



CITY OF BEND

## 2015-2016 ANNUAL REPORT

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

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**National Pollutant Discharge Elimination System  
Municipal Separate Storm Sewer Annual Report**

**Underground Injection Control System Annual Report**



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*November 1, 2016*



FY 2015-2016 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."*

A handwritten signature in black ink, appearing to read "Jon Skidmore", is written over a horizontal line.

Jon Skidmore  
Assistant City Manager, Operations  
City of Bend  
October 31, 2016

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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	<i>City of Bend Water Quality Monitoring Plan</i>
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 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.

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 now to be a statewide general permit. In the meantime, the City's permit coverage is extended through the negotiation period under the existing permit, and 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.

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 tenth Annual Report submitted to the DEQ and describes stormwater quality and pollution prevention activities implemented by the City during Fiscal Year 2015-2016 (July 2015 through June 2016). 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. Tables or 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 exceeded the requirement of having interdepartmental stormwater coordination meetings at least four times per year in FY2015-16. Stormwater Coordinators consist of multiple intra-agency groups 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 Stormwater Liaisons, and those department heads and in higher management attending a direct reports meeting to the assistant City Manager, Jon Skidmore, discussing topics including stormwater that would previously be covered by the now-defunct Economic Development and Infrastructure Strategic Management (EDISM), and subgroups of these. The direct reports meeting occurs twice monthly.

The Stormwater Liaisons consists of representatives from multiple departments that focus on stormwater issues. Stormwater items that require coordination at the highest department-head level are handled through the standing meetings with the assistant City Manager or other City management and department head level coordination meetings. Such high level meetings this year discussed utility budgeting and rates. For efficiency, the City continued having targeted meetings with subgroups of this Liaisons group and other sub group members on specific issues.

Stormwater Liaisons meetings included:

- Stormwater Liaisons Meetings (10/19, 4/15, 6/15)
- Stormwater Liaisons—Streets/Stormwater (5/16)

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

Stormwater coordination inclusive meetings included:

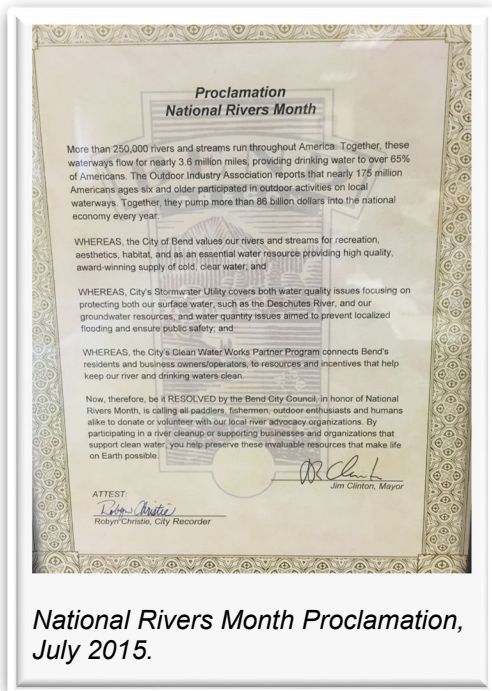
- Interdepartmental Supervisor/Manager Meetings (EIPD, Streets, Utilities) (Monthly)
- Storm Drain Art Proposal Review (7/2)
- Quest at the Fest Planning (7/7)
- Stormwater Billing Audit (7/27)
- Private Drainage Facility Mapping Data Need (7/29)
- Clean Water Works Public Outreach Campaign (7/14, 7/21, 7/28)
- Utility Inspection Coordination Meetings (monthly as needed) (8/6, 9/1, 10/14, 11/9, 1/5, 2/8, 4/5)
- Stormwater Regulatory, O&M, Lab, and Sweeping Coordination (8/5, 9/2)
- FY 2014-15 Stormwater Sampling Review (10/2)
- Group Redline Plan Review (Utilities, Private Engineering) (weekly as needed)
- Stormwater Budget Analysis (1/16)
- Flow Monitoring Coordination (4/1, 4/4, 4/11, 5/4)

City staff also continued to participate in the SE Interceptor, Galveston Corridor Improvement project, 14<sup>th</sup> Street, and South Awbrey Butte stormwater planning efforts. The Galveston Corridor project purpose is “to create a collective effort of business owners, property owners, and neighboring residences to enhance economic vitality, improve pedestrian and bicycle safety and effectively manage stormwater along the Galveston corridor (See <http://www.bend.or.us/index.aspx?page=1240> for project details).

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

**City Council.** In FY2015-16, the City Council:

- Made a National Rivers Month proclamation and discussed stormwater as part of the Galveston improvement project (see July 2015 agenda: [http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=348](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=348)),
- Decided on revisions to Part V-Construction Observation and Inspection Requirements of the City of Bend Public Improvement Procedure Standards and Specifications revised 8/2015 that involves having the engineer of record signing off on right-of-way improvements ([http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=351](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=351));
- Approved a Bend Addendum to the 2015 Deschutes County Multi-



Jurisdictional Natural Hazards Mitigation Plan addressing joint response for cases such as flooding, winter storms, etc. in September 2015

([http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=351](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=351));

- Received updates on Galveston and 14<sup>th</sup> Street projects and selected a consultant for Galveston in January 2016

([http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=364](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=364);

[http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=365](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=365));

- Discussed in February a riparian upgrade project from the Upper Deschutes Watershed Council, Covered Loads, and Commute Options "Open Streets" project concept

([http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=366](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=366);

[http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=367](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=367));

- Authorized the South Awbrey Butte Drainage study contract with HDR in April ([http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=375](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=375));
- Adopted the FY2016-17 fee schedule in June 2016. ([http://bend.granicus.com/GeneratedAgendaViewer.php?view\\_id=2&clip\\_id=379](http://bend.granicus.com/GeneratedAgendaViewer.php?view_id=2&clip_id=379))

As in past years, City staff notified City Council of stormwater updates through a written message in the weekly City Manager memorandum to Council, such as an analysis of the Clean Water Works program (see Appendix A for an example). City Council was also kept apprised of Mirror Pond project updates, which include proposals for stormwater improvements.

**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), and 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. Drafts of several fact sheets and other outreach were created and reviewed by three ACWA committees for content during FY2015-16 in preparation for graphic layout final drafts.

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. City staff also participated in the statewide DEQ MS4 Advisory Committee for the Phase II NPDES MS4 permit.

City staff presented to national and statewide groups with regards to sharing program components with other agencies and regulators to improve efficiencies and understanding through information sharing. On November 18, 2015 the City Stormwater Program Manager participated in a webinar for the Center for Watershed Protection regarding "Post-Construction Stormwater Controls—Behind the Scenes in Bend" (see Appendix F) to 88 sites including private consultants, Phase II and other municipalities, and state governments. In May 2016, the City Stormwater Program Manager provided a presentation at the annual ACWA Stormwater Summit on social marketing in relation to the Clean Water Works partnership program (see Appendix B).

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 FY2015-16, but with a continuance of emphasis on more focused meetings to increase efficiency as workload pressures continued to remain high. Together the Stormwater Coordinators (which have taken the place of the former Stormwater Action Team) well exceeded the measurable goals for FY2015-16. The City has effectively worked to further incorporate ad hoc task groups to improve efficiency and effectiveness with key staff people on smaller implementation projects.

## 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 new provision added to Bend Code 11.16.120 became effective related to requiring secure, lockable, leak-proof oil and /or grease containers to prevent spillage and dumping (see Appendix A).

*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 in a thorough, planned approach to address stormwater improvement opportunities as they arise.

### Task II.3 Financing (MS4/UIC)

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 FY2015-16 was increased to \$5 per equivalent residential unit (ERU), and another increase, to \$5.15/ERU, was passed in June 2016 for FY2016-17. 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 Stormwater Utility brought in revenues of \$3.2 million in FY2015-16 to cover quantity and quality issues.

The City operates on a biennial budget. The FY2015-17 budget report related to stormwater is included in Appendix A of the FY2014-15 annual report. Finally, staff kept abreast of federal and state rule changes that could impact or influence legal authority and requirements including the EPA's proposed Waters of the

U.S. Rule, and federal lawsuits related to Total Maximum Daily Loads (TMDLs).

*Effectiveness.* The City has successfully established a stormwater utility service charge, and began collecting fees 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 again as part of the fee resolution in 2016. Starting July 2016, the stormwater service charge will be \$5.15/ERU. The FY2016-17 anticipated revenue including rate, non-rate, and interest is \$3.4 Million. The City Budget Committee and City Council supported the budget and rate increases. 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 has been conducting a periodic audit of its billing as a result of the last aerial photograph for quality assurance. As of March 2016, 203 audit-related changes to the billing system have been made as a result to ensure accuracy.

#### Task II.4 Planning (MS4/UIC)

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 the DEQ NPDES Phase II MS4 Advisory Committee (MAC), and by staying apprised 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 FY2015-16, there were no annexations.

**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 (DLCDC) 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, which is continuing. The City is on track to have both the City Council and the Deschutes County Board of Commissioners adopt a final UGB amendment in FY2016-17. City stormwater staff continues to track the ongoing process (see: <http://www.bend.or.us/index.aspx?page=1290> for UGB updates).

**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 public review and finalization planned in FY2015-16.

#### Task II.5 Annual Reporting (MS4/UIC)

This annual report, covering FY2015-16, is the tenth 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 permit and ISWMP 2022 which has been approved by DEQ as the management document for the WPCF-UIC permit. This is the third 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](http://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<sup>1</sup>)

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 2016) 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, using Geoblade and transitioning to 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 4,951 drywells (up from 4,804 dry wells last year); 974 active drill holes, 4 drain fields, 184 swales and 10,914 catch basins and additional storm facilities. 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).

#### 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).

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<sup>1</sup> See BMP V-5 for MS4-related mapping.

### 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 now the Utilities Director rather than the Public Works Director.

- David Abbas is the Streets Department Director.
- Tom Hickmann is now the Engineering and Infrastructure Planning Department Director.
- Ryan Oster is the City Engineer.
- Mel Oberst has retired; Russell Grayson is the City's Community Development Director.
- Sonia Andrews has left the City and Sharon Wojda is the Finance Director.
- Anne Aurand is the new Communication Director, replacing Justin Finestone.
- Hardy Hanson retired; Charles Swann oversees Street supervision.
- Terry Burks retired. The Utilities Manager role has disappeared, but the duties are now handled by Interim Assistant Utility Director Teresa Ristoff.

For FY2016-17, the City will be proposing 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.

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).



## **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 FY2015-16.

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

**Utility Bill Inserts.** The Our City newsletter is included with utility bills. The July 2015 newsletter encouraged readers to download the City's Annual Water Quality Report that includes mention of the stormwater quality program (see <http://bendoregon.gov/Modules/ShowDocument.aspx?documentid=23625> and [www.bendoregon.gov/waterreport](http://www.bendoregon.gov/waterreport)). The August 2015 version included an article on New Utility Rates, discussing the increases to utility rates including stormwater. The same edition included an article offering free irrigation sprinkler inspections, a program put on by the Utility Water Conservation group that can help reduce dry weather stormwater flows as well (see <http://bendoregon.gov/Modules/ShowDocument.aspx?documentid=23920>).

**Clean Water Works Campaign.** In spring of 2015, the City kicked off its new Clean Water Works campaign, which it continued with a Clean Water Works partnership program through December 2015. As part of the Clean Water Works campaign, the City incorporated an identifier and several new outreach pieces including 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 distributed a Kids Activity Guide that was developed in April 2015 (see Appendix B). Several outreach sheets were based on the information in the City's own pollution prevention trainings, for which the Public Advisory Group suggested that



they be extended to the public. In August 2015, the City staff provided Clean Water Works Partner materials to all partners. These included point of purchase displays, discount cards, and partner water bottles and bags to 23 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 for both August 2015, and then again in the spring for a separate 2016 contest. In spring 2016, the City worked with BendFilm to distribute the 2016 contest flyer electronically to area schools with students in the age range of the contest (5<sup>th</sup>-12<sup>th</sup> grade) as part of BendFilm's Future Filmmakers outreach. And staff again provided an electronic copy to the local Home School outreach group to post to their members. 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 for use starting in FY2015-16 (see below). The banners are being used primarily for displays at outreach booths at events.

The City implemented a Clean Water Works Partnership Program (see Chapter 4 for details) that included distribution of discount cards and/or Clean Water Works educational materials at Stream Stewardship Day (August 8) City offices, Munch n Movies booth (September 11), CJ Lovejoys for a neighborhood road opening celebration (September 13), Octoberfest (September 16-18), and as part of Discover Nature Festival via Environmental Center staff (September 26), and distributed educational materials at the City's Earth Day parade and festival booth in April 2016. The City provided a presentation on the effort at the annual ACWA Stormwater Summit in May (see Appendix B)



*Clean Water Works Banner (3'X10').*

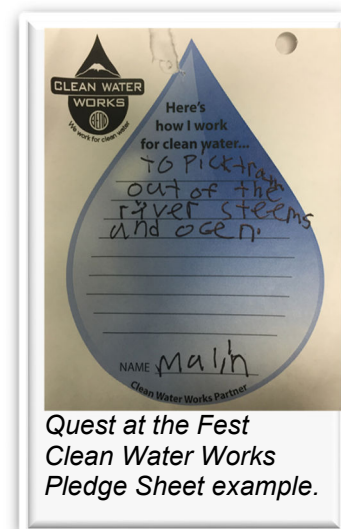
**Targeted Mailouts.** The City conducted a targeted mailout to car washes in June 2015, and then separate targeted mailouts to all developers, food service, carpet cleaner facilities with a Bend Business License at the beginning of July to invite them to join the Clean Water Works Partner program. As part of this effort, the City sent a mailing with an introductory letter, fact sheet, partnership form, and Clean Water Works sticker 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).



**“It’s All Connected” Outreach.** As a sub-message in Clean Water Works messages, the City continued to use the “It’s All Connected” message to illustrate to the public the connections between stormwater, drinking water and river water quality, and the importance of not polluting. The City distributed illicit discharge flyers and Illicit Discharge Minimization Manuals with the “It’s All Connected” graphic. Additionally, the sound bite from the 30-second public service announcement that is included on the City’s You Tube and web page (<http://www.bendoregon.gov/index.aspx?page=290>) is played on the City’s public works telephone “hold” music. The storm drain art and film contest used an “It’s All Connected” theme as well (see Section 4 Public Involvement for more information)

**Other Outreach/ Distribution.** On Saturday, July 11, 2015, City staff included the watershed diorama and introduced the new working UIC diorama at Quest at the Fest, the City’s area at Summerfest festival and instituted a clean water pledge that received 96 pledges handwritten by visitors (see picture at right for an example, and Appendix B for a summary).

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.



*Quest at the Fest  
Clean Water Works  
Pledge Sheet example.*

City stormwater staff stocked information holders at public areas throughout the City (Boyd Acres, 15<sup>th</sup> Street, City Hall, Finance Department) 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)
- APWA “P.W. Paws Rain of Terror” comic book
- 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

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>).

The City staff led an ACWA IDDE outreach project that included developing a draft of a pressure washing fact sheet and booklet, and landscaper outreach, together with several other outreach still under development.

City staff provided a presentation as part of a nationwide webinar by the Center for Watershed Protection on post construction controls in November 2015, an information sharing presentation to a joint ACWA Groundwater/ Stormwater/ Public Education Committee meeting in February 2016 on the Clean Water Works Partnership program, and a presentation entitled “Community Based Social Marketing—Clean Water Works Campaign” at the ACWA Stormwater Summit on May 11, 2016 (see Appendices A and F).

*Effectiveness.* 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 Appendix A, specifically appendix to City Manager Memorandum to City Council). The survey was designed to include baseline questions to compare the effectiveness of the stormwater program over time. This was the first time the City has paid for a stormwater specific statistically significant professional survey. 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 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, the Bend Arts, Beautification and Culture Commission, 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](http://www.bendoregon.gov/stormwater) by revamping the site to incorporate and keep up to date the Clean Water Works campaign a [www.bendoregon.gov/cleanwaterworks](http://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](http://www.bendoregon.gov/stormwaterbmp)) and City infrastructure projects like Galveston (<http://www.bendoregon.gov/index.aspx?page=1375>) 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](http://www.bendoregon.gov/stormwatermp)). There was 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.

**Effectiveness.** Overall, the use of the website has again increased over the past year (see table on page 3-5). The exception to this is the Business and Home page, which makes sense given that the page was split this year with the Home and Garden section moved onto its own page. Keeping the stormwater website updated is a continual process. The City has included a link on the website to comment on the stormwater pages and no comments from that link were received during FY2015-16. Over 190 people are on the City News email update list. Although still relatively small in relation to population size, the City's Facebook presence continues to grow. The City has over 9,577 likes in FY2015-16, up from 6,628 Likes on its Facebook page last year. Twitter following continues to trend upward. The City currently has 5,502 followers on Twitter, up from 4,292 in FY2014-15 and 2,921 followers in FY2013-14 and 1,177 followers in FY2012-13. 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 over 130%.

**Table 3.1 Web Page View Comparison (FY2014-15 to FY2015-16)**

Page Title	Date Range	Visits	Pageviews	Avg Time	% Exit
City of Bend : Clean Water Works					
	7/1/2014-6/30/2015	86	723	0:01:18	11.48%
	7/1/2015-6/30/2016	205	1,234	0:01:19	16.45%

Page Title	Date Range	Visits	Pageviews	Avg Time	% Exit
% Change					
		↑ 138.37%	↑ 70.68%	↑ 1.00%	↑ 43.29%
City of Bend : Stormwater					
	7/1/2014-6/30/2015	164	1,150	0:00:49	13.83%
	7/1/2015-6/30/2016	231	1,566	0:00:45	14.30%
% Change					
		↑ 40.85%	↑ 36.17%	↓ -8.80%	↑ 3.40%
City of Bend : Stormwater Utility Fee					
	7/1/2014-6/30/2015	133	369	0:01:46	35.23%
	7/1/2015-6/30/2016	171	402	0:02:17	41.54%
% Change					
		↑ 28.57%	↑ 8.94%	↑ 29.33%	↑ 17.91%
City of Bend : Stormwater Master Plan					
	7/1/2014-6/30/2015	235	610	0:03:37	37.87%
	7/1/2015-6/30/2016	163	399	0:02:55	40.35%
% Change					
		↓ -30.64%	↓ -34.59%	↓ -19.21%	↑ 6.55%
City of Bend : About Stormwater					
	7/1/2014-6/30/2015	65	267	0:01:08	23.97%
	7/1/2015-6/30/2016	73	302	0:01:42	22.52%
% Change					
		↑ 12.31%	↑ 13.11%	↑ 50.09%	↓ -6.05%

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

As part of the Clean Water Works campaign the City continued to air the 30-second TV commercial developed in spring 2015 introducing the Clean Water Works campaign, including at Munch ‘n’ Movies in August and September 2015 and on television. The commercial is also posted on the City web site

<http://www.bendoregon.gov/modules/showdocument.aspx?documentid=22500> and on the City's YouTube channel.

The City continued to post on the City's website and play some of the three 60-second radio public service announcements (PSAs)—one focusing on [illicit discharge reduction](#); one focusing on what our [stormwater utility service charge covers](#); and one focusing on [sediment reduction](#) during the fall 2015 as the City completed additional radio advertisements promoting Clean Water Works partners with four clean water radio advertisements that also ran in the fall. These were identical except for the names of different partners in the middle (example: <http://www.bendoregon.gov/modules/showdocument.aspx?documentid=24366>). The radio PSAs are posted on the City web site [www.bendoregon.gov/cleanwaterworks](http://www.bendoregon.gov/cleanwaterworks) at the bottom of the home and garden page under "Audio;" and on the "Discounts and Partners" page. The City's Stormwater Program Manager also provided a 5-7 minute interview on KBNW radio in November 2016 to promote the Clean Water Works program.

The City also produced two commercials in FY2015-16, one promoting [Clean Water Works partners](#) efforts; and the other resulting from the Clean Water Works video contest. These both aired on television during the first half of the fiscal year.

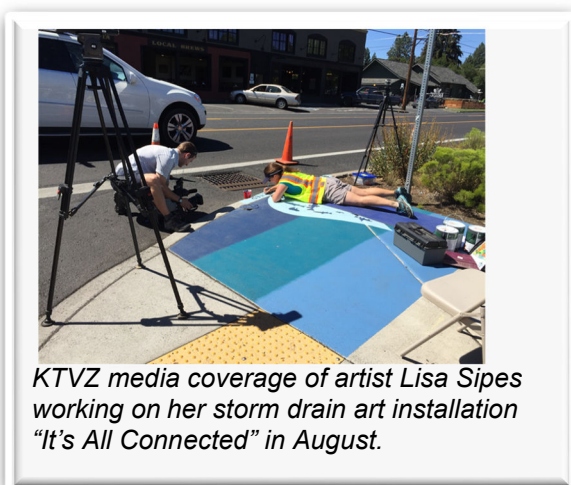


The City continues to utilize City Edition to provide updates on the stormwater utility and its programs with two segments developed in FY2015-16:

- Stream Stewardship Day/Clean Water Works Partnership kickoff (126 views online)
- Clean Water Works Student Video contest.

Older segments and additional video outreach remain available on the City's YouTube channel or website and still received views in FY2015-16:

- The school education program that included footage taken during the stormwater quest field trip (spring 2015) ([www.youtube.com/watch?v=pOXo5Z](http://www.youtube.com/watch?v=pOXo5Z))



- [OrlUc](#) ) currently has 100 views
- Third Street Stormwater Project
  - Vactor Truck Operations (separate video; not CityEdition)
  - It's All Connected commercial ((see <http://www.youtube.com/watch?v=fMMDbsMJ3Zg>).

Additionally, City efforts garnered news media attention such as the Storm Drain Art Contest that the stormwater program used to help promote Stream Stewardship Day (see photo).

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 11, 2015. Volunteers worked the watershed diorama and provided outreach materials.

The City released some stormwater quality related news releases/articles in FY2015-16. A news release on July 2, 2015 was titled "Comment on new construction inspection process." The Source Weekly included City Quest at the Fest information in July 2015. The City prepared an article in the Bend Chamber of Commerce's newsletter on the Clean Water Works partnership program in November 2015. The City announced those earning their Certified Erosion and Sediment Control Lead in a press release to the Cascade Business News (not picked up) and distributed to the City's Better Business Bend website; and the City's sprinkler inspection program was picked up by KTVZ (see Appendix B).

The City's newsletter *Our City: A Newsletter for Bend Citizens*, distributed with monthly utility bills and posted on the website, included the following articles (Electronic copies of *Our City* are available on the City's website at: [www.bendoregon.gov/index.aspx?page=649&parent=3243](http://www.bendoregon.gov/index.aspx?page=649&parent=3243)):

- City Drinking Water Meets or Exceeds Standards (July 2015) (included section on Clean Water Works program)
- New Utility Rates (August 2015);
- Free Irrigation Sprinkler Inspections (August 2015) (water conservation program that helps reduce dry weather flows)

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.

The City displayed the "Clean Water Works" movie slide prior to several films at



the Bend Film Festival, held in October, 2015. The City also advertised the “Clean Water Works” 30-second public service announcement at Munch ‘n’ Movies as well.

*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 school education program “Water Resource Education” City Edition segment has received 76 views on You Tube as of August 21, 2015, as well as additional views in City Hall and cable television.

The City’s You Tube News channel now has 497 subscribers, 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).

The Clean Water Works commercial has 102 website views, the Stream Stewardship River Cleanup Program with Clean Water Works discount card announcement has 126 views, and the Clean Water Works student video contest has 297 views as of October 2016. The Vactor Truck Stormwater Operations video has had 7,904 (+1574) views in the six years it has been on the channel. The Bend Downtown Stormwater first published in January 2015 has 217 views. The “3<sup>rd</sup> St. Stormwater Project” that was published on October 31, 2013 has received 324 (+39) views while the “3<sup>rd</sup> St. Underpass Change” has 251 views on the channel. The video includes information on drill hole spill control measures as well. In May 2016 the City received notification that the City’s initial “Clean Water Works” commercial won the American Water Works Association’s Pacific Northwest Section’s Excellence in Communications Award 2016 in the category “video Communications—Large Utility.”

The Bend *Bulletin* has a daily circulation of 27,547 Monday through Friday, 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 15,000 and a total readership of 37,500 weekly (Source Weekly, 2013 Distribution and Circulation). It is distributed in Bend, Redmond, Prineville, Madras, Sisters, Sunriver, and LaPine.

The 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. The City's Facebook page has 9,577 Likes (up from 6,596 Likes a year before) and 5,502 followers and 174 likes on Twitter.

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 continued with "Clean Water Works" video shown before Munch n' Movies showings this year, deemed effective as it is a local family-friendly event; the attempt at the booth was not as effective as it received very few visitors although distributing Clean Water Works Discount cards at the event was effective.

#### 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 local environmental centers and watershed councils 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 new 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 2015-16, the dioramas were used at several events as well including Quest at the Fest (July 2015) where the UIC model was debuted and Earth Day (April 2016).



*UIC model.*

*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 museums Water festival in October 2015, and the Environmental Center's use of the watershed diorama at the Days of Nature festival at Riverbend Park in September 2016.

### 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. A summary of implementation status efforts is included in Appendix A. 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 outreach plan for FY2015-16 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 continued in FY2015-16 to improve training reach and recordkeeping (Message I) (see Appendix D). The following topics are covered:

**Table 3.2 Staff Stormwater Pollution Prevention Training**

Topic	Suitable for Applicable Staff:	Number Trained in FY2015-16
Vehicle and Equipment Washing	Garage, Utility, Streets; EIPD	0
Leaky Equipment and Fueling Training	Garage; Utility, Streets	144
Spill Prevention, Control and Cleanup Training	Garage; Utility, Streets, EIPD field	144
Utility/Road Repair & Maintenance Training	Streets, Utilities, EIPD field	161
Paint Use and Disposal Training	Streets, Utilities	144
Landscape Maintenance Training	Streets, Utilities (Stormwater)	0
Illicit Discharge Follow-up Stormwater Training	Stormwater Program Staff only	0
Illicit Discharge Recognition and Reporting	All City Staff	0
Pressure Washing/ Surface Cleaning	Streets, Utilities, Garage, Facilities	114
Winter Road Care	Streets	30
Street Sweeping	Streets	0
Concrete Use and Disposal	Utility, O&M, Streets, EIPD, Inspectors	0

Those topics not trained via Compli in FY2015-2016 will be trained in FY2016-17. 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 a new UIC diorama model together with the watershed model completed (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 Future Filmmakers. Conducted advertising to schools with contest-aged children (6<sup>th</sup> to 12<sup>th</sup> grade in summer 2015 and extended to 5<sup>th</sup>-12<sup>th</sup> grade in 2016) (Message II)
- Banner messages were developed and three new banners with the Clean Water Works message were 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](http://www.bendoregon.gov/stormwaterbmp)) and distributed by private engineering (Messages II and III)
- Print advertising continued in Parks and Recreation Guide (Message II)

- Incorporating stormwater considerations and sizing into Central Oregon Landscape brochure still under development (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)
- Significant storm drain marking occurred in FY2014-15 with most of Awbrey Butte covered in markers as part of a large scale volunteer effort coordinated by a Boy Scout as his Eagle project (see Chapter 4.0 of the FY2014-15 annual report for details). Permanent messaging of manhole covers continued in FY2015-16 (Message III)
- City staff provided a training on post construction controls for the Center for Watershed Protection November 2015 webinar and encouraged local attendance (Messages III (infiltration) and V)
- Conducted an incentive program with a discount card for various businesses in summer-winter 2015, with car washes, construction industry contractors, food service establishments, and carpet cleaners the first business groups to be 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" that was developed in late FY2013-14 released to purchasing for review and distribution in July 2014 but that has gotten delayed due to purchasing division staffing shortages. City stormwater staff are still awaiting review and approval to come in line with a new workable timeline considering the separate Clean Water Works incentive program with discount cards that is occurring during summer-winter 2015 (Message IV)
- Include drinking water protection areas on City mapping web site (Message IV)
- City staff offered IECA webinars and an onsite training in March 2016 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 (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 FY2015-16 (Message V)
- City staff contracted with a consulting firm to assist with TMDL preparedness and modified the scope of work in early 2014 to include 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 launched in April 2015 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, educate residents and businesses about the link between land 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)

#### 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 distribution 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 October 2015 to share our lending library and available materials with teachers.

In FY2015-16, 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 materials 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 two 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 partnership program with the Environmental Center reached 1,490 Bend students the first year and a similar number this fiscal 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**

The City exceeded the measurable goals for implementation of required permit activities. The main focus this year was establishment of the Clean Water Works Partnership program, a pilot project 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. This summary focuses on the overview and effectiveness of this effort.

**Goals.** The campaign was based around several goals.

- Cost-effectively increase educational awareness of the importance of water pollution prevention focusing on addressing key pollutants.
- Increase educational awareness on the roles and services of the stormwater utility in advance of the proposed rate increase.
- Establish partnerships to work together in an incentive-based manner to ensure clean water through Bend, focusing on addressing key pollutants.
- Implement City of Bend Stormwater Quality Strategic Education Outreach Campaign developed per the City's Integrated Stormwater Management Plan 2022 for NPDES and WPCF stormwater permit compliance, and in congruence with Bend 2030 Vision elements. Address the following four of six minimum control measures related to the NPDES permit: public education; public participation; illicit discharge elimination; construction site activities.

**Key Pollutants Addressed.** The campaign focused on the following:

- Sediment
- Lead
- Illicit Discharges (General Prevention Education)

**Approach.** A multi-based approach was used.

- Provide value-added television and radio advertising
- Link with existing efforts to provide added attention
- Include outreach at events (printed materials, banners, slides, videos, giveaways) with standard identifier
- Incorporate volunteer partners for mutual benefits incentive programs
- Include spring education program and fall education/partnership program

**Effectiveness Public Survey.** Key statistically significant findings from public surveys conducted in April 2015 and October 2015:

- An increased amount of citizens show concern for pollution in drinking water (up 6%) and surface water (up 9%)
- Fewer respondents believe all or most of Bend's stormwater is treated at the Water Reclamation Facility (sewer treatment plan) (5% decrease)
- More residents understand what the stormwater service charge covers
  - "Unsure" dropped from 71% (April) to 63% (November)
  - "Operation and Maintenance" cited rose from 8% (April) to 14% (November)
  - "Quality/Protection" rose from 4% (April) to 7% (November)

Among those who did recall stormwater education efforts, TV commercials, TV news, and new articles or press releases were the most common sources (all in the 40s% range), followed by Clean Water Works identifiers, advertisement in the long-lasting BPRD recreation guides (in the 30-39% range), and then Radio,

eventers or awards ceremonies, displays at partner organizations, and promotion giveaways (in the 20s% range).

Questions designed to measure key pollutants targeted, found:

- 92% of respondents felt “Careful use of garden fertilizers and pesticides would have a large (69%) or some (23%) impact on improving stormwater quality.
- 89% felt “Reducing litter and waste on the streets and sidewalks” would have a large (56% or some (33%) beneficial impact.
- 83% felt “Taking measure to keep lead out of dirt and water” would have a large (55%) or some (28%)



*Pacific Northwest American Water Works Association Award for “Clean Water Works” TV Commercial.*

- 78% felt “Preventing soils from getting into streets and drains” would have a large (36%) or some (41%) impact on improving stormwater quality.

Evaluation results suggest that citizens tend to remember more often messages that have been used over time (several years). Public Advisory Group members feel the program should be continued, but for a year in length before making long-term decisions. The 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 developed future level of effort needed is expected to be reduced and partners seemed willing to participate again based on survey results.

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.

 **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 2015-2016:

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

During FY2015-16 the Stormwater Quality Public Advisory Group (PAG) met 3 times (October 27, April 7, and June 13) providing input on the annual report, strategic planning, the Clean Water Works campaign, and illicit discharge pollution prevention. (See Appendix C for a list of PAG members, and meeting agendas/summaries).

*Effectiveness.* The City exceeded its goal of convening the Public Advisory Group at least semiannually. The City strives for bimonthly to quarterly meetings but often takes a break during the summer months given the scheduling challenges with vacations. City staff continues to find the Public Advisory Group very helpful in providing input and new perspectives to new materials and concepts and thereby directly helps improve the effectiveness of the stormwater program. Both groups have proven effective with the PAG focused on providing input to stormwater staff and the IAC focused on providing input and recommendations to the City Council.

**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.

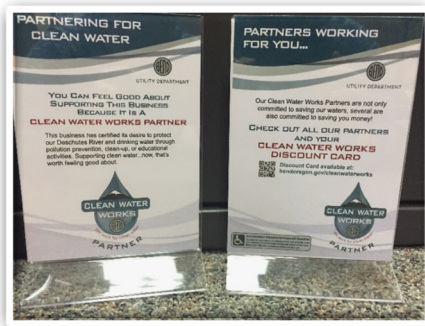
In FY2015-16, public input was solicited on and public hearings were held at City Council meetings on the proposed changes to inspection certification in the Standards and Specification and on the stormwater utility service charge.

*Effectiveness.* Past public meetings have proven successful in obtaining input to improve the City’s integrated stormwater management plans/

**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 implemented an innovative social marketing campaign to increase volunteer participation for clean water.

**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 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, and a thank you bag of goods including water bottles and window decals to note their participating.



*Clean Water Works Partnership Program Point of Purchase Displays (Front and Back).*

They were also able to specify a discount of their choice to be included on the Clean Water Works Partner Discount Card. Citizens could 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 initial partnership program ran from August through December and had benefits to City (best management practices outreach had an improved chance of being read and disseminated; business owners were pledging to care for our clean waters); had benefits to the business owners (advertising, discount card to attract more business, 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 was not a certification program, but a voluntary pledge incentive program. By the end of July 23 businesses signed up to participate, and additional signed up in August.

**Storm Drain Art Contest.** The City of Bend Communication Department worked with the Streets, City Recorder, and Bend Arts and Beautification Commission and Stormwater Utility to create the storm drain art contest. Artists were sought to compete in a contest to paint four drains in high foot-traffic areas that drains to the river. Winners were selected based off of submittals and worked to complete their paintings prior to Stream Stewardship Day. Three artists completed murals on four storm drains, garnering media attention on both their efforts but also to promote Stream Stewardship river clean up day participation on August 8. An added bonus was the number of stormwater questions City staff, volunteers, and artists received while they were painting. See:



News coverage of artist David Kinker preparing his design bordering Harmon Park. Source: KTVZ.

- KTVZ—Local Artists Picked for Bend Storm Drain Painting: [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKewiK\\_bX4sdbPAhXmwVQKHUbc2kQFggcMAA&url=http%3A%2F%2Fwww.ktvz.com%2Fnews%2FLocal-artists-picked-for-Bend-storm-draining-painting%2F34225118&usq=AFQjCNG-Gv4\\_UeKa40H\\_RfSP0-gXr-THZg&bvm=bv.135475266.d.cGw](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKewiK_bX4sdbPAhXmwVQKHUbc2kQFggcMAA&url=http%3A%2F%2Fwww.ktvz.com%2Fnews%2FLocal-artists-picked-for-Bend-storm-draining-painting%2F34225118&usq=AFQjCNG-Gv4_UeKa40H_RfSP0-gXr-THZg&bvm=bv.135475266.d.cGw)
- Bend Bulletin: Bend Selects Storm Drain Artists: [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0ahUKewiK\\_bX4sdbPAhXmwVQKHUbc2kQFggcMAM&url=http%3A%2F%2Fwww.bendbulletin.com%2Flocalstate%2F3352467-151%2Fbend-selects-storm-drain-artists&usq=AFQjCNHPE3g1-d8bmCf7vo23yAv5-4s2JA&bvm=bv.135475266.d.cGw](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0ahUKewiK_bX4sdbPAhXmwVQKHUbc2kQFggcMAM&url=http%3A%2F%2Fwww.bendbulletin.com%2Flocalstate%2F3352467-151%2Fbend-selects-storm-drain-artists&usq=AFQjCNHPE3g1-d8bmCf7vo23yAv5-4s2JA&bvm=bv.135475266.d.cGw)
- KTVZ—Artists Paint Storm Drains: <http://www.ktvz.com/video/local/artists-paint-storm-drains/69009643>
- Bend Chamber Newsletter: [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=9&cad=rja&uact=8&ved=0ahUKewiK\\_bX4sdbPAhXmwVQKHUbc2kQFghQMAg&url=http%3A%2F%2Fbendchamber.org%2Ftag%2Fdeschutes-brewery%2F&usq=AFQjCNFsCqDVkrrrMCgMQikggw3Fzldkw&bvm=bv.135475266.d.cGw](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=9&cad=rja&uact=8&ved=0ahUKewiK_bX4sdbPAhXmwVQKHUbc2kQFghQMAg&url=http%3A%2F%2Fbendchamber.org%2Ftag%2Fdeschutes-brewery%2F&usq=AFQjCNFsCqDVkrrrMCgMQikggw3Fzldkw&bvm=bv.135475266.d.cGw)
- KTVZ—Public Art Offers Green Message: <http://www.ktvz.com/video/local/public-art-offers-green-message/69031608>

Lisa Sipe posted details on her “Its All Connected” efforts (see her photo at left) on her website: <http://www.lisamariesipe.com/2015/10/01/storm-drain-art/> Lisa states:

*I spent 8 hours brainstorming and putting the initial proposal together for the City of Bend, 6 hours creating my custom stencil for the project and 3 days or about 15 hours of painting the sidewalk on site. I wanted to share this with you because often we see art that looks simple but that doesn't mean it didn't take a lot of time to create.*



Photo Credit: L. Sipe



*Artist Nick Malthius  
completing his mural on  
Galveston.*

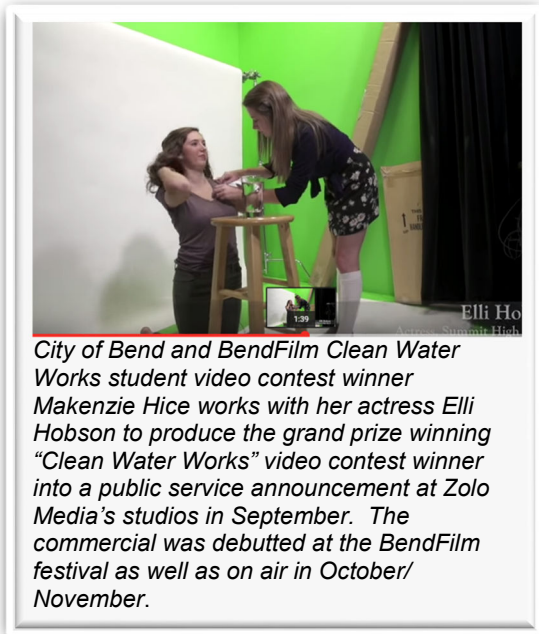
**City's Volunteer Program.** The City's Volunteer Coordinator continues working with several members of the community including high school students, landscape architects, contractors and nursery experts to modernize landscaping and public facilities to be water and maintenance friendly, and incorporating designs that use and demonstrate stormwater features to address a stormwater localized flooding problem. The City stormwater staff continued to work with the Bend Beautification Program staff to coordinate volunteers from service clubs, private individuals, church groups, Neighborhood Associations and other groups for litter pickup, vegetation management, and storm drain marking (see Figure 5-1 and also FY2014-15 Annual Report).

City staff make maps, keep bags stocked and track and ensure directions are followed or this ongoing program. Staff are monitoring the marker installations by date installed to track their longevity.

The City both actively participated in and helped to sponsor the Stream Stewardship Day (see Appendix C). This annual event was coordinated by the Upper Deschutes Watershed Council (UDWC), and was held on August 8, 2015. The event included REI, and the Old Mill District as sponsors as well, among others who helped advertise the event. 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:

- 186 Volunteers
- 34 bags of weeds removed
- 22 bags of instream debris removed (plus lots of large items such as patio umbrellas, bikes, pieces of metal, etc.)
- At least 6 media hits (TV spot on KTVZ, interview on KPOV, City Edition, The Source, the Bulletin, Old Mill Guide)
- Lots of positive feedback from many partners and volunteers! Many very fulfilled faces at the end of the day!

**School Outreach.** In spring 2015, the City worked to invite students to participate in the Clean Water Works Video contest. See Section III.1 and Appendix C for more details.



*City of Bend and BendFilm Clean Water Works student video contest winner Makenzie Hice works with her actress Elli Hobson to produce the grand prize winning "Clean Water Works" video contest winner into a public service announcement at Zolo Media's studios in September. The commercial was debuted at the BendFilm festival as well as on air in October/ November.*

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 ( see <http://www.nuggetnews.com/main.asp?SectionID=8&SubSectionID=8&ArticleID=22358>). 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.

In FY2015-16 the City of Bend Utility Department again partnered with the Environmental Center who worked with local school teachers to develop 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 was a Stormwater Quest (see Appendix C of the FY2014-15 annual report for details and [www.youtube.com/watch?v=pOXo5ZOrLUc](http://www.youtube.com/watch?v=pOXo5ZOrLUc) from last year which currently has 100 views). 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 and is highlighted on the City's YouTube channel.

**Effectiveness.** The Clean Water Works partnership programs proved challenging, rewarding, and successful. An online survey of Clean Water Works Partners was taken 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 storm drain art project, by partnering with the Bend Arts and Beautification Commission, was able to far extend the reach of the City's message into several arts magazines and newsletters that the City has not historically reached on this topic. And the project helped draw attention to the Stream Stewardship Day very effectively. Although the paintings have not stood well up to time given the harsh

winter environment, the project was a success for the media attention it garnered. For its efforts, in 2016 the team won a national 3CMA (City-County Communications and Marketing Association) Savvy award in the category of Most Creative Activity With Least Dollars Spent (1-100,000 population). Judges comments included:

*Many communities have mural art programs or storm water awareness campaigns, but Bend combined the two and created an eye-catching awareness campaign that is hard to miss. Winning combination of art and information built from a partnership of city staff and the arts community.*

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. The City Edition segment provides insightful background on the subject (see Chapter 3). Staff was hoping to use multiple entries for a public selection award as well that would help drive people to the City's Clean Water Works website but unfortunately there was not enough entries, likely given that the timeline over the summer is during a period when school kids do not have access to their iPads. The team worked to counteract this by releasing the 2016 contest in March to give more time, while trying to keep the end dates such to match up well with the BendFilm Festival in October.

#### 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.1 Public 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 is seeing benefits of past year public participation encouraging others to do more (see storm drain marking). In FY2014-15 and FY2015-16 the City of Bend worked with Riley Research and Associates to conduct a random sample survey of City of Bend Residents. The goal of these surveys was to learn more about the awareness, knowledge and perceptions Bend residents have on stormwater issues and pollution prevention and how that changed with the Clean Water Works Partnership Program. The survey shows that Bend residents feel it is very important to be educated on how to prevent stormwater pollution and statistically significant changes were found (see Summary Assessment of Effectiveness in Chapter 3, and the full report is included in Appendix A). The efforts of the public are helping to ensure this occurs.

# 5.0 **ILLICIT DISCHARGE CONTROLS**

## Introduction

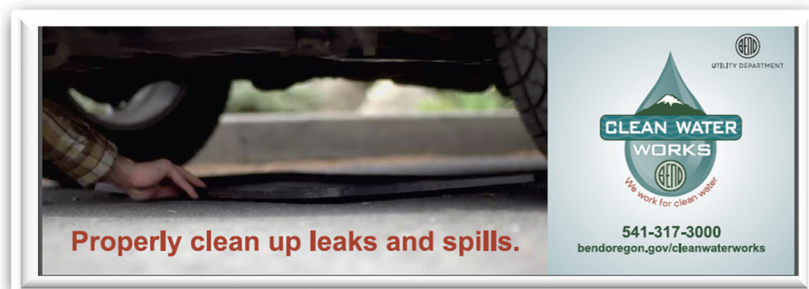
The purpose of this component is to eliminate discharges of pollutants from illicit connections and illegal dumping to the storm drainage system. This chapter describes the activities conducted during FY2015-16 to address illicit discharges.

## Tasks Completed (ISWMP (2006))

The following tasks are tasks conducted during FY2015-16.

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

In April 2015 the City kicked off a new outreach and social marketing campaign based off of its strategic education strategy, called Clean Water Works. This campaign purpose is to build awareness and behavior change through targeted topics and clear messages about stormwater pollution prevention information together with an incentive program. In FY2014-15 through FY2015-16 the campaign focuses on three main issues: general illicit discharge information, lead reduction, and sediment reduction.



*Clean Water Works banner focusing on reducing illicit discharges.*

The first part of the campaign included development of print, TV and radio advertisements, and four illicit discharge prevention banners (see example at left) that include the City's phone number. Fact sheets on illicit discharges were distributed for both home

and commercial/industrial (<http://www.bendoregon.gov/modules/showdocument.aspx?documentid=22546A>) uses. Additional outreach that indirectly helps reduce illegal discharges and improper disposal was also developed and posted under the Home and Garden, Business, and Kids sections of the new Clean Water Works website (see [www.bendoregon.gov/cleanwaterworks](http://www.bendoregon.gov/cleanwaterworks)).

In June-December 2015 the City developed and promoted a business partnership program for fall 2015. The goal of the program is to increase engagement in protecting water quality. This is accomplished by providing best management practices and information in a manner that engages the interest of the targeted business/nonprofit--by offering incentives to businesses and non-profits such as free TV and radio spots and marketing discounts on a discount card distributed to the public. 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 late June 2015 the City released partnership invitations and application packets to all 25 commercial car washes and auto detailing businesses within Bend using the Bend Business License database for contact information. The application packet included a letter outlining the incentive program, a commercial car wash fact sheet, and partnership participation form for those interested in becoming a partner. In July 2015, the City released similar invitations and application packets to food service/restaurants (illicit discharge targeted: grease, fats, oils, debris), 344 construction companies (illicit discharge targeted: sediment); and carpet cleaners (illicit discharge targeted: wastewater) (see Appendices C, D, and E). The hypothesis was that by offering the incentive program we would have a higher chance of the recipient reading and therefore exposing themselves to the best management practices whether or not they decided to take the pledge to participate. Additional invites were sent to those who had volunteered at least three hours of time towards river clean up or stormwater quality or education efforts. The City had 21 participants in the discount card program.

In FY2015-16, the City in conjunction with the BendFilm Festival, presented an award to the Clean Water Works student video contest winner Makenzie Hice. Her video focused on minimizing illicit discharges. Makenzie wrote and, with Zolo Media, helped produce a Clean Water Works public service announcement (see screen shot, right) that was shown at the BendFilm Festival Future Filmmakers event in October at McMenemy's theater, and ran as a PSA in late fall 2015 on local television. Her video was also featured on City Edition (<https://youtu.be/rIOa3GCB4fQ>). The City will continue to use it for outreach, such as at Munch 'n' Movies.



*Still from Clean Water Works student film contest winner public service announcement.*

The City continued to distribute the Illicit Discharge Minimization BMP Manual and the illicit discharge flyer 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. See Task V.7 and Appendix D for a summary of illicit discharge response actions addressed in FY2015-16.

City stormwater regulatory staff participated in the 2016 National Watershed and Stormwater Conference put on by the Center for watershed Protection on April 12, 2016, focusing specifically on the illicit discharge detection and elimination presentations (see Appendix D).

**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 food service, construction, and carpet cleaners meeting the program participation requirements within Bend. The effectiveness of the City’s Clean Water Works initial pilot campaign was determined with a post-pilot program evaluation survey conducted in October 2015 (see final report in Appendix B). The results showed statistically significant increases in the number of residents understanding regarding stormwater contaminants being a somewhat or major concern for Bend’s drinking water and with regards to bend’s rivers and streams. A survey of Clean Water Works Partnership program participants (14 responding) found that 71% felt that the program made them and their employees think more about the ways to protect water quality or the importance of protecting water quality; the other 29% responded “Maybe/Unsure” and no one responded “No”.

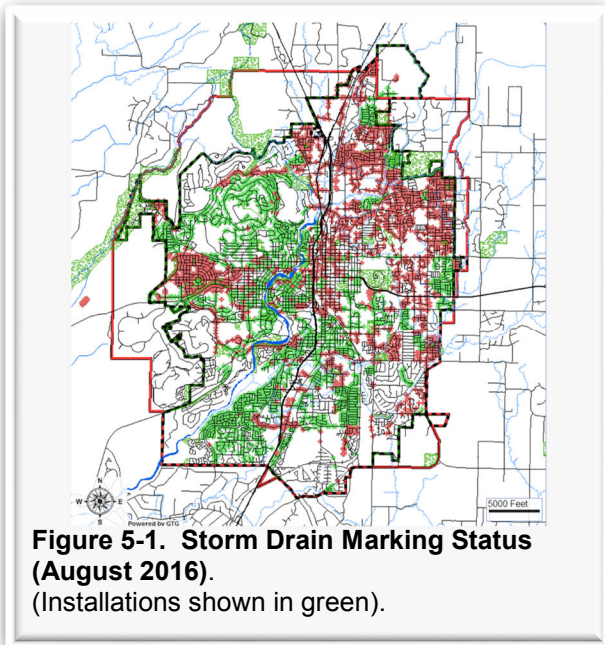
In the past, the stormwater utility has also teamed up with the Industrial Pretreatment Program (IPP) to distribute Illicit Discharge BMP Manual and DEQ automotive repair fact sheets to automotive repair facilities within Bend. The fact sheets were handed out during IPP inspections. Due to some staffing changes/reorganizations within the Industrial Pretreatment Program and stormwater staff attention on developing the new partnership program, this level of effort may have dropped off this past year--

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 an imprinted, lifelong “Only Rain in the Storm Drain” stamp (see picture at right). In FY15-16 the City installed 81 new curb inlets with a permanent



*Permanent lid with stamped pollution prevention message included that designates storm drains.*



**Figure 5-1. Storm Drain Marking Status (August 2016).**  
(Installations shown in green).

imprint.

The City has also had an ongoing volunteer storm drain marking program, with installations of round, plastic semi-permeant markers (10-12 years longevity expected) affixed to existing drain inlets. The program has seen strong success over time (see map below)

*Effectiveness.* The City has successfully integrated a method of providing a

permanent stormwater quality message as part of an identifier for stormwater facilities and no added cost.

The map at left illustrates the effectiveness of the volunteer storm drain marker installation program, which has focused on areas draining to the river and areas within a drinking water protection area. The emblem 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 reservoirs. Although volunteer marking was lacking this year due to workload priorities this year, the City has averaged well over 50 markers per year since the start of the program, and has stormwater/river volunteer efforts as a combined volunteer coordination/communication goal this coming year. In addition the City plans to have an intern begin a quality control/assurance verification program to ensure the markers remain readable and in place over time.

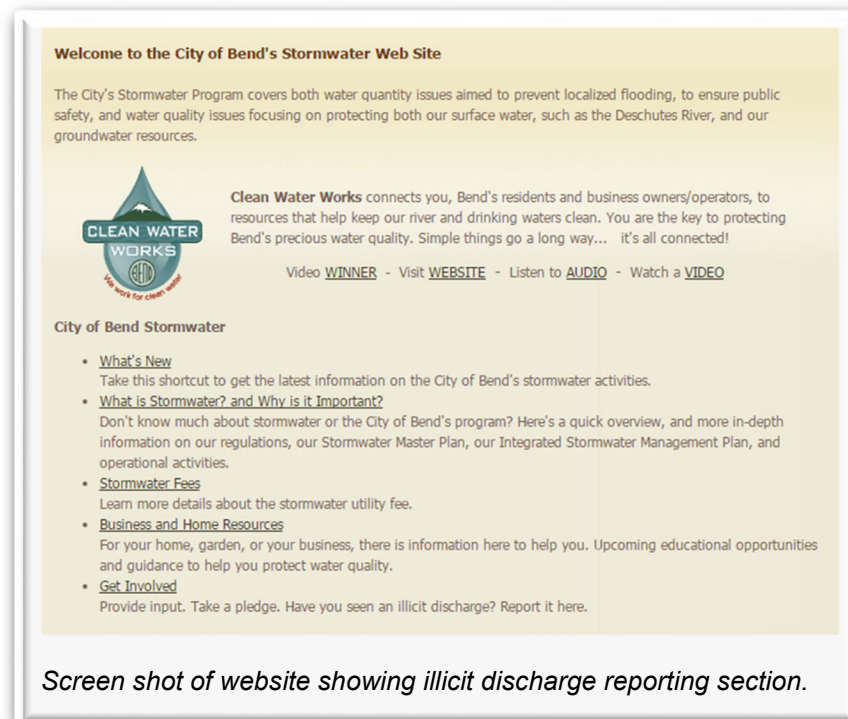
**Task V.4 Post Illicit Discharge Prevention Information on Web Site (MS4/UIC)**

Stormwater related material is located in a central location at: [www.bendoregon.gov/stormwater](http://www.bendoregon.gov/stormwater). The main page has five main categories, including “Get Involved” which links to a location to report illicit discharges (see bottom of picture below).

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](http://www.bendoregon.gov/cleanwaterworks)). City staff posted the new illicit discharge fact sheet for both business and homeowners and radio advertisements (<http://www.bend.or.us/modules/showdocument.aspx?documentid=22502>) on the City’s

web site. These fact sheets were based on similar ones created for City staff, which Stormwater Public Advisory Group members suggested be made available to the public as well.

**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



Screen shot of website showing illicit discharge reporting section.

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.

#### Task V.5 Stormwater System Map (MS4<sup>1</sup>)

The City developed a geodatabase map in FY2008-09 including GPS coordinates for known City stormwater facilities, and the City has been updating the geodatabase as appropriate since. City Information Technology GIS staff regularly update the mapping interface, Geoblade, which has greatly improved staff response times and information. A version is also available online for the public to use that includes the piped system, using Geoblade, 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.* 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. The City is in process of upgrading to a new mapping system called BOOM (geocortex-based). The City will be working with and modifying this database over the coming year(s) to better meet staff and public needs.

#### 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 conjunction with and as called out in the ordinance. 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 early to mid-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 (<http://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.

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<sup>1</sup> See Task II-6a for related UIC mapping.

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



*One of multiple downtown spill locations and lab samples taken one morning as part of investigation of spill that was tracked upstream. Conclusions indicate probability of improper disposal of paint in the garbage and leakage during transport.*

The Utility department continues to work closely with 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, including further up in the watershed to attempt to find and properly address the source. The stormwater utility is in the process of adding a new staff member to oversee erosion and sediment control enforcement and post construction site inspections. This new positioning is expected to be filled in the first half of FY2016-17.

To ensure stormwater-performance standard trainings are occurring, the City uses an online program called Compli for public works staff. In FY2015-16, public works staff were trained in Winter Road Care, Leaky Equipment and Fueling, Spill Prevention, Control and Cleanup, Utility/Road Repair & Maintenance; Pressure Washing and Surface Cleaning; Paint Use and Disposal. A list of staff that completed the trainings is included in

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. Compli trainings were not held in FY2015-16 for Landscape Maintenance Training, Illicit Discharge Recognition and Reporting, Vehicle and Equipment Washing; Street Sweeping; and Concrete Use and Disposal, but supervisors have received the training packets and fact sheets in the past for each of the areas listed in Table 3.1 for incorporation into their informal tailgate trainings. See Appendix D for a copy of the training sheets and quiz questions.

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 Compli 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.

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



*Field Component of CESCL Training, March 31, 2016.*

In March 2016 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 details).

*Effectiveness.* The City continued to use its tracking system, maintaining a spreadsheet of stormwater-specific follow-up actions, tracking 47 events in FY2015-16 (see Appendix D). Staff coordinated 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. Most times initial outreach and education resolve the issue. In FY2015-16 City of Bend staff issued one formal violation to a commercial carpet cleaning business that was caught dumping carpet cleaning waste into a catch basin. In order to avoid a fine the carpet cleaner entered into a consent agreement with the City that required to them to submit monthly waste disposal logs.

City staff will work in the coming year to incorporate the additional trainings that have been made available to supervisors to use with their staff but have not made it yet into Compli—namely Illicit Discharge Recognition and Reporting, Vehicle and Equipment Washing; Street Sweeping; and Concrete Use and Disposal—into Compli for improved tracking.

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

The City continues to use its non-emergency Code Enforcement automated phone tree. One of the options in the phone tree is for reporting Illicit Discharges. Callers who select that option are transferred directly to stormwater staff for follow-up. Another is for construction site erosion and sediment control or drainage issues, which is directed to the construction manager in the community development department overseeing private

development inspectors. Additionally the City advertises the general 541-317-3000 number for reporting illicit discharges and getting information regarding 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 continues to use the Citizen Service Request (CSR) form to the City's webpage (<http://bendoregon.gov/index.aspx?recordid=133&page=26>). This form allows the public to electronically report Illicit Discharges directly. The completed form is automatically emailed to stormwater program staff for follow-up.

Front desk staff are trained on where to send illicit discharge inquiries 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 uses 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 to look for ways to improve its reporting mechanisms and educate the public on how to prevent illicit discharges. The City worked with the Public Advisory Group to get input late in the fiscal year on note pads with stormwater pollution prevention messages that includes a tagline "Spills Happen. Call 541-317-3000 x 2 or 911 if hazardous." These pads will be finalized in time for early FY2016-17 events.

#### 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. Water conservation staff have been growing, with the addition of a temporary sprinkler program inspector in FY2015-16 who oversaw the City's new Sprinkler Inspection Program. The first year they implemented the program, that included the summer of 2015, they promoted it to everyone equally on a voluntary basis. This year, they first opened the sprinkler inspection program up to high water users and sent them a targeted note encouraging their participation in the voluntary program, and then opened it to the general public. The sprinkler program is a professional service provided at no additional charge in which participants receive a site visit analysis and a customized watering scheduled for their landscape as well as education on how to maximize the performance of their underground irrigation system. The pilot 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 program is open to City of Bend water users (Bend drinking water utility covers about 16,000 acres) with an operating underground irrigation system.

In addition the City has been updating the waterwise landscape photos online, and

began work on a waterwise landscape guide that includes stormwater considerations, and working with OSU Extension on an update to the Central Oregon Xeriscape™ guide, both expected to be released in FY2016-17. (See <http://www.bendoregon.gov/index.aspx?page=1085>.)

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 new ISWMP 2022 was approved by DEQ as part of the WPCF-UIC permit issuance but not yet 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 started implementing the new performance standards as part of the ISWMP 2022 and is fully compliant with the scheduled implementation schedule. The use of the Compli system with performance standards fact sheets has improved staff training on the new performance standards. The City met its ISWMP (2006) goal of completing the performance standards for inclusion for consideration in the draft ISWMP 2022.

## **Enforcement Actions**

In FY2015-16, the City provided education and verbal warnings along with one formal violation. In general, the City starts with 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. More 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 new customer service data base 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 form. 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. This year, stormwater program staff attended a webinar by the Center for Watershed Protection that focused on illicit discharge compliance, and staff continue to look for valuable IDDE staff training. A great deal of illicit discharge detection and elimination efforts 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 as well to increase and improve its separate sanitary sewer system by the installation of new interceptor lines (SE Interceptor: <http://www.bendoregon.gov/index.aspx?page=149>; North Area Sewer Improvement: <http://www.bendoregon.gov/index.aspx?page=1245>; Plant Interceptor Sewer Line Rehab: <http://www.bendoregon.gov/index.aspx?page=1344>), a new pump station upgrade adjacent to the Deschutes River (Colorado Lift Station: <http://www.bendoregon.gov/index.aspx?page=1115>), and an expansion of the water reclamation facility (<http://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 purpose 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 related to sediment loads. Although the main source of sediments in the Deschutes River are related to upstream river management activities, the City sees it as a priority to reduce the stormwater-related sediment contributions to the problem. Sediments are a main pollutant coming off of uncontrolled construction sites and can clog stormwater facilities including drywells and drill holes as well as negatively impact the Deschutes River, which is listed for sediment and turbidity within Bend.

Construction sites that disturb one or more acres and discharge stormwater through a man-made conveyance or directly to a surface water 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. Per the City's Grading/Clearing regulations as part of the Bend Code Title 16 stormwater ordinance, grading permits are now required on all commercial developments that are adding 5,000 square feet or more of impervious surface or adding one or more UICs, and erosion 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 FY2010-11, the City updated the Design Standards, Construction Specifications and the Development Codes. City's standards and specifications only apply to City-owned property and rights-of-way, not to private lands. The revised standards include new erosion control details and incorporates the COSM erosion requirements. The standards and specifications are available online at: <http://www.bendoregon.gov/index.aspx?page=161>. The revisions adopted the Central Oregon Stormwater Manual (2010) and took effect July 1, 2011.

On January 4, 2012, the City Council voted to approve the new comprehensive

stormwater ordinance adopting Bend Code Title 16 (see Annual Report FY11-12 Appendix A). Bend Code Title 16 adopts the Central Oregon Stormwater Manual (2010). Staff are continuing to working with city inspectors, contractors and developers to refine the education and implementation of the ordinance especially through reorganizations and during this period of growth. Development and construction site plans for City review are routed through E-Plans, an electronic review software. The City hired a new Construction and Right-of-Way Manager in private engineering, Kyle Thomas, in FY2014-15. Kyle's role is to oversee the engineering inspectors in the right-of-way in coordination with onsite development inspections. In August 2015, the City adopted new standards related to inspection, 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](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 providing certification that the designs are being installed per the site plan.

*Effectiveness.* The City has successfully completed improving design standards and specifications including adoption and beginning implementation of Bend Code Title 16 and the revised Standards and Specifications. The City has made major progress in regulating construction site erosion and has completed the tasks outlined for this BMP. As the City moves into a period of growth, staffing pressures increase. As a result, in FY2014-15 department heads reviewed roles and responsibilities for implementing portions of Bend Code Title 16, especially with respect to construction issues. As a result of this review the Stormwater Utility has received approval to hire an additional enforcement position which the City worked towards in FY2015-16, and expects to hire in fall FY2016-17.

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

The City sent a Clean Water Works Partnership invite to over 300 construction contractors and company owners. The packet sent in July included an invite cover letter, a partnership participation sheet, a Clean Water works sticker, and a new fact sheet entitled "Sediment Prevention for Businesses" that included 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 the "Single Family Example Drainage Plan" that 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" to project proponents to help with implementation of Bend Code Title 16 (see FY2012-13 Annual Report, Appendix E for copies).

City staff also provides copies of the Oregon Association of Clean Water Agencies (ACWA) "Construction Site Stormwater Guide," an inspection field guide. The field guide is glove-box-sized and includes example pictures and information on proper installation and maintenance of common erosion and sediment controls.

City staff have placed several construction site references on its website: [www.bendoregon.gov/cleanwaterworks](http://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. A construction company and an engineering firm 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 FY2015-16 grading and drainage ordinance compliance and questions were routed to Kyle Thomas, the City's Construction/Right-of-Way Manager, to coordinate compliance, investigation and follow-up. When an erosion and sediment, or poor housekeeping or spill problem is discovered on site, City inspectors provide verbal education and warnings. If the erosion and sediment problems are not addressed by the time the inspector returns for the next inspection, the inspector can withhold additional inspections until the problem is remedied, which can have the effect of stopping a project from progressing. This proved to be an effective way to encourage contractors to repair erosion control deficiencies. Building inspectors help with compliance as part of their standard inspections as well.

Over 47,595 total inspections were requested in FY2015-16 of the Community Development Department. The Community Development Department recorded 980 single family residential starts and 341 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 FY2015-16 there were 667 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 utility staff responded to 13 Construction Site illicit discharge complaints; those complaints were included in the Illicit Discharge Tracking sheet (see Appendix D).

*Effectiveness.* Both commercial construction activity and single family home starts increased in FY2015-16. Inspectors are providing verbal education and warnings regarding construction site stormwater management and delaying other inspections when needed to encourage compliance. 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. The Stormwater Utility is in the process of hiring an additional enforcement position that will focus on construction site erosion and post construction inspection in an effort to assist building inspectors. City staff have advertised this new position and anticipates hiring in the first-half of FY2016-17.

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



CPESCL Field Training.

In March 2016 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 27 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 with the City of Bend gave a presentation on common erosion control issues that inspection staff are finding in the field. Wendy Edde, City of Bend, gave an overview on the City’s regulations and erosion control requirements. Krista Ratliff with Oregon DEQ provide 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 good in Washington state and recognized in Oregon by the DEQ as well.

The City of Bend also hosted several webinars in FY2015-16 (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**

Fall Webinar Series		
Presenter	Webinar Training	Date
U.S. EPA	Clean Water & Safe Roads: Finding the Balance	November 3, 2015

Winter Webinar Series		
Presenter	Webinar Training	Date
ASCE	Design of Erosion Control Measures for Small Channels	November 17, 2015
ASCE	Construction Stormwater BMPs	November 17, 2015

*Effectiveness.* Between the webinars and on-site Certified Erosion Control Lead (CESCL) training, the City exceeded its biennial training requirements for this task. The CESCL training had a lot of interest but was limited by the training room capacity. The City will consider using a larger venue for future erosion control classes. Some wanted to see a shorter one-day class. 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 FY2015-16. 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, inspectors work to educate as part of standard operating procedure and this approach quickly resolves any potential issues. In FY2015-16, no formal violations were issued and multiple verbal warnings resulted in compliance without need for escalation. Of the 48 illicit discharge complaints, 13 were related to construction or erosion control, for which educational materials were provided and cleanup activities were taken (see Appendix D).

### **Summary Assessment of Effectiveness**

The City has successfully implemented the tasks in this component. Staff have been and are continuing to focus on education and refining coordination efforts both internally and with external groups to ensure effective and smooth implementation of Bend Code Title 16, the Standards and Specifications and, through these, the Central Oregon Stormwater Manual and are looking forward to improving the program with the new hire. The construction staff have been very helpful when complaints to stormwater utility staff are brought forward to them and they are often able to obtain immediate compliance with warnings, education or delays. The adoption of Bend Code Title 16 provides adequate enforcement authority. Feedback from trainings is used to refine effectiveness of future trainings. The City develops and distributes new education materials as the needs presented themselves, and is working towards improving enforcement staffing. The City is continuing to refine its enforcement plan as roles and

responsibilities change with new hires, to improve it based on recent workload and experience and record-keeping needs and technological capabilities.





# 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.

## **Tasks Completed (ISWMP (2006))**

The following describes yearly tasks that have been completed, or are ongoing that were performed during FY 2015-16:

### 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 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.

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

As noted in the FY2007-08 Annual Report, City staff have determined that, in general, private development 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 the new Bend Code Title 16 (See Annual Report FY2011-12 Appendix A), Bend Code Title 16: section 16.15.040). The new code requires all new commercial development to submit a signed maintenance agreement that will be recorded on the title of the property. The agreements are recorded on the properties' title (see FY2013-14, Appendix F for an example).

For City-owned facilities, City staff continues 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. On the private side, the City continues to use E-Plans for review and electronic record keeping.

*Effectiveness.* Having maintenance agreements are useful for implementing Bend Code Title 16. 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.

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

In FY2015-16, the City adopted a new chapter to the Standards and Specifications, Part V - Construction Observation and Inspection Requirements (see Chapter 2). This document provides clear expectations for contractors, developers, engineers of record and City staff engaged in construction of public infrastructure that will be accepted for ownership and maintenance by the City. The document changes how the City will inspect public development projects. The City intends to transfer the construction inspection responsibility onto the Design Engineer. This includes erosion/sediment control and post construction stormwater facility testing.

City staff began work to improve inspection documentation of post-construction controls based on the information gleaned from attendance at the Vegetated Private Water Quality Management Training hosted by Clean Water Services and Portland Community College in May 2016.

*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 at the City.

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

The City’s Stormwater Program Manager earned fifteen continuing education hours for attending the Vegetated Private Water Quality Management Training on May 23 and 25, 2016 (see Appendix F). City staff provided feedback on the OSU xeriscape guide update, as well as an internal Landscape Design guide under development to include stormwater design considerations.

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 distributed several at the Oregon ACWA conference in July 2016.

The City provided several training opportunities associated with post-construction stormwater controls to internal staff and the public. The following is a listing of 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). These were hosted by the Center for Watershed Protection (CWP), the US. EPA or the International Erosion Control Association (IECA) (see Table 7-1 below). Stormwater Program Manager gave a presentation as part of the “Checking in On Post-Construction Stormwater Management” webinar with regards to Bend’s experience on November 18, 2015. Copies of the webinar announcements, sign-in sheets and evaluations are available in Appendix E.

**Table 7.1 Post-Construction Control Trainings**

Fall Webinar Series		
Presenter	Webinar Training	Date
U.S. EPA	Green Infrastructure Maintenance: Facts, Fiction, Cold Weather, and Costs	November 3, 2015
U.S. EPA	Clean Water & Safe Roads: Finding the Balance	November 3, 2015
CWP	Checking in on Post-Construction Stormwater Management	November 18, 2015
Winter Series		
Presenter	Webinar Training	Date
ASCE	Hydrologic Trespass and Nuisance Considerations in Stormwater Design	December 1, 2015
ASCE	Storm Water Management Alternatives for Small Commercial Sites	December 1, 2015
ASCE	Permeable Pavement: Design Considerations and Tips for Avoiding Failures	December 15, 2015

Two City staff members attended ACWA's Stormwater Summit held at Lane County Community College on May 11, 2016.

Staff continues to make available the following outreach guides on its website at [bendoregon.gov/stormwaterbmp](http://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., Stream Stewardship Day and Earth Day). The full color guide includes information specific to Central Oregon.

*Effectiveness.* City staff successfully met the requirements of this task. Having continuing education credits available helps draw the engineering community to the webinar trainings that provide access to national expertise.

#### Task VII.5 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-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. DEQ is still reviewing the ISWMP 2022 with respect to the issuance of the City's NPDES permit reissuance for drainage to the river, but has accepted them for its UIC program.

### **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

staff worked with transportation engineers to ensure success of low impact development into the Reed Market Improvement project (phase two) and the Murphy Road Overpass project. The projects included sediment manhole upgrades, installation of regional bio-swales and additional planter boxes along a Reed Market Rd. City stormwater staff continue to participate on the design team to address the stormwater runoff. Staff continued to participate on the Galveston project as well as provide input on other CIP and internal maintenance projects.

The City is working to tailor its preferred post-construction facilities by area, and worked to obtain performance data as part of that effort.

In Bend, affordable housing pressure is high. Vacancy rates have been very low (below 1.5%) for an extended period recently. City Council recently amended the development code to clarify that the Accessory Dwelling Units, which are being allowed, can take advantage of tandem (one behind another) parking as well. Tandem parking has always been allowed for single family residences. This removes a potential hurdle for reducing the parking footprint.

*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.

#### 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.

*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.

#### **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 in FY2015-16. The City has updated and actively implemented the development rules and legal authority to require and maintain adequate post-construction controls. 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.



## 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 activities and to minimize discharges of pollutants to watercourses and injection systems. Routine maintenance activities include: street sweeping, maintenance of storm drainage facilities and watercourses, and litter control. In FY2015-16, the City has 4,951 drywells, 974 drill holes, 4 drain fields, 1,284 swales, and 10,914 catch basins and other stormwater facilities in addition to the over 40 miles of storm drain pipe, 14 miles of which drain to the 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 FY2015-16:

#### Task VIII.1 Street Sweeping (MS4/UIC)

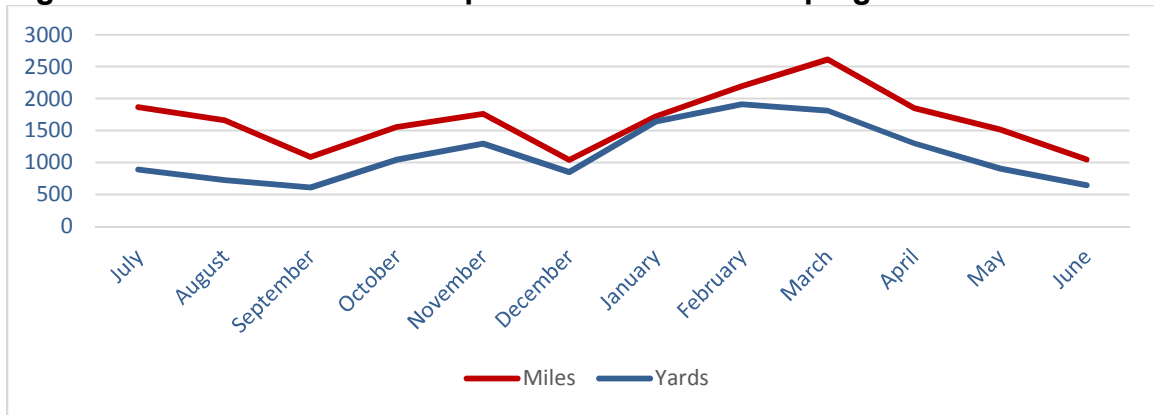
The City continues its ongoing street sweeping program per its Sweeping Operations Plan (2014, see Appendix G). The City is broken down into 8 geographical sweeping areas, and then broken down again into 4 sub zones. Each sub-zone requires approximately four days for a sweeper to complete. Routes are designed based on street classification and changing community needs. Each sweeping vehicle contains a notebook size map of the sections with identified boundaries. Sweeper operators are assigned sections on a daily/weekly basis. Large area maps are used by Streets Supervisors to define and refine areas based on community needs. These maps are located in the Streets supervisory staff offices. Routes are assessed for accuracy and edited as needed once per year.

In FY2015-16, the Stormwater Utility funded 3 FTE of 7 FTE sweeper positions due to the stormwater benefits of street sweeping. The Streets fund supports the other 4 FTE. Whereas the 3 stormwater utility funded personnel focused on sweeping year around, due to budget cuts, the Street funded 4 FTES were repositioned during the summer to other crews within the Street Dept. to help with street repair and ADA requirements. The City conducted a special election in March to pass a fuel tax to help with street repairs/budgets but that measure failed. During winter operations when the sweepers can access the streets, the 4

FTE street sweeper crew operate the sweepers as well (November 7 to March 10) (see Figure 8-1).

During FY2015-16 the City Stormwater Utility purchased a new mechanical broom sweeper. This replacement should be helpful as over the past year, the sweeper equipment has suffered a high number of break downs as most of the fleet is older and functioning at the 10,000 hour mark. The City continues to operate five to seven sweepers running when the pavement is dry and departures are above freezing. In FY2015-16 they traveled 19,912 miles, directly removing 13,641 yards of material from the streets.

**Figure 8-1. FY2015-16 Municipal Maintenance Sweeping**



**Table 8-1 FY2015-16 Municipal Maintenance Sweeping**

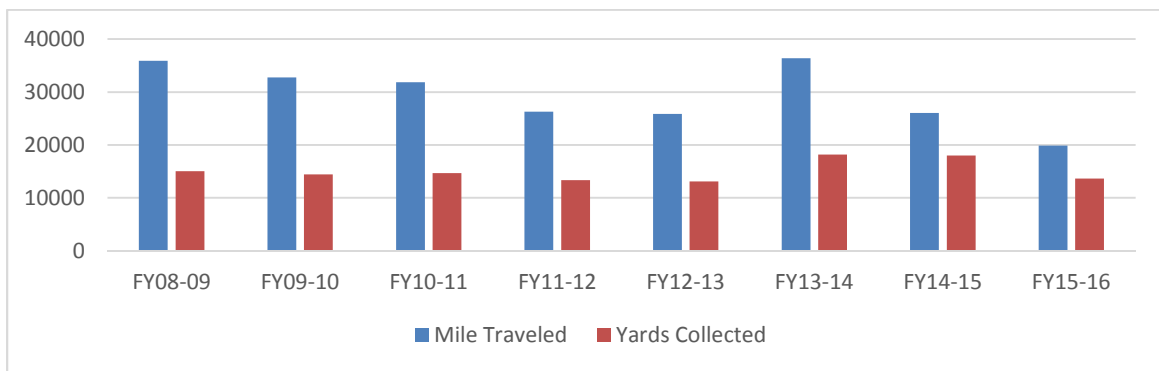
Date	Miles	Yards
July	1868	893
August	1661	724
September	1088	609
October	1555	1048
November	1763	1298
December	1039	852
January	1721	1642
February	2192	1912
March	2612	1813
April	1850	1302.5
May	1517	904
June	1046	644

In June, City staff prepared a map with the sweeper zones overlaid with areas

that drain to the river (MS4)—staff are working to place additional focus on increasing the effectiveness of sweeping especially in areas that drain to the river given that sediment/turbidity is a pollutant of concern.

*Effectiveness.* The 13,641 yards of material collected in FY2015-16 was kept out of the City’s drainage system. This helps to reduce clogging of stormwater facilities, and helps to keep pollutants out of the Deschutes River. 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. Several of the existing sweepers have been requiring increased maintenance and down-time, so the purchase of the new sweeper should be helpful for increasing efficiency.

**Figure 8-2. Sweeping Summary from FY2008-09 through FY2015-16**



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 across Louisiana from McMenamins. While City Streets crews sweep the public streets, the City’s Facilities division is responsible for sweeping the parking lots and parking structure. In the early years of the stormwater program, the City formed a combined Clean Streets and Parking Lots/Litter Task Group within Public Works to determine monitoring protocols and examine ways to improve the effectiveness of the entire sweeping program by first monitoring the build-up of sediment and litter and identifying where improved cleaning is needed most. City Stormwater Program and sweeping supervisors still meet. 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 from FY2011-12 on (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 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: <https://www.youtube.com/watch?v=3eE6d2-eH3Y&index=23&list=PLufJOv4LpbfAT2WkINy89WDCrQ9YdFBKE>.

The Street Division right-of-way and landscape maintenance crews collect litter as a part of their routine maintenance when trimming brush and/or trees. Tree trimming is tracked by Infor EAM asset management work order system. The Street Division also administers an Adopt-A-Road program and a Volunteer program whereby citizen help in 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.

The City stormwater crews helped at the annual Stream Stewardship event held in August 2015 by collecting the bags of materials brought up by volunteers. This year the event had 186 volunteers, removing a total of 56 garbage bags of weeds, trash and debris for the river.

City staff have responded to several grease storage container spills in the past several years. In an effort to address this issue the City added a new code section (Bend Code 11.16.120) requiring that all grease collection and recycling companies use secure, lockable and leak proof containers. A best practices letter was sent out to all grease handling businesses and restaurants, a copy of this letter was included in Appendix G.

*Effectiveness.* The City effectively assists in the collection and disposal of litter. Working with DBBA increases that effectiveness. When issues arise, City leaders ensure they are resolved, as with the Economic Development Director championing code changes to improve grease handling downtown.

### Task VIII.4 Landscape Maintenance Practices

City staff reviewed and provided comments for an updated water wise landscape



guide in April- June 2016. This updated guide will include a section on stormwater facility planning and sizing, and show low impact development examples. The City anticipates having this guide complete in FY2016-17.

The City's water conservation group started sprinkler inspection program. Offering free sprinkler inspection for City of Bend water customers. Staff have 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. In spring 2016, the City extended the pilot program of 2015 but worked to increase efficiency by reaching out with specific invites to high water users first before opening the program to the general public.

The City of Bend, Stormwater Program Manager 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 G.

City capital improvement projects have incorporated stormwater surface controls including Reed Market (<http://www.bendoregon.gov/index.aspx?page=814>), Third Street Underpass, and the G.O. Bond roundabouts (<http://www.bendoregon.gov/modules/showdocument.aspx?documentid=25392> ). Several have remained under warranty for vegetation establishment. City staff worked with engineering to ensure one that failed at Brookwood and Powers roundabout gets properly corrected before acceptance by the stormwater utility.

*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 184 swales. The City has implemented improved practices such as plant selection and considering concave medians and bioretention that incorporate stormwater as a design element. The City is still working to ensure proper maintenance during warranty in a standard manner, and to ensure proper communication upon hand-over to stormwater utility for ongoing maintenance. City is working to improve vegetated control inspection forms based off the recent training, and refining recommendations on when and where to choose surface controls in right of way as opposed to other low impact development options.

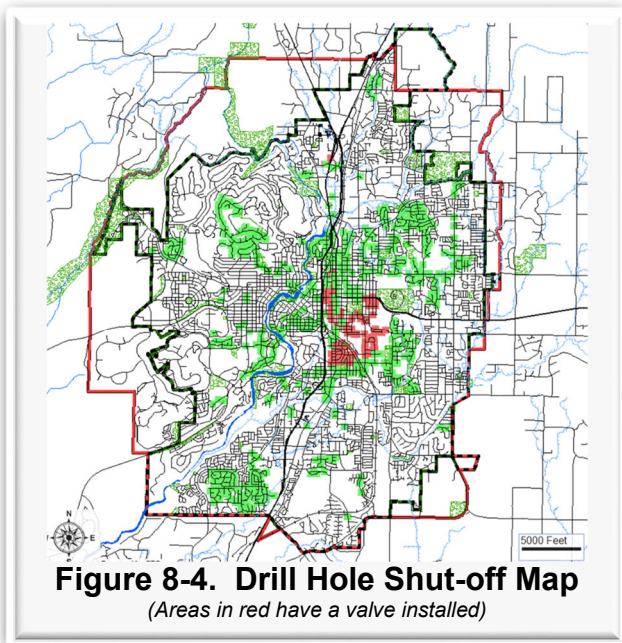
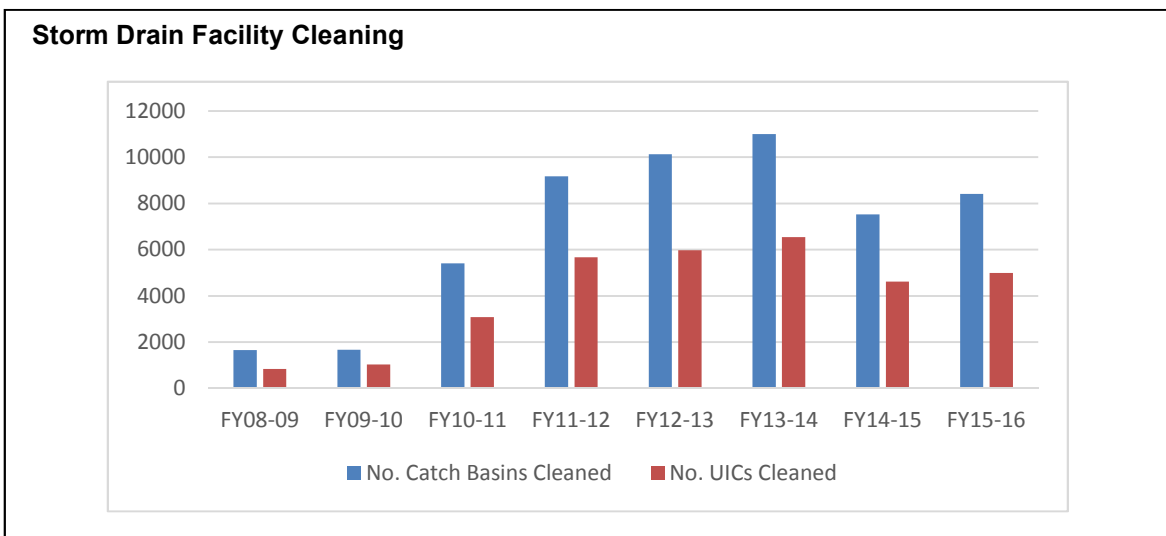
#### Task VIII.5 Improved Catch Basin/Storm Drain Facilities Cleaning (MS4/UIC)

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 FY2015-16, the four dedicated stormwater operations staff along with 2 seasonal temporary staff maintained 8,417 catch basins, and 5,001 UICs (dry wells and drill holes) removing 234 yards of material. In addition to routine cleaning and inspection, staff completed 22,463

maintenance repairs, including catch basin replacements and unplugging clogged drill holes. They also conducted maintenance on City swales/detention basins/bioretenion cells 673 times, or roughly equivalent to quarterly.

The City also maintains a Contech Stormfilter that is installed in Newport Avenue at the west end of the Newport Bridge. In addition, staff installed 244 gross pollutant traps around drill holes to help prevent clogging within the hole. These are proving effective at reducing clogging and preventing large size pollutants from entering the drill hole.

**Figure 8-3. Storm Drain Facility Cleaning**



In FY15-16 City staff continued work on the Awbrey Butte Drainage study. The City has hired a consultant to model the drainage flows for this areas. 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 continues to increase efficiency and effectiveness of the

City's stormwater program to clean the catch basins, drill holes and dry wells, removing more than 244 yards of material. The maintenance levels this year increased slightly over FY2014-15 levels but remain lower than previous years in part due to special projects such as the Awbrey Butte Drainage study and UIC retrofit projects which take time (see Figure 8-2). Additionally, installation of gross pollutant screens on existing drill holes 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 will allow stormwater crews to safely block the flow during a spill to a drill hole. In FY2015-16 staff installed fifteen 6"-drill hole shut-off valves at high risk locations and 257 trash screens. The City plans to continue this program and install approximately another 15 valves in FY2016-17.

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 an illicit discharge prevention (see Appendix D). 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 in FY2014-15. City staff are now 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.

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 continues to use 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 valves on high risk drill holes helps reduce impact risk to that risk incurred during response times because staff are given the ability to close off 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 reduce situations where spills may occur and when to report spills; along with the needs and expectations for protecting water quality through storm drain maintenance. 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. Switching to Compli for training is helping to improve record keeping, accountability, and efficiency.

#### 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 who see an illicit discharge or illegal dumping are trained to contact stormwater personnel for educational follow-up (see also Task V-2). City staff reported 22 of the 48 reports of illicit discharges reported in FY2015-16. Additionally, the City has focused outreach efforts, such as its successful “It’s All Connected,” and “Clean Water Works” campaigns and storm drain marking program on reducing non-stormwater discharges (see the Public Education and Public Participation chapters of the annual report for more information).

The City distributed funnels, Kids activity guides, highlighters and water droplets for the July 2015 Quest at the Fest event. The funnel and water droplets include a phone number to report illicit dumping.

*Effectiveness.* City staff are implementing educational and inspection best management practices to help reduce the number and severity of illicit dumping incidences. The storm drain facility cleaning means every facility inspected as part of Task VIII.5 during FY2015-16 is also examined for evidence illicit discharges. Increased education on illicit discharges has led to calls from citizens as well, which have been 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 inspections of both the Boyd Acres facility and 15<sup>th</sup> Street facility and completing self-inspection checklists quarterly together with the regularly-scheduled safety inspections for staff efficiency (see Appendix

G). Staff began to conduct these audits in FY2010-11.

*Effectiveness.* The City has been effective in conducting corporation yards audits this year and use these as needed to initiate discussions with appropriate staff to improve practices as needed. The face-to-face interaction is useful for problem solving.

#### 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 FY2015-16.

*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

*Effectiveness.* Commute Options worked to coordinate better with statewide programs to improve efficiency by way of introducing Drive Less Connect in fall 2011. In FY2015-16 the City continued to promote the TDM program, and electronic reporting through the Oregon Drive Less Connect website. City staff efforts saved 4,600 gallons of gas. The Oregon Drive Less Connect webtracker states that the statewide program has saved \$1.9M, 259,000 gallons of gas, 727,000 trips, 8.4 M miles not driven alone and 5.2 M 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 FY2015-2016 City of Bend TDM Summary  
 General Alternative Transportation Program Report**

7/1/2015 through 6/30/2016

<b>Number of Users Joined Network</b>	<b>51</b>
<b>Non SOV Miles Logged</b>	<b>161,123</b>
<b>Bike trips</b>	<b>8,150</b>
<b>Bus trips</b>	<b>46</b>
<b>Carpool trips</b>	<b>7,010</b>
<b>Compressed Work Week trips</b>	<b>546</b>
<b>Did Not Work trips</b>	<b>1,713</b>
<b>Drive Alone trips</b>	<b>1,493</b>
<b>Other trips</b>	<b>10</b>
<b>Telework trips</b>	<b>202</b>
<b>Walk trips</b>	<b>3,385</b>
<b>Savings</b>	
	<b>Total</b>
Carbon Dioxide (lbs)	94,560
Gasoline (gal)	4,647
Monetary savings (\$)	35,622
<b>Ridematch statistics</b>	
	<b>Total</b>
Ridematch search performed	90
Ridematch search with no result	65
Ridematch requests sent	13
<i>(Results based on all time)</i>	

**Task VIII.11 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-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 begun distributing training fact sheets to help explain performance standards and best management practices in a manner suitable to tailgate meeting trainings.

*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 FY2015-16. 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. The additional data that the City is collecting is being compiled and analyzed which 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](http://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 having completed a baseline river monitoring analysis, continues to collect data to help determine 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 as part of the WPCF-UIC permit issuance.

In FY2015-16, the City continued the use of automatic sampling collectors with Nalgene bottles 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 FY2015-16 is included in Appendix H.

The City met its goal of collecting two stormwater samples at each of the 6 sample locations. The City deployed the samplers for a total of 4 rain events.

In addition to the stormwater monitoring plan, stormwater staff collected two grab samples from catch basins as part of illicit discharge program. One sample was collected from a drywell located in an alley in downtown area and the sample was collected from a catch basin in a light industrial area. Based on the lab results the material found in the alley was more than likely paint, that may have been spilled by the trash company while emptying the dumpster. The sampler results for the catch basins located in the light industrial area did indicate the presence of fuels and oils. Based on the low levels of oil, City staff could not tell if the oils had been dumped into the basin, or if it was just normal street operations and traffic.

City staff continue to experiment with the ISCO flow monitors. This year staff deployed two flow monitors for the entire season, one at Empire and the other at Simpson. The samplers are set to send out a text message to monitoring staff when flow is detected or when the unit needs new batteries. The flow data is automatically uploaded to a web based view using 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 is in the process of revising its UIC monitoring plan; in the revised plan City staff will request making flow monitoring an optional task as staff time allows. It is not required in either permit; and was being conducted from a pure research perspective.

*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 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. In order 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 in order 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 FY2015-2016:

**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.

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).

*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 FY2015-16:

#### 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.

*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 continues to install additional spill closure valves in additional high risk areas at a rate of 15 per year (see BMP X-3), and 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 FY2015-16. Table 10.2 provides a summary of UICs decommissioned in FY2015-16 and Table 10.3 provides a summary of UICs expected to be decommissioned in FY2016-17 or beyond.

**Table 10.1 New City of Bend UIC Installation Summary (FY2015-16)**

<b>Facility ID</b>	<b>Install Date</b>	<b>Location Description</b>
DDW010380	7/28/2015	OSU Cascades Off Site
DDW010381	7/28/2015	OSU Cascades Off Site
DDW010390	7/21/2015	Silver Lake Blvd Improvements
DDW010391	8/15/2014	Shevlin Estates
DDW010413	8/31/2015	Taylor Thomas Professional Center
DDW010414	8/31/2015	Taylor Thomas Professional Center
DDW010415	8/31/2015	Taylor Thomas Professional Center
DDW010416	8/31/2015	Taylor Thomas Professional Center
DDW010417	8/31/2015	Taylor Thomas Professional Center
DDW010419	4/12/2016	Cascade Heights Ph. 3
DDW010420	4/12/2016	Cascade Heights Ph. 3
DDW010421	4/12/2016	Cascade Heights Ph. 3

Facility ID	Install Date	Location Description
DDW010422	4/12/2016	Cascade Heights Ph. 3
DDW010423	4/18/2016	NW Crossing Ph. 29
DDW010424	4/18/2016	NW Crossing Ph. 29
DDW010425	4/18/2016	NW Crossing Ph. 29
DDW010426	4/18/2016	NW Crossing Ph. 29
DDW010444	4/5/2016	Jones Farm Subdivision
DDW010445	4/5/2016	Jones Farm Subdivision
DDW010446	4/5/2016	Jones Farm Subdivision
DDW010447	4/5/2016	Jones Farm Subdivision
DDW010448	4/5/2016	Jones Farm Subdivision
DDW010449	4/5/2016	Jones Farm Subdivision

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 10.3 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.

**Table 10.2 FY2015-16 Decommissioned City of Bend UICs Summary**

UIC	Description
DDW001494	DDW001494, 2038, PARRELL RD
DDW001647	DDW001647, 2164, NW ORDWAY AVE
DDW003032	DDW003032, 139, NW GASOLINE ALY
DDW003423	DDW003423, 588, NW MERCHANT WAY
DDW003442	DDW003442, 1599, S HWY 97
DDW008161	DDW008161, 2304, S HWY 97
DDW010325	Aspen Ridge Subdivision

**Table 10.3 Anticipated UIC Decommissioning and Installation**

UIC Number	Action Anticipated	Timing	Project
New French Drain	Addition as part of waterwise upgrade at City Utility Complex ( Boyd Acres )	FY2016017	Waterwise Landscaping
DDW001540 (decommission) DDW010456 (new replacement)	Decommissioning, removing and replacing across northbound lanes with DDW010456	FY2016-17 (anticipate spring)	SE Interceptor
DDH009923	Potential decommissioning	FY2017-18 or beyond	SW Roosevelt Water Main Replacement
DDH009922	Potential decommissioning	FY2017-18 or beyond	SW Roosevelt Water Main Replacement
DDH009921	Potential decommissioning	FY2017-18 or beyond	SW Roosevelt Water Main Replacement

*Upgrades.* Additionally, the City is working to upgrade UICs. In FY2015-16, 15 drill holes have been retrofitted with a valve that can be manually closed using a valve key in the event of a spill. This decreases spill risk and increases worker safety precautions. Similarly 257 drill holes have been retrofitted in FY2015-16 with a gross contaminant screen, designed to keep larger sized materials (litter, vegetation, etc.) from entering and clogging the drill hole. This serves to keep larger sized plastics and other pollutants from entering the drill hole.



*Conducting open grate drywell inspections as part of the UIC Retrofit Project.*



The City is implementing its open-grate drywell retrofit plan (see annual report FY14-15, Appendix I). In FY2015-16, City staff purchased 6 UIC inserts with a 36" sump for Brooks Alley parking lot, 19 for City right-of-ways and 1 that was installed at the Boyd Acres corporation yard as a demonstration (see photo below). To date, City staff have retrofitted 22 open grate UICs, by installing these drywell inserts at a cost of just over \$1,500 apiece.



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

**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 plans to monitor these installations for quality assurance/quality control through the winter months to see how they withstand freeze-thaw and weighted conditions prior to purchasing more. Should they work well, the City plans to continue with this approach 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.

### 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.