

Urban Growth Boundary. In 2009, the City of Bend submitted a proposal to expand the City's urban growth boundary (UGB) to the Oregon Department of Land Conservation and Development (DLCD) for approval. In 2010, the Oregon Land Conservation and Development Commission (LCDC) issued an order that partially acknowledged and remanded the proposal back to the City for further work. In FY2016-17, both the City Council and the Deschutes County Board of Commissioners adopted a final UGB amendment in FY2016-17. On December 6, 2016 the Bend UGB Expansion was acknowledged by the DLCD, with the expansion adding 2,380 acres of land for housing and employment around the edges of the existing City. On June 7, 2017, the City and County adopted a Joint Management Agreement to establish clear responsibilities; and the City has adopted an ordinance for the Urbanizable Area District (see: http://www.bend.or.us/index.aspx?page=1290 for UGB maps and documents; and City Edition article https://www.youtube.com/watch?v=FU9xSIyrnXY for an overview.). Along with the UGB adoption is a requirement to increase density within the City by over 60%--the City began working with the Stormwater Quality Public Advisory Group in Spring 2017 to review and provide input on how to address and plan for the effects of increasing density on the stormwater system.

Effectiveness. The City effectively met the August 2011 deadline for submittal of its NPDES Permit reissuance package for DEQ review. The City obtained its Water Pollution Control Facility Permit for stormwater underground injection controls on May 14, 2013. The NPDES permit reissuance is still actively being developed as a statewide general permit with initial public review taking place in July-August 2017 and finalization now planned in FY2017-18.

Task II.5 Annual Reporting (MS4/UIC)

This annual report, covering FY2017-18, is the eleventh annual report prepared by the City and serves to cover ISWMP (2006), describing continuing activities and achievements made to meet the water quality requirements of the NPDES MS4 permit and ISWMP 2022, which has been approved by DEQ as the management document for the WPCF-UIC permit. This is the fourth annual report submitted to DEQ for activities required by the WPCF-UIC permit. Descriptions of effectiveness are included under each task. Per the City's stormwater permits, the annual reports are due by November 1 of each year. A summary of performance standard implementation status to date for all components is included in Appendix A. This annual report was created with input and review from Stormwater Liaisons members representing several municipal departments and Stormwater Quality Public Advisory Group (PAG) members

representing various community interests (see Appendix C). All annual reports are posted on the City's website (www.bendoregon.gov/stormannualreport), and City staff are open to comments and suggestions for improvements.

Effectiveness. The completed report signifies that this task has been met for the current fiscal year. The review of the draft by the Stormwater Quality Public Advisory Group and internal departments helped improve the quality of the final document.

Task II.6 UIC Registration (UIC[1])

The City's GIS geodatabase includes all known City-owned stormwater facilities, an impervious surface area layer and drinking water protection area layers. A copy of the most recent (September 2017) UIC registration list is included in Appendix I. This provides information on new UICs, as well as UICs that have been closed or retrofitted. The City's UIC facilities and wellhead protection areas are included on the City's mapping services website, BOOM, located at: http://www.bendoregon.gov/index.aspx?page=463. Additionally the City has street level imagery that staff can use for internal research purposes.

Effectiveness. This is an ongoing task, but the City continues to update and improve its base map of existing structures and knowledge of its facilities. The City's database now includes 5,112 drywells (with 67 installed and 10 decommissioned in FY2016-17; 1,027 active drill holes, 4 drain fields, 193 swales 8,700 catch basins, 6 lynch catch basins, 1,580 curb inlets (17 of which were installed in FY2016-17); 72 up basins, and 42 inlets.. The database also includes the location of bioswales, the direction of pipe flows, and dry well test report data.

City staff have developed a standard operating procedure for registering and incorporating public UICs under the City's permit under one facility, which has been helpful for maintaining the accuracy of the City's UIC database. With the receipt of the permit, some procedures have been modified to reflect the permit registration requirements.

Tasks Completed (ISWMP 2022)

The City's WPCF-UIC permit recognized the ISWMP 2022. Whereas several of the tasks mirror those in the original ISWMP (2006), some are different. For those that mirror, we direct you to the ISWMP (2006) task status update.

BMP II-1. Administration and Coordination (MS4 and UIC)
See ISWMP 2006 Task II.1 Administration and Coordination (MS4/UIC).

[1] See BMP V-5 for MS4-related mapping.

BMP II-2. Legal Authority (MS4 and UIC)
See ISWMP 2006 Task II.2 Legal Authority (MS4/UIC).

BMP II-3. Financing (MS4 and UIC)
See ISWMP 2006 Task II.3 Financing (MS4/UIC).

BMP II-4. Planning (MS4 and UIC)
See ISWMP 2006 Task II.4 Planning (MS4/UIC).

BMP II-5. Annual Reporting (MS4 and UIC)
See ISWMP 2006 Task II.5 Annual Reporting (MS4/UIC).

Summary Assessment of Effectiveness

Since adoption of the ISWMP (2006), the City has (a) formed a stormwater utility, (b) obtained reliable funding for that utility, (c) staffed the utility, currently with a program manager, a program analyst, 4 dedicated stormwater field staff, 3 FTE sweeper staff, 1/2 FTE management/administration staff, support to Engineering and Infrastructure Planning Department for stormwater capital projects, and additional temporary staff as needed. The City is actively coordinating internally, as well as with the public through the Stormwater Quality Public Advisory Group and stormwater quality staff participate on other city planning task groups as invited. Additionally, the City is also actively coordinating with other municipalities in the state (through the Oregon Association of Clean Water Agencies (ACWA), Pacific Northwest Clean Water Association (PNCWA), and Association of Public Works Agencies (APWA), to improve effectiveness, knowledge and efficiencies. The internal meeting summaries included in Appendix A are evidence of continued coordination among departments.

The City was effective in improving its stormwater-related legal authority as per regulatory requirements including for construction site management, post-construction controls, utility and financial stability, and illicit discharge. Efficiency could increase if the City could operate under just one Integrated Stormwater Management Plan 2022 rather than the dual plans given the permit reissuance timing, but the City appreciates the efficiencies of being able to submit one annual report for both permits, given that the systems are interrelated.

ISWMP Revisions/Future Improvement Tasks

The City has reviewed the ISWMP 2022 tasks and has the following updates to the ISWMP 2022 itself at this time. As the EDISM group has morphed into the Assistant City Manager's direct reports meetings, the ISWMP 2022 description should be modified eventually to reflect this; however the tasks themselves are broad enough where they can be met need for permit change.

With regards to responsible personnel (Table II-1 in ISWMP 2022), the following changes have occurred since 2012:

- Public Works has been split into three different departments: Streets, Utilities, and Engineering and Infrastructure Planning Department (EIPD). The Directors of each of these departments report to Assistant City Manager Jon Skidmore.
- Paul Rheault is the Utilities Director rather than the Public Works Director.
- David Abbas is the Streets Department Director.
- Tom Hickmann is the Engineering and Infrastructure Planning Department Director.
- Ryan Oster is the City Engineer.
- Russell Grayson is the City's Community Development Director.
- Sharon Wojda is the Finance Director.
- Anne Aurand is the Communication Director.
- Charles Swann oversees Street supervision.
- In Spring 2017, Reese Moody, Collection Systems Supervisor, and Shannon Ostendorff, Utility Operations Manager left the City. While Orrin Libolt has filled the Collection Systems Supervisor that oversees the stormwater operations crews, the Utility Operations Manager position has not yet been filled and is undergoing review.
- The Utilities Manager role has disappeared, but the duties were handled in FY2016-17 by then-Interim Assistant Utility Director/Support Service Manager Teresa Ristoff. Currently these duties are split between Paul Rheault, Teresa Ristoff, and Steve Prazak.
- In Summer 2017, Jeff England (EIPD) retired from the City. His role is being absorbed by three principal engineers: Eric Forster, George Franklet, and Joshua Robertson.
- Within the Utility Department, Nick McAteer oversees small engineering projects.

In Fall 2016, the City proposed modifications to the UIC Stormwater Monitoring Plan for consideration due to different methodologies needed given a new contract lab, removal of extra analytes not required in the permit, and a proposed change in sampling location within the same corporation yard site due to installation of a new treatment device. These proposals were accepted by DEQ.

The City continues to seek to have one stormwater quality management plan to address both its surface water and underground discharges, thus an integrated stormwater management plan. The City submitted to DEQ by the August 3, 2011 NPDES Permit reissuance submittal deadline, a fully updated draft Integrated Stormwater Management Plan 2022 for DEQ NPDES staff review. The draft ISWMP 2022 public review period ran from October 2011-late January 2012, and included a public meeting. The City revised the document (November 30, 2012) based on comments received and submitted it to DEQ as part of the WPCF-UIC

permit issuance package in December 2012. This revised copy was also provided for consideration by DEQ NPDES permit staff. As part of the WPCF-UIC permit issuance, the draft ISWMP 2022 underwent a public review period conducted by DEQ and was accepted without change. The City began implementing the ISWMP 2022 in FY2013-14 under the WPCF-UIC Permit that was issued in May 2013, and carries through a 10-year planning period to coincide with that permit.

A major review will be conducted at the five year planning mark of the UIC permit (by FY2018-19) as well as when the NPDES Phase II General Permit, designed to take the place of the existing individual NPDES Phase II MS4 permits, is released. While DEQ staff continue to develop the NPDES MS4 permit the City must by NPDES permit regulations also continue to implement the original ISWMP (2006). City staff are effectively meeting the initial performance standards based on the timeline adjustments noted in the ISWMP 2022 given the date of acceptance and permit issuance (see Appendix A for an implementation status summary of performance standards within ISWMP 2022).

3.0 *PUBLIC EDUCATION AND OUTREACH ON STORMWATER IMPACTS*

Introduction

The purpose of this component is to implement a program to distribute educational materials to the community or conduct equivalent outreach activities about stormwater discharge impacts on water resources, including both surface waters and groundwater, and the steps that the public can take to reduce such pollutants in stormwater runoff. The City is committed to providing a strong public outreach component for this program to provide the public a basic understanding of what stormwater is and why using best management practices (BMPs) matter.

Tasks Completed (ISWMP (2006))

The following tasks have begun or continued implementation in FY2016-17.

Task III.1 Utility Bill Inserts, Brochures or Posters (MS4/UIC)

Utility Bill Inserts. The Our City newsletter, entitled "A Newsletter for Bend Citizens," is included with utility bills. The following contained articles either specifically related to stormwater pollution prevention or that incorporated stories that promoted activities having a direct or indirect benefit to water pollution prevention, such as reducing automotive trips traveled or reducing dry weather flows.

- July 2016. The July 2016 newsletter included information on utility rate increases, an announcement promoting the Deschutes River Cleanup, and an announcement of the Annual Water Quality Report that includes information on stormwater pollution prevention efforts especially related to UICs.
- August 2016. The August 2016 newsletter provides information on water leak detection, that can help reduce dry weather flows, and again announced the annual water quality report.
- November 2016. The November 2016 newsletter provides an article on "Urban Drool" Prevention that promoted the City's annual stormwater report, along with general information on Winter Road Maintenance.
- January 2017. The January 2017 newsletter provided information on how the City Budget Works that included mention of stormwater funding; together with information on Bend being a bicycle friendly community.
- March 2017. The March 2017 newsletter provided an article on the Clean

Water Works Film Contest for Kids, and promoted the Earth Day Fair where the City kicked off this year's Clean Water Works campaign.

- April 2017. The April 2017 newsletter included an article entitled "Protect the Deschutes River" that introduced the stormwater utilities new compliance specialist. It also included an article on the Water Wise Program's irrigation overspray inspection program.
- June 2017. The June 2017 newsletter included a story on the Clean Water Works partnership program (see Appendix B).

City staff also worked preparing copy of a stormwater article for the July 2017 newsletter, which would be the final hard-copy version to be sent to customers as the City Communications Department switches to an online electronic only version.

Clean Water Works Campaign. In January 2017, the City reinvigorated its Clean Water Works campaign, which it promoted in the spring 2017 with a new Clean Water Works partnership program through December 2017. As part of the Clean Water Works campaign, the City incorporated the identifier and several new outreach pieces including fact sheets for RVs, Landscape Maintenance Services, Choosing a Landscaper, and Pressure Washing fact sheet and equipment tag along with draft work on a pressure washing pamphlet (see Appendix B). Additionally the City distributed earlier developed campaign materials such as illicit discharge fact sheets for residents and businesses, lead reduction fact sheet, sediment reduction fact sheets, food service outreach update, business inspection checklist, a commercial vehicle wash fact sheet, and the Kids Activity Guide. Several of the new outreach sheets were based on the Oregon Association of Clean Water Agency drafts that have been reviewed statewide.

In April/May, the City staff provided Clean Water Works Partner materials to its partners with an official kick-off at the Earth Day parade and festival. These included point of purchase displays, discount cards, and partner water bottles and bags together with the illicit discharge outreach fact sheet, pad of paper with easy reminders and pen to both owners and staff of the participating businesses.

The City continued to post a call for entries for the City of Bend, Zolo Media and BendFilm Clean Water Works video contest for students from Fall 2016 – Spring 2017. In fall 2016, the City worked with BendFilm to distribute the 2017 contest flyer electronically to area schools with students in the age range of the contest (5^{th}-12^{th} grade) as part of BendFilm's Future Filmmakers outreach. This year the City expanded to also include a poetry category open to ages K-12.

The City also posted at Quest at the Fest one 3'x10' and two 3'X 8' banners that included the Clean Water Works logo and pollution prevention messages. Additionally, the sound bites from the 30-second public service announcements

that are included on the City's You Tube and web page (http://www.bendoregon.gov/index.aspx?page=290) are played on the City's public works telephone "hold" music.

Targeted Mailouts. In early 2017, the City conducted targeted mailouts to car washes, all developers, food service/restaurants, pressure washers, RV rentals and sales, and carpet cleaner facilities with a Bend Business License and clean water volunteers (known to have spent 3+ hours) to invite them to join the Clean Water Works Partner program. As part of this effort, the City sent a mailing with an introductory letter, specific fact sheet or booklet, and partnership form inviting them to participate (see Appendix D). The targeted mailings were sent to businesses that were selected based on the campaign pollutants of focus (illicit discharges in general, lead, and sediments).

Other Outreach/ Distribution. The City also distributed training opportunity and other announcements by email using the City's Stormwater Stakeholder email list; and made announcements on the City's website and social media including Facebook and Twitter.

City stormwater staff stocked information holders at public areas throughout the City (Boyd Acres, City Hall) as appropriate with one or more of the following:

- Kids Activity Guide
- ACWA "Protecting Your Watershed" (English and Spanish)
- Considering Stormwater—Time and Moneysaving Considerations at the Conceptual Planning Stage
- ACWA Construction Site Stormwater Guide—Illustrated Best Management Practices
- ACWA UIC brochures (Clean Water Tips for the Home and Clean Water Tips for Business and Industry)
- Bend's Better Site Design Walking tour—Ideas for Keeping Water Quality in Mind When Developing Sites
- Training Webinar Announcements
- Illicit Discharge Manual
- Pressure Washing and Surface Cleaning Brochure
- Oregon Rain Garden Guide with revised Plant List
- Oregon State University's Waterwise Gardening in Central Oregon

City staff continued to provide outreach that discussed the importance of not discharging Fats, Oil, and Grease (FOG) into sewer or storm drains (see webpage at http://www.bend.or.us/index.aspx?page=190).

Effectiveness. The City exceeded its Bend ISWMP (2006) requirements to develop at least 2 information piece utility bill inserts, brochures or posters and distribute at least 4 this year. The City distributes the bulk of its public outreach

on its website (see www.bendoregon.gov/cleanwaterworks), through social media, by video, and via direct mail of targeted audiences.

The City of Bend conducted a pre-Clean Water Works campaign survey in spring 2015 and a post campaign survey conducted in October 2016 with the report completed in April 2016 (see FY2015-16 Annual Report, Appendix A, specifically appendix to City Manager Memorandum to City Council). Statistically significant findings occurred between the baseline and final survey. See summary assessment at the end of the chapter for a summary.

The City chooses long-standing guides like the Bend Park and Recreation District's Recreation Guides and this year, the Smart Shopper, to display its educational outreach messages because these are more likely to be kept around for a while before being discarded, lending to additional chances to be viewed multiple times by the target audience.

City staff used additional resources to spread the stormwater pollution prevention message this year, including the Upper Deschutes Watershed Council, Environmental Center, and several volunteers participating in the Clean Water Works Partnership Program. This helped reach the word beyond typical channels.

Task III.2 Stormwater Pollution Prevention Web Site (MS4/UIC)

The City continued to update the stormwater website www.bendoregon.gov/stormwater focusing on an update of the Clean Water Works campaign at www.bendoregon.gov/cleanwaterworks. The Clean Water Works website includes buttons for home and garden resources; kid's page; businesses; and discounts and partners. The website includes general stormwater quality information as well as topics of interest to the general public. The rest of the stormwater site remains organized into interest areas, including: What's New?, About Stormwater, Business Resource, Home Resources, Regulations, Stormwater Master Plan, Get Involved, and Frequently Asked Questions. The "Get Involved" section includes several outreach resources for interested consumers. The City announces new- and redevelopment-related stormwater webinar workshops through the City's stormwater webpage, as well as posting outreach materials (www.bendoregon.gov/stormwaterbmp) and South Awbrey Butte Drainage Study (http://www.bendoregon.gov/index.aspx?page=1351) and existing long term plans such as the Stormwater Master Plan (www.bendoregon.gov/stormwatermp). There continues to be a site for the Third Street Underpass project (see http://www.bendoregon.gov/index.aspx?page=645). The City also continued to use other communication tools such as Facebook, Twitter, and an internal City intranet site to distribute announcements (see Figure 3-1).

Figure 3-1. Social Media Outreach Example

Effectiveness. Overall, the use of the website has again increased over the past year (see Table 3.1). Keeping the stormwater website updated is a continual process. The City has included a link on the website to comment on the stormwater pages. No comments were received during FY2016-17.

Table 3.1 Web Page View Comparison (FY2015-16 to FY2016-17)

Page Title	Date Range	Visits	% Exit
City of Bend : Clean Water Works			
	7/1/2015-6/30/2016	205	16.45%
	7/1/2016-6/30/2017	616	16.56%
	% Change	↑ 200%	↑ 1%
City of Bend : Stormwater			
	7/1/2015-6/30/2016	231	14.30%
	7/1/2016-	856	12.62%

Page Title	Date Range	Visits	% Exit
	6/30/2017		
	% Change	↑ 271%	↓ -12%
City of Bend : Stormwater Utility Fee			
	7/1/2015-6/30/2016	171	41.54%
	7/1/2016-6/30/2017	125	51.20%
	% Change	↓ -27%	↑ 23%
City of Bend : Stormwater Master Plan			
	7/1/2015-6/30/2016	163	40.35%
	7/1/2016-6/30/2017	217	29.03%
	% Change	↑ 33%	↓ -28%
City of Bend : About Stormwater			
	7/1/2015-6/30/2016	73	22.52%
	7/1/2016-6/30/2017	540	27.04%
	% Change	↑ 640%	↑ 20%

Although still relatively small in relation to population size, the City's Facebook presence continues to grow. The City has over 11,622 at present (September 11, 2017), up from 9,577 likes in FY2015-16. Currently there are 10,900 followers and over 4,000 total site visits. Twitter following continues to trend upward as well. The City currently has 6,754 followers on Twitter, up from 5,502 in FY2015-16 and 1,177 followers in FY2012-13 (see Figure 3-2).

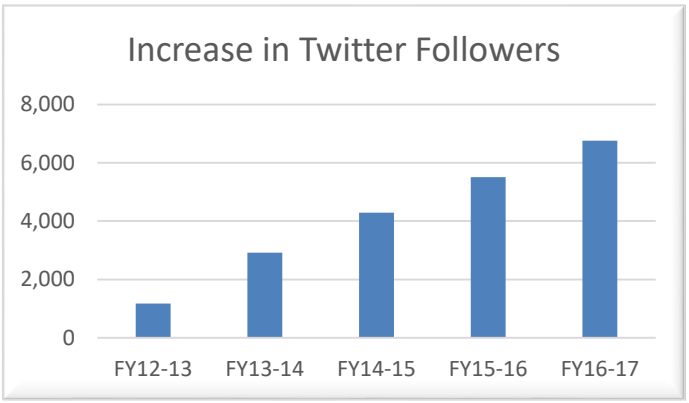
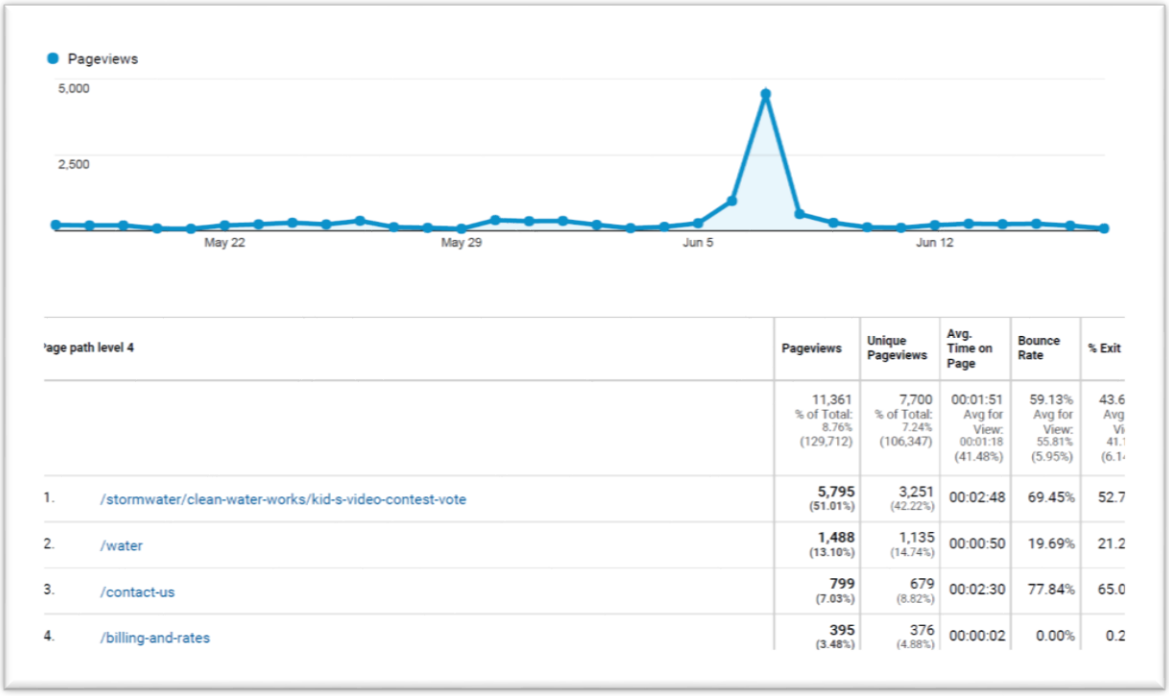


Figure 3-2. Number Following City of Bend Twitter Account

Although numbers are still relatively low in comparison to the population, increasing trends means social media is becoming an increasingly useful media to incorporate into campaigns. As Table 3.1 illustrates, the Clean Water Works partnership efforts were useful in increasing the number of hits to the Clean Water Works page showing a year to year increase in visits of 200%. The largest increase was the success of the People's Choice Award vote for the film contest, which earned over 5,000 hits in one day (see Figure 3-3). That is more than all the hits to the site the past year.



'age path level 4		Pageviews	Unique Pageviews	Avg. Time on Page	Bounce Rate	% Exit
		11,361 % of Total: 8.76% (129,712)	7,700 % of Total: 7.24% (106,347)	00:01:51 Avg for View: 00:01:18 (41.48%)	59.13% Avg for View: 55.81% (5.95%)	43.6 Avg Vi 41.1 (6.1
1.	/stormwater/clean-water-works/kid-s-video-contest-vote	5,795 (51.01%)	3,251 (42.22%)	00:02:48	69.45%	52.7
2.	/water	1,488 (13.10%)	1,135 (14.74%)	00:00:50	19.69%	21.2
3.	/contact-us	799 (7.03%)	679 (8.82%)	00:02:30	77.84%	65.0
4.	/billing-and-rates	395 (3.48%)	376 (4.88%)	00:00:02	0.00%	0.2

Figure 3-3. Website Analytics of Video Contest People's Choice Vote

Task III.3 City News Broadcast Stormwater Quality Messages and Press Releases (MS4/UIC)

Commercial PSAs. As part of the Clean Water Works campaign the City again aired the 30-second TV commercials developed in spring 2015 entitled "Clean Water Works,""Dirty Water," and the Clean Water Works partnership commercial. Screenings "Clean Water Works" and "Dirty Water" occurred at Munch 'n' Movies in August and September 2016 and on television. The commercials are also posted on the City web site. The City displayed the "Clean Water Works" movie slide prior to several films at the Bend Film Festival, held in October, 2016 and at other BendFilm events throughout the year.

The City continued to post on the City's website and played the radio public service announcements (PSAs)—one focusing on illicit discharge reduction; one

Freeze frame from Clean Water Works Partners television commercial that aired in May-June.

focusing on what our stormwater utility service charge covers; and one focusing on sediment reduction together with those additional radio advertisements promoting Clean Water Works partners during the spring 2017. The radio PSAs are posted on the City web site www.bendoregon.gov/cleanwaterworks at the bottom of the home and garden page under "Audio;" and on the "Discounts and Partners" page.

The City also refined a commercial promoting Clean Water Works partners efforts with the addition of the new partners, which aired on television during the first half of 2017.

In 2017, the City purchased 883 spots and negotiated bonus spots for a total of 1,961 advertising spots across formats and genres, including 15 TV stations and 6 radio stations.

City Edition and Other Video Outreach. The City continues to use City Edition to provide updates on the stormwater utility and its programs. In FY2016-17, the City created the following segment:

- Reducing Sediment in the Deschutes River (March 2017, 111 views online), a still of which is shown in the picture below.

The City's Stream Stewardship partner, Upper Deschutes Watershed Council, created a video for the 2016 event that took place in August: https://www.youtube.com/watch?v=ugu5MkK7Tmc. KTVZ also included a segment on it

as well: https://www.youtube.com/watch?v=0-Xdy_Q95xU.

Press Releases. The public, including school children, were able to view stormwater equipment, the watershed diorama and other public works equipment during Quest at the Fest event, which was located downtown adjacent to the Bend Summer Fest on July 9, 2016. Volunteers worked the watershed diorama and provided outreach materials. The City took out a full-page advertisement in the Source Weekly to promote the event.

The City released several stormwater quality related news releases/articles in FY2016-17. Many were focused on the City newsletter *Our City: A Newsletter for Bend Citizens*, distributed with monthly utility bills and posted on the website in Bend (see Task 3.1 for a description). The Source Weekly included City Quest at the Fest information in July 2016. This year, the City again released for distribution a press release announcing those earning their Certified Erosion and Sediment Control Lead but it was not picked up.

The City continued to purchase advertising space in the Bend Park and Recreation Guides, the advertisements include a stormwater pollution prevention "Clean Water Works" message in each guide (See Appendix B). The guides were chosen as a useful outreach tool as people tend to keep them to refer to for recreational activities throughout the quarter rather than recycling them immediately as with a newspaper.

This year, the City added an advertisement in the Smart Shopper guide, another guide that people tend to keep and refer—the advertisement promoted clean water and our partners (see Appendix B). The City also purchased advertising in the Earth Day section and the Summer Events issues of *the Source Weekly*, advertising the Clean Water Works Partners together with a clean water message. The City also purchased advertisements in the *Bend Bulletin's* Go! Magazine, and online webpage (Appendix B).

Effectiveness. The City exceeded the measurable goals for this task, which was to post at least one stormwater quality-related message per year during each permit year, and to submit either locally or as part of a regional effort at least three news releases regarding stormwater issues to media outlets per year.

The City's You Tube News channel now has 575 subscribers (as of October 4, 2017), up from 401 subscribers last year. COTV is shown on BendBroadband in Bend, Redmond, Sisters, Black Butte Ranch, Tumalo, Sunriver, and Powell Butte. The Bend DMA rank which covers this area and beyond is 193 with a cable penetration of 60% according to Zolo Media quoting a 2013 PSU study (Zolo Media, 2014). Several videos remain up on the City's youtube channel, where they continue to add some views each year.

The *Bend Bulletin* has a daily circulation of 26,986 Monday through Friday, down from 27,547 Monday through Friday, in 2012. The last known circulation data for weekend delivery is as follows: 28,924 on Saturday and 29,997 on Sundays according to the Oregon Newspaper Publisher's Association (August 2012). In addition to Bend, the *Bulletin* is delivered to Gilchrist, LaPine, Sunriver, Sisters, Redmond, Terrebonne, Prineville, Madras, and Warm Springs, so the City's efforts may have benefits beyond the City limits.

The Source Weekly has a net weekly circulation of 15,500 weekly (2017) up from 15,000 and a total readership remaining at 37,500 weekly (Source Weekly, 2017 and 2013 Distribution and Circulation). It is distributed in Bend, Redmond, Prineville, Madras, Terrebonne, Sisters, Sunriver, and LaPine.

The City's newsletter is distributed monthly with the approximately 35,000 utility bills, is made available on the City's website and is emailed out to email subscribers. Hardcopy mailouts will end after July 2017 for cost and sustainability reasons. Electronic mailing lists will be used instead.

According to its 2016 sponsorship packet, the Bend Film Festival routinely brings in 8,000+ attendees, 73% of whom are from the Bend Area and 8% from other parts of Oregon for approximately 80+ screenings of movies over four days at 6 venues. The gender breakdown is 67% female, and the age of attendees includes 9% in the 22-34 year age range; 13% in the 35-44 year age range, 49% in the 45-64 year age range and 27% who are 65 years or older. Per 2014 data, education levels of attendees indicate that 38% hold post-graduate degrees and 96% attended college. The slide is shown multiple times prior to a screening, and thus is an effective tool for getting our pollution prevention message to people in a cost-effective manner. Although the costs have been rising and the percentage of Bendites has fallen 7% since 2014, the total number of attendees has increased by 3,000 in that same time period and the slides are shown multiple times.

City increased to two the number of educational videos screened at Munch n' Movies showings this year, deemed effective as it is a local family-friendly event.

UIC model.

Task III.4 Stormwater/Watershed Diorama (MS4/UIC)

The City again made its watershed and UIC dioramas available to lend to local school teachers for use in their classrooms, and it received use from The Environmental Center and Upper Deschutes Watershed Council together with the High Desert Museum and interested parties. The stormwater/watershed diorama includes both surface water

and groundwater components. City staff continued to use additional setup pieces that included a gas station, apartment building to promote additional urban setting pollution prevention discussions. The UIC model depicts a city street that drains into four catch basins cut-aways. Two of the basins are connected to a drywell and the other connect to a drill hole. In FY 2016-17, the dioramas were used at several events as well including Quest at the Fest (July 2016) and Earth Day (April 2017). At the Teacher Appreciation Day event in September 2016 at the High Desert Museum, the City released its "Teacher's Resources" fact sheet together with a setup of the diorama, videos available to lend, classroom monitoring kits, the BendFilm video contest announcement to help get the word out about the resources the Stormwater Program have available to lend.

Effectiveness. Both dioramas have been well received as interactive, visual, three-dimensional learning tools. Using the unit at Quest at the Fest and other events is especially effective as it draws families in to learn about pollution prevention in an enjoyable manner. The models were also loaned out for events that staff could not attend, such as at the High Desert Museum's Water Festival in October 2016 (UIC model), and the Environmental Center's use of the watershed diorama at the Day of Nature festival at Riverbend Park in September 2016. The face-to-face contact with teacher at the Teacher Appreciation event was very useful for making contact with educators. The Environmental Center was also there promoting the City's schools program, which gather a lot of interest resulting in a full program for the year.

Task III. 5 Performance Standards (MS4/UIC)

The new ISWMP 2022, containing the completed performance standards, was approved by DEQ as part of the WPCF-UIC permit issuance. Baseline implementation status is being met in full. A summary of Performance Standards and implementation status is available in Appendix A.

Effectiveness. The City met its ISWMP (2006) goal of completing the performance standards task for inclusion in the ISWMP 2022 draft that was accepted by DEQ for the WPCF-UIC permit in FY2012-13, and continues implementing the new performance standards as part of the ISWMP 2022. The City is on schedule with implementation considering the City received its WPCF-UIC permit in May 2013.

Tasks Completed (ISWMP 2022)

BMP III-1. Develop and Implement Strategic Outreach Plan Targeting Pollutants of Focus for the Public and City Employees (MS4 and UIC)

City staff worked with the Stormwater Quality Public Advisory Group (PAG) to develop and finalize the strategic outreach plan in November 2013, and began implementation thereafter (see Annual Report FY2013-14 Appendix B).

Substantial progress continued to be made on all implementation goals noted in the strategic outrace plan for FY2016-17 mainly incorporated into the Clean Water Works partnership program:

- Distribution of fact sheets to support tail-gate meeting training (5-15 minutes) for City Staff, and initial distribution that was upgraded as a continual improvement project to being conducted online via the City's COMPLI to improve training reach and recordkeeping continued into FY2016-17 (Message I) (see Table 8.3). In the second half of the fiscal year, the COMPLI program was phased out for another similar program, Target Solutions, with broader reach throughout the City. Staff are working with the implementers of this transition to ensure the stormwater training modules are included in the new system. See Table 8.3 for the topics covered and number of staff trained. In addition, supervisors were provided copies of the fact sheets when first developed for their use in informal training.
- Acronyms and Abbreviations distributed at front counters, on the website under "What's New," and upon request (Message II)
- Development and use of the UIC diorama model together with the watershed model (Message II)
- Advertising at BendFilm Festival and Munch 'n' Movies (see Appendix B), and worked with BendFilm and Zolo Media to jointly host a Clean Water Works student film contest together with BendFilm's Future Filmmakers. Conducted advertising to schools with contest-aged children (5th to 12th grade in school year 2017 for the video contest, and to children Kindergarten – 12th for a poetry contest over the same time period) (Message II)
- Banner messages were developed in past years and three banners with the Clean Water Works message are used at outreach events (Message II)
- Single-family Residential Site Plan and ACWA Erosion and Sediment Control guide, and regulatory flow charges included on City's website (www.bendoregon.gov/stormwaterbmp) and distributed by private engineering and this year through the Clean Water Works Partership Program invites (Messages II and III)
- Print advertising continued in Parks and Recreation Guide, and extended to Smart Shopper in 2017 (Message II)

- Stormwater considerations and sizing incorporated into both the CCity of Bend Waterwise Landscape brochure completed in FY2016-17, together with update of the Waterwise Gardening in Central Oregon guide with OSU (formerly the Xeriscape™ Guide) (Message III).
- Business related section including type of business specific and general illicit discharge fact sheets for both residents and businesses are posted on the Clean Water Works website (Message I and III)
- Storm drain marking occurred in FY2016-17 as part of an Earth Day volunteer effort with OSU graduate students. Permanent messaging of manhole covers continued in FY2016-17(Message III)
- City staff provided training on post construction controls (see Chapter 7, Task VII-4). (Messages III (infiltration) and V)
- Continued with a new 2017 incentive program with a discount card for various businesses similar to the one conducted in summer-winter 2015, with car washes, construction industry contractors, food service establishments, pressure washers, and carpet cleaners the business groups targeted with an offer. This wasn't scheduled until later years, but we flipped the schedule with the pilot incentive program entitled "Stormwater Facility Maintenance Assistance Program." The paperwork for that effort was developed in late FY2013-14 and released to purchasing for review and distribution in July 2014 but that approval was delayed due to purchasing division staffing shortages and legal counsel's concerns. City stormwater staff awaited review and approval until mid-May 2017, which was too late for this fiscal year given the separate Clean Water Works incentive program with discount cards that is occurring in 2017 (Message IV) With the several years of delay, program staff did not budget for the Stormwater Facility Maintenance Assistance Program in the upcoming biennial budget and instead started considering how to incorporate something similar into the Clean Water Works program through a discount.
- Include drinking water protection areas on City mapping web site (Message IV)
- City staff offered IECA webinars and an onsite CESCL training in February 2017 to improve knowledge of effective erosion and sediment control; continued to distribute ACWA Construction Site Guide and distributed a sediment fact sheet for both residents and businesses. This year, the City distributed the ACWA Construction Site Guide with the invite for participation in the Clean Water Works Partner program (Message IV)
- Clean Water Works Partnership Program outreach focused on and included new and existing targeted fact sheets with BMPs specifically related to reducing pollutants of concern (Message V).
- Work to improve illicit discharge coordination and reporting internally began in FY2013-14 and continued with development and deployment of the fact sheets with input from operation staff. Illicit discharge

minimization ongoing training using Compli software was setup and began taking place in late FY2014-15 continuing into FY2016-17. Staff are now moving the same training to a new program. Staff also purchased new spill kits for utility vehicles. A new IDDE doorhanger was created in FY2016-17 (Message V).

- In past years, City staff contracted with a consulting firm to assist with TMDL preparedness including providing a review of best management practices and structural controls specific to local stormwater pollution concerns that was completed in FY2015-16 (Message V).

The Clean Water Works campaign that originally launched in April 2015 was reinvigorated in January 2017 was developed keeping the following objectives noted in the public outreach strategic plan in mind:

- Use positive messages throughout the campaign.
- Continue watershed/stormwater awareness, but move more towards actions
- Conduct evaluation surveys to research the levels of awareness in the city and effectiveness of the programs
- Increase awareness of sediment impacts to storm drainage facilities and the Deschutes River/Tumalo Creek
- Through a media campaign, educated residents and businesses about the link between lands use activities and water quality/flooding as well as about the City's role in protecting water resources and managing stormwater.
- Increase awareness of potential pollutants from automotive vehicles and options to minimize these pollutants
- Increase awareness of what constitutes an illicit discharge and how to prevent spills and encourage behaviors to reduce illicit discharges.

Effectiveness. The City is effectively implementing the Strategic Outreach Plan for stormwater education.

BMP III-2 Stormwater Pollution Prevention Web Site (MS4 and UIC)

See ISWMP (2006) Task III.2 Stormwater Pollution Prevention Web Site (MS4/UIC).

BMP III-3. Media Relations: City News Broadcast Stormwater Quality Messages and Press Releases (MS4 and UIC)

See ISWMP 2006 Task III.1 Utility Bill Inserts, Brochures or Posters (MS4/UIC) and ISWMP 2006 Task III.3. City News Broadcast Stormwater Quality Messages and Press Releases (MS4/UIC)

Effectiveness. The City has exceeded an average of one stormwater quality message posted per year.

BMP III-4. School/Enrichment Activity Outreach: Stormwater/Watershed Diorama (MS4 and UIC)

The City actively assists with the Upper Deschutes Watershed Council's outreach to school children by (a) making the watershed diorama available; (b) providing copies of the Kid's Activity Guides and highlighters/pens available for distribution to appropriate grade levels; (c) making Worldwide Monitoring Day sampling kits available, notifying of available grants and helping sponsor Stream Stewardship Day. In return UDWC assists by distributing City materials such as the video contest flyers (see Task IV.3). City staff also provided the UIC model to High Desert Museum Staff at the Water Festival held October 6 -9, 2016, and City stormwater staff participated in the Teacher's Night event at the High Desert Museum in September 2016 to share our lending library and available materials with teachers.

In FY2016-17, the City again entered into a contract with the Environmental Center developing a school outreach program entitled "A Journey Through Bend Youth Education Partnership" with regards to the Utility Department focus on wastewater, drinking water, and conservation, and stormwater pollution prevention. Staff shared the availability of a PNCWA school outreach grant availability and one school was able to obtain that to help them participate in the program. The event included a Stormwater Quest field trip along with distribution of materials and outreach to elementary and middle school aged children. See program annual report in Appendix B.

See also ISWMP 2006 Task III.4 Stormwater/Watershed Diorama (MS4/UIC) and Task IV.3.

Effectiveness. The stormwater education program has increased effectiveness over the last few years since the City Utility Department as a whole has made it a priority to develop a One-Water type program covering all aspects of the water cycle with which the City is involved, and hiring a consultant to conduct that work. Being able to directly meet with area wide teachers at the High Desert Museum's Teacher's Night Out is an effective way to share our offerings in a face-to-face manner. The school outreach program with the Environmental Center reached 1,961 students this year, up from 1,490 Bend students the first year.

BMP III-5. Implement Performance Standards (MS4 and UIC)

See ISWMP 2006 Task III.5 Performance Standards (MS4/UIC) and Appendix A.

Summary Assessment of Effectiveness

Pacific Northwest American Water Works Association Award for "Dirty Water" TV Commercial.

The City exceeded the measurable goals for implementation of required permit activities. The main focus this year was continuation of the Clean Water Works Partnership program to determine if such level of effort could be effectively performed at a single mid-size city given that the other locations it has been tried have been major metropolitan areas with several municipalities participating. The goal in 2017 is to determine if conducting an established program is sustainable given the resources of a mid-size City. See the FY2015-16 Annual Report for a summary focusing on the overview and effectiveness of this effort.

Evaluation results suggest that citizens tend to remember more often messages that have been used over time (several years). Public Advisory Group members felt the program should be continued, but for a year in length before making long-term decisions. Thus the City is following that guidance with the 2017 effort. The initial effort took a substantial amount of staff time, and much was incorporated in house due to the fact that the Utility Department fortunately happens to have a communication technician who once owned her own marketing firm in town. This greatly saved on costs, although the program cost levels did face scrutiny and cutbacks at the highest management levels given overall City priorities, needs, and perceptions. Long-term viability at these levels are unclear, although with several outreach materials already developed. the 2017 level of effort needed has been reduced. While partners seemed willing to participate again based on survey results, very few repeats occurred, but more partners did sign up including from the newly targeted landscape community. None from the newly targeted pressure washer community or car washes accepted the invite in 2017. Giving car wash discounts is challenging though because many are self-serve using tokens, and not easily set up for offering a discount.

Because City staff understand the importance of effective outreach and education for stormwater quality, stormwater education and outreach will continue to be a priority in the upcoming years. But these will be weighed against capital funding needs as well.

4.0 PUBLIC INVOLVEMENT AND PARTICIPATION

Introduction

The goal of the public involvement and participation (PIP) component is to work with City residents, public employees, businesses, and government officials concerning the importance of and methods for controlling pollutants in urban runoff. Ultimately, community involvement in implementing pollution prevention practices and in evaluating and documenting conditions within the watershed is the only hope of achieving meaningful change in the quality of urban runoff.

Tasks Completed (ISWMP (2006))

The following tasks are completed or ongoing routine tasks conducted during FY 2016-17:

Task IV.1 Public Advisory Group (MS4/UIC)

During FY2016-17, the Stormwater Quality Public Advisory Group (PAG) took on the special role of examine possible approaches to handling stormwater in Bend as the City continues to densify. The City agreed to increase density by 66% in the 20 year UGB planning period. As such, the PAG agreed midyear to meet bimonthly as they focus on this issue. Thus, whereas the permit requirement is to meet at least semi-annually, the PAG has met 5 times including an optional field trip during the fiscal year. (See Appendix C for a list of PAG members, and meeting agendas/summaries). The group worked on developing a problem statement and examining regional/neighborhood scale and street scale controls to start.

Effectiveness. The City exceeded its goal of convening the Public Advisory Group at least semiannually. City staff worked to fill vacancies this year prior to embarking on the special sessions focusing on post-construction controls with increasing density. City staff continues to find the Public Advisory Group very helpful in providing input and new perspectives on various stormwater issues, and thereby directly helps improve the effectiveness of the stormwater program. Long-standing PAG members have commented that they enjoy providing input on the problem definition and Strengths-Weaknesses-Opportunities-Threats (SWOT) analyses related to the density topic.

Task IV.2 Public Meeting (MS4/UIC)

This task refers to holding public meetings when updating the ISWMP. However, the City is not currently in the process of updating the ISWMP—the ISWMP 2022 did go through a public review process and was accepted by DEQ for the UIC

permit. Similarly a public meeting was held for the original ISWMP adopted in 2006 as necessary for the City's NPDES Phase II MS4 permit. DEQ has recently released a public draft NPDES Phase II MS4 general permit designed to replace the individual existing permits for stormwater drainage to surface water. Once that is completed, the City will begin a process to refine the ISWMP and incorporate a public meeting at that time.

In FY2016-17, public input was solicited for the South Awbrey-Butte Drainage Study in February and March of 2017 as to drainage issues on the South side of Awbrey Butte.

Effectiveness. Past public meetings have proven successful in obtaining input to improve the City's integrated stormwater management plans and master plan. The public input received in 2017 gave the engineering team better insight into drainage issues on the south side of Awbrey Butte and feedback from the meeting is being incorporated into the final report.

Task IV.3 Stormwater Quality Volunteer Opportunities (MS4/UIC)

In addition to the standing volunteer efforts such as the work of the City's Volunteer Coordinator on storm drain marking and landscape maintenance and modifications over time, the City Stormwater Program again implemented an innovative social marketing campaign to increase volunteer participation for clean water. The Stormwater Program wanted to see if, as an established program, the amount of effort became more sustainable for a mid-size City.

Clean Water Works Partnership Program. The City sought to include more behavior change buy-in by promoting a multiple incentive partnership program. Those businesses or groups that met specific criteria (e.g., had a Bend Business License, were willing to run through a short fact sheet of best management practices training, mark their storm drains (as applicable) or, in some cases, had volunteered at least three hours for clean water, etc.) were invited to participate in the voluntary program. Those participating were rewarded with radio and television advertising, website acknowledgement, received point of purchase advertising (with the number or displays this year targeted to the type of business and request of the partner), and a thank you bag of goodies. The goodies incorporated an educational component this year and were extended to all employees; they included water bottles, lunch bags with an informational fact sheet for each of the employees, and window decals to note their participation. The efforts this year were modified to increase engagement from their employees. The partners were also able to specify a discount of their choice to be included on the Clean Water Works Partner Discount Card. Citizens can then visit the Clean Water Works webpage and download the discount card for free, or pick one up through various means such as at events or City offices.

This partnership program is running from April 2017 through December 2017

and has benefits to City (best management practices outreach had an improved chance of being read and disseminated, this year to all participating employees as well; business owners were pledging to care for our clean waters); has benefits to the business owners (advertising, discount card to attract more business, giveaways for their employees, positive connotations); and the public benefited by being able to more easily recognize those who pledged to be a good player and discounts at local businesses. This is not a certification program, but a voluntary pledge incentive program. In 2017, we have 14 partners actively providing discounts. This brings up the number of past and present participants, including those providing and not providing discounts, to 39 since the program started in 2015.

Storm Drain Marking. The City of Bend coordinated with Oregon State University students after the Earth Day Fair in April 2017 to mark storm drains. For more information, see Task V.3. Additionally, this year the City had a limited number of storm drain markers available on a first come first service basis to encourage marking of private drains as well.

OSU Graduate students helped mark storm drains for Earth Day 2017.

Deschutes River Cleanup. The City both actively participated in and helped to sponsor the Deschutes River Cleanup, formerly known as Stream Stewardship Day (see Appendix C). This annual event was coordinated by the Upper Deschutes Watershed Council (UDWC), and was held on August 6, 2016. The event included several sponsors including REI, whose employees perform monthly clean-ups on their own as well, and the Bend Park and Recreation District. The City announced the event via its Facebook site and posted event posters. To encourage City staff support, the stormwater division had staff available to help collect and dispose of bags of litter collected by local dive teams and riparian area collection efforts. Announcements of the event were also made on local radio stations. The Upper Deschutes Watershed Council reported the following results:

- About 25 garbage bags of instream debris
- Roughly 67 bags of litter and weeds from riparian areas
- 1,400 pounds of total debris removed by about 200 volunteers.

School Outreach. The City Utility Department hosts an intensive school outreach program for the three water utilities—drinking water, water reclamation, and stormwater. In FY2016-17 the City of Bend Utility Department again partnered with the Environmental Center who worked with local school teachers to refine and implement the “Our Water Program, a Journey Through Bend” (see Appendix B for the summary report). The overall program includes five lesson plans related to all aspects of water, one of which is the Stormwater Quest. The

Quest took place at Riverbend Park along the Deschutes River with teachers, parents, and Environmental Center staff helping to lead the efforts. Students worked to solve puzzles as they visited stormwater facilities located in the park. The City Edition video that captured the event remains available on the City's YouTube channel (see www.youtube.com/watch?v=pOXo5ZOrlUc).

In spring 2016 and throughout the summer, the City invited students to participate in the Clean Water Works Video contest. Unfortunately no entrants were received by the August deadline. The City ran the 2015 student winning psa at Munch n Movies in August/September 2016. And the City decided to try the contest one more time, but this time lined up with student's school use of their IPads and schedules and adding a poetry contest, placing the due date at the end of April. We received a much better response rate with the FY2016-17 entries, with 14 entries for the video contest and one entry for the poetry contest. The winners included the following in video (links are hosted by the contestant and some may no longer be available):

- Tyler Bodi Sweet, Most Creative, "East Bend Boys and Girls Club for Clean Water"
- Sequoyah Walther-Gingold, People's Choice Award, "Clean Water"
- Joe Sortor, 5th-8th Grade Division Winner, "Don't Take Our Water for Granted"
- Akira Talaba, Grand Prize Winner: Video, "Clean Water Works"

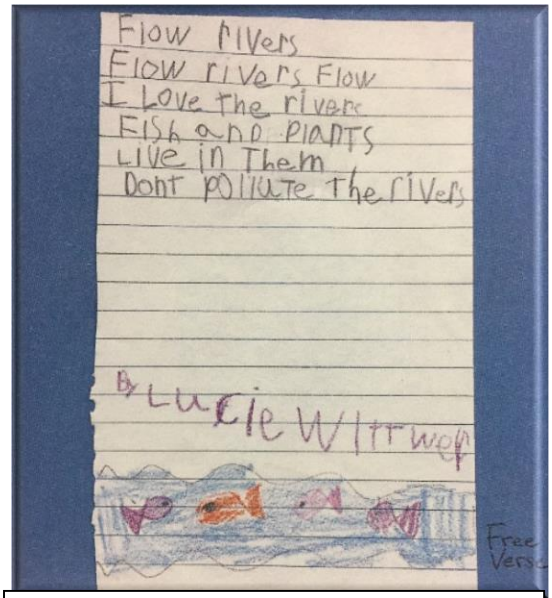


Figure 4-1. Grand Prize Winning Poem

Lucie Wittwer was the Grand Prize Winner for Poetry, with her poem "Flow Rivers." See Section III.2 and Appendix C for more details.

Additionally, our video contest partner BendFilm would show our Clean Water Works advertising slides at their BendFilm events throughout the year for added reach.

The City worked through the Upper Deschutes Watershed Council to help outreach to schools by restocking and repeatedly lending out the City's watershed diorama for their watershed education efforts, which culminate in a watershed summit for students. Additionally, the City continued its popular diorama lending program to area teachers and others interested. The City also provide copies of its new Kid's Activity Guide and giveaways for Upper Deschutes Watershed Council to use in

their teachings.

Effectiveness. The Clean Water Works partnership programs proved challenging, rewarding, and successful. An online survey of Clean Water Works Partners was taken after the initial effort using Survey Monkey and 14 responded. Whereas 21% of respondents felt the Partnership effort was a good value for them, 100% of respondents indicated they would participate again in the coming year. Ten (71%) indicated that this partnership program make them and their employees think of ways to protect water quality or the importance of protecting it, with the remaining four answering "maybe/unsure". A majority (57%) felt that the effort helps make a positive difference for water quality, with the remaining 29% indicating it has the potential to do so. The City has worked to increase effectiveness this year by (a) expanding the number of potential partners to include landscapers and pressure washers; (b) increase the hurdle to participate to include ensuring their personal storm drains are marked (City has some first come first served markers to assist); and (c) provide outreach goodies for all employees, with the goodies including an applicable fact sheet to help reinforce best management practices.

Given Bend's hard winters, the storm drain art paint did not have the longevity that would be help to make a continuing program be sustainable; thus the City decided not to continue with the efforts even though the payback in media coverage the first year was very much worthwhile. Reaching out to the art community was an added bonus, so the City worked to build on that by offering a student poetry contest this year instead.

The school video contest was another terrific partnership between a non-profit (BendFilm), government institution (the City), for profit business (Zolo Media) all working together to help school children interested in the field of film and acting get firsthand experience while providing an important community service message. Staff were successful this year to obtain multiple entries for a public people`s choice selection award that would helped drive people to the City's Clean Water Works website. With the addition of a last day promotion by Zolo Media on their CBS and ABC syndicates with interviews of students and program staff, the number of people accessing the City's Clean Water Works site to vote increased to over 4,000 hits, more in one day than the entire year previously. In short, it went viral in Bend terms. Improving the connection so post votes would send folks to a more educational page will be worked on to further increase effectiveness in future years.

Task IV.4 Performance Standards (MS4/UIC)

Performance standards have been completed and incorporated into the ISWMP 2022. The new ISWMP 2022 was approved by DEQ as part of the WPCF permit issuance. In FY2013-14 the City began implementing the new performance standards as part of the ISWMP 2022 for the WPCF-UIC permit, and the City

continued to implement these and additional performance standards this year per the schedule. Performance Standards implementation status is available in Appendix A.

Effectiveness. The City met its original ISWMP 2006 goal of completing the performance standards for inclusion in the draft ISWMP 2022 and is on task meeting them.

Tasks Completed (ISWMP 2022)

BMP IV-1. Public Advisory Group (PAG) (MS4)
See ISWMP 2006 Task IV.1 Public Advisory Group (MS4/UIC).

BMP IV-2. Public Meetings (MS4)
See ISWMP 2006 Task IV.1Public Advisory Group (MS4/UIC).

BMP IV-3. Stormwater Quality Volunteer Opportunities (MS4)
See ISWMP 2006 Task IV.3 Stormwater Quality Volunteer Opportunities (MS4/UIC).

BMP IV-4. Performance Standards (MS4)
See ISWMP 2006 Task IV.4 Performance Standards (MS4/UIC).

Summary Assessment of Effectiveness

The City exceeded its goals for public participation this year, and as can be seen in reading the individual tasks and effectiveness evaluations, the City is actively improving its programs to become increasingly more efficient and effective. The new People's Choice Award contest was especially effective at leading people to the Clean water Works website. The partnership with Zolo Media and BendFilm was excellent in helping to get the word out about both clean water and the contest to both students and the public. Zolo aired a cover story about the People's Choice contest that aired on both its prime time ABC and CBS stations right before the end of the contest, including interviews with City staff and the students of Seven Peaks Elementary. Their teacher had based curriculum around the contest as a learning opportunity for the students, and he had learned of the contest through the City's Our City outreach newsletter. This year with the focus on density pressures, the Stormwater Public Advisory Group is playing a key role for the community, just as it was designed to do.

5.0 ILLICIT DISCHARGE CONTROLS

Introduction

The purpose of this component is to eliminate discharges of pollutants from illicit connections and illegal dumping to the storm drainage system. This chapter describes the activities conducted during FY2016-17 to address illicit discharges.

Tasks Completed (ISWMP (2006)

The following are conducted during FY2016-17.

Task V.1 Public Education on Illegal Discharges and Improper Disposal (MS4/UIC)

In April 2015, the City kicked off an outreach and social marketing campaign based off of a strategic education strategy, called Clean Water Works. This campaigns purpose is to build awareness and change behavior through targeted topics and clear messages about stormwater pollution prevention information together with an incentive program. The campaign focuses on three main issues specific to the concerns in Bend: general illicit discharge information, lead reduction, and sediment reduction.

Figure 5-1. Clean Water Works Partner Logo

The initial campaign included development of print, TV and radio advertisements, and four illicit discharge prevention banners that include the City's phone number. Fact sheets on illicit discharges were distributed for both home (www.bendoregon.gov/government/departments/utilities/stormwater/clean-water-works) and commercial/ industrial uses. This year the City reinvigorated the campaign with a new partnership program and materials. In FY2016-17, the City developed several new outreach pieces including *Proper RV Waste Disposal fact sheet*, *Pressure Washing fact sheet*, *Landscape Maintenance for Healthy Water fact sheet*, *Hiring a Landscaper fact sheet*, and an *Illicit Discharge Door Hanger*.

The goal of the Clean Water Works program is to increase engagement in protecting water quality. The City accomplishes this by providing best management practices and information in a manner that engages the interest of the targeted business/nonprofits by offering incentives to businesses and non-profits such as free TV and radio spots and marketing discounts on a discount card. In return, participating businesses agree to train staff on stormwater BMPs, many aimed to reduce illicit discharges, or to volunteer for clean water. The idea is a triple-win social marketing campaign based on concepts from EPA's *Getting In Step* guidance.

In April 2016, the City mailed out partnership invitations and application packets to all businesses in the following classifications; (13) Auto shop, (18) Carpet Cleaners, (134) Contractors, (173) Restaurants, (9) Car Washes, (69) Landscapers and (10) Pressure Washers within Bend. The City used the Bend business license database for contact information. The application packet included a letter outlining the incentive program, an applicable fact sheet or guide, and partnership participation form for those interested in becoming a partner (see Appendices C, D, and E). By offering the incentive program, we would have a higher chance of the recipient reading the best management practices whether or not they decided to participate. In FY2016-17, the City had 14 participants in the discount card program and distributed 185 gift bags to their employees. The City extended the gift bag program to all employees this year and included an extra educational fact sheet to extend the reach of the program.

In FY2016-17, the City in conjunction with Bend Film and Zolo Media hosted the second Clean Water Works student video contest. This year the City received 14 video submissions and had over 4,000 votes for the Viewer's Choice Award. This year's winner was Akira T. His video focused on the importance of not polluting the river. The City also held a poetry contest. Lucy W. won the contest with Her *Flow Rivers* poem. The effort gained a cover story new coverage on our local ABC and CBS networks. The City aims to develop these into PSAs for outreach, such as at Munch 'n' Movies and on television.

Figure 5-2. Clean Water Works Video Contest Grand Prize Winner
Still from FY2016-17 Clean Water Works student film contest winner public service announcement.

The City continued to distribute the *Illicit Discharge Minimization BMP Manua*l and the *Illicit Discharge flye*r as educational outreach as part of illicit discharge follow-up procedures (see Appendix D of the FY2012-13 Annual Report) and regularly followed up on Illicit Discharge reports. Towards the end of the year the City sought to update the Illicit Discharge flyer to a door hanger. See Task V.7 and Appendix D for a summary of illicit discharge response actions addressed in FY2016-17.

Effectiveness. The City exceeded its goal of conducting outreach to 50% of businesses within a specific segment by distributing the Clean Water Works partnership program invites to all known Auto shop, Carpet Cleaners, Contractors, Restaurants, Car Washes, Landscapers and Pressures Washers within Bend.

Task V.2 Illicit Discharge Reporting Mechanism (MS4/UIC)

The City maintains an automated non-emergency Code Enforcement phone tree. The City designates one of the options in this phone tree for reporting Illicit Discharges.

Callers who select that option are transferred directly to stormwater staff for follow-up. Another option is for construction site erosion and sediment control or drainage issues, which is directed to the construction manager in the Community Development Department for routing. Additionally, the City advertises the general number, (541-317-3000) for reporting illicit discharges and general information about the stormwater utility. The City's "Clean Water Works" campaigns include the public works main phone number and website information that can be used for reporting illicit discharges.

The City continues to use the illicit discharge reporting standard operating procedure (see FY2009-10 annual report for additional information). The City also uses an online Citizen Service Request (CSR) form available on the City's webpage (www.bendoregon.gov/services/online-services/citizen-service-request-form-public-works). This form allows the public to electronically report Illicit Discharges. The completed form is automatically emailed to stormwater program staff for follow-up.

Front desk staff are trained on where to send illicit discharge reports for proper response, and they are using an automated call center program for directing calls and response. Additionally, the City posted contact information for people to report illicit discharges on the City's website. Stormwater staff use the Infor system to issue and track work orders. City staff has implemented a preventive maintenance schedule and zones to efficiently clean and maintain the stormwater system and staff keep an eye out for evidence of illicit discharges as they do so.

Effectiveness. The City continues improve its reporting mechanisms and educate the public on how to prevent illicit discharges. City staff work with the Public Advisory Group to get input on pollution prevention messages.

Task V.3 Post Warnings About Illicit and Illegal Discharges (MS4/UIC)

Per the Standards and Specifications revisions that took effect on July 1, 2011, new and replaced City of Bend stormwater manhole covers now include a permanent imprinted, "Only Rain in the Storm Drain". In FY2016-17 the City installed 19 new curb inlets with this permanent imprint.

OSU graduate students who volunteered to apply storm drain markers with our pollution prevention message on Earth Day

Additionally, the City has an ongoing volunteer storm drain marking program, with the installation of round, plastic semi-permanent markers (10-12 years longevity expected) affixed to existing catch basins. The marker includes a general "Don't Pollute" message along with pictures of swimmers, fish, ducks, and drinking water. For this reason, we use it both in areas that drain to the river and areas that flow underground toward our drinking

water aquifer. The program has seen strong success over time (see Storm Drain Marking Map in appendix D). This year the as part of Earth Day celebration, the City coordinated a storm drain marking event with OSU graduate students. The group marked 195 catch basins in 4 hours. Each volunteer received a fanny pack with a discount card and other Clean Water Works goodies to remember their effort.

Effectiveness. The City has successfully integrated a method of providing a permanent stormwater quality message on all new manhole lids.

The Storm Drain Marking Map in appendix D shows the effectiveness of the volunteer storm drain marker program, which has focused on areas draining to the river and within drinking water protection areas. Due to the volunteer effort by the OSU graduate students, the City installed 195 markers, exceeding the City's goal of installing 50 markers per year.

Task V.4 Post Illicit Discharge Prevention Information on Web Site (MS4/UIC)

Stormwater related material is located in a central location at: (www.bendoregon.gov/stormwater). The page has five main categories, including "Get Involved" which links to a location to report illicit discharges (see picture on right).

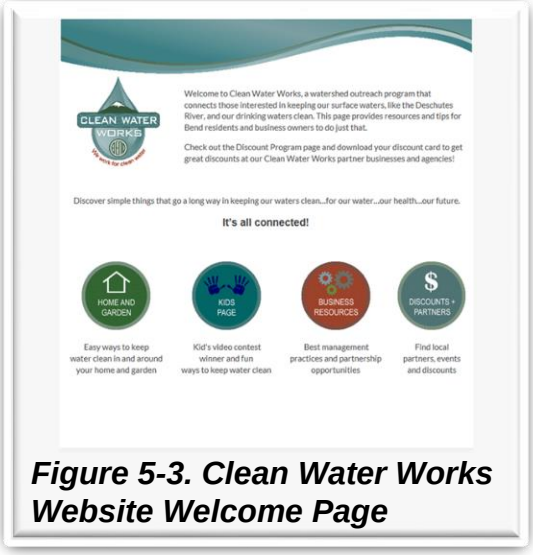


Figure 5-3. Clean Water Works Website Welcome Page

In FY2015-16 the City added a Clean Water Works webpage that includes four main sections: Home and Garden, Kid's Page, Business Resources and Discount and Partnerships (see www.bendoregon.gov/cleanwaterworks). City staff post new *illicit discharge fact shee*t for both business and homeowners and radio advertisements (www.bend.or.us/modules/showdocument.aspx?documentid=22502) on the City's web site.

In FY2016-17, City of Bend worked with a graphic designer to develop and posted several new fact sheets on the website, including a *Pressure Washing Fact Sheet*, *Tips for Looking to Hire a Landscaper* and *RV Waste Disposal* (www.bendoregon.gov/home/showdocument?id=30490) (See Appendix B).

Effectiveness. The City has provided information on its website to report spills. Additionally, the Home and Garden and Business sections of the Clean Water Works campaign pages have several outreach pieces targeting illicit discharge minimization, both in general, and for specific pollutants. City staff have received several calls this year from concerned citizens noting illicit discharges, which suggests that the contact information on the website and other methods is reaching the public who care enough to let the City know of potential spills and problem areas, allowing a more efficient

response and better water quality protection. The Clean Water Works page showed a 200% increase in visits this fiscal year over last (see chapter 3.0).

Task V.5 Stormwater System Map (MS4[1])

The City developed a geodatabase map in FY2008-09 including GPS coordinates for all known City stormwater facilities, and has continued to update the geodatabase as appropriate since. In FY2016-17, City Information Technology GIS staff updated the mapping interface from geoblade to BOOM, the new interface that utilizes Geocortex software. A limited version is available online for the public to use that includes catch basins, storm drain pipes and UICs. The online map viewer is located at: (www.bendoregon.gov/index.aspx?page=463). Additionally, the City has street level imagery that staff can use for internal research purposes.

This year, the City began researching and collecting private stormwater facility location data. A temporary employee is reviewing private drainage plans, assigning facility ID numbers for each private drainage facility and recording location data. When completed the City will convert the data into a geo-database and uploaded into the City GIS system.

Effectiveness. The City has successfully conducted an overall in-field inventory and ongoing maintenance to keep the data in the base map updated. The geodatabase includes directions of pipe flows as well as swales, UICs, and other features. The inclusion of best known locations of public and private wells along with time of travel and buffer overlays also helps citizens with UICs better understand their locations to assist them in their own regulatory compliance and water quality protection efforts. In FY2016-17 the City upgraded the map viewing interface.

Task V.6 Illicit Discharge Ordinance (MS4/UIC)

On January 4, 2012, the Council adopted a stormwater ordinance adopting Bend Code Title 16 (see Appendix A of the FY2011-12 annual report). Chapter 16.20 of the ordinance covers Illicit Discharge Controls. In FY2012-13, the City finalized and began distributing the Illicit Discharge Best Management Practices Minimization Manual. A copy of the manual is available in Appendix D of the FY2012-13 Annual Report. Additionally, as part of the ordinance effort, interdepartmental staff worked through implementation roles and responsibilities in 2012. The Stormwater utility takes primary responsibility of illicit discharge inspection response and follow-up.

Effectiveness. The City has successfully developed the Illicit Discharge Manual (www.bendoregon.gov/index.aspx?vurl=idmanual) that is referenced in the stormwater ordinance, Bend Code Title 16, and has continued the implementation and education process.

[1] See Task II-6a for related UIC mapping.

Task V.7 Program to Detect and Address Illicit Discharges (MS4/UIC)

The Utility Department continues to work closely with Operation Maintenance staff, Building Inspectors, Engineering Inspectors and Industrial Pretreatment Program staff to coordinate IDDE efforts. The City has a Stormwater Analyst who is trained on, and responsible for, following up on illicit discharge notifications and complaints. When a spill or illicit discharge is noted, this staff person investigates to attempt to find and properly address the source. The stormwater utility added a new staff member in FY2016-17 to oversee erosion and sediment control enforcement and post construction site inspections.

To ensure stormwater performance standard trainings are occurring, the City uses an online program called Compli to track staff trainings. In FY2016-17, public works staff were trained in Concrete Use and Disposal; Winter Road Care; Leaky Equipment and Fueling; Spill Prevention, Control and Cleanup; Utility/Road Repair & Maintenance; Pressure Washing and Surface Cleaning; Vehicle and Equipment Washing; and Paint Use and Disposal (see Appendix D). The staff are required to take a short quiz after each training. These trainings are provided as a series of stormwater-performance standard specific trainings are implemented throughout the year to appropriate staff (see Chapter 3 for a summary). Trainings are automatically emailed out to applicable public works employees and reminders are provided. Staff are required to review a fact sheet or review a presentation and complete a short quiz. In FY2016-17 Staff began migrating the trainings to a new software, Target Solutions. The new software should be fully operational in FY2017-18 and will function similar to the Compli System.

In addition to the safety meeting, all new public works staff are trained through watching the video “Storm Watch, Municipal Storm Water Pollution Prevention” and they take a test/certification on Target Solutions that they have completed the effort. The video covers the following segments:

- Good Housekeeping & Spill Prevention
- Vehicle & Equipment Washing
- Vehicle & Equipment Maintenance
- Spill Reporting & Response
- Street Maintenance
- Outdoor Storage of Materials & Wastes
- Landscaping & Lawn Care.

Field Component of CESCL Training, February 27, 2017.

Staff continue to conduct inspections of the City’s 15th Street and Boyd Acres Corporation Yards in conjunction with quarterly Safety Inspections (see Appendix G).

In February 2017, the City of Bend hosted an Erosion and Sediment Control Lead training course and invited local contractors and City inspection staff (see Chapter 6 for more details on this training).

Effectiveness. The City continued to use its tracking system, maintaining a spreadsheet of stormwater-specific follow-up actions, tracking 32 events in FY2016-17 (see Appendix D). This number is slightly lower than years past, but this is due to the hiring of a new compliance specialist. Previously all construction site erosion complaints were tracked in a single IDDE database, but now construction site/ erosion control complaints are tracked separately (See Chapter 6).

Staff continued to coordinate well with various DEQ staff in addressing the issues that arose. Reports came from the public as well as from other City staff noticing problems in the field, suggesting that the staff training and public outreach have continued to be useful. Initial outreach and education has been successful in resolving most of the issues. In FY2016-17, City of Bend staff issued one formal violation, to an apartment complex that had multiple pump station overflows into an onsite drainage swale. In order to avoid a fine, the apartment complex is working with the City to develop a consent agreement, which requires the property manager to increase the maintenance frequency for the pump station, until the pump station can be upgraded/replaced. Additionally the City continued to track the compliance orders for the FY 2015-16 infractions by a carpet cleaner to successful completion also the City referred one claim to DEQ and DEQ conducted the enforcement.

City staff incorporate several additional trainings including; Illicit Discharge Recognition and Reporting, Vehicle and Equipment Washing; Street Sweeping; and Concrete Use and Disposal into Compli system. Work has begun to migrate all the existing trainings into Target Solutions, which provides opportunity for additional trainings.

Task V.8 Minimize Landscape Irrigation Runoff (MS4/UIC)

City stormwater staff work closely with water conservation staff to help minimize dry weather flows from irrigation runoff. The City's water conservation group continued its sprinkler inspection program, offering free sprinkler inspections for City of Bend utility customers. In FY2016-17, Staff performed over 200 inspections, reducing water use and adjusting sprinkler heads to eliminate overspray onto city streets and sidewalks. The sprinkler inspection program is a free service in which participants receive a site visit analysis and a customized watering schedule for their landscape as well as education on how to maximize the performance of their underground irrigation system. The program includes a visual inspection to pinpoint any problems in the sprinkler system, including runoff, tests to determine how evenly the water is covering intended areas, and a soil sample to determine root depth and soil type. The staff conducted extensive advertising including the Smart Irrigation and Water Wise City Edition (www.youtube.com/watch?v=k0aMFj-jK1E).

City staff worked with the OSU extension program to update the *Water-wise Gardening in Central Oregon guide* (formally called *Xeriscape in the High Desert*). The revised Water-wise Gardening guide was published in February of 2017. A copy of the guide is available online at (https://catalog.extension.oregonstate.edu/em9136/viewfile). The Water

Conservation group also developed a new Water-wise landscape guide with input from stormwater staff. This new guide includes a section on stormwater facility planning and sizing, and shows several low impact development examples; a copy of the guide is also available online at (www.bendoregon.gov/home/showdocument?id=29569).
The City continues to include landscape irrigation runoff minimization measures in its standards and specifications.

Effectiveness. The work of the Water Conservation program team have resulted in increased efforts towards improving landscape irrigation efficiency and reducing landscape irrigation runoff.

Tasks Completed (ISWMP 2022)

BMP V-1. Public Education on Illegal Discharges and Improper Disposal (MS4 & UIC)

See ISWMP (2006) Task V.1 Public Education on Illegal Discharges and Improper Disposal (MS4/UIC).

BMP V-2. Illicit Discharge Reporting Mechanism (MS4 & UIC)

See ISWMP (2006) Task V.2 Illicit Discharge Reporting Mechanism (MS4/UIC).

BMP V-3. Post Warnings About Illicit and Illegal Discharges (MS4 & UIC)

See ISWMP (2006) Task V.3 Post Warnings about Illicit and Illegal Discharges (MS4/UIC).

BMP V-4. Post Illicit Discharge Prevention Information on Web Site (MS4 & UIC)

See ISWMP (2006) Task V.4 Post Illicit Discharge Prevention Information on Web Site (MS4/UIC).

BMP V-5. Implement Illicit Discharge Regulations (MS4 & UIC)

See ISWMP (2006) Task V.6 Illicit Discharge Ordinance (MS4/UIC) and ISWMP (2006 Task V.7 Program to Detect and Address Illicit Discharges (MS4/UIC).

BMP V-6. Implement Performance Standards (MS4 & UIC)

Performance standards have been completed and incorporated into the ISWMP 2022. The ISWMP 2022 was approved by DEQ as part of the WPCF-UIC permit issuance but has not yet been accepted as part of the City's NPDES permit reissuance that remains in negotiation. Performance standards implementation began in FY2013-14 based on the timing of the WPCF-UIC permit issuance. A summary of Performance Standards implementation status is available in Appendix A.

Effectiveness. The City has is implementing the performance standards as part of the

ISWMP 2022 and is fully compliant with the implementation schedule. The use of the Compli system for performance standards trainings has improved staff ability to track training related performance standards (see Appendix D for a list completed trainings). In FY2016-17 the City began smoothly migrating the for performance standards trainings to a new software, Target Solutions. The New software is anticipated to be fully implemented in FY2017-18. The City met its ISWMP (2006) goal of completing the performance standards for inclusion for consideration in the draft ISWMP 2022.

Enforcement Actions

In FY2016-17, the City provided education and verbal warnings along with one formal violation and one referral to DEQ. In general, the City starts with data collection, education and a problem-solving approach. Violators are provided educational materials and a form noting the violation is distributed around the neighborhood. Cost for cleanup can also be charged to the violator. Serious violations on private property are referred directly to the DEQ for follow-up and enforcement. See Appendix D for a summary of illicit discharges and follow-up activity.

Summary Assessment of Effectiveness

The City has made significant progress including improved legal authority and clarifications through the illicit discharge ordinance section and associated Illicit Discharge Manual that now provides for additional education and enforcement in an effort to reduce illicit discharges. Since FY2010-11, the City has been using its customer service database program (INFOR). This program effectively assists in tracking initial stormwater illicit discharge reports and helps verify that the proper staff are notified of the incident. The City also continues to effectively use the online citizen service request to respond to illicit discharge reports. Stormwater staff are also seeing improvements in spill response notification from fire and water/wastewater utilities.

The City has effectively improved its staff training approach that will help reduce illicit discharges, and improve notification of spills. Illicit discharge detection and elimination efforts naturally appear to focus on sanitary sewer/septic system cross connections. The City of Bend currently works to address a large number of pollutants with its IDDE program; however, the City has been working diligently to increase and improve its separate sanitary sewer system by the installation of new interceptor lines (SE Interceptor: (www.bendoregon.gov/index.aspx?page=149); North Area Sewer Improvement: (www.bendoregon.gov/index.aspx?page=1245); Plant Interceptor Sewer Line Rehab: (www.bendoregon.gov/index.aspx?page=1344), a new pump station upgrade adjacent to the Deschutes River (Colorado Lift Station: (www.bendoregon.gov/city-projects/city-infrastructure-projects/colorado-lift-station), and an expansion of the water reclamation facility (www.bendoregon.gov/index.aspx?page=664). These efforts represent a substantial commitment to improving wastewater infrastructure, with the bonus of reducing concerns of wastewater leaks and problems entering the stormwater system.

6.0 CONSTRUCTION SITE STORMWATER ACTIVITIES

Introduction

The objective of this component is to control pollutants discharged to municipal storm drains from new and redevelopment construction activities to the maximum extent practicable. Several of the pollutants of concern within the Deschutes River are directly attributed to sediment loading; with the majority of sediments sourced from upstream activities. The City sees it as a priority to reduce stormwater related sediment contributions into the river within its jurisdiction. Sediments are a major pollutant that can come off uncontrolled construction sites and have the potential to clog stormwater facilities (e.g. drywells, drill holes, and swales) and negatively impact the Deschutes River, which is listed for sediment and turbidity within the city of Bend.

Construction sites that disturb one or more acres and discharge stormwater directly to a surface water body are already regulated through the state-administered NPDES 1200-C permit program. Many construction sites within the City limits are either smaller than one acre or the stormwater discharges do not drain to a surface water. As part of the Bend Code Title 16 Stormwater Ordinance, grading permits are required on all commercial developments that are adding 5,000 square feet or more of impervious surface or adding one or more UICs, and sediment must be prevented from reaching the storm drain system from all sites.

Tasks Completed (ISWMP (2006))

The following tasks are either completed yearly or are continuing:

Task VI. 1 Evaluate and Update Regulatory Authority and Procedures (MS4/UIC)

In FY2016-17, the City began a partial review and update of the Design Standards, Construction Specifications and the Development Codes. City's Standards and Specifications only apply to City-owned property and right-of-ways, not to private lands unless referred to in the development code. The revised standards will include additional erosion control details while continuing to include the COSM erosion requirements. The current standards and specifications are available online at http://www.bendoregon.gov/index.aspx?page=161.

The City's stormwater staff continues to work with city inspectors, engineers, contractors and developers to implement Bend Code Title 16. Part of the implementation process is the review of development and construction site plans

through E-Plans, an electronic review software. In August 2015, the City adopted new standards related to inspections, including shifting some responsibilities to the engineer of record. (see http://www.bend.or.us/modules/showdocument.aspx?documentid=23509 for the standards and http://bend.granicus.com/MetaViewer.php?view_id=5&clip_id=351&meta_id=12606 for the City Council issue summary for more information.) The engineer of record is responsible for certifying that the designs are installed per the site plan. The Stormwater Compliance Specialist works closely with the Construction and Right-of-Way Manager and his team in Private Engineering along with the Building Inspectors to ensure efforts are coordinated and messages are consistent.

In FY2016-17, the City hired a Stormwater Compliance Specialist in the Utility Department. The Stormwater Compliance Specialist is responsible for educating, inspecting, regulating and enforcing construction site stormwater ESC compliance.

Effectiveness. The City has successfully completed improving design standards and specifications including the adoption and implementation of Bend Code Title 16, Standards and Specifications, and the COSM. The City has made major progress in regulating construction site erosion and sediment and has completed the tasks outlined for this BMP. In FY2016-17 the Stormwater Utility hired a Stormwater Compliance Specialist. Since January 2017, he has taken the lead on revising inspection forms, attending pre-construction meetings to provide education and communicate expectations, conducting ESC verification inspections, and enforcing when needed. An ESC Inspection form is attached in Appendix E.

Examples of ESC BMPs

Task VI.2 Construction Site Educational Materials (MS4/UIC)

The City sent a Clean Water Works Partnership invite to 134 construction contractors and company owners. The packet sent in March 2017 included an invite cover letter, a partnership participation pledge sheet, a Clean Water Works sticker, the 20-page illustrated ACWA Construction Site Stormwater Guide, and a fact sheet entitled “Sediment Prevention for Businesses” that includes information on both post-construction as well as construction sediment. The second page included a segment entitled, “What Can You Do as a Builder/Contractor” with five BMPs and a list of resources for more information. (See Appendix E).

The City continued to provide on our website the "Single Family Example Drainage Plan" to project proponents to help with implementation of Bend Code Title 16 (see FY2012-13 Annual Report, Appendix E for copies). This can be used to help calculate stormwater flows and encourages the use of Low Impact Development, along with a "Suggested BMPs for Single Family Construction Sites—Example Erosion and Sediment Control Plan".

City staff have placed several construction site references on its website: www.bendoregon.gov/cleanwaterworks. The references include, in addition to the three named above, the following links:

- Sediment Fact Sheet for Businesses
- Maintain Construction Site BMPs Poster
- Erosion and Sediment Control Fact Sheet
- Grading Clearing & Erosion Permit Flow Chart
- Drainage Submittal Flow Chart
- Sample Erosion and Sediment Control Plan - Single Family Residential
- Stormwater Maintenance Agreement
- Central Oregon Stormwater Manual
- Construction Stormwater Pollution Prevention (NPDES Webcasts)
- Construction Stormwater Pollution Prevention Plan Development

Effectiveness. The City has met the schedules for this task and have provided for additional materials and incentive programs as well. Some construction companies and homebuilders have participated in the Clean Water Works Partnership program. The City continues to look for opportunities to partner with groups like ACWA and IECA to produce cost effective high quality outreach materials.

Task VI.3 Construction Site Inspections and Violation Hotline (MS4/UIC)

In FY2016-17, grading and ESC questions were routed to the City's Stormwater Compliance Specialist to coordinate compliance, investigate and follow-up. When an ESC or poor housekeeping issue is discovered on site, the Stormwater Compliance Specialist, in coordination with City inspectors, provides verbal education and warnings. If the erosion and sediment problems are not addressed by the time the Stormwater Compliance Specialist returns for the next inspection, a formal Stormwater Violation Letter outlining the compliance deficiency, inspection history, required actions, and potential enforcement procedures may be issued. In coordination with CDD, the Stormwater Compliance Specialist can withhold additional inspections or issue a Stop Work Order until the problem is remedied, which can have the effect of stopping a project from progressing. This procedure proved to be an effective way to encourage contractors to repair erosion control deficiencies in a timely manner. An example Stormwater Violation Letter is attached in Appendix E.

Over 53,688 total inspections were requested in FY2016-17 of the Community Development Department. The Community Development Department recorded 831 single-family residential starts and 332 approved commercial final inspections. Engineering inspectors require erosion and sediment controls unless the site is in a depression and stormwater would stay on site. Erosion and sediment controls have been required on grading/drainage permits, all work in right-of-way, and on commercial properties. In FY2016-17 there were 896 grading/drainage reviews. Engineering inspectors inspected for erosion and sediment controls on these, providing verbal warnings as needed. No stop-work orders for drainage were needed. The Stormwater Compliance Specialist along with other Utility staff made 106 construction site visits, attended 20 preconstruction meetings, and issued 1 stormwater violation letter; these events were recorded in the Inspection Tracking Log Book (see Appendix E).

Effectiveness. Both commercial construction activity and single-family home starts stayed elevated in FY2016-17 compared to prior years. To meet compliance goals, the Stormwater Compliance Specialist and Engineering/Building Inspectors provided verbal education, warnings, and delayed inspections to meet construction-site stormwater management goals. City staff reviewed roles and responsibilities to increase effectiveness but the work load is straining existing resources in both the Community Development and Engineering departments. In response, the newly hired Stormwater Compliance Specialist devoted a focus on construction site ESC inspections and post construction drainage inspections. The Stormwater Compliance Specialist has increased compliance effectiveness and helped Engineering and Building Inspectors with complaint response.

Task VI.4 Construction Site Education (MS4/UIC)

2017 CESCL Field Training.

In March 2017 the City of Bend hosted a two-day Certified Erosion Sediment Control Lead (CESCL) training course. An announcement flyer was emailed out to local contractors and engineers. The City had 29 sign-up for the class and 22 attendees. Roughly, half of the attendees were City employees and the other half were local engineers and contractors. The City contracted with Nathan Hardebeck, with Clean Water Technologies to provide the training and organize a hands-on erosion control BMP demonstration in the field. In order to make the class more applicable to our region, several local presentations were included with this training. Kyle Thomas,the City of Bend Construction and Right-of-Way Manager, gave a presentation on common erosion control issues that inspection staff are finding in the field. Wendy Edde, City of Bend Stormwater Program Manager, gave an overview on the City's regulations and erosion control requirements. Krista Ratliff with Oregon DEQ provided an update on the state 1200c permit. A copy of the presentations, sign-in sheets and a course evaluation summary have been included in Appendix E. Those completing the test at the end of the course earned a Certified Erosion and Sediment Control Lead designation, valid in Washington State and recognized in Oregon by the DEQ.

The City of Bend also hosted several Construction ESC related webinars in FY2016-17 (see Table 6-1 below). Copies of the webinar announcements, sign-in sheets and evaluations are available in Appendix E.

Table 6.1 Construction Site Training Summary

Spring Webinar Series		
Presenter	Webinar Training	Date
ASCE	Construction Stormwater Best Management Practices (BMPs)	December 20, 2016
ASCE	A New Approach to Application of Sediment Transport for Jurisdictional Assessment in the Arid Southwest	December 20, 2016

On a broader scale, the City prepared a City edition cable news segment on the Sediment Reduction program entitled "Reducing Sediment in the Deschutes River,

" that first aired in March 217 on cable TV, in City Hall, and is still available on the City's YouTube channel (see https://www.youtube.com/watch?v=r8r0LydZH_s). The City Edition segment on sediment has been viewed 112 times since posted in Spring 2017.

Effectiveness. Between the webinars and on-site Certified Erosion Control Lead (CESCL) training, the City exceeded its biennial training requirements for this task. The City will consider using a larger venue for future CESCL classes to accommodate more people. Some feedback was that some people wanted to see a shorter one-day class and that the field component was very useful.

Task VI.5 Participate in Regional Coordination Activities: Regional Stormwater Control Manual (MS4/UIC)

Developed regionally and refined in 2010, the Central Oregon Stormwater Manual (2010) has been incorporated into both the City's Design Standards and Construction Specifications and Bend Code Title 16.

Effectiveness. The COSM (2010) is now part of the City's development rules, referred to in both the Standards and Specifications and Bend Code Title 16.

Task VI.6 Performance Standards (MS4/UIC)

Performance standards have been completed and incorporated into the ISWMP 2022. The ISWMP 2022 (November 2012) was approved by DEQ as part of the WPCF-UIC permit issuance to begin in FY2013-14 and is being considered by the DEQ as part of the NPDES permit reissuance, expected to be a statewide general permit. A summary of initial implementation status of the Performance Standards is available in Appendix A.

Effectiveness. The City's implementing the new performance standards as part of the ISWMP 2022 and is in full compliance with the standards in FY2016-17. The City will review the ISWMP 2022 once NPDES permit conditions are known.

Tasks Completed (ISWMP 2022)

BMP VI-1. Implement the Stormwater Regulations (MS4 and UIC)

See ISWMP (2006) Task VI. 1 Evaluate and Update Regulatory Authority and Procedures (MS4/UIC).

BMP VI-2. Implement Performance Standards Related to Construction Site Controls (MS4 and UIC)

See ISWMP (2006) Task VI.6 Performance Standards (MS4/UIC).

Enforcement Actions

The City has the ability to provide education, warnings, delayed inspection and red tags (stop work orders) to violators. Most often, the Stormwater Compliance Specialist and Building/Engineering inspectors work to educate as part of standard operating procedure and this approach quickly resolves any potential issues. In FY2016-17, one formal violation letter was issued and multiple verbal warnings resulted in compliance without the need for escalation. These events were recorded in the Inspection Tracking Log Book (see Appendix E).

Summary Assessment of Effectiveness

The City has successfully implemented the tasks in this component. Staff has continued to focus on education and coordination efforts, both internally and externally to ensure effective and smooth implementation of Bend Code Title 16, the Standards and Specifications, and the Central Oregon Stormwater Manual. The City has improved the program this year with the integration of the newly hired Stormwater Compliance Specialist to handle ESC compliance tasks along with inspection needs. The adoption of Bend Code Title 16 provides adequate enforcement authority. Feedback from trainings is used to refine effectiveness and selection of future trainings. The City develops and distributes new education materials as the needs present themselves, and is working towards improving enforcement staffing. In FY2016-17, Utility staff made 106 construction site visits, attended 20 preconstruction meetings, and issued 1 Stormwater Violation Letter. The City is continuing to refine its enforcement plan as roles and responsibilities change due to workload, experience, record-keeping needs, and technological capabilities. Across departments, staff are noticing that uncovered loads appear to be contributing to the sediment problem, and this may be an important area to focus future efforts.

7.0 POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW AND REDEVELOPMENT

Introduction

The objective of the Post-construction Stormwater Management in New Development and Redevelopment chapter is to minimize the discharge of pollutants in stormwater from new developments and redevelopments within the City limits.

Tasks Completed (ISWMP (2006))

The following describes yearly tasks that have been completed, or are ongoing that were performed during FY 2016-17:

Task VII.1 Participate in Regional Stormwater Control Manual and Tailor to Bend (MS4/UIC)

The Central Oregon Stormwater Manual (2010) has been adopted as part of Bend Code Title 16 and the City's Standards and Specifications. Links to the COSM are available on the City's website.

Effectiveness. Obtaining a DEQ review of the revised COSM (2010) and adopting the manual as part of the City's Standards and Specifications and Bend Code Title 16 helped encourage its widespread use and provided the City enforcement authority to require its use. Other municipalities that have adopted the manual include Deschutes County and the City of Redmond, so it is serving as a regional guide. The COSM may need to be reviewed to consider DEQ's current risk-evaluation on stormwater underground injection controls and new post-construction control requirements coming out of the anticipated NPDES Phase II MS4 general permit once finalized. Team members briefly discussed this in FY2016-17 but decided an update at this time is premature especially given the status with the phase II permit.

Task VII.2 Operation and Maintenance (MS4/UIC)

As noted in the FY2007-08 Annual Report, City staff have determined that, in general, private developments are required to maintain private stormwater facilities and the City maintains City stormwater infrastructure. Maintenance responsibility for regional controls will be considered on a case-by-case basis.

City staff has incorporated long-term operation and maintenance considerations within Bend Code Title 16 (See Annual Report FY2011-12 Appendix A), Bend Code Title 16: section 16.15.040). The code requires all new commercial development to submit a signed private maintenance agreement that will be recorded on the title of the property (see FY2013-14, Appendix F for an example).

For City-owned facilities, City field staff continue to use the INFOR asset management software to assist with maintenance tracking and facilities assets management. Field staff also continues to conduct a review of public stormwater facilities to determine which need to be improved/replaced as part of their everyday maintenance activities. With the hire of the Stormwater Compliance Specialist in January 2017, the City has improved it's an intensive O&M verification program to identify existing deficiencies in public stormwater facilities. This effort included updating inspection sheets (see Task VII.3). The more intensive O&M verification program is tracked on Sharepoint.

On the private side, the City continues to use E-Plans for project review and electronic record keeping but inspects only on compliant. The city continued an intensive effort in FY2016-17 to better capture private stormwater facilities into their own database for easier retrieval and data analysis. Over 6,300 facilities have been entered into the database by the end of June 2017. The Stormwater Program has copies of both private stormwater plans and private maintenance agreements (37 to date) saved on Sharepoint by tax lot number.

Effectiveness. Having maintenance agreements are useful for implementing Bend Code Title 16. In the future additional guidance on proper maintenance, perhaps adding visuals to the maintenance descriptions in the COSM or other guidance, may help improve understanding of proper maintenance. Preventative maintenance routes have been established in the INFOR system, and are being used to schedule and track routine maintenance operations. With the addition of the Stormwater Compliance Specialist, in FY2016-17 24 public stormwater facilities have been inspected and outstanding maintenance and installation deficiencies have been identified. This shows a marked increase in number of inspections. The finding will help improve future maintenance on installation as program staff share findings with operations and engineering staff.

Task VII.3 Evaluate and Update Plan Review and Inspection Programs (MS4/UIC)

In FY2016-17, the City hired a Stormwater Compliance Specialist to improve inspection documentation of post-construction controls and lead the inspection program. Staff attendance at the Vegetated Private Water Quality Management Training hosted by Clean Water Services and Portland Community College in

June 2017 has helped provide guidance in program development. The Stormwater Compliance Specialist has trained and coordinated closely with building and private engineering inspectors.

Effectiveness. Although initial effectiveness of changes occurring as a result of passage of Bend Code Title 16 appear promising, the City is continuing to work through implementation of Bend Code Title 16 with respect to fine-tuning inspection and enforcement pathways given the significant reorganizations internally that continue as growth increases. The City has been monitoring efforts closely and has widespread support to work to refine and improve the processes given the changes occurring in the City. With the hire of the Stormwater Compliance Specialist, the City has developed more effective stormwater facility inspection forms along with an inspection tracking spreadsheet. Copies of inspection forms and an abbreviated copy of the tracking spreadsheet are available in Appendix F. These refinements to the inspection program are increasing effectiveness.

Task VII.4 Post-Construction Control Education (MS4/UIC)

Multiple City of Bend staff assisted with the planning of and provided the venue for the PNCWA 2016 pre-conference workshop “Build a Rain Garden”. On October 18th, the City hosted a City of Bend Stormwater tour for participants of the PNCWA 2016 conference held in Bend. The tour included visits to Franklin’s Corner, the Third Street underpass projects, and the Bend Park and Recreation Administration Building Stormwater Facilities. In FY2016-17, City staff provided input on the internal Waterwise Landscape Guide (http://www.bendoregon.gov/home/showdocument?id=29569), and the OSU Waterwise Gardening in Central Oregon guide (https://catalog.extension.oregonstate.edu/em9136/viewfile). This feedback resulted in the incorporation of the Stormwater Management Section of the OSU Waterwise Gardening Guide and the City Infiltration Plant-List developed by PAG members and local experts. For the City of Bend Waterwise landscape Guide, the feedback included the additions of rain gardens and permeable pavement in the infiltration planting plan figure and a two-page spread on stormwater management (see Appendix F).

The City continues to distribute Bend’s Better Site Design Walking Tour, which provides an approximately 3-mile walking tour in the Old Mill and Farewell Bend and Riverbend Park areas of better site design features that help improve water quality by means of low impact development techniques. Nineteen sites are noted on the tour including bioretention swales, reduced parking footprints, pervious asphalt, green roofs, and riparian buffers. The City’s Stormwater Compliance Specialist earned fifteen continuing education hours for attending the Vegetated Private Water Quality Management Training on June 21 and 22, 2017 (see Appendix F). Four City staff members attended ACWA’s Stormwater

Summit held at Lane County Community College on May 10, 2017.

The City provided several training opportunities associated with post-construction stormwater controls to internal staff and the public. Program Manager Wendy Edde attended NRPA Webinar *Green Infrastructure in Parks: Collaboration, Funding, and Community Engagement* on March 9th 2017. Several other City staff attended the CWP Webinar Training *Making Urban Trees Count* on June 21st 2017. Table 7.1 provides a listing of other trainings related to post-construction controls that the City either hosted or helped to sponsor and invited the public, via notifications to the City's Stormwater Liaisons, PAG and Stormwater Stakeholder email lists, to attend (see Appendix F unless otherwise noted for sign-in sheets and presentation notes).

Table 7.1 Post-Construction Control Trainings

Winter Webinar Series		
Presenter	Webinar Training	Date
ASCE	Permeable Pavement: Design Considerations and Tips for Avoiding Failures	December 20, 2016
Spring Webinar Series		
Presenter	Webinar Training	Date
CWP	Stormwater Contaminants of Emerging Concern	March 24, 2017

Staff continues to make available the following outreach guides on its website at bendoregon.gov/stormwaterbmp, and several are available through the Permit Center:

- Better Site Design Walking Tour Booklet (2013 update) and Points to Ponder
- Considering Stormwater at the Conceptual Planning Stage Brochure
- Example Drainage Plan—Single Family Residential (2013)
- Central Oregon Stormwater Manual (2010)
- One Backyard at a Time Video (Bend area examples excerpt)
- Oregon Rain Garden Guide
- Central Oregon Plants for Stormwater Facilities (May 2013 update)
- Stormwater Maintenance Agreement
- Links to EPA website low impact development materials

The City helped distribute "The Oregon Rain Garden Guide" and supplemental plant list for Central Oregon by providing copies at outreach events (i.e., Deschutes River Cleanup and Earth Day). The full color guide includes information specific to Central Oregon. Starting in February 2017, the Stormwater Public Advirsory Group began a special meeting series focusing on post-construction control options with increased density within the City. The first meetup included education presentations and tours related to green infrastructure and low impact development. See chapter 4.0 for more details.

Effectiveness. City staff successfully met the requirements of this task. Due to staffing shortages the City's Program Manager could not commit to speaking at the "Build a Rain Garden" workshop for PNCWA. The City was able to draw from the expertise of a PAG member to substitute, providing attendees hands-on experience, and an understanding of the importance of PAG support. Incorporating stormwater design considerations into the Water-wise Gardening in Central Oregon Guide (February 2017) and City of Bend Waterwise Landscape Guide helps users consider stormwater drainage and design earlier in the planning process, allowing for more opportunities to affectively address the issues in a sustainable manner. Coordinationg with water conservation efforts has proven useful and has increased effectiveness. Having continuing education credits available helps draw the engineering community to the webinar trainings that provide access to national expertise. The ASCE webinar on permeable pavements gave permeable pavers a 4/5 on a scale of 1-5 with 5 being excellent (see Appendix 6).

Task VII.5 Performance Standards (MS4/UIC)

Performance standards have been completed and incorporated into the ISWMP 2022. The ISWMP 2022 was approved by DEQ as part of the WPCF-UIC permit issuance with implementation. Implementation efforts are included in the Performance Standards implementation status, available in Appendix A.

Effectiveness. The City is on schedule with implementing the performance standards.

Tasks Completed (ISWMP 2022)

BMP VII-1. Implement the Stormwater Regulations (MS4 and UIC)

The City continues to focus its efforts this year on the implementation of both the Standards and Specifications and Bend Code Title 16. For example, stormwater engineering staff worked with a landscape architect to ensure success of low impact development into the Reed Market Improvement project given landscape establishment issues that have been occurring at the site that includes bio-swales and planter boxes along a Reed Market Rd. City stormwater staff continue to participate on the design team to address the stormwater runoff for the 14th Street project and the South Awbrey Butte Drainage Study. Staff continued to provide input on other CIP and internal maintneance projects as well.

The City is working to tailor its preferred post-construction facilities by area for inclusion in the next Standards and Specifications update.

Effectiveness: The City continues to implement post construction controls as part of retrofit projects, and was effective in securing budget increases to continue implementing the capital improvement projects outlined in the Stormwater Master Plan, adopted in August 2014. Delays in implementation area result of competing demands.

BMP VII-2. Implement Performance Standards Related to New Development and Redevelopment Site Controls (MS4 and UIC)

A summary of the implementation status for the Performance Standards incorporated into ISWMP 2022 and accepted by DEQ under the City's WPCF-UIC permit is included in Appendix A.

In FY2016-17, the City hired a Temporary Stormwater Database Technician to continue collecting information on the location of UICs and other stormwater facilities distributed within city limits on private industrial and commercial property. GPS coordinates and attribute data were entered into a spreadsheet to provide quick and easy access to stormwater facility location information in the case of an illicit discharge or emergency spill as well as to assist City field staff performing private stormwater facility inspections. Attribute information for these facilities includes a unique ID for each facility, a facility type, a site address, the source from which the facility location was derived, the date the information was entered into the database, who created that data, and property owner and contact information. While over 7,000 facilities have been entered into the system, the database is still in the process of being constructed and is estimated to be sustainably completed by August 2018.

Effectiveness: The City is currently on schedule with implementation of performance standards. The City met retrofit performance standards with the construction of Reed Market Project (phase two) work that is underway.

The City has successfully ramped up the process of conducting an overall inventory check for private stormwater facilities for non-single family residential properties. The inclusion of this information into the City's current datasets will provide City Staff and Emergency Spill Responders a better understanding of UIC and other onsite drainage facility locations, therefore improving water quality protection efforts.

The City also tried out a deepened >18inch catch basin in an area of town not draining to the river, for a sidewalk improvement project where stormwater grates were being changed out for improved bicycle safety. The City may consider maintaining these sites as a experimental project to see if the deepened catch basins are more effective than the regular catch basins.

Summary Assessment of Effectiveness

The City is on schedule in implementing the tasks in this section. Overall, City staff participated in both attending and providing multiple workshop presentations related to post-construction controls. The City has updated and actively implemented the development rules and legal authority to require and maintain adequate post-construction controls. In FY2016-17, the City hired a Stormwater Compliance Specialist to perform maintenance verification inspections of post-construction stormwater facilities. The City is implementing the performance standards and is meeting or exceeding the approved schedule. The City has been successful in securing additional funding to help fund the capital improvement projects described in the Stormwater Master Plan. In FY2016-17, the City hired a Temporary Stormwater Database Technician to collect information on the location of stormwater facilities distributed throughout city limits on private industrial and commercial properties. While it has been five years since the City has submitted the ISWMP 2022 the City is hesitant to update the plan until reviewing the next draft of the Phase II General Permit that DEQ expects to have out in FY2017-18.

8.0 *MUNICIPAL OPERATIONS AND MAINTENANCE ACTIVITIES*

Introduction

The objective of this component is to work with maintenance staff to maximize the removal of pollutants during routine maintenance and minimize the discharges of pollutants to watercourses and injection systems. Routine maintenance activities include: street sweeping, inspections and cleaning of storm drainage facilities and watercourses, and litter control. As of this writing the City stormwater system has 5,112 drywells, 976 drill holes, 4 drain fields, 194 swales, and 10,400 catch basins in addition to the over 40 miles of storm drain pipe, 14 miles of which drain to the Deschutes River. This component also includes reviewing corporation yard practices and making recommendations to improve the quality of stormwater runoff from these facilities.

Tasks Completed (ISWMP (2006))

The following describes ongoing tasks or tasks completed during FY2016-17:

Task VIII.1 Street Sweeping (MS4/UIC)


City Sweeper Downtown Bend.

The City continues to implement its Sweeping Operations Plan (see Appendix G for a copy of the most recent plan). The City is broken down into eight geographical sweeping areas, each area has four zones. Each zone requires approximately four days for a sweeper to complete. Routes are designed based on the street classification and community needs. Each Sweeper contains a map of the zone with the identified route boundaries. Sweeper operators are assigned zones on a daily/weekly basis and routes are assessed for accuracy and updated as needed.

In FY2016-17, the Stormwater Utility continued to fund three FTEs of seven FTEs sweeper positions due to the stormwater benefits of street sweeping. The three stormwater utility funded personnel focused on sweeping year around. Due to budget restrictions, the four Street funded FTEs are re-positioned during the

summer to assist with paving and ADA projects. During winter operations when the sweepers can access the streets, the four FTE street sweeper crew operate the sweepers as they are able given weather conditions (November to March) (see Figure 8-1).

The City continues to improve sweeping efficiency. In FY2016-17 the City used electronic reader boards to inform neighborhoods of the sweeping schedule and to help reduce the number of cars parked along the curb line. The City also developed new door hanger to inform homeowners on what they can do to keep the curb line clear for maintenance crews and street sweepers (see Appendix G for a copy of the door hanger). In FY2016-17 the sweepers traveled 18,239 miles and removed 16,108 cubic yards of material from the streets.

Figure 8-1. FY2016-17 Municipal Maintenance Sweeping

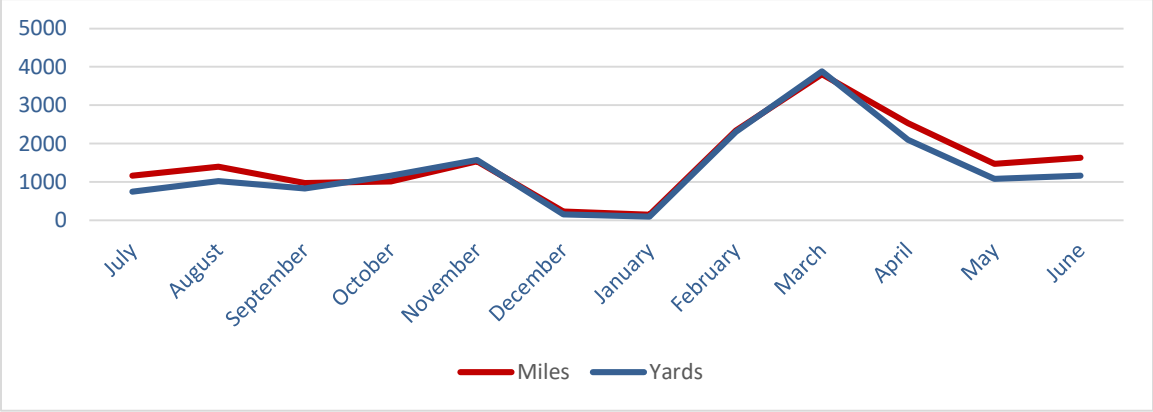
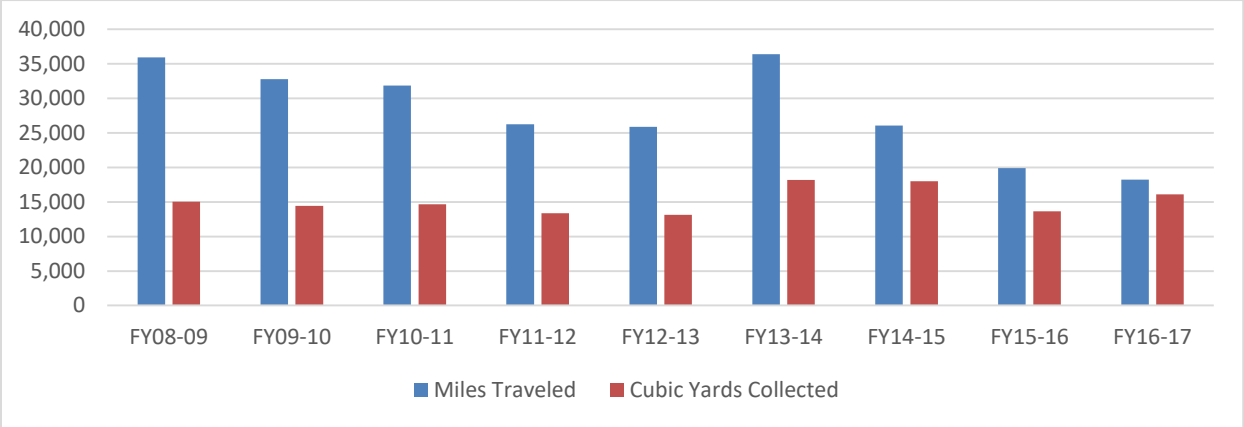


Table 8-1 FY2016-17 Municipal Maintenance Sweeping

Date	Miles	Cubic Yards
July	1160	748
August	1400	1024
September	974	828
October	1011	1160
November	1536	1572
December	233	156
January	150	100
February	2340	2303
March	3805	3881
April	2529	2098
May	1471	1078
June	1630	1160

Effectiveness. The City sweeping program collected 16,108 cubic yards of material in FY2016-17. The removal of this material reduces clogging of stormwater facilities and keeps pollutants out of the Deschutes River. The City is continuing to look for ways to improve sweeping efficiency such as reader boards, door hangers, and the consideration of callout system. The sweeper zones need to be smaller in size, to facilitate this new grid system the Street Supervisor is working towards developing new routes for the program. The amount of material removed is also related to the type of winter weather received and the quantity of traction material (cinders/basalt) that have been applied. This winter was exceptionally severe and broke several snow fall accumulation records. While sweeping is important throughout the City, sweeping in areas that drain to the river is the highest importance from a stormwater quality perspective because the river is listed for sediment/turbidity. Staff have asked that the level of service be increased in the river drainage with the new routes. Staff are also looking to measure effectiveness for both the proposed route changes and the purchase of a new sweeper, scheduled for FY2017-18.

Figure 8-2. Sweeping Summary from FY2008-09 through FY2016-17



Task VIII.2 Parking Lot Sweeping (MS4/UIC)

The City owns and is responsible for sweeping five parking lots throughout the City: the downtown parking structure, the Mirror Pond parking lots, the Brandis lot at Greenwood and Bond, and the Troy Field parking lot. The Street department is responsible for sweeping public roads and both corporation yards. Facilities is responsible for sweeping parking lots and the parking structure. In the early years of the stormwater program, the City formed a Clean Streets and Parking Lots/Litter Task Group within Public Works. This group worked to determine monitoring protocols and examine ways to improve effectiveness of the entire sweeping program. The City Stormwater Program Manager and the Sweeping Supervisor continue to meet and coordinate on sweeping efficiency. Parking lot sweeping was not an issue this year. The City has been able to improve its

proportion of yards of material collected per road mile traveled (see Figure 8-2). See also Task VIII.1.

Effectiveness: Crews have not noticed excessive litter or sediments within the parking lots. See Task VIII.1 for more on effectiveness. The City continues to improve sweeping efficiency over time.

Task VIII.3 Litter Collection and Material Disposal (MS4/UIC)

The City continues to provide street-side litter receptacles in the downtown core area that are emptied by a local garbage/recycling company three times per week in the winter and four times per week in the summer. The Downtown Bend Business Association (DBBA) maintains these receptacles with routine cleaning and repair on an as-needed basis per an MOU with the DBBA and the City. For more information on the City's relationship with DBBA to protect stormwater quality in the downtown area, see the City Edition "Bend Downtown Stormwater" that ran during February 2015 and remains available on the City YouTube channel:www.youtube.com/watch?v=3eE6d2eH3Y&index=23&list=PLufJOv4LpbfAT2WkINy89WDCrQ9YdFBkE. City staff prepared a newsletter release in FY2016-17 encouraging residents to properly tree limbs for improved street sweeper access and was also included in the July-2017 Our City Newsletter available on the Citys website at: www.bendoregon.gov/Home/ShowDocument?id=31258 (or see Appendix G).

The Street Division right-of-way and landscape maintenance crews collect litter as a part of their routine maintenance. Work orders are tracked using Infor EAM asset management system. The Street Division also administers an Adopt-A-Road program and a Volunteer program whereby citizens help with weed abatement and collect litter. The City has participated in developing a volunteer program called Bend Beautification. Street sweepers are used to pick up litter on paved surfaces. Large amounts of debris, deposited on streets, alleys, or other City properties are removed by personnel using the necessary equipment needed. Maintenance supervisors do not have authority to enforce compliance, but can notify code enforcement personnel with all pertinent information.

Stormwater crews continued to help at the annual "*Deschutes River Cleanup"* Stream Stewardship event held in August 2016. Crews collected trash bags that were filled by the volunteers and transported them to dump trucks parked in the staging area. This year the event had approximately 200 volunteers, removing a total of 67 garbage bags of weeds, trash and debris from alongside the river and 25 bags of in stream debris for a total of 1,400 lbs. as reported by the Upper Deschutes Watershed Council.

In the past several years, City staff had responded to several grease storage container spills in the downtown areas. In response to these spills, the City

adopted Bend Code 11.16.120 in FY2015-16. The new Code requires that all grease collection and recycling companies use secure, lockable and leak proof containers. As a result of the code change, In FY2016-17 the City did not receive a single grease spill report. With the heavy winter snow, the Citys street cleaning efforts were highlights on KTVZ`s "C.O. streets see trash uncovered by melting snow" February 13, 2017 http://www.ktvz.com/news/co-streets-see-trash-uncovered-by-melting-snow/332441755

Effectiveness. The City effectively assists in the collection and disposal of litter in the Downtown area and throughout the City by picking up trash from landscaping and stormwater facilities. The City also participates in and sponsors The Upper Deschutes Watershed Council, Deschutes River cleanup event that focuses on trash removal. The adoption of Bend Code 11.16.120 significantly reduced the number grease spills.

Task VIII.4 Landscape Maintenance Practices

City landscape crew do not use restricted use herbicides. Training is important and City landscape head Jimmy Hall attended the 2016 Oregon Department Agriculture weed symposium. City staff worked with the OSU extension program to update the water wise landscape guide that was published in February of 2017. A copy of the guide is available online at https://catalog.extension.oregonstate.edu/em9136/viewfile.
This guide includes a section on stormwater facility planning and sizing, shows several low impact development examples and incorporates the Citys approved plants suitable for bio-retention/infiltration basins. This plant list was created taking into account maintenance consideration as well.

The City's water conservation group continued its sprinkler inspection program, offering free sprinkler inspections for City of Bend utility customers. In FY2016-17 Staff performed over 200 inspections, reducing water use and adjusting sprinkler heads to eliminate overspray onto city streets and sidewalks. In addition to conserving water, this program has also helped reduce dry weather irrigation flows into the City streets. They also put on a workshop on February 21, 2017entitled, "Curb the Flow – Streetscaping in Bend" to keep water off the street (see appendix G).

The City of Bend Stormwater Compliance Specialist attended a Vegetated Water Quality Management Certification Course hosted by Portland Community College and Clean Water Services. Copy of the certification is provided in Appendix F. This is the second staff member in the stormwater section that has received this training.

City capital improvement projects have incorporated stormwater surface controls, including Reed Market, Murphy Road Improvements, and the G.O. Bond

roundabouts. See the City of Bend completed infrastructure projects for more information on recently completed projects (http://www.bendoregon.gov/city-projects/city-infrastructure-projects/recently-completed-projects) .

Effectiveness: The City is effectively installing new stormwater surface controls in right-of-way areas, handling stormwater via low impact development standard measures incorporated in the Standards and Specifications and the COSM. At present the City has 193 swales. The City has implemented improved practices such as plant species selection and concave medians and bioretention that incorporate stormwater as a design element. The City is working to ensure proper maintenance during warranty in a standard manner, and necessary communication upon change of responsibility to the stormwater utility for ongoing maintenance. In FY2016-17 the City Stormwater Compliance Specialist inspected 24 swales and has identified several needed maintenance repairs. Once all of the inspections are completed the repairs will be prioritized and corrected as budget allows.

Task VIII.5 Improved Catch Basin/Storm Drain Facilities Cleaning (MS4/UIC)

Staff continued work to identify opportunities and improve maintenance practices. Stormwater field crews use the Infor system to manage swales, catch basin and UIC maintenance records. In FY2016-17, the four dedicated stormwater operations staff along with two seasonal temporary staff maintained 12,203 catch basins, 7,039 UICs (dry wells and drill holes) and removed 502 yards of material for these stormwater facilities. In addition to routine cleaning and inspection, staff completed 32,554 work orders, including tasks such as catch basin cleaning, catch basin replacements and unplugging clogged drill holes. Stormwater Crews also maintained City swales/detention basins/bioretention quarterly, performing over 760 maintenance inspections.

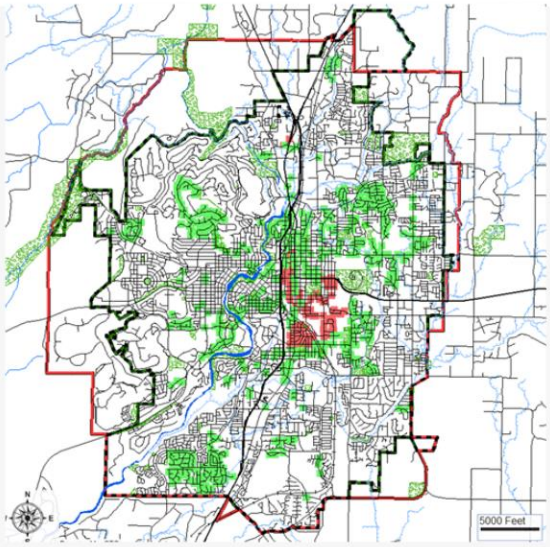
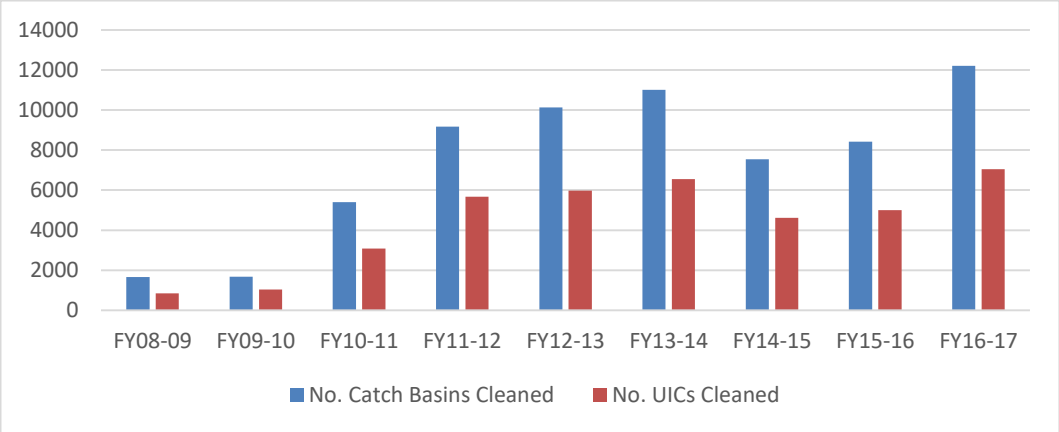


Figure 8-3. Drill Hole Shut-off Map
(Areas in red have a valve installed)

Figure 8-4. Storm Facility Cleaning from FY2008-09 through FY2016-17



As the number of landscaped stormwater facilities increase, stormwater crews are having to spend more time on landscape maintenance. This year in an effort to keep current stormwater maintenance schedules, staff contracted with a local landscape business to maintain several vegetated stormwater facilities. That allowed crews focus on catch basin and UIC cleaning (see Figure 8-3)

The City continues to maintain a Contech Stormfilter that is installed in Newport Avenue at the west end of the Newport Bridge, replacing the filters as needed. In FY2016-17 staff temporally held off on the installation new gross pollutant traps on drill holes and focus maintenance effort on retrofitting open-top drywells. Work on the drill hole retrofits will continue in FY2017-18. The drill hole retrofits have proving to be effective at reducing clogging and preventing large size pollutants from entering the drill hole.

In FY2015-16 City staff began work on the Awbrey Butte Drainage study. The City hired a consultant to model the drainage flows for this area. In conjunction with this project City crews cleaned and CCTV inspected all of the piped system within the drainage basin. Crews also collected other data, including curb height and infiltration rates for existing UICs within the drainage basin.

Effectiveness. The additional staff, along with the INFOR software and the use of private contractors has continued to increase efficiency and effectiveness of the City's stormwater program to clean the catch basins, drill holes and dry wells, removing more than 502 yards of material. The maintenance levels have continued to increase (see Figure 8-3) making this year one of the most effective cleaning years to date. Additionally, installation of gross pollutant screens on existing drill holes and the installation of open topped drywell inserts has helped

prevent clogging and increased the efficiency in cleaning these types of UICs.

Task VIII.6 Spill Prevention, Response Materials, and Training (MS4/UIC)

Stormwater crews began implementing a drill hole valve installation program in FY2013-14. The shut-off valves allow stormwater crews to safely block the flow during a spill to a drill hole. In FY2016-17 staff temporally held off on the installation new gross pollutant traps on drill holes and focus maintenance effort on installing Drywell-Catch Basin Inserts on direct injection drywells. Staff installed 20 Drywell-Catch Basin Inserts at high risk locations within the right-of-way and at City cooperation yards. The City plans to continue both the drill hole and drywell retrofit programs in FY2017-18.

Staff continued to maintain simple spill kits in each of the street and stormwater vehicles. Streets and stormwater field crews are trained annually in spill prevention and response and in illicit discharge prevention (see Appendix D). In FY2016-17 City expanded the spill kit program and purchased spill kits for all utility vehicles. Distribution will take place in FY2017-18. Spill containers are also present at both Corporation Yards (15th and Boyd Acres).

The City keeps one sander loaded year round to serve for spills, as the sand can be used to make a temporary berm to help contain the spilled materials. The City also maintains two spill containment trailers that are stocked with absorbents, booms, pipe plugs and other related items in order to respond to larger spills. They are located at each corporation yard for easier access throughout town.

In FY2013-14 the City developed a series of 13 tailgate trainings; each training packet includes an informational fact sheet/ handout. The tailgate trainings were upload into the City COMPLI program. City staff are required to review the fact sheets annually online and complete a short quiz for each. Staff can work the completion of these into their schedule, given ample time before deadlines, and this improves tracking and accountability. In FY2016-17 the City began phasing out the use of COMPLI and began migrating these trainings over to a new training software platform Target Solutions.

The City continues to require all new Utility, Streets, and EIPD employees to complete the training entitled “Municipal Storm Water Pollution Prevention—Storm Watch.” This consists of reviewing online videos and completing a short quiz covering best management practices for: good housekeeping & spill prevention, vehicle and equipment washing; vehicle and equipment maintenance; spill reporting and response; street maintenance; outdoor storage of materials and wastes; and landscaping and lawn care.

The City uses integrated pest management (IPM) techniques for weed control but does track its weed control program pesticide use; the reporting information

that is provided yearly to the State is available upon request. Stormwater crews carry storm drain plugs and absorbents for spill response.
Effectiveness. Installing drill hole valves and Drywell-Catch Basin Inserts on high risk UICs helps reduce spill impacts and risk because staff are given the ability either contain the material in a sump or close off the drill holes during a spill incident. The spill trailer allows for staff to contain and clean up larger spills. Training helps staff understand how to respond to spill situations, when to report a spill and the importance of protecting storm drain from spilled material. With the break-up of Public Works into three individual departments, additional coordination work remains necessary to ensure that training across the departments is maintained.

Task VIII.7 Illicit Dumping (MS4/UIC)

Areas with high pedestrian traffic tend to have higher levels of gross pollutants (trash). As a result, stormwater crews sweep the downtown corridor where there is high pedestrian traffic at a higher rate than other areas of town. City staff are trained to report illicit discharges to the appropriate stormwater personnel (see also Task V-2). Staff reported 17 of the 32 reports of illicit discharges reported in FY2016-17. The City continues to focus outreach efforts on its "Clean Water Works" campaign and storm drain marking program (see the Public Education and Public Participation chapters of the annual report for more information).

The City distributed kids activity guides, highlighters and crayons for the July 2016 Quest at the Fest event. The materials include a link to the city website where they can report illicit dumping.

Effectiveness. City staff have implemented educational and inspection best management practices to help reduce the number and severity of illicit dumping incidences. Every storm drain facility is inspected annually (see Task VIII.5) by stormwater crews and examined for evidence of illicit discharges. Increased education on illicit discharges has led to increased calls from both citizens as well as City staff, which get investigated and addressed (see Chapter 5).

Task VIII.8 City-owned Corporation Yards, Industrial and Commercial Facilities (MS4/UIC)

City staff continued to conduct municipal self-audits to improve water quality on corporation yard sites, performing quarterly inspections at both the Boyd Acres and 15th Street. Staff complete an inspection checklists during the regularly-scheduled safety inspection (see Appendix G for an example inspection). Staff began to conduct these inspections in FY2010-


Installed Drywell Catch Basin Insert at The Boyd Acres Yard.

11.

In September 2016 the underground fuel tanks and above ground pumps at the Pilot Butte Campus (On the east side of the building) were removed. The fueling pad was previously uncovered, posing a risk to stormwater run-on and spills. In FY2016-17 stormwater crews installed three Drywell-Catch Basin Inserts in all of the open toped drywells at the Boyd Acres Corporation Yard. The insert settles out the heavy solids and contain floatables oils.

Effectiveness. The City has been effective in conducting corporation yards quarterly inspections and initiating discussions with appropriate staff to improve practices as needed. The City has also take steps provide basic pre-treatment on open grate UICs at the Boyd Acres facility.

Task VIII.9 Detect and Correct Cross-connections and Leaks (MS4/UIC)

Beginning in FY2013-14, City crews collect CCTV inspections data on all new stormwater pipes both when installed and at the end of the warranty period. The crews verify that storm pipes are installed per the approved plans. This initial pipe survey data help provide base line information and will allow for quicker identification of illicit connections in the future. In FY2015-16, the City completed a comprehensive CCTV pipe inspection for the Awbrey Butte Drainage study, and no sewer illicit connections were found. In addition to the CCTV pipe inspections, stormwater staff are trained to look for illicit connections as part of routine zone maintenance. The City found no illicit connections in FY2016-17.

In a separate project that will reduce the potential for drinking water pollution and septic cross connections, the City is installing a South East Sewer Interceptor. The project has the potential to eliminate 1,000 septic systems of the estimated 2,800 spices systems in operating within City limits. Properties within 300 feet of a sewer line are required to connect when there onsite septic system fails.

Effectiveness. Implementing CCTV inspections for stormwater together with smoke test inspections in the sanitary sewer have been effective for ensuring and cross-connections are addressed.

Task VIII.10 Promote Commute Alternatives for Municipal Employees and the Public (MS4/UIC)

The City also continued its transportation demand management program (TDM) to encourage alternative modes of transportation and to reduce single occupancy vehicle trips. City staff are offered $60 or the equivalent in time off for every 20 trips using alternative transportation. The program is coordinated through Commute Options (see Appendix G). The City has a page setup for staff with

information on different type of travel—guidance on setting up carpools, bicycle riding, etc, and information on how to sign up for the TDM program. In FY2016-17 this effort included the Bike More Challenge, a state wide program held in June by the Street Trust. Also noted in the January 2017 City Newsletter, the League of American Bicyclist named the City as a "Bicycle Friendly Community" www.bendoregon.gov/Home/ShowDocument?id=29192 (or see appendix G)

Effectiveness. In FY2016-17 the City continued to promote the TDM program, and electronic reporting through the Oregon Drive Less Connect website. City staff efforts saved 2,892 gallons of gas. The Oregon Drive Less Connect website tracker states that the statewide program has saved $43,965 gallons of gas, 173,149 trips, 1.4 million miles not driven alone and 888,348 lbs. of carbon dioxide saved presumably across the state. (see http://www.commuteoptions.org/your-options/drive-less-connect/). Table 8-2 provides City of Bend employee statistics.

Table 8.2
FY2016-17 City of Bend TDM Summary

User Travel Data	Jul-Sept 2016	Oct-Dec 2016	Jan-Mar 2017	Apr-June 2017	Fiscal Year 2016-17 Totals
Number of Users Joined Network	8	2	6	11	27
Total Number of Users	226	230	237	247	N/A
Total Active Users	130	113	107	118	N/A
Total Inactive Users	96	117	130	129	N/A
Non SOV Miles Logged	29,985	7,921	30739	30,004	98,649
Total Trips	4,342	1,122	3771	4,830	14,065
Bike trips	2,555	135	504	1,984	5,178
Bus trips	38	23	83	53	197
Carpool trips	1,061	516	1681	1,160	4,418
Compressed Work Week trips	98	26	80	91	295
Other trips	0	4	2	8	14
Telework trips	56	30	87	66	239
Vanpool trips	0	-	0	-	0
Walk trips	534	388	1334	1,468	3724
Savings					
Carbon Dioxide (lbs)	18,979	4,279	16907	18,604	58,769
Gasoline (gal)	935	210	829	918	2892
Monetary savings ($)	$7,153	$1,614	6376	$ 7,014	$22,157
Ridematch Statistics					
Ridematch search performed	97	100	104	104	104
Ridematch search with no result	71	74	78	78	78
Ridematch requests sent	13	13	13	13	13

Task VIII.11 Performance Standards (MS4/UIC)

Performance standards have been completed and incorporated into the ISWMP 2022. The ISWMP 2022 was approved by DEQ as part of the WPCF-UIC permit issuance and was scheduled to begin in FY2013-14. The City is meeting the baseline requirements on schedule. A summary of performance standards and initial implementation status is available in Appendix A. City staff have developed and distributed training fact sheets to help explain performance standards and best management practices in a manner. In FY2015-16 the Performance Standard Trainings were uploaded into the Compli system, allowing the City to better track what staff have been trained. See Table 8.3 for the total number of utility staff trained by performance standards section in FY2016-17. The City is in the process of migrating performance standard trainings to a new software platform called Target solutions. The City anticipates completing this migration in FY2017-18.

Table 8.3
FY2016-17 Compli Performance Standard Trainings

Performance Standard Training Section	# of Staff Completed
Utility / Road Repair and Maintenance	113
Concrete Use and Disposal	116
Vehicle and Equipment Washing	144
Winter Road Care	32
Leaky Equipment and Fueling Training	145
Paint Use and Disposal	145
Pressure Washing Surface Cleaning Fact Sheet	116
Spill Prevention Control and Cleanup	144
Stormwater Pollution Prevention	146

Effectiveness. The City is effectively implementing the new performance standards as part of the ISWMP 2022, having met the initial standards scheduled to be met during F2013-14. The City met its goal of completing the performance standards for inclusion in the draft ISWMP 2022 and implementation efforts are progressing effectively.

Tasks Completed (ISWMP 2022)

BMP VIII-1. Street Sweeping (MS4 and UIC)

See ISWMP (2006) Task VIII.1 Street Sweeping (MS4/UIC).

BMP VIII-2. Implement Performance Standards (MS4 and UIC)

See ISWMP (2006) Task VIII.11 Performance Standards (MS4/UIC).

BMP VIII-3. Landscape Maintenance Practices (MS4 and UIC)

See ISWMP (2006) Task VIII.4 Landscape Maintenance Practices.

BMP VIII-4. Improved Storm Drain Facilities Cleaning (MS4 and UIC)

See ISWMP (2006) Task VIII.5 Improved Catch Basin/Storm Drain Facilities Cleaning (MS4/UIC).

BMP VIII-5. Promote Commute Alternatives for Municipal Employees (MS4 and UIC)

See ISWMP (2006) Task VIII.10 Promote Commute Alternatives for Municipal Employees and the Public (MS4/UIC).

Summary Assessment of Effectiveness

As demonstrated herein, the City has been able to refine its collection and cleaning programs to be more efficient. The City has also been effective in installing several new landscaped drainage controls in the right-of-way. Crews are effectively maintaining the system, and are making improvements to existing drill holes to prevent both large scale pollutants from entering the hole as well as to include emergency shut-off devices in the most high-risk areas to help facilitate quick and safe closure in the case of an emergency spill. Outreach and coordination to ensure pollution prevention at corporation yards continues and the City is working to be more effective with its staff trainings by incorporating Compli. The TDM program continues to be a success as well.

9.0 MONITORING

Introduction

As a Phase II NPDES permitted community, the City of Bend is not required to monitor stormwater discharges that drain to the river, but is required to monitor stormwater drainages to UICs as part of its WPCF-UIC permit, received in May 2013. Early in 2004, the City and the Upper Deschutes Watershed Council (UDWC) began a multi-year monitoring program to gather data on the presence or absence of pollutants of concern in the Deschutes River within the Bend Urban Growth Boundary (Deschutes River Miles 172, and 159). This baseline report was completed in FY2009-10.The baseline data of the Deschutes River monitoring study will be useful to compare results of overall river health over time to help illustrate overarching effectiveness of pollution prevention efforts.

Task Completed (ISWMP (2006))

Task IX.1 Monitor Stormwater Discharges to the Deschutes River (MS4)

In FY2009-10, through a combined effort with the Upper Deschutes Watershed Council, the City completed the City of Bend Ambient Water Quality Monitoring project. This project focused on studying the diurnal, seasonal and annual variations of pollutants of concern in the river and Tumalo Creek. As part of the multi-year study, City staff conducted monitoring on the Deschutes River and Tumalo Creek just upstream, within and downstream of the City's UGB using grab sampling and continuous temperature monitoring at 16 stations, and continuous multi-parameter monitoring at up to 3 stations. (See Annual Report FY2009-10 for additional information).

In addition, the City of Bend Laboratory collects samples for and performs analysis of both routine river samples and stormwater samples over 8 months of the year for the following constituents:

Temperature
pH
Dissolved Oxygen
Conductivity
Turbidity
Total Dissolved Solids
Total Nitrogen
Total Phosphorus
Nutrients

Escherichia Coli and Total Coliforms

Since September of 2005, the City has deployed multi-parameter submersible sondes at locations upstream and downstream of the City's stormwater outfalls. The purpose for these sondes is to detect changes in river water quality resulting from storm events. The sondes have been in place for significant storm events. The parameters monitored were pH, temperature, conductivity, turbidity and dissolved oxygen. More data and a more intensive data analysis will be necessary to determine if there are any significant stormwater impacts on river water quality, especially with respect to the nitrogen regime. Sondes are deployed during the winter rainy season as well as during the summer.

The City has continued to monitor in FY2016-17. The City annually provides the raw ambient water quality monitoring data to the local DEQ office for their use and consideration.

Effectiveness. The completion of the multi-year monitoring report in FY2009-10 provides the City a useful document for understanding baseline conditions from which the City can compare with future studies to determine ultimate effectiveness of its MS4 stormwater quality programs. Once analyzed the data should help distinguish trends over time to the ambient water quality.

Task IX.2 Enhanced Drinking Water Well Monitoring (UIC)

The City continues to monitor drinking water quality weekly and meet drinking water requirements under the Safe Drinking Water Act through regular well monitoring. The results of this monitoring are summarized in the City's separate yearly drinking water quality annual report, available at www.bend.or.us/index.aspx?page=205, which includes mention of stormwater pollution prevention efforts as well.

The City stormwater and water quality laboratory staff are all under that Water Quality Manager, and staff coordinate as needed to address monitoring issues.

Effectiveness. The City is meeting the Safe Drinking Water Act groundwater requirements through its regular well monitoring. The City has completed the Water Master Plan, and baseline river monitoring analysis and continues to collect data to help determine water quality changes over time.

Task IX.3 Stormwater Monitoring for UICs (UIC)

The City stormwater and water quality laboratory staff continued meeting as needed and these meetings serve as the enhanced monitoring task group, as well as addressing other monitoring issues. The City developed and is

implementing a stormwater monitoring plan, last updated in October 2016 as part of the WPCF-UIC permit issuance.

In FY2016-17, the City continued the use of the Nalgene stormwater sample system at six UIC locations throughout the City. Stormwater staff closely monitors potential precipitation events to target efforts to ensure enough precipitation is present to collect a sample. A summary of the City's stormwater monitoring data collected in FY2016-17 is included in Appendix H.

The City met its goal of collecting two stormwater samples at each of the six sample locations identified the monitoring plan. The City deployed samplers for two rain events and three additional deployments at the Ladera site. Staff had a difficult time collecting enough runoff from the Ladera site to fill the sample container.

City staff deployed two flow monitors during the sampling season, one at Empire and the other at Simpson. The flow monitors send out a text message to monitoring staff when flow is detected or when the unit needs new batteries. The flow data is uploaded to a web based viewer, FlowLink Global. While the data is useful, the upkeep on the batteries and sensors calibration is time consuming given the amount of flow the City receives. The City revised its UIC monitoring plan in October 2016, making flow monitoring an optional task as staff time allows.


Staff deploying a Nalgene Sampler at the Bend Airport.

Effectiveness. This program is continuing to provide the required data needed for the stormwater quality management program for both the river and UIC disposal. All analytes monitored were within compliance levels.

Task IX.4 Performance Standards (MS4/UIC)

Performance standards have been completed and incorporated into the ISWMP 2022. The new ISWMP 2022 was submitted in December 2012 and approved by DEQ as part of the WPCF-UIC permit issuance. Performance Standards and implementation status is available in Appendix A.

Effectiveness. The City continues to effectively implement the performance standards for monitoring as part of the ISWMP 2022 (see Appendix A).

Tasks Completed (ISWMP 2022)

BMP IX-1. Monitoring of the Deschutes River (MS4)

See ISWMP (2006) Task IX.1 Monitor Stormwater Discharges to the Deschutes River (MS4).

BMP IX-2. Stormwater Monitoring for UICs (UIC)

See ISWMP (2006) Task IX.3 Stormwater Monitoring for UICs (UIC).

BMP IX-3. Implement Performance Standards (MS4/UIC)

See ISWMP (2006) Task IX.4 Performance Standards (MS4/UIC).

Summary Assessment of Effectiveness

The City has successfully developed and currently implements a UIC monitoring plan tailored to Central Oregon climate and challenges. The City has increased the effectiveness of its stormwater monitoring efforts through the use of automatic grab samplers in conjunction with grab samples.

♦ 10.0 *UNDERGROUND INJECTION CONTROLS* AND *DRINKING WATER PROTECTION AREA INVESTIGATION, DELINEATION AND MANAGEMENT*

Introduction

This chapter covers reporting of activities listed under Chapter 10 of the Integrated Stormwater Management Plan 2022 entitled "Underground Injection Controls," and Chapter 10 of the original ISWMP (2006) entitled "Drinking Water Protection Area Investigation, Delineation and Management." One of the highest priorities for the City is protecting its drinking water wells from contamination. To do this, the City needs to know where and how it should focus its protection efforts and to meet Underground Injection Control (UIC) requirements that are protective of groundwater. The purpose of this section is to provide the information the City needs to do this, especially with respect to the City's stormwater underground injection controls (UICs). For this reason, the title of this chapter changes between the Integrated Stormwater Management Plan (2006) and the ISWMP 2022, from "Drinking Water Protection Area Investigation, Delineation and Management," to "Underground Injection Controls," respectively. This chapter of the annual report covers both the ISWMP (2006) and ISWMP 2022 respective chapters.

Tasks Completed (ISWMP 2006)

The following describes yearly tasks that have been completed, or are ongoing that were performed during FY2016-2017:

Task X.1 Drinking Water Protection Area Delineation (UIC)

The City completed its Drinking Water Protection Area Delineation for City wells in FY2010-11 (See FY2010-11 Annual Report Appendix I).

Effectiveness. The City successfully completed the development of new/refined well head protection area delineations for use in its required Source Water Assessment, and has completed the Source Water Assessment including updating the potential contaminant source database.

Task X.2 Drinking Water Protection Plan (UIC)
The focus of this task is to identify real and potential contaminant sources within the refined Drinking Water Protection Areas (DWPAs), designate which are private and public sources of potential pollutants, and develop and provide

targeted educational materials minimizing potential contaminant sources for those agencies, businesses and residences within the revised DWPAs. This task became even more important after the DWPA project significantly changed the DWPAs. In FY2010-11 through FY2011-12, the City applied for and received a $30,000 grant to update the potential contaminant source inventory and to perform a susceptibility analysis to prioritize protective measures that might be taken to minimize the risk to groundwater. The PCS inventory and susceptibility analysis was completed in October of 2013. The report was reviewed and accepted by the Oregon Health Authority Drinking Water Program. This year the City's focus was updating the Source Water Assessment for the City's drinking water watershed west of the City. This surface watershed is protected from urban land uses.

The City distributes and makes available on its website two ACWA brochures focusing on UIC pollution prevention—one for residential and one for commercial/industrial users.

Effectiveness: The City is continuing to improve its understanding of its groundwater and stormwater systems to best be able to target efforts to protect drinking water. The City continues to provide education on the importance and methods to protect water quality (see ISWMP 2022 UIC tasks, described below, and the education–related and illicit discharge chapters of this annual report for more details).

Task X.3 Groundwater Vulnerability Study (UIC)

The City submitted and DEQ reviewed and accepted the study entitled "Pollutant Fate and Transport Model Results in Support of the City of Bend UIC WPCF Permit – Groundwater Protectiveness Demonstration and Proposed EDLs" in FY2011-12 (see http://www.deq.state.or.us/wq/uic/docs/template/BendReport.pdf or Appendix I of the FY2011-12 annual report for a copy of the report).

As part of the City's WPCF-UIC permit, the City is required in the 5th year (FY2017-18) to examine emerging pollutants. In anticipation of this, as co-chair of the ACWA Groundwater Committee, the City's Stormwater Program Manager helped set up a meeting of statewide agencies to examine the issue, focusing on pesticides (November 2017). City staff also attended a Center for Watershed Protection webinar, "Pollutants of Concern," on March 24, 2017 to check for overlap with surface water pollutant concerns. (See Appendix I)

Effectiveness: The City has completed the groundwater vulnerability study and received a letter of acceptance from DEQ on February 13, 2012.

Tasks Completed (ISWMP 2022)

The following describes yearly tasks that have been completed, or are ongoing that were performed during FY2016-17:

BMP X-1. Complete Systemwide Assessment (UIC)

The City completed the Systemwide Assessment (SWA) and submitted the documents to DEQ in December 2012 as part of the WPCF-UIC permit issuance package that ultimately resulted in the City receiving its first WPCF-UIC permit. A copy of the UIC Systemwide Assessment is available upon request.

System Wide Assessment - Follow-up Tasks
The Systemwide Assessment suggested follow-up tasks that have mostly been completed related to (a) finalizing drywell depth measurements; and (b) periodically reviewing the State's database or otherwise capturing new drinking water or irrigation water well data (see FY2013-14 and FY2014-15 annual reports for more information). The current drywell database captures depth measurements and is included in Appendix I. The City has continued to track new private wells installations within the City limits or close enough to impact City UIC setbacks. About eight wells were found but know within the City limits. The closest was about 500'-600' East of Shirley Ct, Near Hwy 20 on the east side of town. The 500' buffer therefore would be outside City limits.

In FY2016-17, the City began working with other statewide municipalities and agencies to begin to address the emerging pollutant analysis portion of the UIC permits. The City received direction from DEQ that the focus should be on pesticides, and City staff took an active role in coordinating other municipalities to prepare a cost-effective pollutant fate and transport model analysis for emerging pesticides that began in the spring 2017. The work is expected to be completed in September 2015 for submittal in the 5th year of the permit.

Effectiveness: The City successfully completed the systemwide assessment that was accepted by DEQ who issued the City's WPCF UIC permit in May 2013. The City is using the systemwide assessment to help focus efforts for UIC upgrades. The City is experiencing significant cost savings and anticipates an improved work product by teaming with other municipalities to conduct a substantial fate and transport model for emerging pollutants. The City continues to have a program to install additional spill closure valves in additional high risk areas at an average rate of 15 per year (see BMP X-3) but this fiscal year the team put its focus on installing catch basin inserts for open grate drywells instead. Additionally, the City is yearly tracking installation of new wells.

BMP X-2. UIC Registration (UIC)

A copy of the City's UIC database is submitted with the annual report (see Appendix I). See also Chapter 2.0 (ISWMP 2006) Task II.6 UIC Registration (UIC), Table 10.1 and Appendix I for a summary of new public UICs installed in FY2016-17. The Install Date is the date on the final plans brought to the GIS mapping department. Table 10.2 provides a summary of UICs decommissioned

in FY2016-17 and Table 10.3 provides a summary of UICs expected to be registered in FY2017-18 or beyond and Table 10.4 provides a summary of UICs expected to be decommissioned in FY2017-18 or beyond. City staff discovered one existing drywell (DDW010559) that was previously unmapped.

Table 10.1 New City of Bend UIC Installation Summary (those recorded in FY2016-17)

Facility ID	Install Date	Location Description
DDW010437	5/26/2016	Eastridge Subdivision
DDW010438	5/26/2016	Eastridge Subdivision
DDW010439	5/26/2016	Eastridge Subdivision
DDW010443	5/26/2016	Eastridge Subdivision
DDW010441	5/26/2016	Eastridge Subdivision
DDW010440	5/26/2016	Eastridge Subdivision
DDW010442	5/26/2016	Eastridge Subdivision
DDW010480	3/18/2016	Tuscany Pines Ph 2
DDW010451	6/16/2016	Roosevelt Water Main Replacement Ph. 1
DDW010452	6/16/2016	Roosevelt Water Main Replacement Ph. 1
DDW010453	6/16/2016	Roosevelt Water Main Replacement Ph. 1
DDW010478	12/16/2016	Sunny Breeze Ph. 2
DDW010432	5/11/2016	Rosengarth Estates Ph. 1
DDW010429	5/11/2016	Rosengarth Estates Ph. 1
DDW010430	5/11/2016	Rosengarth Estates Ph. 1
DDW010431	5/11/2016	Rosengarth Estates Ph. 1
DDW010433	5/11/2016	Rosengarth Estates Ph. 1
DDW010434	5/11/2016	Rosengarth Estates Ph. 1
DDW010499	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010498	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010497	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010496	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010495	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010494	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010493	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010492	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010491	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010490	1/20/2016	Stone Creek Ph. A-2 & F-1
DDW010529	4/27/2015	NW Potts Ct
DDW010465	8/26/2016	NW Crossing Ph 23

Facility ID	Install Date	Location Description
DDW010464	8/26/2016	NW Crossing Ph 23
DDW010463	8/26/2016	NW Crossing Ph 23
DDW010476	10/20/2016	Cascade Heights Ph. 4 & 5
DDW010477	10/20/2016	Cascade Heights Ph. 4 & 5
DDW010471	10/20/2016	Cascade Heights Ph. 4 & 5
DDW010530	10/20/2016	Cascade Heights Ph. 4 & 5
DDW010472	10/20/2016	Cascade Heights Ph. 4 & 5
DDW010475	10/20/2016	Cascade Heights Ph. 4 & 5
DDW010473	10/20/2016	Cascade Heights Ph. 4 & 5
DDW010474	10/20/2016	Cascade Heights Ph. 4 & 5
DDW010466	8/26/2016	NW Crossing Ph 23
DDW010467	8/26/2016	NW Crossing at McNeal
DDW010468	8/26/2016	NW Crossing at McNeal
DDW010459	8/22/2016	Pettigrew Place Ph 3
DDW010460	8/22/2016	Pettigrew Place Ph 3
DDW010461	8/22/2016	Pettigrew Place Ph 3
DDW010462	8/22/2016	Pettigrew Place Ph 3
DDW010521	12/16/2016	Sunny Breeze Ph. 2
French Drain	09/2016	62975 Boyd Acres, perforated pipe in waterwise garden on front admin building.

The registration database in Appendix I includes the most complete information, including updates to UIC data, and information on spill and gross pollutant control best management practices installed.

Effectiveness: The City is submitting the registration database in an excel format once per year as part of the annual report, as directed in the City's WPCF-UIC permit. The City is willing to work with DEQ should a different format or manner of submittal (e.g., electronic) is requested to improve database management.

BMP X-3. UIC Retrofits, Upgrades or Decommissioning (UIC)

As part of the City's capital improvement projects the City closed several UICs in FY2015-16 (see Table 10.2 and Appendix I). Table 10.4 includes a table of those UICs that the City anticipates will be closed/decommissioned in FY2016-17. As part of this, the City is working to relocate one drywell as part of a sewer line upgrade project, and is in the early stages of possibly considering decommissioning up to three drill holes in FY2017-18 or thereafter (DDH009923, DDH009922, DDH009921) as part of the SW Roosevelt Water Main Replacement.
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Table 10.2 FY2016-17 Decommissioned City of Bend UICs Summary

UIC	Description
DDW003423	DDW003423, 588, NW MERCHANT WAY
DDW010018	DDW010018, 5594, COUNTRY CLUB DR
DDW010019	DDW010019, 5595, COUNTRY CLUB DR
DDW010020	DDW010020, 5596, COUNTRY CLUB DR
DDW010021	DDW010021, 5597, COUNTRY CLUB DR
DDW010022	DDW010022, 5598, COUNTRY CLUB DR

Table 10.3 Anticipated UIC Installation in FY2017-18 and Beyond

UIC Number	Originally Anticipated Install Date	Current Anticipated Timing	Location/Project
DDW010231	7/25/2014	PROPOSED	Woodhaven Ph. 1
DDW010232	7/25/2014	PROPOSED	Woodhaven Ph. 1
DDW010233	7/25/2014	PROPOSED	Woodhaven Ph. 1
DDW010234	7/25/2014	PROPOSED	Woodhaven Ph. 1
DDW010235	7/25/2014	PROPOSED	Woodhaven Ph. 1
DDW010236	7/25/2014	PROPOSED	Woodhaven Ph. 1
DDW010237	7/25/2014	PROPOSED	Woodhaven Ph. 1
DDW010238	7/25/2014	PROPOSED	Woodhaven Ph. 1
DDW010392	11/24/2014	PROPOSED	Stone Creek B-1
DDW010393	11/24/2014	PROPOSED	Stone Creek B-1
DDW010394	11/24/2014	PROPOSED	Stone Creek B-1
DDW010395	11/24/2014	PROPOSED	Stone Creek B-1
DDW010396	11/24/2014	PROPOSED	Stone Creek B-1
DDW010397	11/24/2014	PROPOSED	Stone Creek B-1
DDW010398	11/24/2014	PROPOSED	Stone Creek B-1
DDW010399	11/24/2014	PROPOSED	Stone Creek B-1
DDW010400	11/24/2014	PROPOSED	Stone Creek B-1
DDW010401	11/24/2014	PROPOSED	Stone Creek B-1
DDW010402	11/24/2014	PROPOSED	Stone Creek B-1
DDW010407	1/1/2015	PROPOSED; Under Construction	Colorado Lift Station Vol VI-A N383171.30 E 3289445.75
DDW010410	9/28/2015	PROPOSED	Mission Linen Supply
DDW010456	1/1/2016	PROPOSED; Under Construction	SEI 2S&3

UIC Number	Originally Anticipated Install Date	Current Anticipated Timing	Location/Project
DDW010457	8/16/2016	PROPOSED; Under Construction	Escena Apartment Homes
DDW010458	8/16/2016	PROPOSED; Under Construction	Escena Apartment Homes
DDW010481	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010482	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010483	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010484	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010485	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010486	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010487	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010488	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010489	2/2/2017	PROPOSED	Leehaven Subdivision
DDW010500	8/1/2016	PROPOSED	Stone Creek Ph. A-3 & F-2
DDW010501	8/1/2016	PROPOSED	Stone Creek Ph. A-3 & F-2
DDW010502	8/1/2016	PROPOSED	Stone Creek Ph. A-3 & F-2
DDW010503	8/1/2016	PROPOSED	Stone Creek Ph. A-3 & F-2
DDW010504	8/1/2016	PROPOSED	Stone Creek Ph. A-3 & F-2
DDW010505	8/1/2016	PROPOSED	Stone Creek Ph. A-3 & F-2
DDW010506	8/1/2016	PROPOSED	Stone Creek Ph. A-3 & F-2
DDW010507	8/1/2016	PROPOSED	Stone Creek Ph. A-3 & F-2
DDW010508	3/17/2017	PROPOSED	Northwest Crossing Ph. 27
DDW010509	3/17/2017	PROPOSED	Northwest Crossing Ph. 27
DDW010510	3/17/2017	PROPOSED	Northwest Crossing Ph. 27
DDW010511	6/9/2016	PROPOSED	Rockridge Park
DDW010512	6/9/2016	PROPOSED	Rockridge Park
DDW010513	6/9/2016	PROPOSED	Rockridge Park
DDW010514	6/9/2016	PROPOSED	Rockridge Park

UIC Number	Originally Anticipated Install Date	Current Anticipated Timing	Location/Project
DDW010515	6/9/2016	PROPOSED	Rockridge Park
DDW010522	4/17/2017	PROPOSED	Northwest Crossing District 2 Lot 2
DDW010523	4/28/2017	PROPOSED	Lava Ridges Ph. 6
DDW010524	4/28/2017	PROPOSED	Riverwalk Subdivision
DDW010525	4/28/2017	PROPOSED	Riverwalk Subdivision
DDW010526	4/28/2017	PROPOSED	Riverwalk Subdivision
DDW010527	4/17/2017	PROPOSED	OR6 Vail
DDW010528	4/17/2017	PROPOSED	OR6 Vail
DDW010535	6/29/2017	PROPOSED	Hidden Hills Ph. 3
DDW010536	6/29/2017	PROPOSED	Hidden Hills Ph. 3
DDW010537	7/5/2017	PROPOSED	Ogden Subdivision
DDW010538	6/20/2017	PROPOSED	Northwest Woodlands
DDW010539	6/20/2017	PROPOSED	Northwest Woodlands
DDW010540	6/20/2017	PROPOSED	Northwest Woodlands
DDW010541	7/24/2015	PROPOSED	Shevlin Bluffs Ph. 2
DDW010542	7/24/2015	PROPOSED	Shevlin Bluffs Ph. 2
DDW010543	7/24/2015	PROPOSED	Shevlin Bluffs Ph. 2
DDW010544	8/1/2017	PROPOSED	Shevlin Bluffs Ph. 3 & 4
DDW010545	8/1/2017	PROPOSED	Shevlin Bluffs Ph. 3 & 4
DDW010546	8/1/2017	PROPOSED	Shevlin Bluffs Ph. 3 & 4
DDW010547	8/1/2017	PROPOSED	Shevlin Bluffs Ph. 3 & 4
DDW010548	6/28/2017	PROPOSED	Marea Landing Ph. 1 & 2
DDW010549	6/28/2017	PROPOSED	Marea Landing Ph. 1 & 2
DDW010550	6/27/2017	PROPOSED	Boneyard Brewing Public House
DDW010551	7/19/2017	PROPOSED	Blakely Apartments
DDW010552	8/11/2017	PROPOSED	Lodges at Bachelor Village Ph. 1
DDW010553	8/11/2017	PROPOSED	Lodges at Bachelor Village Ph. 1
DDW010554	8/11/2017	PROPOSED	Lodges at Bachelor Village Ph. 1
DDW010555	8/11/2017	PROPOSED	Lodges at Bachelor Village Ph. 1
DDW010556	8/11/2017	PROPOSED	Lodges at Bachelor Village Ph. 1

UIC Number	Originally Anticipated Install Date	Current Anticipated Timing	Location/Project
DDW010557	8/11/2017	PROPOSED	Lodges at Bachelor Village Ph. 1
DDW010558	8/11/2017	PROPOSED	Lodges at Bachelor Village Ph. 1
Drillhole	Spring/Summer 2018	Spring/Summer 2018	Shevlin Park and Shevlin Meadows Intersection
Unnamed (DW1)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 52+41.87; 14th Street Reconstruction
Unnamed (DW2)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 55+08.70; 14th Street Reconstruction
Unnamed (DW3)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 56+02.35; 14th Street Reconstruction
Unnamed (DW4)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 60+63.67; 14th Street Reconstruction
Unnamed (DW5)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 62+39.95; 14th Street Reconstruction
Unnamed (DW6)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 63+73.05; 14th Street Reconstruction
Unnamed (DW7)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 66+21.87; 14th Street Reconstruction
Unnamed (DW8)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 67+31.25; 14th Street Reconstruction
Unnamed (DW14)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 87+59.25; 14th Street Reconstruction

UIC Number	Originally Anticipated Install Date	Current Anticipated Timing	Location/Project
Unnamed (DW15)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 89+70.80; 14th Street Reconstruction
Unnamed (DW17)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 92+82.20; 14th Street Reconstruction
Unnamed (with swale)	Project Construction Start Summer 2018	Project Construction Start Summer 2018	Station 94+19.30; 14th Street Reconstruction

Table 10.4 Anticipated Decommissioning in FY2017-18 and Beyond

UIC Number	Planned Activity	Project Timing	Project Name/ Comments
DDH009923	Potential decommissioning	FY2017-18 or beyond	SW Roosevelt Water Main Replacement; construction slated spring 2018
DDH009922	Potential decommissioning	FY2017-18 or beyond	SW Roosevelt Water Main Replacement construction slated spring 2018
DDH009921	Potential decommissioning	FY2017-18 or beyond	SW Roosevelt Water Main Replacement construction slated spring 2018
DDW001540 (demolition) DDW010456 (new replacement)	Decommissioning, removing and replacing across northbound lanes with DDW010456 Under construction	FY2016-17 to FY2017-18	SE Interceptor Under Construction
DDW010533	Potential decommissioning	FY2017-18 and beyond, Phase I Construction start	14th Street, Phase I Construction; Westside of

UIC Number	Planned Activity	Project Timing	Project Name/ Comments
		spring 2018	Century at Knoll Avenue
DDW001239	Potential decommissioning	FY2017-18 and beyond, Phase I Construction start spring 2018	14th Street, Phase I Construction ; Westside of Century at Knoll Avenue

Upgrades. Additionally, the City is working to upgrade UICs. The City continued implementing its open-grate drywell retrofit plan and is ahead of schedule (see annual report FY14-15, Appendix I). In FY2016-17, City staff purchased 20 UIC inserts with a 36" sump for Police Department, City right-of-ways and the Boyd Acres corporation yard (see installation photo below) at a cost of approximately $1,500 apiece (see Table 10.5). Stormwater staff consulted with Fire and Airport staff to assist them in securing budgets in time for the biennial budget review process for future years work as well. In Table 10.5 the blue text represents those inserts purchased in FY16-17 for installation.

Table 10.5 Open Top Drywell Retrofit Status

City Facility ID	DEQ UIC #	DEQ Well #	Department Owner	DWPA / Road Classification	Status
DDW003114	10025	1050	Airport		Scheduling for FY18-19-FY20-21
DDW009606	10025	2918	Airport		Scheduling for FY18-19-FY20-21
DDW009607	10025	2916	Airport		Scheduling for FY18-19-FY20-21
DDW009608	10025	2915	Airport		Scheduling for FY18-19-FY20-21
DDW009609	10025	2914	Airport		Scheduling for FY18-19-FY20-21
DDW009610	10025	2917	Airport		Scheduling for FY18-19-FY20-21
DDW009611	10025	1051	Airport		Scheduling for FY18-19-FY20-21
DDW009612	10025	2919	Airport		Scheduling for FY18-19-FY20-21
DDW009613	10025	2920	Airport		Scheduling for FY18-19-FY20-21
DDW009614	10025	2921	Airport		Scheduling for FY18-19-FY20-21
DDW009615	10025	2922	Airport		Scheduling for FY18-19-FY20-21
DDW009616	10025	2923	Airport		Scheduling for FY18-19-FY20-21
DDW009617	10025	2924	Airport		Scheduling for FY18-

City Facility ID	DEQ UIC #	DEQ Well #	Department Owner	DWPA / Road Classification	Status
					19-FY20-21
DDW009619	10025	1044	Airport		Scheduling for FY18-19-FY20-21
DDW009622	10025	1049	Airport		Scheduling for FY18-19-FY20-21
DDW009625	10025	1047	Airport		Scheduling for FY18-19-FY20-21
DDW009626	10025	1048	Airport		Scheduling for FY18-19-FY20-21
DDW010073	10025	5651	Airport		Scheduling for FY18-19-FY20-21
DDW007553	10025	5094	Brooks Alley Parking Lot		Installed
DDW007554	10025	5093	Brooks Alley Parking Lot		Installed
DDW007555	10025	5095	Brooks Alley Parking Lot		Installed
DDW007559	10025	5278	Brooks Alley Parking Lot		Installed
DDW007560	10025	5279	Brooks Alley Parking Lot		Installed
DDW007561	10025	5277	Brooks Alley Parking Lot		Installed
DDW001533	10025	437	COB ROW	10yr / Alley	Installed
DDW001534	10025	438	COB ROW	10yr / Alley	Installed
DDW001610	10025	514	COB ROW	Alley	Installed
DDW002053	10025	2461	COB ROW	Alley	Installed
DDW003091	10025	1517	COB ROW	Local	Installed
DDW003102	10025	1544	COB ROW	Alley	Installed
DDW003146	10025	1528	COB ROW	Local	Installed
DDW003179	10025	1577	COB ROW	5yr	Installed
DDW003239	10025	2014	COB ROW	TBD	Installed
DDW003276	10025	560	COB ROW	5yr / Alley	Installed
DDW003360	10025	458	COB ROW	Alley	Installed
DDW003386	10025	970	COB ROW	Alley	Installed
DDW003444	10025	2059	COB ROW	10yr / Local	Installed
DDW003489	10025	513	COB ROW	Alley	Installed
DDW003495	10025	656	COB ROW	Alley	Installed
DDW003496	10025	440	COB ROW	Alley	Installed
DDW003499	10025	88	COB ROW	Alley	Installed
DDW003500	10025	130	COB ROW	Alley	Installed
DDW003504	10025	517	COB ROW	Alley	Installed
DDW003514	10025	540	COB ROW	Alley	Installed
DDW003529	10025	5006	COB ROW	Local	Installed
DDW007207	10025	5023	COB ROW	Local	Installed

City Facility ID	DEQ UIC #	DEQ Well #	Department Owner	DWPA / Road Classification	Status
DDW007303	10025	5539	COB ROW	Local	Installed
DDW007304	10025	72	COB ROW	Alley	Installed
DDW007536	10025	5365	COB ROW	10yr	**Installed**
DDW007567	10025	552	COB ROW	Local	Installed
DDW007601	10025	5031	COB ROW	Alley	Installed
DDW008151	10025	5311	COB ROW	10yr	**Installed**
DDW008166	10025	5489	COB ROW	Minor Arterial	**Installed**
DDW008934	10025	5316	COB ROW	10yr	**Installed**
DDW009247	10025	657	COB ROW	Alley	Installed
DDW009523	10025	658	COB ROW	Alley	Installed
DDW003348	10025	185	Facilities (Boyd)		**Installed**
DDW003352	10025	190	Facilities (Boyd)		Installed
DDW003353	10025	189	Facilities (Boyd)		Installed
DDW003354	10025	188	Facilities (Boyd)		Installed
DDW003030	10025	538	Facilities (City Hall)		Removed after further inspection / cleaning revealed not a UIC.
DDW003032	10025	139	Facilities (City Hall)		Removed after further inspection / cleaning revealed not a UIC.
DDW010063	10025	5641	Fire	1yr	Scheduled FY2017-18
DDW010064	10025	5642	Fire		Scheduled FY2017-18
DDW010065	10025	5643	Fire		Scheduled FY2017-18
DDW010066	10025	5644	Fire		Scheduled FY2017-18
DDW010067	10025	5646	Fire		Scheduled FY2017-18
DDW010068	10025	5645	Fire		Scheduled FY2017-18
DDW010071	10025	5649	Fire		Scheduled FY2017-18
DDW010072	10025	5650	Fire	1yr	Scheduled FY2017-18
DDW003023	10025	631	Police		Installed
DDW003027	10025	629	Police		Installed
DDW003034	10025	630	Police		Installed
DDW003041	10025	627	Police		Installed

Effectiveness: The City installed drop-in retrofits with a three-foot sump into the open grated drywells. As this sump is larger than what the company has standardly constructed, the City monitored these installations for quality assurance/quality control through the winter months to see how they withstood freeze-thaw and weighted conditions prior to purchasing more. Operations staff found that welding the rings onto the drywells helps ensure the catch basin inserts do not fall into the drywell given the City's freeze-thaw winter cycles can otherwise result in loosening and slippage. Since given these additional steps, the units worked well, the City continued purchasing the inserts due to the cost-effectiveness given existing grading and drainage changes would not be needed. The initial installations within the right-of-way are focusing on high spill risk and time of travel areas first; individual departments are covering the cost of theirs and their timelines differ as budget has been set aside.

Installing open grate UIC retrofit at Boyd Acres corporation yard as an installation demonstration.

Summary Assessment of Effectiveness

The City has significantly increased scientific understanding of its system and groundwater aquifer through drinking water protection area delineation and vadose zone analysis, with refining knowledge of the locations and status of its UIC system, and completion of the potential contaminant source identification project and Systemwide Assessment. The City is actively implementing an open-grate drywell retrofit project and is refining its drainage system as it redevelops to include pretreatment while actively conducting selective outreach and field modifications to be more protective within wellhead protection areas. The inserts are working well at capturing contaminants.