Number	Permit Section	Question
1	S5.A.2	Attach updated annual Stormwater Management Program Plan (SWMP Plan). (S5.A.2) Saved Document Name: Attachment 1_2017 SWMP update_1_03242017125634
2	S9.D.5	Attach a copy of any annexations, incorporations or boundary changes resulting in an increase or decrease in the Permittee's geographic area of permit coverage during the reporting period per S9.D.5. Saved Document Name: Attachment 2_ Annexation ordin_2_03242017125635
3	S5.A.3	Implemented an ongoing program to gather, track, and maintain information per S5.A.3, including costs or estimated costs of implementing the SWMP. Yes
4	S5.A.5.b	Coordinated among departments within the jurisdiction to eliminate barriers to permit compliance. (S5.A.5.b) Yes
5	S5.C.1.a.i and ii	Attach description of public education and outreach efforts conducted per S5.C.1.a.i and ii. Saved Document Name: Attachment 3_Outreach summary_5_03242017125733
6	S5.C.1.b	Created stewardship opportunities (or partnered with others) to encourage resident participation in activities such as those described in S5.C.1.b. Yes
7	S5.C.1.b	Used results of measuring the understanding and adoption of targeted behaviors among at least one audience in at least one subject area to direct education and outreach resources and evaluate changes in adoption of targeted behaviors. (Required no later than February 2, 2016, S5.C.1.b) Yes
7b	S5.C.1.b	Attach description of how this requirement was met.

Number	Permit Section	Question
		Saved Document Name: Attachment 4_NPDES Outreach As_7b_03242017125733
8	S5.C.2.a	Describe the opportunities created for the public to participate in the decision making processes involving the development, implementation and updates of the Permittee's SWMP. (S5.C.2.a) See Attachment 5_Public Engagement Opportunities
9	S5.C.2.b	Posted the updated SWMP Plan and latest annual report on your website no later than May 31. (S5.C.2.b) Yes
9b	S5.C.2.b	List the website address. https://www.redmond.gov/Environment/StormwaterUtility/NPDES
10	S5.C.3.a.i - vi	Maintained a map of the MS4 including the requirements listed in S5.C.3.a.i.-vi. Yes
11	S5.C.3.b.v	Implemented a compliance strategy, including informal compliance actions as well as enforcement provisions of the regulatory mechanism described in S5.C.3.b. (S5.C.3.b.v) Yes
12	S5.C.3.b.vi	Updated, if necessary, the regulatory mechanism to effectively prohibit illicit discharges into the MS4 per S5.C.3.b.vi. (Required no later than February 2, 2018) Not Applicable
12b		Cite the Prohibited Discharges code reference
13	S5.C.3.c.i	Implemented procedures for conducting illicit discharge investigations in accordance with S5.C.3.c.i. Yes
13b	S5.C.3.c.i	Cite methodology City of Redmon Illicit Discharge Detection and Elimination Manual, 2011

Number	Permit Section	Question
14	S5.C.3.c.i	Percentage of MS4 coverage area screened in reporting year per S5.C.3.c.i. (Required to screen 40% of MS4 no later than December 31, 2017 (except no later than June 30, 2018 for the City of Aberdeen) and 12% on average each year thereafter. (S5.C.3) 7
15	S5.C.3.c.ii	List the hotline telephone number for public reporting of spills and other illicit discharges. (S5.C.3.c.ii) 425-556-2868
15b	S5.C.3.c.ii	Number of hotline calls received. 29
16	S5.C.3.c.iii	Implemented an ongoing illicit discharge training program for all municipal field staff per S5.C.3.c.iii. Yes
17	S5.C.3.c.iv	Informed public employees, businesses, and the general public of hazards associated with illicit discharges and improper disposal of waste. (S5.C.3.c.iv) Yes
17b	S5.C.3.c.iv	Describe the information sharing actions. (S5.C.3.c.iv) See Attachment 6_IDDE Info Sharing
18	S5.C.3.d	Implemented an ongoing program to characterize, trace, and eliminate illicit discharges into the MS4 per S5.C.3.d. Yes
19	S5.C.3.d.iv	Number of illicit discharges, including illicit connections, eliminated during the reporting year. (S5.C.3.d.iv) 56
20	S5.C.3.d.iv	Attach a summary of actions taken to characterize, trace and eliminate each illicit discharge found by or reported to the permittee. For each illicit discharge, include a description of actions according to required timeline per S5.C.3.d.iv

Number	Permit Section	Question
		Saved Document Name: Attachment 7_IDDE Tracking Sum_20_03242017025910
21	S5.C.3.e	Municipal illicit discharge detection staff are trained to conduct illicit discharge detection and elimination activities as described in S5.C.3.e. Yes
22	S5.C.4.a	Implemented an ordinance or other enforceable mechanism to address runoff from new development, redevelopment and construction sites per the requirements of S5.C.4.a. Yes
23	S5.C.4.a.i-iii	Revised ordinance or other enforceable mechanism to effectively address runoff from new development, redevelopment and construction sites per the requirements of S5.C.4.a.i-iii. (Required no later than December 31, 2016, except no later than June 30, 2017 for Permittees in Lewis and Cowlitz counties, and no later than June 30, 2018 for the City of Aberdeen) Yes
23b	S5.C.4.a.i-iii	Cite code reference for revised ordinance or other enforceable mechanism to address runoff from new development, redevelopment and construction sites. Redmond Municipal Code 15.24
24	S5.C.4.a.i	Number of exceptions granted to the minimum requirements in Appendix 1. (S5.C.4.a.i., and Section 6 of Appendix 1) 0
25	S5.C.4.a.i	Number of variances granted to the minimum requirements in Appendix 1. (S5.C.4.a.i., and Section 6 of Appendix 1) 0
26	S5.C.4.b.i	Reviewed Stormwater Site Plans for all proposed development activities that meet the thresholds adopted pursuant to S5.C.4.a.i. (S5.C.4.b.i) Yes
26b	S5.C.4.b.i	Number of site plans reviewed during the reporting period. 29

Number	Permit Section	Question
27	S5.C.4.b.ii	Inspected, prior to clearing and construction, permitted development sites that have a high potential for sediment transport as determined through plan review based on definitions and requirements in Appendix 7 Determining Construction Site Sediment Damage Potential, or alternatively, inspected all construction sites meeting the minimum thresholds adopted pursuant to S5.C.4.a.i. (S5.C.4.b.ii) Yes
27b	S5.C.4.b.ii	Number of construction sites inspected per S5.C.4.b.ii. 29
28	S5.C.4.b.iii	Inspected permitted development sites during construction to verify proper installation and maintenance of required erosion and sediment controls. (S5.C.4.b.iii) Yes
28b	S5.C.4.b.iii	Number of construction sites inspected per S5.C.4.b.iii. 695
29	S5.C.4.b.ii, iii and	Number of enforcement actions taken during the reporting period (based on construction phase inspections at new development and redevelopment projects). (S5.C.4.b.ii, iii and v) 52
30	S5.C.4.b.iv	Inspected all permitted development sites that meet the thresholds in S5.C.4.a.i upon completion of construction and prior to final approval or occupancy to ensure proper installation of permanent stormwater facilities. (S5.C.4.b.iv) Yes
31	S5.C.4.b.ii-iv	Achieved at least 80% of scheduled construction-related inspections. (S5.C.4.b.ii-iv) Yes
32	S5.C.4.b.iv	Verified a maintenance plan is completed and responsibility for maintenance is assigned for projects. (S5.C.4.b.iv) Yes

Number	Permit Section	Question
33	S5.C.4.c	Implemented provisions to verify adequate long-term operation and maintenance (O&M) of stormwater treatment and flow control BMPs/facilities that are permitted and constructed pursuant to S5.C.4. a and b. (S5.C.4.c) Yes
34	S5.C.4.c.i and ii	Updated provisions to verify long-term operation and maintenance of stormwater treatment and flow control BMPs/facilities that are permitted pursuant to S5.C.4.a and b. (Required no later than December 31, 2016, except no later than June 30, 2017 for Permittees in Lewis and Cowlitz counties, and no later than June 30 2018 for the City of Aberdeen, S5.C.4.c.i and ii Yes
35	S5.C.4.c.iii	Annually inspected stormwater treatment and flow control BMPs/facilities per S5.C.4.c.iii. Yes
35b	S5.C.4.c.iii	If using reduced inspection frequency for the first time during this permit cycle, attach documentation per S5.C.4.c.iii Not Applicable
36	S5.C.4.c.iv	Inspected new residential stormwater treatment and flow control BMPs/facilities and catch basins every 6 months per S5.C.4.c.iv to identify maintenance needs and enforce compliance with maintenance standards. Yes
37	S5.C.4.c.v	Achieved at least 80% of scheduled inspections to verify adequate long-term O&M. (S5.C4.c.v) Yes
38	S4.C.4.c.vi	Verified that maintenance was performed per the schedule in S5.C.4.c.vi when an inspection identified an exceedance of the maintenance standard. Yes
38b	S5.C.4.c.vi	Attach documentation of any maintenance delays. (S5.C.4.c.vi) Not Applicable

Number	Permit Section	Question
39	S5.C.4.d	Provided copies of the Notice of Intent for Construction Activity and Notice of Intent for Industrial Activity to representatives of proposed new development and redevelopment. (S5.C.4.d) Yes
40	S5.C.4.e	All staff responsible for implementing the program to control stormwater runoff from new development, redevelopment, and construction sites, including permitting, plan review, construction site inspections, and enforcement are trained to conduct these activities. (S5.C.4.e) Yes
41	S5.C.4.f.i	Reviewed, revised and made effective the low impact development-related enforceable documents per S5.C.4.f.i. (Required by December 31, 2016, except by June 30, 2017 for Permittees in Lewis and Cowlitz counties, and by June 30, 2018 for the City of Aberdeen) Yes
41b	S5.C.4.f.ii	Attach a summary of the LID review and revision process that includes the requirements listed in S5.C.4.f.ii. (Required with annual report due no later than March 31, 2017, except no later than March 31, 2018 for Permittees in Lewis and Cowlitz counties, and with the Fifth Year annual report for the City of Aberdeen) Saved Document Name: Attachment 8_Redmond LID Integ_41b_03242017025947
42	S5.C.4.g	Participated and cooperated with the watershed-scale stormwater planning process led by a Phase I county. (S5.C.4.g) Yes
43	S5.C.5.a	Updated and implemented maintenance standards as protective, or more protective, of facility function as those specified in Chapter 4 of Volume V of the Stormwater Management Manual for Western Washington (as amended 2014). (Required no later than December 31, 2016, except no later than June 30, 2017 for Permittees in Lewis and Cowlitz counties, and no later than June 30, 2018 for the City of Aberdeen, S5.C.5.a). Yes
44	S5.C.5.a	Applied a maintenance standard that is not specified in the Stormwater Management Manual for Western Washington.

Number	Permit Section	Question
		No
44b	S5.C.5.a	Please note what kinds of facilities are covered by this alternative maintenance standard. (S5.C.5.a)
45	S5.C.5.a.ii	Performed timely maintenance per S5.C.5.a.ii. Yes
46	S5.C.5.b	Annually inspected all municipally owned or operated permanent stormwater treatment and flow control BMPs/facilities. (S5.C.5.b) Yes
46b	S5.C.5.b	Number of known municipally owned or operated stormwater treatment and flow control BMPs/facilities. (S5.C.5.b) 214
46c	S5.C.5.b	Number of facilities inspected during the reporting period. (S5.C.5.b) 214
46d	S5.C.5.b	Number of facilities for which maintenance was performed during the reporting period. (S5.C.5.b) 43
47	S5.C.5.b	If using reduced inspection frequency for the first time during this permit cycle, attach documentation per S5.C.5.b. Not Applicable
48	S5.C.5.c	Conducted spot checks and inspections (if necessary) of potentially damaged stormwater facilities after major storms as per S5.C.5.c. Not Applicable
49	S5.C.5.d	Inspected all municipally owned or operated catch basins and inlets as per S5.C.5.d, or used an alternative approach. (Required once no later than August 1, 2017 and every two years thereafter, except once no later than June 30, 2018 and every two years thereafter for the City of Aberdeen) Not Applicable
49b	S5.C.5.d	Number of known catch basins.

Number	Permit Section	Question
		11286
49c	S5.C.5.d	Number of catch basins inspected during the reporting period. 816
49d	S5.C.5.d	Number of catch basins cleaned during the reporting period. 94
50	S5.C.5.d.i-ii	Attach documentation of alternative catch basin cleaning approach, if used. (S5.C.5.d.i or ii) Not Applicable
51	S5.C.5.f	Implemented practices, policies and procedures to reduce stormwater impacts associated with runoff from all lands owned or maintained by the Permittee, and road maintenance activities under the functional control of the Permittee. (S5.C.5.f) Yes
52	S5.C.5.g	Implemented an ongoing training program for Permittee employees whose primary construction, operations or maintenance job functions may impact stormwater quality. (S5.C.5.g.) Yes
53	S5.C.5.h	Implemented a Stormwater Pollution Prevention Plan for all heavy equipment maintenance or storage yards, and material storage facilities owned or operated by the Permittee in areas subject to this Permit that are not required to have coverage under an NPDES permit that covers stormwater discharges associated with the activity. (S5.C.5.h) Yes
54	S7.A	Complied with the Total Maximum Daily Load (TMDL)-specific requirements identified in Appendix 2. (S7.A) Not Applicable
55	S7.A	For TMDLs listed in Appendix 2: Attach a summary of relevant SWMP and Appendix 2 activities to address the applicable TMDL parameter(s). (S7.A) Not Applicable

Number	Permit Section	Question
56	S8.A	Attach a description of any stormwater monitoring or stormwater-related studies as described in S8.A. Not Applicable
57	S8.B.1	Participated in cost-sharing for the regional stormwater monitoring program (RSMP) for status and trends monitoring. (S8.B.1) No
57B	S8.B.2	If choosing to conduct individual status and trends monitoring, attach an annual stormwater monitoring report in accordance with S8.B.2. (Required to submit reports beginning March 31, 2016) Saved Document Name: Attachment 9_Stream_Monitoring_57B_03242017030047
58	S8.C.1	Participated in cost-sharing for the regional stormwater monitoring program (RSMP) for effectiveness studies. (S8.C.1) (Required to begin no later than August 15, 2014) Yes
58b	S8.C.2	If choosing to conduct discharge monitoring, attach an annual stormwater monitoring report in accordance with S8.C.2 and Appendix 9. (Required to submit reports beginning March 31, 2016) Saved Document Name:
59	S8.D.1	Contributed to the RSMP for source identification and diagnostic monitoring information repository in accordance with S8.D.1. (Required to begin no later than August 15, 2014) Yes
60	G3	Notified Ecology in accordance with G3 of any discharge into or from the Permittees MS4 which could constitute a threat to human health, welfare or the environment. (G3) Yes
61	G3	Number of G3 notifications provided to Ecology. 22

Number	Permit Section	Question
62	G3.A	Took appropriate action to correct or minimize the threat to human health, welfare, and/or the environment per G3.A. Yes
63	S4.F.1	Notified Ecology within 30 days of becoming aware that a discharge from the Permittee's MS4 caused or contributed to a known or likely violation of water quality standards in the receiving water. (S4.F.1) Not Applicable
64	S4.F.3.a	If requested, submitted an Adaptive Management Response report in accordance with S4.F.3.a. Not Applicable
65	S4.F.3.d	Attach a summary of the status of implementation of any actions taken pursuant to S4.F.3 and the status of any monitoring, assessment, or evaluation efforts conducted during the reporting period. (S4.F.3.d) Not Applicable
66	G20	Notified Ecology of the failure to comply with the permit terms and conditions within 30 days of becoming aware of the non-compliance. (G20) Not Applicable
67	G20	Number of non-compliance notifications (G20) provided in reporting year. 0
67b	G20	List the permit conditions described in non-compliance notification(s). Not Applicable

City of Redmond

NPDES Annual Report Covering 2016

Attachment 1:

City of Redmond Stormwater Management Plan

The City of Redmond

Stormwater Management Program (SWMP) Plan

Prepared by Peter Holte
City of Redmond
Department of Public Works
Division of Natural Resources

March 23, 2017

CityofRedmond
WASHINGTON

INTRODUCTION

General Information about this Document

This document is the City of Redmond's Stormwater Management Program (SWMP) Plan. It has been created to comply with requirements found in the Western Washington Phase II Municipal Stormwater Permit (NPDES Permit), which is part of the Federal Clean Water Act. The NPDES Permit requires that the City of Redmond produce a Stormwater Management Program Plan (SWMP Plan), and update it regularly, to reflect Redmond's actions and planned actions in meeting permit requirements.

The first NPDES Permit was issued to the City of Redmond by the State of Washington Department of Ecology in 2007 and revised in 2009. A new, one-year permit was issued to the City of Redmond on August 1, 2012. The 2012 re-issued permit extends the terms and conditions for the previously issued 2007 – 2012 NPDES permit for a period spanning between August 1, 2012 to July 31, 2013. A new, 5-year NPDES Permit took effect on August 1, 2013. This new 5-year permit will stay in effect until July 31, 2018.

Section S5.2.A requires that the City detail "activities for the upcoming calendar year" in order to meet the NPDES permit requirements. In many cases, requirements in the 2013-2018 NPDES permit do not take effect immediately. The City will meet new requirements as they take effect.

This document is organized according to the five NPDES Permit SWMP elements. Excluding this introduction section, the five elements are the sections of this SWMP: 1) Education and Outreach, 2) Public Involvement and Participation, 3) Illicit Discharge Detection and Elimination, 4) Controlling Runoff from Development and Redevelopment projects, and 5) Municipal Operations and Maintenance. Within each section, requirements of the permit are individually detailed (i.e. S5.C.3.b). To review the permit language in comparison to what Redmond has designed in response, one can access the permit at the following Washington Department of Ecology website:

http://www.ecy.wa.gov/programs/wq/stormwater/municipal/phaseIIww/wwphiipermit.html

The City's SWMP Plan aims to reduce the discharge of pollutants into receiving waters within Redmond to the maximum extent practicable (MEP), to apply all known and reasonable technologies (AKART) to address stormwater pollutants, and protect receiving waters from degradation. These goals will be accomplished by the implementation of all aspects of this SWMP Plan and through action taken by the City that are not required by NPDES and thus not detailed in this Plan. The City intentionally exceeds some NPDES Permit requirements to better protect water resources and to keep those resources safe for human contact and able to sustain aquatic ecosystems/species.

PUBLIC EDUCATION AND OUTREACH

The City of Redmond's Natural Resources Division of Public Works provides and participates in a variety of education and outreach efforts focused on environmental stewardship, including stormwater management.

S5.C.1.a.i and ii Targeted Stormwater Outreach

In 2017, the City of Redmond will take the following actions to provide targeted stormwater-related outreach programs to the public:

1. Continue to coordinate with other permitted jurisdictions in Western Washington to create an outreach group called Stormwater Outreach for Regional Municipalities (STORM). Again leveraging resources with other permittees in the North King County Stormwater Outreach Group (The SOGgies) to fund a newspaper insert in the Seattle Times, as part of the Time's Education in the Classroom program. The insert will go out in all copies of a regular weekday edition of the paper. The insert will promote stormwater education outreach by detailing how rainfall runoff becomes polluted, providing simple actions people can take to reduce stormwater pollution, and promoting the Puget Sound Starts Here brand.

2. Continue to provide classroom environmental educational programs to schools in Redmond via a partnership with the Cascade Water Alliance and/or the environmental education non-profit organization, Nature Vision.

3. Take part in the STORM Don't Drip and Drive Campaign social marketing campaign.

4. Conduct outreach to junior high school and high school students: a) detailing the stormwater pollution issues associated with charity carwash fundraisers, and b) encouraging student organizations to engage in alternative fundraising activities.

S5.C.1.b Creating Stewardship Opportunities

In 2016, the City will provide stewardship opportunities via the G*reen Redmond Partnership*, a volunteer stewardship program in partnership with the non-profit land conservation organization, *Forterra*.

S5.C.1.c Measuring Outreach Effectiveness

For a number of years the City hired a consultant to conduct Charity Carwash Program drive-through (windshield) monitoring in Redmond six weekends a year and provide outreach at the junior and senior high schools. In 2016, as required by the NPDES permit, Redmond used information gathered by this consultant, and similar programs in neighboring jurisdictions to evaluate the effectiveness of this program. This analysis revealed that awareness of issues related to car washing are increasing, and that catchbasin inserts the City has provided are problematic for a number of technical and logistical reasons. In 2017, based on this evaluation, the City has determined that the program should phase-out loaning the charity car washing

catchbasin inserts, and continue to provide outreach to junior high school and high school students. This outreach will a) detail the stormwater pollution issues associated with charity car wash fund raisers, and b) encourage student organizations to engage in alternative fundraising activities.

PUBLIC INVOLVEMENT AND PARTICIPATION

The City of Redmond is committed to ongoing opportunities for public input into the development of this plan and for public input into initiatives designed to improve water quality.

S5.C.2.a and S5.C.2.b Involving the Public in the SWMP

In 2016, the City invited the public to review and comment on the City's Stormwater Management Program Plan (SWMP Plan) via an advertisement on the City's web home page. The City welcomes comments from the public at any time throughout the year, and provides a contact number for residents to call with questions throughout the year from the City's SWMP webpage: http://www.redmond.gov/Environment/StormwaterUtility/NPDES/. In 2017, the City will again invite public input using the same means detailed above.

The City further involves the public in our stormwater management related decisions by engaging people during the planning and construction of stormwater infrastructure projects, and during stormwater-related policy revisions. In 2016, Public Works Department staff took part in training seminars to improve our public involvement methodologies. This training emphasized involvement with stakeholders early-on in construction planning and policy revision processes, and stressed the importance of continuing to listen to stakeholders throughout these processes. In 2016, the City also contracted with EnviroIssues, a private contractor, to further assist staff with public involvement such as the low impact development code revisions.

In 2017, the City will continue to learn, refine, and expand its use of these new engagement practices. Such actions will include on-going consultation and advisement with stakeholders regarding the implementation of watershed restoration planning in Redmond's priority watersheds, and policy recommendations for on-site stormwater management in Redmond's most dense urban areas.

ILLICIT DISCHARGE DETECTION AND ELIMINATION

The Illicit Discharge Detection and Elimination (IDDE) program is designed to prevent contamination of groundwater and surface water by monitoring, tracking, and removing non-stormwater discharges into the stormwater drainage system.

S5.C.3.a Municipal Stormwater Drainage System Map

In 2017, the City will continue to maintain an up-to date stormwater conveyance map in an enterprise geospatial database. Updating and managing geospatial data is done according to documented procedures and quality control standards. Global information system (GIS) data includes attributes that describe ownership, water quality facility design details, flow control facility design details, conveyance design information, and spatial data. GIS data is managed with ESRI software and database management system solutions. Both private and public stormwater system data is managed geospatially. The GIS stormwater data includes all nominal diameter pipes, not just 24 inch or larger. Land use and drainage area delineations for each outfall have been developed and are updated regularly.

S5.C.3.b Water Pollution Prevention Ordinance / Municipal Code 13.06

The City of Redmond Municipal Code 13.06 authorizes the IDDE program and meets the requirements specified in the NPDES. In the vast majority of cases, the City works to enforce this code by using education and technical assistance to seek voluntary compliance. The City will escalate its response as necessary to ensure compliance; first by supplying violators with a warning letter that clearly details what is needed to comply with Municipal Code 13.06 and the consequences of refusal to comply. If further actions are needed, the City has the power to bring violators before the City's hearing examiner.

S.5.C.3.c Ongoing IDDE Program to detect non-stormwater discharges and Illicit Connections

The City is required to screen 40% of the City's stormwater system for illicit connections by December 31, 2017. The City has achieved compliance with this requirement. In 2014, City's stormwater maintenance crew began using required stormwater facility inspections as an opportunity to conduct vision inspection procedures for signs of illicit connections. This visual inspection protocol is noted as an acceptable screening practice in *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessment, Center for Watershed Protection, October 2004.* These inspections are recorded as part of the Stormwater Crew's catch basin inspection records. The stormwater crew will notify the City's IDDE coordinator if potential pollution issues are identified.

A portion of the 40% of the City's stormwater system may also be fulfilled by using a camera cart to video sections of the City's stormwater system. This method is also identified as an acceptable screening practice in the document noted in the previous paragraph. The percentage of this requirement that will be fulfilled by this requirement has not yet been determined.

S.5.C.3.d Implement an ongoing program designed to address illicit discharges

The City currently has an ongoing, fully funded, IDDE program. The City responds to and investigates, calls regarding environmental concerns such as illegal dumping, spills, illicit discharges, and illicit connections. Documentation of IDDE procedures are detailed in the City*'s Illicit Discharge Detection and Elimination (IDDE) Program Manual: City Policies and Procedures (2011).*

The City operates a telephone hotline that allows citizens to report illicit discharges or illicit dumping within city limits: (425)556-2868. The hotline is covered 24 hours a day, seven days a week. During regular business hours, calls are received and followed up on by the Natural Resources Division of Public Works. Off hour calls are managed by Redmond's police dispatch and standby maintenance crew. The hotline has been publicized by the City's website, magnets distributed at community events, Redmond's television channel (RCTV), and most outreach materials created by the City typically include the hotline number. All calls are tracked and followed up on.

Additionally, targeted outreach materials have been developed and deployed to the public for restaurant related non stormwater discharges, car washing, and general awareness of stormwater and prohibited discharges.

In 2017, these activities will continue.

S.5.C.3.e IDDE Staff Training

Scott McQuary, the City of Redmond Pollution Prevention Program Administrator (including IDDE program) and Joe Capis, Private Drainage Inspector, attended King County's IC/IDDE training to comply with Section S5.C.3.f.i of the Phase II Municipal Stormwater Permit in 2009. In 2017, IDDE staff will look for and participate in opportunities to remain up-to-date on new spill response and illicit discharge detection procedures by participating in webinars, training workshops, conferences and other capacity building activities, if and when such activities become available.

S.5.C.3.f Program Recordkeeping

The City currently tracks each type of IDDE incidence that rises to the level of a G3 notification. Records include a copy of the G3 notification, the City's response to the incident, the timing of the response and how those incidences are resolved. As previously mentioned, the City also maintains records of visual inspections of catch basins and other stormwater facilities in order to meet the 40% screening requirement.

CONTROLING RUNOFF FROM NEW DEVELOPMENT, REDEVELOPMENT AND CONSTRUCTION SITES

How development and redevelopment occur within Redmond can have a significant impact on the health of City waterways. The City reviews development plans, inspects development sites during construction, and monitors private stormwater system infrastructure bi-annually to ensure facilities are maintained. In addition, the City has begun taking actions to incorporate new alternative stormwater management practices--a.k.a. Low Impact Development (LID)--into its code and operating procedures as required by the NPDES permit.

S5.C.4.a Apply Stormwater Management Standards to Development, Redevelopment, and Construction Sites

Redmond Municipal Code (RMC) 15.24 codifies stormwater management in Redmond, and includes code for construction, and stormwater infrastructure design. In 2016, RMC 15.24 was updated and then adopted by City Council December 6, 2016. This code authorizes the City to enforce provisions required by this section of the permit, and the minimum requirements in the permit's Appendix 1.

The City also revised its Stormwater Technical Notebook, a document to detail the required construction practices to protect waterways and to convey construction standards for new or retrofitted stormwater infrastructure. The revised Notebook was adopted on December 28, 2016, and aligns with the Department of Ecology's 2012 Stormwater Management Manual for Western Washington (SWMMWW),as amended in 2014.

In meeting the Appendix 1 Minimum Requirement #5, the City has chosen to allow developers the use of pervious pavements or a functional equivalent designed to provide the same rate of stormwater infiltration. The City requires that development projects wishing to use this functionally equivalent design supply a hydrologic modeling-based justification detailing equivalency. The City justifies this design via a Technical Memo using analysis based on the Western Washington Hydrology Model (WWHM).

In 2017, the City will conduct a Business Case Analysis, examining stormwater infiltration strategies in the City's densest urban locations. This analysis will inform the City's approach to on-site stormwater management in these areas.

In the Downtown Redmond and the Overlake Neighborhood, the City will use regional facilities to meet Minimum Requirement #5: On-site Stormwater Management and Minimum Requirement #6: Runoff Treatment in the permit's *Appendix 1*. In 2015, a regional stormwater vault in the Overlake Neighborhood, and a regional water quality treatment facility in Downtown Redmond will be fully operational. More information regarding Redmond's use of regional facilities, including a copy of Ecology's *Letter of Support* for this approach, is available on the City's website: http://www.redmond.gov/Environment/StormwaterUtility/RegionalFacilities.

Section 7 of Appendix 1 allows permittees to seek approval from Ecology to tailor certain development and redevelopment stormwater requirements. The City used

this provision to gain approval for an alternative method of achieving compliance with Minimum Requirement #5: On-site Stormwater Management, Minimum Requirement #6: Runoff Treatment, and Minimum Requirement #7: Flow Control in permit's *Appendix 1*. *The City of Redmond Watershed Management Plan* provides the details of this alternative approach.

For 2017, the City continues to implement the *Watershed Management Plan* by continuing planning efforts for additional stormwater detention facilities in Tosh Creek Watershed. In addition, the City received another National Estuaries Program grant for Monticello Creek Watershed and is continuing to formulate a watershed restoration implementation strategy for that area. More information regarding the *Watershed Plan*, including Ecology's *Letter of Approval* for this approach, is available on the City's website: https://www.redmond.gov/Environment/StreamsHabitat/lakesriversstreams/WatershedManagement.

S5.C.4.b Review and Inspect Development/Redevelopment Projects

The City has a permitting process with civil/site plan review and approval process, inspection, and enforcement to meet standards established by S5.C.4b for all new and redeveloped sites that meet the thresholds details in Appendix 1 of the NPDES permit (see Figures 3.2 and 3.3. on pages 9 and 10 of Appendix 1). This oversight occurs in phases: prior to construction during the plan acceptance process, before the site is cleared during an initial site construction best management practices (BMP) implementation inspection, during construction via construction site inspections, and post construction as part of the stormwater infrastructure acceptance inspection.

Plans are reviewed by licensed engineers or qualified engineering firms for compliance with Redmond's standards. Public projects that are in the right-of-way, do not typically trigger local permits; however, public projects are subject to and abide by Appendix 1 of the NPDES permit.

The City's stormwater engineers review projects that trigger temporary erosion and sediment control (TESC) plans, wet weather plans, or stormwater pollution prevention plans (SWPPP). Once the City has accepted a plan to control erosion, runoff and other potential construction impacts, and prior to extensive clearing and construction, City staff inspects the site to ensure that the proper TESC measures have been selected, properly placed, and installed correctly.

During construction, the City conducts frequent inspections at the worksite--typically more than once a week when utilities are being constructed, and after major rain events--to ensure proper implementation and maintenance of TESC best management practices. Redmond inspectors have the authority to enforce Redmond Municipal Code (RMC) 13.06 and RMC 15.24, using corrective action notices and stop work orders, to insure the protection of receiving waters from construction impacts.

After construction, the City again inspects stormwater structures at a project site. If the maintenance thresholds have been triggered, the City requires that needed maintenance take place. If the maintenance thresholds have not been reached, or once maintenance has been completed, the City then accepts the project.

S5.C.4.c Post Construction Operation and Maintenance

The City has provisions to verify adequate long-term operation and maintenance (O&M) of post-construction stormwater facilities and BMPs. RMC 13.06 requires inspection and maintenance of private stormwater facilities, and all stormwater structures (including pipes and catch basins), in accordance or excess of requirements established by the NPDES Permit. RMC 13.06 also establishes enforcement authority and procedures. In 2016, Redmond adopted maintenance standards equivalent to or more protective than those established in the 2012 *Stormwater Management Manual for Western Washington* (Volume V, Chapter 4). In 2017; the City is now using these standards.

The City has records of our private stormwater inspection program dating back to 1990. These records enable the City to use a reduced frequency inspection of stormwater infrastructure as allowed by the permit in S5.C.4.c.iii. Based on an analysis of these program records, the City inspects private stormwater treatment and flow facilities every other year on a rotating basis, splitting drainages between even and odd numbered years. In 2017, the City will inspect stormwater facilities in the following basins: Marymoor, North Star, Education Hill, Westside, Lake Sammamish and as well as coalescing plate vaults and media cartridges vaults. For additional information regarding why and how the City uses reduced frequency inspections, contact Peter Holte, 425-556-2822.

When maintenance needs are identified, City staff notifies the property owners. The property owners provide the City with receipts and other documentation as proof that the work has been completed. In some cases, the private stormwater facilities inspection coordinator will revisit the site to ensure that necessary maintenance has occurred.

As mentioned previously, all stormwater infrastructure, including runoff treatment and flow control facilities, are inspected post construction one year after acceptance, to release warranty bonds. Once this occurs, sites are added to the long term private system inspection program and typically get inspected within one year from the warranty bond release.

During heavy house construction, single-family home inspectors inspect the stormwater drainage system that can potentially be impacted by the home construction activity. This occurs every six months during heavy home construction. If facilities and stormwater conveyance require cleaning during home construction, responsible parties are required to perform maintenance/cleaning.

S5.C.4.d Notice of Intent (NOI)

The City makes the application for NOIs for coverage under the NPDES Construction Stormwater General Permit and the NPDES General Industrial Stormwater Permit available to the development proponents. Copies of the application are also available at Redmond City Hall, in the Development Services Center. This activity is on-going in 2017.

S5.C.4.e Staff Training

All staff responsible for plan review of stormwater runoff controls are licensed professional engineers or qualified consultants. Follow-up training is provided as needed to address changes in standards, procedures, techniques, and staffing. City staff members responsible for inspection of stormwater infrastructure are adequately

trained to do so. All staff responsible for managing construction TESC measures are Certified Erosion and Sediment Control Lead (CESCL) trained. Additional Public Works construction staff and maintenance technicians may also receive their first CESCL certification if it is determined it will ensure that the City's inspection requirements are being met. The City will continue to document and maintain records of training provided and the staff trained.

S5.C.4.f Low Impact development code-related requirements

In 2016, the City completed the permit's requirement to review, revise, and alter City codes, standards, and procedures with the goal of making low impact development (LID) the "preferred and commonly-used approach to site development." The City completed the required "LID integration" report and submitted it as part of the annual report covering permit activities for 2016.

In 2017, and onward, the City will continue to conduct the work necessary to ensure LID practices are fully integrated in Redmond's stormwater management practices and operations.

S5.C.4.g Watershed-scale stormwater planning

The City of Redmond is continuing conversations with King County to support the county's watershed planning process in the Bear Creek Watershed. The City has actively taken part in stakeholder engagement activities. In 2017, the City will continue fully participate in the County's efforts to implement this permit requirement.

POLLUTION PREVENTION AND OPERATION AND MAINTENANCE FOR MUNICIPAL OPERATIONS

The City of Redmond has taken many steps to insure operation and maintenance activities are done in a manner that protect and reduce potential impacts to stormwater drainage and receiving waters.

S5.C.5.a Maintenance Standards

The City adheres to and has adopted maintenance standards in Chapter 4 of Volume V of the *2005 Stormwater Management Manual for Western Washington*. In some instances, as with the trigger to clean catch basins, the City exceeds maintenance requirements. In 2016, the City adopted the new standards within the 2012 Stormwater Management Manual for Western Washington.

S5.C.5.b Annual Inspection of Flow Control and Runoff Treatment Facilities

The City currently inspects and maintains flow control and runoff treatment facilities owned and operated by the City to ensure they are maintained in accordance with City standards. Control structures related to ponds and bioswales are inspected annually. The stormwater crew uses a GIS database to inspect, identify maintenance needs, and detail what facilities have been maintained. Cleaning and maintenance occurs within the timeframe prescribed by the NPDES Permit. New stormwater treatment and flow control facilities are added to the inspection list when the City takes them into ownership.

In some cases, the stormwater crew relays maintenance issues to City stormwater engineers so they can assess if the issue can be addressed for less than $25,000. If the remedy exceeds $25,000, it is considered a capital improvement project and is placed on a list of prioritized capital stormwater facility needs.

S5.C.5.c Major Storm Event Inspections

The City typically inspects the stormwater system during and after large storm events. In 2017, as per NPDES requirements, the City's stormwater crew and City engineers will inspect the stormwater system should we have an event that is equal to or greater than the 10-year 24-hour storm (2.8 inches of rainfall in 24 hours).

S5.C.5.d Catch Basin Inspections

Currently the City has opted to inspect and clean all municipally operated catch basin once by August 1, 2017, and every two years thereafter. The City is on track to complete all necessary inspections and maintenance by this deadline. The City may use a different alternative in another part of the City in future years. The City is choosing to clean all catch basins which have 50% of the catch basin's storage capacity filled. This exceeds the City's formal standard of 60%. Maintenance and cleaning of catch basins occurs within 6 months of the inspections as required by the permit.

S5.C.5.f Reduction of Municipal Operations Stormwater Impacts

Redmond has developed and adopted procedures for all items listed in the permit requiring documentation of practices/procedures. Locally developed standard operating procedures (SOPs) are equivalent or more protective of receiving waters than those in Volume V of the 2005 Ecology S*tormwater Management Manual for Western Washington*. Procedures and associated policies have been developed and provided to maintenance staff and maintenance staff supervisors/management in Public works and Parks and Recreation; training has also been provided. In 2017, the City is using its Asset Management Development Process to redouble its efforts, conducting a review to ensure that the correct maintenance standard is used at the associated Stormwater Treatment and Detention Facility.

In the last two years the City's Public Works Maintenance Operation Center has hired a number of new supervisors. The City will schedule a regular; routinely review of stormwater-related SOPs. This schedule will similar to that of other Maintenance Operation Center SOPs—for example, health and safety SOPs.

S5.C.5.g O&M Employee Training

The City maintains a training program for all operations field staff on procedures necessary to protect stormwater drainage and receiving waters. The training also included Redmond specific information on water quality and IDDE awareness as discussed in the IDDE section of this plan. All maintenance staff have been trained and plans have been established to train new maintenance employees, including limited duration employees. In 2017, the City is evaluating at what interval to repeat this training.

S5.C.5.h Stormwater Pollution Prevention Plan (SWPPP) for Redmond's Maintenance and Operations Center

The City developed a SWPPP for its Maintenance and Operations Center. The plan was developed using a consulting firm (Brown and Caldwell) with experience developing SWPPPs for industrial sites. The City's SWPPP details a stormwater and BMP monitoring program, spill response protocol, structural (with implementation dates) and operational BMPs, site maps, contaminant inventory, and a schedule to annually review the SWPPP.

The Current SWPPP has been updated to reflect new construction at the Public Works and Parks Maintenance and Operation Center (MOC). As required by the SWPPP, MOC staff will continue to conduct monitoring in accordance with the schedules provided in the SWPPP.

S5.C.5.i Record Maintenance

The City maintains records of inspection, maintenance, and repair to City operated stormwater facilities as detailed in each section of S5.C.5.

MONITORING AND ASSESSMENT

For a number of years, the City of Redmond has monitored both water quality in lakes, rivers and streams, and the effectiveness of best management practices to protect water quality. The 2013-2018 permit now requires all permittees to either pay into a regional monitoring program or conduct water quality monitoring as defined by the permit. The following details how the City will meet permit requirements related to: a) status and trends monitoring, b) effectiveness studies, and c) source identification and diagnostic monitoring.

S8. A. Annual Reporting

In 2017, the City will provide a description of studies of monitoring and stormwater related activities conducted by or on behalf of the City as part of this annual report.

S8.B Status and Trends Monitoring

The City of Redmond has chosen to conduct its own status and trend monitoring, as is allowed by the permit. The City has fulfilled its obligations to meet this requirement as detailed in the permit. For information on the monitoring reports generated by this effort, please contact Peter Holte, 425-556-2822.

S8.C Effectiveness Studies

The City has chosen to buy into the Regional Stormwater Management Program (RSMP) effectiveness study in order to meet this requirement. In 2017, the cost to City of Redmond to buy into this program is $21, 899.00.

S8.D Source Identification and Diagnostic Monitoring

The City is required to pay into the RSMP source identification and diagnostic monitoring program. In 2017, the cost to City of Redmond to buy into this program is $2,013.00.

City of Redmond

NPDES Annual Report Covering 2016

Attachment 2:

City Annexations in 2016

NON-CODE

CITY OF REDMOND
ORDINANCE NO. 2832

AN ORDINANCE OF THE CITY OF REDMOND, WASHINGTON, ANNEXING APPROXIMATELY 11.9 ACRES BOUNDED BY THE WESTERN EDGE OF 134TH AVENUE NE ON THE WEST, REDMOND CITY LIMITS TO THE EAST, ON THE NORTH BY THE NORTHERN LINE OF LOT 3, BLOCK 157, BURKE & FARRAR'S KIRKLAND ADDITION TO THE CITY OF SEATTLE, DIVISION NO. 31, AND ON THE SOUTH BY THE SOUTHERN LINE OF LOT 5, BLOCK 157, BURKE & FARRAR'S KIRKLAND ADDITION TO THE CITY OF SEATTLE, DIVISION NO. 31, AS RECORDED IN VOLUME 25 OF PLATS, PAGE 26, KING COUNTY, WASHINGTON, AND REQUIRING THE PROPERTY TO BE ASSESSED AND TAXED AT THE SAME RATE AND ON THE SAME BASIS AS OTHER PROPERTY WITHIN THE CITY, FILE NO. LAND-2014-02021

WHEREAS, on November 7, 2014, the City of Redmond received a Notice of Intent requesting annexation of a portion of Redmond's Potential Annexation Area in NE Rose Hill referred to as the Lake Washington School District Annexation; and

WHEREAS, the Notice of Intent was signed by owners of the property representing at least ten percent (10%) of the acreage of the area to be annexed; and

WHEREAS, On January 6, 2015, the Redmond City Council approved a motion to accept the Notice of Intent to Annex and authorized the circulation of a direct petition to annex the area referred to as the Lake Washington School District Annexation; and

WHEREAS, the entire annexation area is composed of property owned by the Lake Washington School District, No. 414; and

WHEREAS, under RCW 28A.335.110 since the school district property constitutes the entirety of the proposed annexation area, the petition must include either the signatures of the School District's Board of Directors, or the signature of a person or persons authorized by resolution or motion of the Board to sign on their behalf; and

WHEREAS, a representative authorized by resolution of the Lake Washington School District Board of Directors signed the Direct Petition on their behalf; and

WHEREAS, on March 1, 2016, Redmond staff provided Notice of Intention to annex the area legally described on the petition to the Washington State Boundary Review Board (BRB) for King County; and

WHEREAS, on April 25, 2016, the BRB deemed the action approved as proposed in the Notice of Intention filed by the City of Redmond based on the matters on record in the Notice of Intention; and

WHEREAS, it is the long-standing policy of the City of Redmond to support the annexation of land in its Potential Annexation Areas; and

WHEREAS, the City is committed to ultimately annexing all of NE Rose Hill; and

WHEREAS, annexing the Lake Washington School District property in NE Rose Hill advances City policy and responds to property owner requests; and

WHEREAS, the City Council held a public hearing on the proposed annexation on May 17, 2016, and at the conclusion of said hearing, determined that the property should be annexed, subject to the Redmond Zoning Code and subject to a requirement that the property be assessed and taxed at the same rate as other property within the City.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF REDMOND, WASHINGTON, DOES ORDAIN AS FOLLOWS:

Section 1. Annexation. That certain 11.9 acres of property bounded by the western edge of 134th Avenue NE on the west, Redmond city limits to the east, on the north by the northern line of Lot 3, Block 157, Burke & Farrar's Kirkland Addition to the City of Seattle, Division No. 31, and on the south by the southern line of Lot 5, Block 157, Burke & Farrar's Kirkland Addition to the City of Seattle, Division No. 31, as recorded in Volume 25 of Plats, Page 26, King County, Washington and depicted on the map attached hereto as Exhibit 2 and legally described on the attached Exhibit 1, both of which exhibits are

incorporated herein by this reference as if set forth in full, is hereby annexed to and made a part of the City of Redmond.

Section 2. Zoning. Zoning for the Lake Washington School District Annexation shall be set at a combination of RIN (Residential Innovative) in conformance to the Comprehensive Plan and adopted pre-annexation zoning.

Section 3. Indebtedness. Pursuant to the terms of the annexation petition, all property within the territory annexed shall be assessed and taxed at the same rate and on the same basis as other property within the city, including assessments for taxes and payment of any bonds issued or debts contracted prior to or existing as of the date of annexation.

Section 4. Duties of the Planning Department. The Planning Department is hereby directed to file a certified copy of this ordinance, together with the attached Exhibits 1 and 2, with the King County Council. In addition, the Planning Department is authorized and directed to file the annexation certificate provided for in RCW 35A.14.700 with the Office of Financial Management within thirty (30) days of the effective date of the annexation.

Section 5. Effective Date. This ordinance shall become effective five days after its publication, or publication of a summary thereof, in the city's official newspaper, or as otherwise provided by law.

ADOPTED by the Redmond City Council this 17th day of May, 2016.

CITY OF REDMOND

JOHN MARCHIONE, MAYOR

ATTEST:

MICHELLE M. HART, MMC, CITY CLERK (SEAL)

APPROVED AS TO FORM:

JAMES E. HANEY, CITY ATTORNEY

FILED WITH THE CITY CLERK:	May 3, 2016
PASSED BY THE CITY COUNCIL:	May 17, 2016
SIGNED BY THE MAYOR:	May 20, 2016
PUBLISHED:	May 23, 2016
EFFECTIVE DATE:	May 28, 2016
ORDINANCE NO. 2832	

YES: ALLEN, BIRNEY, CARSON, MARGESON, MYERS, SHUTZ, STILIN

LEGAL DESCRIPTION
CITY OF REDMOND ANNEXATION PARCELS

THOSE PORTIONS OF LAND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

LOT 3, BLOCK 157, BURKE & FARRAR'S KIRKLAND ADDITION TO THE CITY OF SEATTLE, DIVISION NO. 31, ACCORDING TO THE PLAT RECORDED IN VOLUME 25 OF PLATS, PAGE 26, RECORDS OF KING COUNTY, WASHINGTON;
SAID PORTION CONTAINS 152,525 SQUARE FEET, OR 3.5015 ACRES OF LAND, MORE OR LESS.

TOGETHER WITH:

LOT 4, BLOCK 157, BURKE & FARRAR'S KIRKLAND ADDITION TO THE CITY OF SEATTLE, DIVISION NO. 31, ACCORDING TO THE PLAT RECORDED IN VOLUME 25 OF PLATS, PAGE 26, RECORDS OF KING COUNTY, WASHINGTON;
SAID PORTION CONTAINS 152,964 SQUARE FEET, OR 3.5116 ACRES OF LAND, MORE OR LESS.

TOGETHER WITH:

LOT 5, BLOCK 157, BURKE & FARRAR'S KIRKLAND ADDITION, DIVISION NO. 31, ACCORDING TO PLAT RECORDED IN VOLUME 25 OF PLATS, PAGE 26, RECORDS OF KING COUNTY, WASHINGTON;
SAID PORTION CONTAINS 153,403 SQUARE FEET, OR 3.5217 ACRES OF LAND, MORE OR LESS.

TOGETHER WITH THAT PORTION OF THE 134TH AVENUE NE RIGHT OF WAY (FORMERLY VINE STREET), COINCIDENT WITH THE WESTERLY BOUNDARIES OF LOTS 3 THROUGH 5, INCLUSIVE, BLOCK 157, BURKE & FARRAR'S KIRKLAND ADDITION, DIVISION NO. 31, ACCORDING TO PLAT RECORDED IN VOLUME 25 OF PLATS, PAGE 26, RECORDS OF KING COUNTY, WASHINGTON, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID LOT 3;

THENCE NORTH 89°50'08" WEST, ALONG THE WESTERLY EXTENSION OF THE NORTHERLY BOUNDARY OF SAID LOT 3, A DISTANCE OF 60.02 FEET, MORE OR LESS, TO ITS INTERSECTION WITH THE WESTERLY RIGHT OF WAY LINE OF SAID 134TH AVENUE NE;

THENCE SOUTH 01°38'12" WEST, ALONG SAID WESTERLY RIGHT OF WAY LINE, A DISTANCE OF 649.50, MORE OR LESS, TO ITS INTERSECTION WITH THE WESTERLY EXTENSION OF THE SOUTHERLY BOUNDARY OF SAID LOT 5;

THENCE NORTH 89°53'43" EAST, ALONG SAID WESTERLY EXTENSION, A DISTANCE OF 60.03 FEET, MORE OR LESS, TO THE SOUTHWEST CORNER OF SAID LOT 5, SAID CORNER LYING ON THE EASTERLY RIGHT OF WAY LINE OF SAID 134TH AVENUE NE;

THENCE NORTH 01°38'12" EAST, ALONG SAID EASTERLY RIGHT OF WAY LINE, A DISTANCE OF 649.22 FEET, MORE OR LESS, TO THE POINT OF BEGINNING;

SAID PORTION CONTAINS 38,962 SQUARE FEET, OR 0.8944 ACRES OF LAND, MORE OR LESS.

TOGETHER WITH THAT PORTION OF THE 136TH AVENUE NE RIGHT OF WAY (FORMERLY SPRUCE STREET), COINCIDENT WITH THE EASTERLY BOUNDARIES OF LOTS 3 THROUGH 5, INCLUSIVE, BLOCK 157, BURKE & FARRAR'S KIRKLAND ADDITION, DIVISION NO. 31, ACCORDING TO PLAT RECORDED IN VOLUME 25 OF PLATS, PAGE 26, RECORDS OF KING COUNTY, WASHINGTON, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: :

BEGINNING AT THE NORTHEAST CORNER OF SAID LOT 3;

THENCE SOUTH 89°50'08" EAST, ALONG THE EASTERLY EXTENSION OF THE NORTHERLY BOUNDARY OF LOT 3, A DISTANCE OF 30.00 FEET, MORE OR LESS TO THE CENTERLINE OF SAID 136TH AVENUE NE;

THENCE SOUTH 01°05'47" WEST, ALONG SAID CENTERLINE, A DISTANCE OF 645.60 FEET, MORE OR LESS, TO ITS INTERSECTION WITH THE EASTERLY EXTENSION OF THE SOUTHERLY BOUNDARY OF SAID LOT 5;

THENCE SOUTH 89°53'43" WEST, ALONG SAID EASTERLY EXTENSION, A DISTANCE OF 30.01 FEET, MORE OR LESS, TO THE SOUTHEAST CORNER OF SAID LOT 5, SAID CORNER LYING ON THE EASTERLY RIGHT OF WAY LINE OF SAID 136TH AVENUE NE;

THENCE NORTH 01°05'47" EAST, ALONG SAID EASTERLY RIGHT OF WAY LINE, A DISTANCE OF 645.74 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.
SAID PORTION CONTAINS 19,370 SQUARE FEET, OR 0.4447 ACRES OF LAND, MORE OR LESS.

MAR. 8, 2016

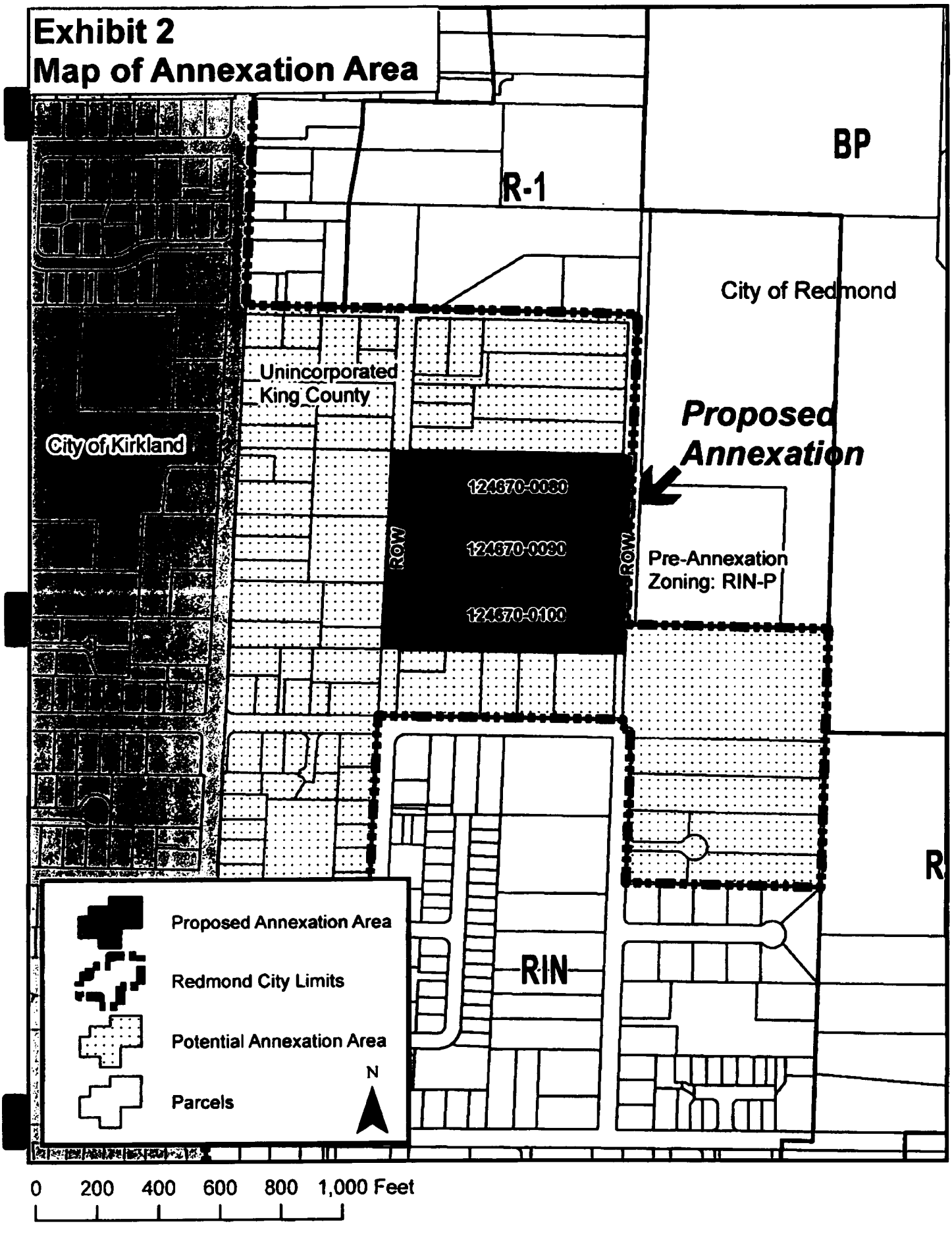
Exhibit 2
Map of Annexation Area
BP
R-1
City of Redmond
Unincorporated
King County
City of Kirkland
Proposed
Annexation
124670-0080
124670-0090
124670-0100
ROW
ROW
Pre-Annexation
Zoning: RIN-P
RIN
R
Proposed Annexation Area
Redmond City Limits
Potential Annexation Area
Parcels
N
0 200 400 600 800 1,000 Feet

City of Redmond

NPDES Annual Report Covering 2016

Attachment 3:

Outreach Summary

The City of Redmond took the following actions to meet NPDES provisions S5.C.1.a.i and ii:

1. The City leveraged participation in Stormwater Outreach for Regional Municipalities (STORM) to promote the Puget Sound Starts Here campaign, including collaborating on two 8-page Newspaper in Education (NIE) inserts in the Seattle Times. The insert reached 38,000 students across the Sound and highlighted multiple BMPs to prevent stormwater pollution.

2. Redmond joined the regional Don't Drip and Drive campaign by recruiting three shops to participate in free leak testing and a 10% discount on leak repairs. The City will continue to promote the campaign through monthly social media updates.

3. Conducted outreach to junior high school and high school students: a) detailing the stormwater pollution issues associated with charity carwash fundraisers, and b) encouraging student organizations to engage in alternative fundraising activities.

City of Redmond

NPDES Annual Report Covering 2016

Attachment 4:

Outreach Effectiveness Evaluation

City of Redmond
NPDES OUTREACH PROGRAM ASSESSMENT
Measure Understanding and Adoption
Of a Targeted Behavior for One Target Audience (S5.C.1.c)

The City of Redmond contracts with *Full Circle Environmental* to conduct the *City of Redmond On-Site Car Wash Outreach Program* each spring and fall—i.e. the time when the majority of charity car wash fundraising events occur. This outreach program began in 2008. The City of Kirkland and Bellevue partner with Redmond by also hiring the same contractor to run a version of this outreach program within their jurisdictions.

City of Redmond uses this program to comply with *Western Washington Phase II Municipal Stormwater Permit* (NPDES permit) outreach requirement S5.C.1.a.ii. This document details the City of Redmond's assessment of understanding and adoption of a targeted behavior by a targeted group as mandated by NPDES permit provision S5.C.1.c.

TARGET BEHAVIORS AND AUDIENCES

Targeted audiences: secondary school clubs and teams--the highest frequency groups to hold car wash fundraising events and, business and property owners who sponsor charity car wash events on their property.

Targeted behaviors for school groups: a) choosing an alternative fundraising activity, and b) properly using a car wash kit insert (i.e. "Sub-Safe Kit" or equivalent) to divert car wash effluent stormwater catch basins to sanitary sewers.

Targeted behaviors for property owners: ensure the correct installation and use of the car wash kit insert when kits are used at their business site so that they comply with Redmond Municipal Code 13.06

PROGRAM ACTIVITIES

The consultant conducts outreach and monitoring during spring and fall of each year when the weather is warm and it is more likely charity car wash events will occur. In 2008, the program initially consisted of "windshield monitoring" during which the consultant drove designated routes, on select weekends, to identify car wash activities within Redmond and Bellevue. If a car wash was identified, the consultant would inspect the event: a) to determine if a car wash kit was being used, b) to determine if the kit was properly installed, and c) to either lend out, or re-install, a kit to ensure polluted effluent was diverted from the catch basin. During this monitoring, the consultant provided outreach and education, and also collected information from the group holding the car wash, as well as from the business hosting the car wash. All information was passed on to the appropriate jurisdiction.

Since then, at the end of each year, the consultant provides each participating jurisdiction with an end of season report which summarizes activities and evaluates the program. The program has evolved over time in response to these evaluations.

PROGRAM EVALUATION AND IMPROVEMENT

The information gathered during initial efforts has been used to alter and improve the program. After several years of monitoring and evaluation, the program has:

- Identified business sites that were most likely to host car wash events.
- Identified secondary school clubs and teams as the groups most likely to use car washes as a fundraising opportunity.

In 2010, Redmond loaned car wash kits to the identified businesses. The consultant also began pre-season outreach to these businesses. This consisted of informing these businesses of their legal obligation to ensure that the kits are used properly and, in subsequent years, checking the condition of the kits on loan to ensure they were in working order. Starting in 2011, the consultant began to provide outreach to the secondary schools. The consultant informed school staff that charity car wash kits are required, and provided names of businesses that have kits on loan. As new information has become available, the number of schools contacted has increased. Further, the cities and our consultants have attempted to promote alternative fundraising options among the secondary school audience.

RESULTS

The following table summarizes the activities taken and the observations made in the end of season reports. This data shows a gradual reduction in the number of illicit car washes occurring over time. Further, all participating cities note that the number of businesses willing to sponsor charity car wash events has decreased over the tenure of the program. In Redmond, three sites initially sponsored car wash events. By 2015, only one business had a kit on loan that allowed these charity events.

Summary of Redmond Charity Car Wash Outreach from 2008-2015				
Season	**Preemptive outreach provided to secondary schools and businesses?**	**Number of weekend drop-in outreach dates**	**Number of car wash events observed on drop-in dates**	**Number of events lacking or improperly using a car wash kit**
Spring 2008	No	6	8	1
Fall 2008	No	9	4	2
Spring 2009	Only to businesses	4	5	2
Fall 2009	Only to businesses	2	2	1
Spring 2010	Yes	2	2	2
Fall 2010	Yes	2	0	0
Spring 2011	Yes	3	1	0
Fall 2011	Yes	3	1	0
Spring 2012	Yes	3	1	0
Fall 2012	Yes	3	2	0
Spring 2013	Yes	5	4	2
Fall 2013	Yes	3	2	1
Spring 2014	Yes	5	4	0
Fall 2014	Yes	5	1	0
Spring 2015	Yes	5	0	0

MEASUREMENT OF AUDIENCES UNDERSTANDING AND ADOPTION OF TARGETED BEHAVIOR

The end of season project reports and the program's response to them are consistent with both the letter and intent of the NPDES outreach assessment requirement S5.C.1.c. The data and complete narratives provided in the reports provide the information necessary to evaluate understanding and adoption of the targeted behaviors by the targeted audiences.

The cities partnering in this outreach have taken the additional evaluation measure of gathering and examining reports from 2008 - 2015 in mass. *Attachment A* details Redmond's evaluation based on Redmond's end of season reports. These reports are available upon request.

Attachment A: City of Redmond Charity Car Wash Program--Assessment of Target Audience Understanding and Adoption of Targeted Behavior

Outreach Actions	Desired Outcome	Evaluation Measure	Evaluation Results	Actions Taken in Response to Evaluation
Pre-season outreach to secondary schools.	Identify viable alternative fundraising opportunities for school clubs and teams.	Feedback from select members of the target audience—this can occur during program delivery.	*This is identified as a need for further evaluation.*	City of Redmond will support and track the City of Bellevue's efforts to identify and evaluate alternative fundraising opportunities.
	Pre-outreach materials to secondary schools have concise, clear messages that resonate with the need to use car wash kits.	Feedback from select members of the target audience—this can occur during program delivery.	*This is identified as a need for further evaluation.*	• City of Redmond will support and track the City of Bellevue's efforts to gather this information. This can occur in the spring 2016 car wash pre-outreach. • Respond to input as appropriate.
	Groups and/or individuals who hold charity car wash fundraisers know that they must meet stormwater codes.	• Number of contacts made. • Details on whom was contacted during pre-season outreach visits	• In 2011, we conducted outreach to two secondary schools in Redmond. • Currently provide outreach to four secondary schools in and around Redmond. • In 2011 contact was made with the school secretary. • Currently we have direct contacts with coaches and club advisors. *This indicates we are effectively achieving this desired outcome.*	• Continue pre-outreach at schools and businesses that hold car washes because staff turnover rates can be high for both groups. • Identify additional methods to distribute this message: ads about fundraising car washes put in Seattle Times (NIE project with East/North Stormwater Outreach Group), Focus on Redmond Newsletter.
Pre-season outreach to businesses and property owners that sponsor fundraising car washes	Pre-outreach materials to business owners and property owners have concise, clear messages that resonate.	Feedback from select members of the target audience—this can occur during program delivery.	• In Redmond we have just one business owner willing to sponsor charity car washing events. *Person to person contact is the most effective and efficient means for this to occur.*	• Continue to visit newly identified sites to ensure that they can properly accommodate car wash kits. • Continue to provide consistent messages to property owner regarding their obligations when hosting a charity car wash event. • Continue ongoing outreach required due to staff or business turnover. • Ask business what, if any additional information they might require.
	Private property owners that host car washes know their obligations to meet stormwater codes.	• Number of businesses allowing car wash events remains the same, decreases, or increases. • The reason businesses stop hosting events.	• In Redmond, after determining what was required to comply with City code we have three businesses that decided to no longer host charity car washes. • One business stopped because they went of business. The second business stopped siting the "hassle and expense" of having to set up and monitor the car wash kit. *This indicates we are likely effectively achieving this desired outcome.*	

Outreach Actions	Desired Outcome	Evaluation Measure	Evaluation Results	Actions Taken in Response to Evaluation
Drop-in outreach on select weekends to business sites which host fundraising car washes	Know where charity car washes are occurring.	Identify sites where the most washing occurs.	• Our evaluations indicate that car wash events should occur at the Redmond Athletic Club. Other businesses are not allowing car wash events. *This indicates we are effectively achieving this desired outcome. (We recognize the need to continue monitoring to achieve this outcome.)*	• Continue "windshield monitoring" to identify location sites.
	Know which groups are holding car washes.	Identify groups who hold the most car washes.	• In Redmond this is primarily secondary school clubs and teams. *We are effectively achieving this desired outcome.*	• Continue pre-season outreach required because of high staff turnover. • Leverage relationship made with advisor and coaches.
	Groups and/or individuals who hold car washes comply in a manner with the law.	• Number of groups conducting illegal car wash events remains the same, reduces, or increases. • Number of improper installations remains the same, decreases, or increases over the length of the program.	• In the last three years, we have seen no illegal car washes during "windshield monitoring." • During the same period, we have only seen one case of improper installation—and that was addressed by the contractor during a site visit. *This indicates we are effectively achieving this desired outcome.*	• Continue drop-in outreach and evaluations. • Provide alternatives to fundraising ideas. • Continue to direct groups to sites who set up kits for them because they have the highest rates of proper use.
	Property owners do not allow charity car washes without the use of properly installed car wash kits.	• Number of business and property owners allowing illegal charity car washes remains the same, reduces, or increases. • Number of improperly installed car wash kits decreases.	• In the last three years, we have seen no illegal car washes during "windshield monitoring." • During that same period, we have only seen one case of improper installation. *This indicates we are effectively achieving this desired outcome.*	• Continue to stress the importance of staff installation of the kit as part of the pre-season outreach. • Continue to evaluate the condition of kits during pre-season outreach.
	Identify common reasons for improper installation.	• Inspection of the kits to record reasons for improper installation. • Determine how long the kits last.	• Highest rates of successful kit set-up at sites where business staff set the kit up for the groups. • Kit materials occasionally go missing or malfunction. • Based on antidotal evidence, we have determined that kits usually last about to 4 years. *This indicates we are effectively achieving this desired outcome.*	• Continue to evaluation car wash kit conditions during pre-season outreach activities. • Stress to businesses and property owners that they are responsible for evaluating and reporting kit issues to the City. Continue to provide City and contractor's contact information. • Plan for regular kit replacement approximately every 4 years, and take more methodical measurements of kit longevity.

MEMORANDAM

TO: Gary Schimek, Natural Resources Division Manager
Jerallyn Roetemeyer, Engineering Supervisor
Peter Holte, NPDES Coordinator
FROM: Eberley Barragán, Recycling Coordinator
DATE: August 26, 2016
SUBJECT: Car Wash Outreach Program Options

This memo outlines options for a new iteration of Redmond's Onsite Car Wash Outreach Program based upon recommendations in the spring 2016 report from Full Circle Environmental (see Appendix B). Four options are compared below: 1) maintaining the current program, 2) discontinuing car wash kits, 3) banning charity car washes altogether or 4) identifying a permanent location which the City can rent to charity groups. Option 2 is recommended as the preferred strategy, since it aligns with the direction taken by other regional programs while also presenting low barriers to adoption.

Program History: Redmond's Onsite Car Wash Outreach Program was launched in 2008 to address the problem of polluted effluent from charity car washes (i.e. heavy metals, dirt and soap being allowed to run untreated into the storm drains, which lead to local waterways). Historically, the City has contracted with Full Circle Environmental to conduct preemptive outreach to schools to identify groups planning to host a charity car wash and to promote alternative fundraisers. Program consultants have also completed "drive-by" observations on weekends in the spring and fall to assess the number of illicit car washes occurring. In 2011, the City began providing car wash kits on-loan to charity groups and host sites to help ensure that car washes do not result in illicit discharge. The kit consists of a tub that plugs the catch basin and a pump that diverts effluent from the tub to a sewer, sink or ground area. The Onsite Car Wash Outreach program has fulfilled requirement S5.C.1.a.ii of the *Western Washington Phase II Municipal Stormwater Permit* (NPDES permit) over the last several years because it focuses on a targeted behavior (safe car washing) among a particular identified group (school groups and businesses that host car washes).

Opportunity for Change: In recent years, the Redmond Athletic Club (RAC) was a go-to car wash location due to its sanitary sewer connection and hands-on help from management to properly use the car wash kit. However, the RAC closed early in 2016, and other potential host sites identified by the City and program consultants were neither ideal nor interested in hosting. It may be because of the lack of enthusiastic host sites, as well as less interest expressed by schools compared to prior years, that the program consultants observed zero car washes during drive-by days in spring 2016 (see Appendix B). This is consistent with a gradual reduction in both the number of host sites and the number of illicit car washes observed over the life of the program (see Appendix C). These factors, combined with a regional trend to phase out municipal support for charity car washes (e.g. the City of Bellevue is phasing out kits starting in fall 2016), suggest an opportunity to rethink program methods.

Options: In comparing the four options, the following criteria were considered: cost, potential to prevent illicit discharge, ease of adoption (internal and external), and regional consistency. See Appendix A for a table comparing options based upon these criteria. Please note that all options recommend continuing the preemptive outreach and drive-by observation components of the program at a cost of approximately $4,500 per year. This recommendation springs from that fact that promoting alternative fundraisers and measuring the prevalence of car washes are key stand-alone program components to address behavior change independent of whether kits are provided. In addition, all

options maintain compliance with Redmond's NPDES permit requirements, since each maintains focus on the same priority behaviors and audiences.

Option 1 – Status quo: This option advocates continuing to provide car wash kits. While it may be the easiest to adopt (requiring no change) and promises to prevent some illicit discharge from car washes that would otherwise be without a kit, the option has two main drawbacks. First, pieces of the kits or entire kits need periodic replacement, representing an administrative and financial cost. (Even when kits are intact, program consultants report that they are sometimes difficult to use and may not always have desired results, which detracts from their ability to prevent illicit discharge). Second, by continuing to provide kits, the City may be implicitly condoning a practice that may have inherent negative environmental impacts, such as high water use or risks to Redmond's aquifer even when kits are used properly (since polluted effluent diverted to a ground area can still infiltrate and pose a risk to Redmond's water supply). Furthermore, surrounding jurisdictions are moving away from providing kits. These include the City of Bellevue, which officially discontinued the kits this fall, and the City of Bothell, which has not provided them for some time. Continuing to offer kits may impede regional consistency in programs and messaging.

Option 2 – Discontinue car wash kits: This option advocates discontinuing the kits starting in spring 2017, preceded by a fall 2016 outreach session announcing the impending change. There are several benefits to this option: it maintains regional consistency, as surrounding jurisdictions move away from kits; it eliminates the (modest) cost of replacing and maintaining kits, and it promises relatively easy adoption (since car washes have steadily been declining and alternative fundraisers have become more popular). In addition, the lack of kits and assistance to set them up may help to discourage an inherently risky environmental practice. Despite these benefits, this option may present a slightly higher risk of negative impacts to stormwater, since any car wash that *does o*ccur would almost certainly be set up without a kit, therefore resulting in illicit discharge. However, this risk may be lessened by the fact that charity car washes have become increasingly less prevalent, and there is no evidence to suggest this trend will not continue.

Option 3 – Ban car washes: This option advocates an outright ban on charity car wash events held within the city. While the potential for enforcement may serve to deter some illicit car washes (resulting in a positive environmental impact), a ban may be difficult to enforce and presents multiple barriers – both internal and external – to adoption. Internally, this option would require Council approval and a change to Redmond Municipal Code, a process which could introduce challenges and delays. Externally, there may be low resident support for an outright ban on charity car washes, and bringing one before the public could portray the City as an unwelcome environment for charity groups. Finally, since no other surrounding jurisdictions have bans on car washes, Option 3 would put Redmond out of step with regional approaches.

Option 4 – Identify a permanent location and rent to charity groups: Under this option, the City would identify and purchase (or repurpose) a site with a sanitary sewer connection that could be used to host charity car washes. The site would then be rented by the City to charity groups. By providing a permanent location with the ideal set-up (i.e. connection to a sanitary sewer, rather than infiltration into a ground area), the City could greatly minimize the risk of illicit car washes and the attendant negative environmental impacts. At the same time, this option is the most costly and also could present significant internal barriers (for example, by requiring staff hours to "host" the car washes onsite). There is also no other jurisdiction adopting this model at this time.

Recommendation: As reflected in Appendix A, **Option 2** presents the greatest potential benefits and fewest draw-backs of the four options. Although it may entail a slight increase in risk of illicit discharge, the ease of adoption, regional

consistency and lower cost outweigh this slight risk. It is therefore the recommended option for implementation in fall 2016.

City of Redmond

NPDES Annual Report Covering 2016

Attachment 5:

PUBLIC ENAGEMENT ACTIVITIES

3/22/2017

In 2016 to meet NPDES permit requirements S5.C.2.a and S5.C.2.b the City:

- Advertised the opportunity to comment on the *City of Redmond 2016 Stormwater Management Program (SWMP)* Plan by placing an internet banner ad on the City's home page. The ad ran for 3 weeks in April of 2016, and invited the public to review and comment on the City's SWMP Plan.
- Placing an article and invitation to comment on the SWMP in the City's newletter, *Focus on Redmond*. The newsletter is mailed out to all Redmond residents.
- In addition, the City's NPDES website (http://www.redmond.gov/Environment/StormwaterUtility/NPDES/) also invites the public to make comments on the City's SWMP at any time throughout the year.

The City further involves the public in our stormwater management related decisions by engaging people during the planning and construction of stormwater infrastructure projects, and during stormwater-related policy revisions. In 2016, Public Works Department staff took part in training seminars to improve our public involvement methodologies. This training emphasized involvement with stakeholders early-on in construction planning and policy revision processes, and stressed the importance of continuing to listen to stakeholders throughout these processes. In 2016, the City also contracted with EnviroIssues, a private contractor, to further assist staff with public involvement activities.

City of Redmond

NPDES Annual Report Covering 2016

Attachment 6:

IDDE INFORMATION SHARING ACTIVITIES

IDDE Information sharing description in answer to question 17b

3/24/2017

To inform public employees, businesses, and the general public of the hazards associated with illicit discharges and improper disposal of waste, the City IDDE program took the following actions:

- New Business License applicants screened and outreach provided if appropriate
- Distributed IDDE Hotline magnets /stickers distributed to general public
- Submitted articles in the City newsletter
- Coordinations with Local Hazardous Source Control & Wellhead Protection business inspections
- Created specific compliance and technical assists materials for fleet car washing and pressure washing

ATTACHMENT 7	**IDDE TRACKING SUMMARY**				
This is an example of the Excel-based tracking sheet. The entire sheet is not supplied here because of its length. **To obtain the complete attachment, please contact the City of Redmond NPDES Coordinator, 425-556-2822**					
13. Source or Cause:	**13a. Commercial [Commercial]**	**14. Correction/Elimination Method:**	**14a. Enforcement [Enforcement]**	**15. Final Resolution Date**	**15a. Final Resolution Date**	**16. Field notes, explanations, and other comments:**
Vehicle		Education/Technical Assistance, Behavior/Operation Modification, Enforcement	Penalty or Fine	1/7/2016		Vehicle for FedEx delivery subcontractor suffered mechanical failure causing oil sheen on roadway and FedEx facility. XL Environmental clean up
Commercial	Mobile Business	Education/Technical Assistance		1/11/2016		Commercial/residential mixed use building pressure washing w/o proper BMPs
Vehicle		Education/Technical Assistance, Behavior/Operation Modification	Verbal Notice	4/12/2016		Condo complex vehicle oil drip concern. Response delay due to incident observation to ERTS and forwarding to Redmond. Resolution delay due the nature of the issue.
Pubic Entity		No Action Needed		1/15/2016		Typical municipal water distribution system infrastructure failure with mobilized silt and sediment. Repairs made
Sanitary Overflow		Education/Technical Assistence	Written Warning	1/29/2016		Private sewer lateral blockage requiring elevated City response and technical assistance due to nature of the blockage

City of Redmond

NPDES Annual Report Covering 2016

Attachment 8:

Low Impact Development Integration Report

memo

to **Peter Holte, City of Redmond**

from **Lolly Kunkler, PE**
Peg Staeheli, PLA, FASLA

re **City of Redmond LID Integration: Process Summary**

date **03/29/2017**

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1. Introduction

The Western Washington Phase II Municipal Stormwater permit, August 1, 2013 - July 31, 2018, requires that the City of Redmond implement a stormwater management program that integrates low impact development (LID) into city policy and code and stormwater management operations. Under the terms of this permit, Redmond and other Phase II cities are mandated to:

a) review and revisions to "enforceable documents" with the goal of making LID the “preferred and commonly used approach” for development (*Western Washington Phase II Municipal Stormwater Permit* S.5.c.4),
b) incorporate changes by December 31, 2016,
c) submit a report to Ecology summarizing the LID integration process by March 31, 2017.

Since January of 2015, MIG|SvR has assisted the City of Redmond with review of City documents as part of the LID integration process and assisted with documentation of that process in compliance with the Washington NPDES Phase II Permit (S5.C.4.f). This report summarizes this review and revision process; providing information as required with the permit requirement S5.C.4.f.ii.

2. Who – The Participants in the Process

The LID code review process included individuals with varying rolls, from workgroups throughout the City. These groups include:

- The LID Integration Project Steering Committee,
- The Subject Area Experts, and
- The Staff LID Integration Policy Review and Revisions Team.

The LID Integration Project Steering Committee—This Committee is made up of workgroup managers and supervisors from throughout the City. This committee oversaw the LID Review and Integration Process with coordination and technical assistance from MIG|SvR. Additional departmental staff also participated. Their work included identifying codes for review, reviewing codes, reviewing the gap analysis, reviewing code changes, and making the final decisions concerning staff level recommendations for code changes.

Individual	Department	Descriptive Job Title
Jerallyn Roetemeyer	Public Works	Environmental Service Section Engineering Supervisor, LID Integration Process Project Lead
Peter Holte	Public Works	NPDES Coordinator, Staff Lead for LID Integration Process
Steve Fischer	Planning	Planning Division Manager
Paulette Norman	Planning	Development Service Engineering Manager
Cathy Beam	Planning	Principal Environmental Planner
Lori Peckol	Planning	Long Planning Division Manager
Lisa Rigg	Public Works	Assistant Maintenance Manager

Subject Area Experts—This group identified code sections that would be part of the review documents using topics and subject areas identified in Ecology's *Low Impact Development Code Update Integration Toolkit* (July 2014).

Individual	Subject Area of Expertise
Steve Hitch	Stormwater Technical Notebook
Sarah Vanags	Zoning Code
Jeff Churchill	Zoning Code and Comprehensive Plan
Eric LaFrance	Standard Details
Nick Entinger	Stormwater Financing
Peter Dane	Transportation related documents
Todd Short	Fire related and international building codes
David Shaw	Park Plan

Staff LID Integration Policy Review and Revisions Team—this team performed the actual review of identified codes, made recommendations to the steering committee, and revised code language in response to the steering suggestions.

Individual	Department	Descriptive Job Title
Peter Holte	Public Works	NPDES Coordinator, Staff Lead for LID Integration Process
Cathy Beam	Planning	Principal Environmental Planner
Steve Hitch	Public Works	Senior Stormwater Engineer
David Shaw	Parks	Parks Senior Planner
Andy Rheaume	Public Works	Watershed Senior Planner
Meg Angevine	Parks	Parks Lead Maintenance Staff
Amanda Balzer	Public Works	Wellhead Protection Environmental Scientist
Cindy Wellborn	Planning	Plan Review Senior Engineer
Sarah Vanags	Planning	Senior Planner
Charlie Cox	Public Works	Stormwater Maintenance & Operation Supervisor
Steve Rountree	Public Works	Lead Capitol Improvement Project Construction Inspector
Todd Short	Fire	Fire Marshall
Rich Halvorsen	Public Works	Lead Capitol Improvement Project Construction Inspector
Tom Hardy	Public Works	Stream Habitat Senior Planner
Aaron Moldver	Public Works	Wellhead Protection Environmental Scientist
Peter Dane	Planning	Transportation Associate Planner
Nick Entinger	Public Works	Engineer Technician

Additional City Staff and Personnel participated in education sessions and were invited to provide comments, concerns and insight to their representative department managers as part of this integration process.

3. What – The Documents Reviewed

The following documents were identified for review by City of Redmond staff and personnel:

- City of Redmond Comprehensive Plan
- City of Redmond Municipal Code
- City of Redmond Zoning Code
- International Fire Code and Redmond Fire Standards
- Redmond Clearing, Grading and Stormwater Management Technical Notebook (STN)
- City of Redmond Transportation Master Plan 2014
- City of Redmond Standard Details

The Subject Area Experts identified the sections of the City code and documents that would be reviewed as part of the LID Review and Integration Process. The NPDES Coordination and MIG|SvR also identified sections. The Subject Area Experts, NPDES Coordinator and MIG|SvR then met to coordinate the review lists and resolve and discrepancies to ensure that no section, necessary for review, would be overlooked. This final list of code and document sections was provided to all participating members of the LID Review and Integration Process. The codes and standards in section 6 of this report details all items that were identified by the subject area experts.

4. Where – Identifying Gaps and Barriers

In mid-January of 2015, MIG|SvR and the members of the LID Integration Project Steering Committee met to review the requirements of the NPDES Permit and to develop an approach for the review and documentation needed to meet those requirements and to fully integrate LID into policy and planning documents for the City.

The team developed an "LID 101" seminar for City staff to provide a general overview of what LID is, and some of the changes in operations that may be required to successfully implement LID. MIG|SvR prepared and led two LID 101 workshops, one held on June 3, 2015 in Council Chambers at Redmond City Hall and the second on June 4, 2015 in the Trinity Building at the Public Works Maintenance and Operations Center. The workshops were attended by City planning, engineering staff and maintenance personnel.

Following the LID 101 Training, the team prepared and facilitated an integration process "kick-off" meeting. The meeting was held on July 20, 2015 in the Council Conference room at Redmond City Hall. During the presentation, the team summarized the NPDES LID Integration requirements, described the process the City would use to meet these requirements, and explained the roles and responsibilities that selected staff members would play in helping the City meet these requirements. Documentation included the presentation of schedule, anticipated meetings, and Code and Policy review sheets which would aid the staff in reviewing the City documents.

Following the July 20th, 2015 meeting MIG|SvR conducted an independent review of the City documents identified in Section 3. MIG|SvR and the LID Integration Project Steering Committee Lead then met with smaller groups of City staff and personnel in a series of Subsection meetings. These meetings focused on review of City documents identified in the Section 3. Four subsection meetings: Parks, Stormwater, Policy and Transportation and Standards, were conducted during October of 2015.

During these meetings, City staff reviewed potential gaps and barriers in City code, policy and standards documents that had been identified by the subject area expert, MIG|SvR and the LID Integration Steering Committee. This information was

tracked by the LID Integration Steering Committee Lead and MIG|SvR. Several synthesis meetings presented the collected material to participating staff and finalized the analysis. The *Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts*, details the code examined, gaps and barriers, considerations, and actions taken.

The LID Integration Project Steering Committee made final staff recommendation to address gaps and barriers. MIG|SvR provided technical assistance and support to City staff during their review of the draft revisions to codes and standards and conducted a peer review of final documents. The synthesized data and proposed resolutions are identified in the document summaries included in the Section 6.

During the second and third quarters of 2016 City staff met with external stakeholders. These meetings resulted in additional changes to the proposed RZC language and the City of Redmond Stormwater Technical Notebook.

5. Review and Adopt – City Approval

Amendments to the RZC and RMC were adopted by the Redmond City Council on December 7, 2016. The City of Redmond's Stormwater Technical Notebook (STN) was administratively adopted on December 28, 2016. After additional meetings with external stakeholder and Ecology, the City made further revisions to the STN on March 1, 2017.

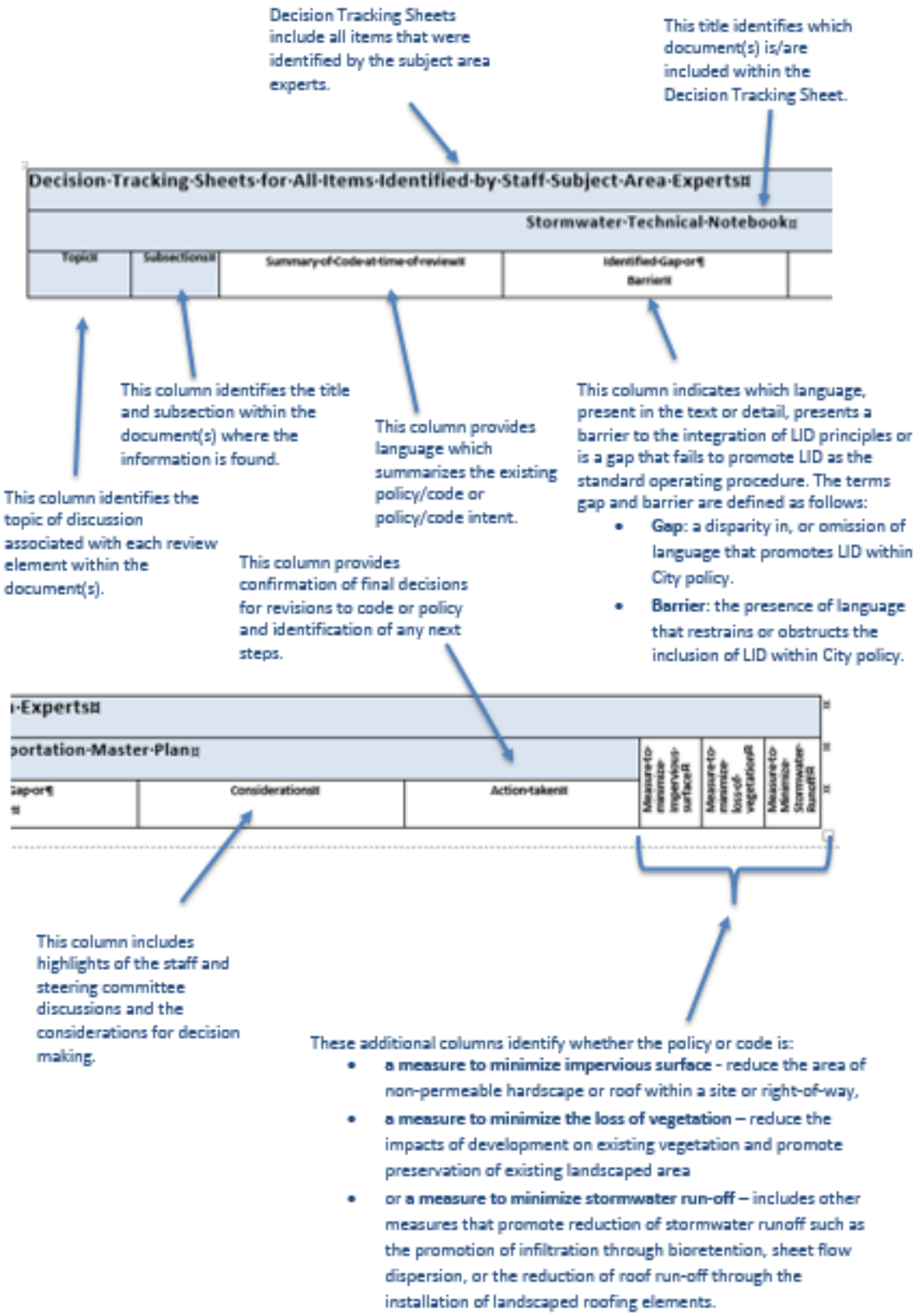
In anticipation of the LID Integration Process, revisions to the Standard Details were incorporated during the 2015-2016 Standard Details update. During the LID Integration Process, additional revisions were identified to be included in the 2017-2018 Standard Details update process.

In some cases, such as the Transportation Master Plan and City Comprehensive Plan, the staff team determined that the current code was supportive of LID, or did not create barriers that prevent the use of LID. In these case, the City identified potential actions that—while not critical to the success to integration of LID into City operation—could further re-enforce the use of LID. The City will consideration these recommendations during regularly scheduled updates to these documents.

6. Document Summaries and the *Decision Tracking Sheets for All Items Identified by Subject Area Experts*

The following subsection provides a summary of the information gathered during the City integration process and the action items the City took based on discussion and deliberation. The *Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts* were developed using guidance from the Ecology Low Impact Development Code Update and Integration Toolkit, July 2014.

The sheets are organized as follows:



6.1 City of Redmond Comprehensive Plan, City of Redmond Municipal Code, and the City of Redmond Zoning Code

City staff reviewed the *City of Redmond Comprehensive Plan (RCP), City of Redmond Municipal Code (RMC), and the City of Redmond Zoning Code (RZP)*.

The RCP is the document that outlines development visions for the City of Redmond and guides decision making that impacts the public and private realms. The document strongly supports the continued development within the City of Redmond in an environmentally responsible and equitable manner.

The RMC consists of all the regulatory and penal ordinances and certain of the administrative ordinances of the city. The RMC establishes fees and permitting for right of way restoration, for inspection and maintenance of stormwater facilities, and for wellhead protection zones and monitoring programs.

The RZC provides the basis regulation of development and redevelopment in all areas of the City including designation of land use zones and the application of development and shoreline requirements.

In general, the plan and codes were supportive of the LID integration. Staff did find some gaps and barriers which were addressed through the revision of code language or the removal of specific code elements. Examples of revisions include:

- Coordination of the of language bewteen the RZC, the STN and Standard Plans.
- Alignment definitions with the RZC, RMC, and RCP with those of the Ecology SWMMWW 2014.

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Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Redmond Municipal Code (RMC), Redmond Zoning Code (RZC) & Redmond Comprehensive Plan

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Stormwater Management Code	**RMC 13.06**	Code provides standards and procedures for inspection, maintenance and repair of stormwater facilities, also referencing minimum standards identified in the Stormwater Technical Notebook (STN).	**NONE**		**No revision needed.**	**X**	**X**	**X**
	RMC 15.24	The language identifies the Washington State Department of Ecology Stormwater management manual adopted by the City, including any amendment language. The section includes applicable stormwater management.	**GAP:** For clarity and ease of reference, the code language should use terms that match the Ecology documentation. The language of the code does not prevent a barrier the integration of LID,		**Revised Code**: Updated the RMC code to reflect changes in terminology.	**X**	**X**	**X**
Wellhead Protection	**RMC 13.07** **RZC 21.64.050 Critical Aquifer Recharge Area (CARA)** **RCP Natural Environment Chapter, Policy 4-B**	RMC 13.07 Establishes wellhead protection zones within the City. RZC 21.64.050 Promotes consistent application of the standard requirements of the CARA: • Infiltration from Pollution Generating Surfaces (PGS) not allowed in Wellhead Protection (WHP) Zones 1 and 2—except for individual single family lots • Infiltration from PGS allowed in WHP Zones 3 and 4 with treatment with permission from a City engineer • On-site Stormwater Treatment and infiltration of stormwater is required to the maximum extent feasible and infiltration from non-PGIS is encouraged in the CARA. RCP 4-B identifies planning elements associated with the Natural Environment	Some barriers are present within the language of the RMC and RZC: • **BARRIER:** Reduces the ability to use certain Green Stormwater Infrastructure Facilities (GSI) in the CARA (RZC 21.64.050.). • **BARRIER:** In certain situations it may require developers to take additional actions and receive additional permission to use pervious pavements and runoff dispersion in WHP Zones 3 and 4 • **NONE**: Infiltration from non-PGIS is supportive of groundwater recharge and therefore supportive of LID. RCP 4-8 **NONE** Sections are support of the inclusion of vegetation and habitat	• The City's shallow aquifer is vulnerable to infiltrated, polluted runoff in areas where the distance to groundwater is insufficient and there is not enough depth of soil to provide proper treatment. • Ecology added language identifying compliance with the *Federal Clean Drinking Water Act* (FSDWA) as possible "competing need" within the *2012 Stormwater Management Manual for Western Washington, Volume 5, and Chapter 5*. This language allows the City to limit infiltration in the City Critical Aquifer Recharge Areas (WHP Zone 1 and 2). • Infiltration from non-PGIS is supportive of groundwater recharge and therefore also supportive of LID. RCP 4-8 Sections are support of the inclusion of vegetation and habitat	**Revised code**: Maintain prohibition of infiltration from PGS in the Critical Aquifer Recharge Areas (WHP Zones 1 and 2), as allowed in Stormwater Management Manual for Western Washington (SWMMWW). Allow and require infiltration from PGS in WHP zones 3 and 4, following requirement and guidance in the SWMMWW. Note changes in the City STN. The City will continue analysis to better understand the potential positive and negative effect of infiltration on Redmond's drinking water aquifer.			**X**
Site requirements for residential zones	**RZC 21.08.170**	The purpose of this code is to establish basic site design requirements for residential zones	**NONE**	This code includes maximum impervious surface cover areas for different residential densities. The coverage detailed in these residential zones will allow for the use of LID. These provisions also detail requirements for open space and native growth protection.	**No revisions needed.**	**X**	**X**	

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Redmond Municipal Code (RMC), Redmond Zoning Code (RZC) & Redmond Comprehensive Plan

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Residential Development regulations	**RZC 21.08.180**	E.2.e.i-iii.—requires the implementation of LID within the Bear Creek Neighborhood. It states that two techniques are required, and then provides several LID planning and design techniques as options for meeting this requirement F.2.a.v.iii.B --"The City will provide maintenance regarding the function of the drainage facility and a description of best management practices for swales for property owners" F.2.c -- Identifies a plant palette for stormwater management facilities	**GAP**: 2.e.i-iii. – The NPDES permit now requires use of LID on-site stormwater management where feasible, the use of LID techniques are no longer *options*. **GAP**: F.2.a.v.iii.B -- the language here is unclear; it is difficult to determine who is providing what maintenance to what infrastructure, and what is required of property owners in terms of the maintenance or coordination with the City. **GAP**: F.2.c -- the planting palette describes only plantings for stormwater ponds, detention ponds, etc. It does not include plantings specific to rain gardens and bioretention.		**Revised code:** Section E.2.e.i-iii has been removed. F.2.a.v.iii -Drainage swales shall be design to minimize maintenance required by the City and adjacent property owners. The adjacent property owner is responsible for landscape maintenance, including irrigation of the swale as needed. <u>The City will provide best management practices for swales so property owners can conduct this landscaping maintenance.</u> The City will provide maintenance ~~regarding the function of the drainage facility and a description of best management practices for swales for property owners~~ <u>to elements of the swale associated with the drainage and stormwater conveyance</u> F.2.c – Ensured that the appropriate bioretention specific plant palette is provided on standard detail 655.			**X**
Residential Development Regulations	**RZC 21.08.200**	Code defines the residential development regulations for the Southeast Redmond neighborhood.	**NONE**	The section is supportive of LID and will remain within the Code to guide any redevelopment of sites that could occur in the future.	**No revisions.**	**X**	**X**	**X**
Residential Development Regulations (Urban Centers)	**RZC 21.10**	Details the zoning code regulations specific Downtown Redmond.	**POTENTIAL BARRER**: The City is currently conducting an analysis regarding the use of LID and, in particular, roof infiltration in Redmond's dense urban areas	The City requires LID were feasible, as defined in the SWMMWW, in both Overlake and Downtown Redmond.	**No revisions.** • City has adopted LID where feasible as per the SWMMWW. • Currently conducting further analysis of this topic in these areas in 2017 to make an informed decision.			**X**
	RZC 21.12	Details the zoning code regulations specific to the Overlake Neighborhood.						

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Redmond Municipal Code (RMC), Redmond Zoning Code (RZC) & Redmond Comprehensive Plan

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Development Height	**RZC 21.10.110** **RZC 21.12.100**	Code defines building height restrictions/regulations for the downtown Redmond district. It allows for a height trade off when building height reductions occur at the ground level.	**POTENTIAL BARRER:** It is unclear the degree to which height restrictions may generate issues relative to LID in Redmond's dense urban areas.	The City requires LID were feasible, as defined in the SWMMWW, in both Overlake and Downtown Redmond.	**No revisions**. • City has adopted LID where feasible as per the SWMMWW. • Currently conducting further analysis of this topic in these areas in 2017 to make an informed decision.			**X**
Parking Standards Downtown	**21.10.120**	Details parking standards for Downtown Redmond.	**POTENTIAL BARRER:** It is unclear the degree to which parking standards may generate issues relative to use LID in Downtown Redmond.	The City currently requires LID were feasible, as defined in the SWMMWW, in Downtown Redmond.	**No revisions.** • City has adopted LID where feasible as per SWMMWW. • Currently conducting further analysis of this topic in these areas in 2017 to make an informed decision.			**X**
Parking Standards Overlake	**21.12.120**	Details parking standards for the Overlake Neighborhood.	**POTENTIAL BARRER:** It is unclear the degree to which parking standards may generate issues relative to use LID in the Overlake Neighborhood. .	The City currently requires LID were feasible, as defined in the SWMMWW, in Downtown Overlake.	**No revisions.** • City has adopted LID where feasible as per SWMMWW. • Currently conducting further analysis of this topic in these areas in 2017 to make an informed decision.			**X**
Landscape Requirements	**RZC 21.12.130**	Requires that setbacks, buffers, open spaces, pervious surfaces, plazas, parks, site and building entrances, pedestrian walkways, service areas, and parking lots be landscaped in the Overlake Neighborhood.	**BARRIER:** Setbacks and buffer zones may inhibit the placement of some GSI stormwater infrastructure (GSI) facilities.		**Revised code:** • Clarifies that "Buffers may include landscape on site stormwater management BMPS such as bioretention or raingardens."		**X**	**X**
Site Requirements	**RZC 21.16.020**	Code defines how to measure design elements such as building area and setback	**NONE**		**No revisions needed.**		**X**	

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Redmond Municipal Code (RMC), Redmond Zoning Code (RZC) & Redmond Comprehensive Plan

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Public Facilities Surface Water Management	**RZC 21.17.10**	Code states that new development shall be served by adequate surface water management systems.	**GAP:** The section references surface water management per the Clearing, Grading and Stormwater Code but does not reference the guidance of the STN.	The City feels there is a need to ensure that development projects consider LID stormwater controls early their planning processes.	**Revised code:** Code requires that development projects in residential areas identify the location of on-site LID stormwater management requirements early in the plan review process during preliminary project design.	**X**	**X**	**X**
Landscape Standards	**RZC 21.32.050**	Code defines general landscape standards including, size, type, condition, and planting standards.	**NONE**		**No revisions needed.**		**X**	**X**
Landscape Standards	**RZC 21.32.060**	Section establishes an "Ecological Score" for development projects. Projects choose from a list actions they must take, and awarded points to achieve minimum required score.	**GAP:** The section allows developers to earn points by installing LID facilities that were previously voluntary but now required.		**Revised code:** Removed language that allowed developers to receive points toward the Ecological Score requirement by taking LID actions that are required.		**X**	**X**
Landscape Standards	**RZC 21.32.070**	Defines landscape standards in parking lots including size, type, and placement geometry. B.3--Tree must be spaced evenly in interior parking lots. B.4--Structural barriers must enclose plantings. Table 21.32.070--details amount of contiguous landscape area within parking lots.	**POTENTIAL BARRIER**: B.3 --Reduces the ability to cluster trees; a practice that is compatible with LID planning principles. **BARRIER**: B.4 – Does not allow for conveyance of stormwater to bioretention facilities. **POTENTIAL BARRIER:** Table 21.32.070 -- Could limit the size and treatment capability of bioretention facilities in parking lots.	B.3 – The City is seeking to achieve 50% canopy coverage over parking lots. Clustering trees for stormwater management and "urban heat island effect" are needs that can and should be balanced. B.4 – Stormwater engineers have noted the need for a notched curb cut. Flushed curb would be another method. Table 21.32.070 – The purpose of this standard is to avoid barren parking lots from developments which place all landscape elements in one within the lot.	**Revised code:** B.2--Language has been added to this subsection. referencing requirements of the STN for any raingardens or bioretention installation within parking lot landscape islands B.3--Trees shall be planted within interior landscape areas at a minimum of one tree per four parking stalls and shall be evenly spaced. See illustration below. When combined with rain gardens or bioretention, spacing shall be as detailed in Table 21.32.070 B.4--Permanent curbs or structural barriers/dividers shall enclose planting areas; however, gaps or breaks in the barriers are acceptable at locations where surface water conveyance is desired. When gaps or breaks in the barrier		**X**	**X**

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Redmond Municipal Code (RMC), Redmond Zoning Code (RZC) & Redmond Comprehensive Plan

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
					occur, they shall be spaced no less than 6 feet on center Table 21.32.070 Table Revised to include language associated with on-site stormwater BMPs			
Landscape Standards	**RZC 21.32.080**	Code defines types of plantings for screening open space, and low coverage	**NONE**		**No revisions needed**.			**X**
Design Concepts	**RZC 21.58**	Establishes criteria for building design and review that addresses architectural concepts, building scale, details, materials, colors, blank wall treatment, pedestrian features, and personal safety.	**GAP:** The Design Concepts scorecard does not include LID considerations.		**Revised code**: The Design Concepts scorecard now awards points for "use of stormwater management used as an amenity (e.g. water features, rain gardens, or drainage swales)."	**X**		**X**
Green Building and Incentives Programs	**RZC 21.67**	Section details the Green Building Incentive Program	**GAP:** This program was designed as an incentive to implement LID and Green Storm Infrastructure (GSI). The change in LID requirements necessitates a re-evaluation of this Program.	• The City does not feel it is appropriate incentivize on-site LID stormwater facilities that are required as part of the NPDES permit, in residential areas. These incentives should be removed from this program. • The City wishes to maintain incentives in residential areas for taking non-required LID actions, or taking LID-related to degree that is beyond what is required by City codes.	**Revised code.** • Removed incentives for NPDES required LID actions. • Maintained incentives for taking LID actions beyond what is required by City codes—example: green roofs, retaining more native growth than required by code, etc.	**X**	**X**	**X**
Development Procedures	**RZC 21.76 Decision Criteria**	Section identifies the City's review process and details the authorization that supports this process.	**NONE**:	The section itself does not contain any gaps or barriers, however the City process defined therein does not present a clear path identifying early consideration of LID.	**Revised permitting intake document:** The City intake checklist have been revised to address the need for LID site assessments and identification of the locations for LID on-site stormwater management facilities at the onset of the project development. The City will continue to work to update checklist to improve communication which clarify expectation regarding project submittals.	**X**	**X**	**X**

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Redmond Municipal Code (RMC), Redmond Zoning Code (RZC) & Redmond Comprehensive Plan

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Definitions	**RCP Glossary**	Section defines some of the terms used within the comprehensive plan. Low Impact Development is defined. Green Stormwater Infrastructure is not included within the glossary terms.	**GAP**: Green Stormwater Infrastructure and some GSI facility-types are not defined.	Comprehensive Plan Policies are strongly supportive of LID. The lack of definitions in the Comprehensive Plan does not represent a barrier to the use of LID. It is unlikely that addition of a definition in this document would significantly enhance the use of LID within the City.	**No action required.** The City will identify potential additional definitions that may be helpful in promoting LID as part of the regularly schedule updates of the Comprehensive Plan.	**X**	**X**	**X**
	RZC 21.78 Definitions	Section defines terms applicable to codes and regulations of the Redmond Zoning Code.	**GAP:** This section excludes several definitions pertinent to the application of regulations related to pavement and landscape elements, including those related to stormwater management.	Need to ensure to align definitions found within the STN and the RZC.	**Revised definitions:** • Use the same definition for "impervious surface" found in the Stormwater Technical Notebook. • Added definitions for the terms "bioretention," "rain garden" and "Stormwater Technical Notebook."	**X**	**X**	**X**
Historic Resources	**RCP 3-B**	Section identifies approaches for preservation of historic places.	**NONE**	The codes related to history preservation appear to be flexible enough to address to accommodate LID.	**No action required.**	**X**	**X**	**X**
Stormwater	**RCP 11-D**	Identifies high-level stormwater management policies including the encouragement of natural drainage strategies.	**NONE**	A numerous Comprehensive Plan Policies that strongly support the use of LID practices through all phases of construction.	**No action required.**			**X**
Transportation	**RCP Section 9**	Identifies the City transportation policies including trails, mass transit, bicycling/walking amenities and safety.	**NONE**	The language within the TMP does not represent a barrier to the use of LID. It is unlikely that addition of a definition in this document would significantly enhance the use of LID within the City. The City may consider making minor additions to this sections during regularly schedule updates to the TMP.	**No action needed.**	**n/a**	**n/a**	**n/a**
Urban Centers	**RCP Section 14**	Identifies the City vision for urban centers.	**NONE**		**No action needed.**	**n/a**	**n/a**	**n/a**
Utility Accounts	**RMC 13.17**	• This section details utility billing structure the stormwater utilities. Stormwater service is billed accounting pervious units. Stormwater service accounts shall only be terminated when parcels are returned to "undeveloped" status based on a restoration plan approved by the City.	**NONE**	Billing by impervious unit creates an incentive to reduce impervious areas and thus aligns with LID.	**No action needed.**	**X**		

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts								
Redmond Municipal Code (RMC), Redmond Zoning Code (RZC) & Redmond Comprehensive Plan						Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Topic	**Subsections**	**Summary of Code at time of review**	**Identified Gap or Barrier**	**Considerations**	**Action taken**			
	RMC 13.18	This section defines the stormwater management utility, ownership and responsibilities.	**NONE**	Section 13.18.060 allows for a commercial customer's rate adjustment based for onsite infiltration based on a tiered system that incentivizes on-site stormwater management.	**No action needed.**	**n/a**	**n/a**	**n/a**
	RMC 13.20	This section establishes stormwater connection and capital facilities charges within the City.	**NONE**		**No action needed.**	**n/a**	**n/a**	**n/a**

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6.2 International Fire Code and Redmond Fire Standards

City staff reviewed the *International Fire Code (IFC)* and *Redmond Fire Standards.*

The IFC and Redmond Fire Standards addresses conditions hazardous to life and property from fire or hazardous materials. The documents provide standards for the construction and installation of infrastructure that safeguard public health and safety and establish minimum regulations for fire protection systems and for providing access to sites and buildings for emergency personnel during emergency responses.

The IFC and Redmond Fire Standards include surfacing requirements and facility adjacency requirements which could limit the inclusion of LID techniques. Some of these barriers can be overcome through revisions to pavement types, and those allowances have been made within the documents as noted in the tracking sheet. However, elements that support health and safety to life and property take precedence.

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Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

International Fire Code & Redmond Fire Code Standards

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Fire Truck Access	**IFC 503.1.1**	Fire access roads shall extend to within 150 ft of all portions of facilities.	**BARRIER:** This could result in increased pavement requirements and limit the quantity of green space, open space, & undisturbed soils.	These regulations related to public safety. This requirement is necessary to ensure emergency vehicles to ensure the rapid deployment of emergency response equipment.	**No revisions:** The minimum dimensions of fire access roads are defined to ensure access for fire protection vehicles and associated equipment during emergency responses. These minimum dimensions impact health and safety	**n/a**	**n/a**	**n/a**
Fire Truck Access	**IFC 503.2.1**	Fire access roads shall be a minimum of 20 ft wide.	**BARRIER:** This could result in increased pavement requirements and limit the quantity of green space, open space, & undisturbed soils.	These regulations related to public safety. Sizing requirements are based on the need to maintain the ability for two emergency response vehicles to pass one another.	**No revisions:** The minimum dimensions of fire access roads are defined to ensure access for fire protection vehicles and associated equipment during emergency responses. These minimum dimensions impact health and safety	**n/a**	**n/a**	**n/a**
Fire Truck Access	**IFC 503.2.3**	Fire access roads shall be constructed of paving materials with minimum load requirements.	**GAP:** Specifications are needed to clarify the performance requirements necessary if pervious pavements are used on fire access roads.	This code does not preclude the use of pervious pavement types, if they identify minimum loading requirements and surfaces are maintained in a manner that does not impede emergency response operations. Fire is not opposed to alternative surfaces if they do not interfere with emergency responders' ability to safely address emergency situations.	**No revisions** at this time**.** The City will seek further information from the consultant to determine what the alternatives might be available for fire access, and what has been used in other location. Determine which, if any, alternatives meet the performance criteria.	**n/a**	**n/a**	**n/a**
Fire Truck Access	**IFC 503.2.4**	States that the minimum turning radius for fire access roads shall be "as determined by the fire code official." In the City of Redmond this is 25' minimum inner radius and 45' minimum outer radius.	**BARRIER:** This could result in increased pavement requirements and limit the quantity of green space, open space, & undisturbed soils.	These regulations are about public safety and it's important that minimums are maintained.	**No revisions**: The minimum dimensions of fire access roads are defined to ensure access for fire protection vehicles and associated equipment during emergency responses. These minimum dimensions impact health and human safety	**n/a**	**n/a**	**n/a**
Fire Truck Access	**Redmond FD Stds**	This document advises in how to implement the International Fire Code within the City of Redmond	**NONE:** There are no barriers in this document outside of the those identified in the IFC.		**No revisions**	**n/a**	**n/a**	**n/a**

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6.3 Redmond Clearing, Grading and Stormwater Management Technical Notebook (STN)

City staff reviewed the Redmond Clearing, Grading and Stormwater Management Technical Notebook (STN).

The City of Redmond "STN locally modifies the Washington State Department of Ecology's 2012 Stormwater Management Manual for Western Washington as amended in 2014 (2014 SWMMWW), and defines how the 2014 SWMMWW is to be applied in the City, and provides information and standards specific to stormwater management in the City of Redmond. The STN is intended to assist those who prepare and submit applications and construction documents by providing design requirements and permit processing information in Redmond. The STN and Redmond's Stormwater Management Program applies to all lands within City limits." Chapter 1, STN, January 2017.

The city staff met to discuss areas of the STN that either affected multiple departments or involved different phases of the development process. Issues discussed ranged from terminology, to resource documents, to operations and maintenance. The staff conversations led to the identification of gaps in policy and planning, technical design, standard details and inspection. While some items discussed were not specifically about LID, the open conversations improved staff understanding of how stormwater management impact various aspects of development, implementation and long range function.

A summary of the revisions to the STN is identified in the forward of the STN document and include:

- Adoption of the Ecology 2012 SMMWW as amended in 2014 (2014 SWMMWW)
- Removal of language that identifies LID as alternative method of stormwater management, making those LID provisions an integral and mandatory part of development stormwater control.
- Requirement that LID feasibility assessment be in accordance with the 2014 SWMMWW
- Provide a functional equivalent for pervious pavement
- Require documentation of source control BMPs
- Define limitations for allowance of proprietary stormwater treatment facilities
- Clarify the process by which the Ecology Manual's "competing needs clause" in Minimum Requirement #5 may be applied to projects.

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Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Stormwater Technical Notebook

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Pollution Generating Surfaces (PGS)	**STN 2.1** **STN 2.5.5** **STN 8.7.4.3**	These sections of the STN describe City-specific requirements that vary from Ecology including the application of Minimum Requirement #5 – On-site Stormwater Management and LID within Wellhead Protection Zones. • Infiltration from Pollution Generating Surfaces (PGS) not allowed in Wellhead Protection (WHP) Zones 1 and 2—except for individual single family lots • Infiltration from PGS allowed in WHP Zones 3 and 4 with treatment with permission from a City engineer • On-site Stormwater Treatment and infiltration of stormwater is required to the maximum extent feasible and infiltration from non-PGIS is encouraged in the CARA.	• **BARRIER:** Reduces the ability to use certain Green Stormwater Infrastructure Facilities (GSI) in the CARA (RZC 21.64.050.). • **BARRIER:** In certain situations it may require developers to take additional actions and receive additional permission to use pervious pavements and runoff dispersion in WHP Zones 3 and 4 • **NONE**: Infiltration from non-PGIS is supportive of groundwater recharge and therefore supportive of LID.	• The City's shallow aquifer is vulnerable to infiltrated, polluted runoff in areas where the distance to groundwater is insufficient and there is not enough depth of soil to provide proper treatment. • Ecology added language identifying compliance with the *Federal Clean Drinking Water Act* (FSDWA) as possible "competing need" within the *2012 Stormwater Management Manual for Western Washington, Volume 5, and Chapter 5*. This language allows the City to limit infiltration in the City Critical Aquifer Recharge Areas (WHP Zone 1 and 2). • Infiltration from non-PGIS is supportive of groundwater recharge and therefore also supportive of LID.	**Revised code**: Maintain prohibition of infiltration from PGS in the Critical Aquifer Recharge Areas (WHP Zones 1 and 2), as allowed in Stormwater Management Manual for Western Washington (SWMMWW). Allow and require infiltration from PGS in WHP zones 3 and 4, following requirement and guidance in the SWMMWW. Note changes in the City STN. The City will continue analysis to better understand the potential positive and negative effect of infiltration on Redmond's drinking water aquifer.			**X**
Compost Amended Soils	**STN 8.7.3.4**	Section identifies compost amendments for soils: "Compost amendment of soils shall be in accordance with Redmond Standard Specifications and Details, Section 9.14, for disturbed areas of development that will not be impervious surfaces post construction. Amending soils may be a more viable alternative to preservation of native soils for some sites, and can realize many of the same benefits. "	**GAP:** Clearer language in the standard specifications for compost would improve constructed outcomes.	No revisions are required; this is an improvement not a barrier. Section 9-14 of the Specifications identity that composted materials must meet standards in WAC Chapter 173-350 Section 220.	**No action needed.**			**X**
LID Site Planning Assessments	**STN 2.9.1** **8.7.5**	Required LID site planning assessments for larger projects, and identifies preferred on-site stormwater management	**GAP**: section 8.7.5 only required LID assessment for "large" projects.	New NPDES provisions require assessment for large projects that trigger applicability thresholds in *Appendix 1*.	**Revised code:** Site assessment is now required with all projects, not just large projects. Language revised to read: "<u>All projects that trigger Minimum Requirement #1 are required to submit a Stormwater Site Plan that includes a site assessment. If infiltration and/or dispersion are not feasible options, the applicant shall provide justification to demonstrate why.</u>"			**X**

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Stormwater Technical Notebook

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Development Review Checklists	**STN Appendix D**	The Application Submittal Checklists and the Coordinated Civil Review (CCR) checklists - include LID as a separate reporting in requirements.	**GAP:** Requiring LID as a separate report requirement conveys that LID is an alternative stormwater management methodology.	Review checklists to ensure they align with the NPDES LID requirements.	Revised checklist: require submittal of an LID assessment as detailed in section 8.7.5.			**X**
Definitions	**STN Glossary and Definitions**	The STN contains both a "glossary section" and a "definition section." *Section 2.3, Definitions* defines terms used in NPDES permit's *Appendix 1*. The glossary defines terms throughout as used in the STN.	**GAP:** Some terms found in the definition section and not found in the glossary. This may create confusion or alter a STN user's interpretation of a SW requirement.		**Revised definition:** Revised to state that all definitions related to minimum requirements are included in Vol 1 of the SMMMWW and section 2.3 has been revised to read: 2.3 Definitions <u>related to minimum requirements have been adopted and not modified by the City as required by the NPDES permit. Those definitions can be found in the glossary of Volume I of the SWMMWW</u>	**X**	**X**	**X**
Horizontal Clearance and Crossing Angle	**STN 8.4.4**	A minimum horizontal clearance of 5 ft. is required between underground utilities (example: storm drain and gas main). Horizontal separation from open channel such as bioretention cells and swales must be 10 ft.	**NONE**	Determined this was not an issue: this should not preclude the installation of all types of LID facilities within in the right of way.	**No action needed.**			**X**
Setbacks	**STN APPENDIX D, pg. 12 of 14**	A checklist in the STN requires infiltration facilities to be at least 100 ft. up slope of building foundations.	**BARRIER:** The required distance (setback) of infiltration facilities will impair the installation of certain GSI techniques at sites where space is limited.		**Revised code:** requirement in section 8.6.11 to require setbacks of 10 feet from the property line.			**X**
Trees	**STN 8.4.11**	"Trees shall not be located within 8 ft. horizontally from storm drain pipe unless root barriers are provided or with approval by a City SW Engineer".	**BARRIER:** This requirement may reduce tree retention and may inhibit the installation of trees, particularly along planting strips where space is limited.		Revised code: Section and Language revised: 8.4.10 "Trees shall not be located within 8 feet horizontally from storm drain pipe unless root barriers are provided as approved by the Stormwater Engineer. With root barriers, trees may be no closer than 3 feet to pipes unless approved by the stormwater engineer."		**X**	

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Stormwater Technical Notebook

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Bioretention Underdrains	**STN 8.4.13**	Identifies a WSDOT pipe specification that must be used for underdrains (WSDOT Standard Specification 9-05.2(6)).	**GAP:** This WSDOT is not preferred type of underdrain for bioretention facilities.		**Revised code:** Added a reference to the slotted pipe specification, WSDOT 9-05.2(**9**) within the City's *Bioretention Standard Detail (SD 655)*.			**X**
Drainage Requirements	**STN 8.6.4**	The Section identifies drainage connections for single family lots, including conveyance requirements and reference to the feasibility of infiltration	**GAP:** The language aligned with past requirements and needs revision to reflect new NPDES LID requirements.		**Revised code:** The language of the section has been revised to simplify drainage requirement and referenced in the appropriate chapters in other parts of the STN.			**X**
Single Family Roof and Foundation Drain Requirements	**STN 8.6.4**	"Roof drain/foundation drain connection from the house …shall be extended to a storm drain structure (not connected directly to a stormwater pipe)."	**GAP:** There is alternative guidance for dispersion. It is included not in this section, but in a flow chart elsewhere in the notebook.	Include the reference to the alternative guidance (the flow chart) that allow dispersion/infiltration into this subsection of the STN—or else move that guidance to this section.	**Revised code:** The language of the Section STN 8.4.6 has been revised to include the following: "These requirements shall also be coordinated with the requirements of Section 2.5.5 that addresses roof runoff dispersion and infiltration"			**X**
Pervious Pavement	**STN 2.9.3.5**	Allows the use of permeable pavements subject to approval by the City's Technical Committee.	**BARRIER:** Requiring the additional approval is a barrier to the use of pervious pavements.	Ecology allows permittees to allow functionally equivalent on-site LID facilities with proper technical investigation.	**Revised code:** Section 8.7.10 now allows for the use of pervious pavement or a Pervious Pavement Functional Equivalent subject the modeling which details that facility design provides the same degree of infiltration as pervious pavements.	**X**		**X**
LID Facility Inspection and Maintenance	**STN 8.7.6**	Details Maintenance requirements for LID facilities.	**GAP:** This provision lacks clear guidance on several LID maintenance related issues such as access and placement of site so that they can be routinely inspected.		**Revised code**: Section 8.7.6 address these issues by clarifying that: a) maintenance of LID in the right of way is a City responsibility, b) requiring easements that allow City staff with access to the LID facilities, c) requiring that property titles clearly detail maintenance responsibilities, and d) clarifying that the City is responsible for maintenance of LID facilities build as part of City's capital project.			**X**

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6.4 City of Redmond Transportation Master Plan 2014

The *Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts – Transportation Master Plan* includes the review and revisions associated with the City of Redmond Transportation Master Plan (TMP).

The TMP identifies the overall City vision for transportation development and is guided by four fundamental principles: safety, maintenance, environmental stewardship and economic vitality and five development strategies: prepare for light rail, ensure strong support for urban centers, improve travel choices and mobility, increase neighborhood connections, and enhance freight mobility. The TMP also includes a set of performance and monitoring metrics that demonstrate what progress is being made toward desired outcomes.

The TMP was generally supportive of the LID integration. The document promotes a reduced carbon footprint by promoting car sharing, carpooling, and public transit.

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Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts								
City of Redmond Transportation Master Plan						Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Topic	**Subsections**	**Summary of Code at time of review**	**Identified Gap or Barrier**	**Considerations**	**Action taken**			
Pavement Maintenance	**TMP Page 128**	The policy identifies minimum maintenance standards for pavement safety through a targeted index score (0-100) with 70 being the lowest allowable score.	**NONE**	This policy is associated with transportation and impacts to the transportation system. This pavement maintenance index is a standard and aligns with the policies of transportation systems. Maintenance associated with the infiltration function of these systems should be included in stormwater documentation, not the transportation documentation.	**No action required.**	**n/a**	**n/a**	**n/a**
Sidewalk Maintenance	**TMP Page 130**	The policy identifies minimum maintenance standards for pavement safety through a targeted index score (0-100) with 70 being the lowest allowable score.	**NONE**	This policy is associated with transportation and impacts to the transportation system. This pavement maintenance index is a standard and aligns with the policies of transportation systems. Maintenance associated with the infiltration function of these systems	**No action required.**	**n/a**	**n/a**	**n/a**

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6.5 City of Redmond Standard Specifications and Details

City staff reviewed the *City of Redmond Standard Specifications and Details*.

The Standard Details govern design and construction of infrastructure within the public right of way, private streets, driveways, parking lots, commercial developments, industrial developments and residential construction. These standards include but are not limited to the placement of utilities, the types and depths of pavements and subbase, the location of striping and signage.

In anticipation of the LID Integration Process, revisions to the Standard Details were incorporated during the 2014 and 2015 Standard Details updates. During those update periods the City added the following LID-related details:

- 632 Soil Amendment and Depth
- 643 Permeable Pavement Section
- 646 Pervious Concrete Sidewalk
- 647 Permeable Pavement on Slopes
- 650 Roof Rain Harvesting
- 655 Bioretention Facility
- 657 Bioretention Plant Palette
- 659 Bioretention Curb Cut Extension
- 661 Bioretention Check Dam
- 663 Bioretention In-line Curb Cut
- 665 Bioretention Side Curb Cut
- 667 Bioretention Outlet Structure
- 669 Bioretention Clean-out
- 671 Bioretention Hydrant Access
- 673 Perforated Pipe Connection

During the LID Integration Process, some additional gaps and barriers were noted and identified to be addressed during the 2017 Standard Details update process. The City made several revisions to the standard plans to reduce these gaps and barriers. Examples include:

- Creating a standard plan which provides a functional equivalent for sidewalk infiltration where pervious pavement is infeasible
- Addressing maintenance within the paving language of the standard specifications

In the upcoming year, the City will be working with staff to create additional details including a proposed green street standard plan and a proposed paver detail for the urban centers.

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Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Standard Details and Specifications

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Pavement Repair	**SD 302A** **SD 647**	SD 302A: Details pavement repair for conventional roadway pavements. SD 647: Details installation requirements for pervious pavements.	GAP: Neither detail provides guidance on pavement repair for pervious pavements.		**Revised specifications**: Pavement repair has been addressed in the language of the City of Redmond Standard Specifications Section 5-03 and identifies the threshold for when a pavement must be repaired in-kind. 5-03 Repairs of asphalt and concrete permeable pavements less than 60 square feet shall be made with standard materials, i.e. the repairs will result in impervious pavement. Repairs over 60 square feet shall be install in-kind, i.e. with porous pavement materials.	X		
Typical Roadway Section	**SD 301**	Detail shows the typical paving section for Redmond roadways.	GAP: The detail references only subbase material for conventional pavement systems.	Staff discussed the need to create a LID development road section to be used to meet feasibility criteria with the Stormwater Management Manual for Western Washington (SWMMWW).	**Revision scheduled for 2018:** The need for a Green Street Standard has been identified. In 2017, the City will work with developers to ensure that LID principles and BMPS are being installed as part of new development. This this process will provide additional information to the City to make suitable recommendations for developing a standard plan. The City will publish a Green Street Standard Detail during the 2018 Standard Details update.			X
Downtown Pedestrian Pavement Installation Details	**SD 303B**	Detail includes information relating to the geometry and appearance of downtown sidewalks including the requirement that downtown walks be scored.	GAP: Requiring scoring of pervious pavements can be a barrier. They are not easy to sawcut because of the more open graded aggregate network and reduced fines.	It's hard to sawcut pervious concrete. But scoring could be done while the concrete was still wet, before curing. This would require a revision to the detail.	**No revision**: Pervious concrete pavement sidewalks will not be used in the downtown urban center. To promote infiltration of sidewalk run-off a functional equivalent has been included as a standard detail in the 2017 update (to be published in April 2017). The standard detail is identified as "Pervious Pavement Alternative Design"			X
	SD 303C	Details the installation of ceramic pavers in Downtown Redmond.	GAP: Currently requires the use of ceramic pavers exclusively.	Removing the restriction that paver be ceramic creates a good standard detail that can be used for a wider array of pavers that can be used to create pervious hard scape surfaces.	**No revision:** The standard plan will remain in the Redmond Standard Details. During the 2018 update, an additional detail will be added for non-ceramic pavers to be used.	X		

Decision Tracking Sheets for All Items Identified by Staff Subject Area Experts

Standard Details and Specifications

Topic	Subsections	Summary of Code at time of review	Identified Gap or Barrier	Considerations	Action taken	Measure to minimize Impervious surface	Measure to minimize loss of vegetation	Measure to Minimize Stormwater Runoff
Permeable Pavements	**SD 643 Permeable Pavement Section**	Detail provides typical section depths and materials for permeable pavements. The detail requires approval by the City Stormwater Engineer for installation of pervious pavement in the public right of way.	BARRIER: Engineer's approval is an extra condition placed on the installation of LID techniques may be mandated in some circumstances, to meet on-site Stormwater management requirements in Appendix *1* of the NPDES Permit.		Revised detail: The requirement for approval by the Engineer has been removed from the Standard Plan 643.	**X**		
Roadway	**DG03 Sight Distance Triangle**	Detail identifies geometry/lengths for sight distance triangles within roadway intersections.	None	Bioretention is allowed in these locations. Requirements to plant shrubs no taller than 18-inches does not prohibit the installation of bioretention.	No revisions needed.			**X**

7. Continuing to Promote and Support LID in the City of Redmond

The City has, and will continue to promote and support the integration and implementation of LID.

- The City will conduct further analysis concerning how to integrate on-site stormwater management within Redmond's dense urban areas.
- The City will continue to coordinate with stakeholder groups to capture questions, opportunities and needs to ensure successful implementation of LID within the City.
- The City's 2016 budget process resulted in the creation of two new full-time positions to support LID within the City:
    - An LID development review engineer who will work on programmatic and logistical elements within the City's project review process support LID integration, and to review application of LID actions at new and redeveloped construction projects, and
    - An additional construction inspector who will help address the additional private construction site inspection work-load issues that will be generated as result of the newly adopted LID requirements.

All documents referenced within this report and associated can be found at the www.Redmond.gov.

City of Redmond

NPDES Annual Report Covering 2016

Attachment 9:

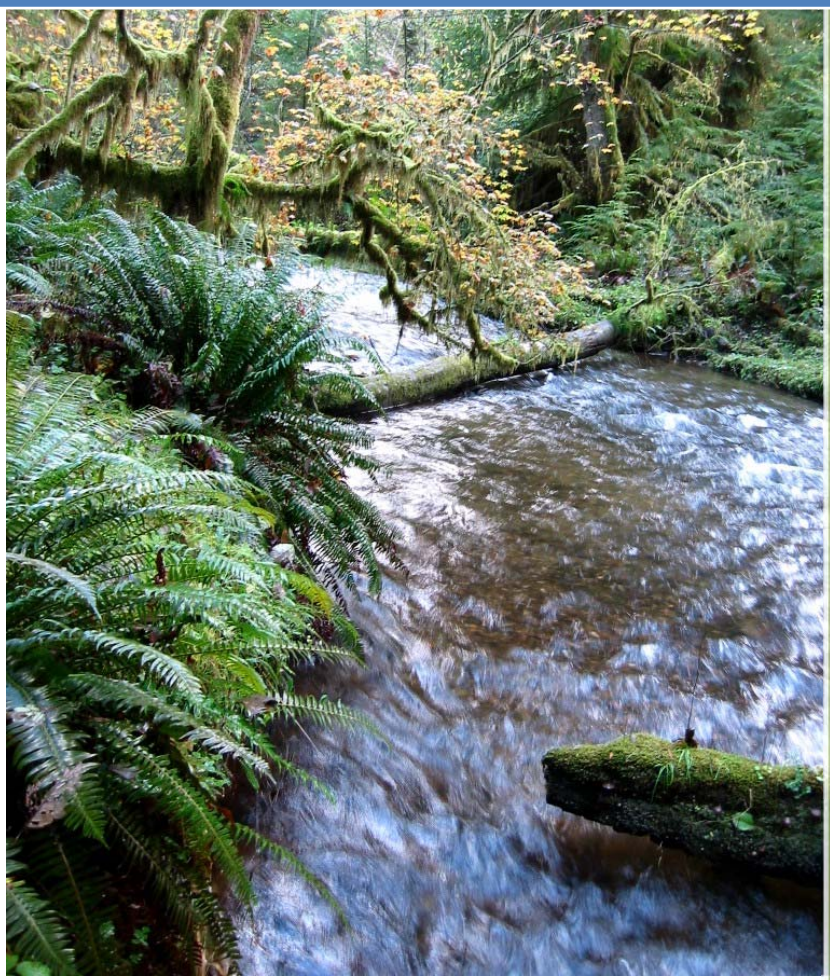
Status and Trend Monitoring Report

(Note: This version of the Monitoring Report does not contain a Report Appendices,do to their substantial length. A version of the report with the appendices is available by contacting the City of Redmond NPDES Coordinator, 425-556-2822.)

CityofRedmond
WASHINGTON

2016

Stream Monitoring Report



Tanya L. MacFarlane

Surface Water Quality Technician

3/16/2016

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2016 CITY OF REDMOND STREAM MONITORING REPORT

INTRO

The City of Redmond in 2014 chose option 2 for compliance with the 2013-2018 NPDES Permit.

SITE CONFIRMATION

The City of Redmond initially conducted a desktop evaluation of all sites provided by Washington State Department of Ecology (Ecology). The table of sites was downloaded and sorted for Redmond and then by "ORDER" number. The result produced 20 sites within the City of Redmond city limits. Each of the sites' coordinates were then brought into Redmond's GIS layer and spatially located.

Several sites were not suitable without doing a field visit. Site 798 is located in the Sammamish River. Site 874 is located in/on a building without a stream within 0.5 miles. Site 886 is located in a tributary that does not flow 4-6 months out of the year. Sites 900 and 977 are located in the midline of Lake Sammamish.

Next, a GIS layer was added to the map with all the sites that Redmond has historically sampled and compared locations. Sites 41, 58, 221, 419, 512, 626, 656, 736, and 784 had been monitored for continuous temperature, monthly water quality and/or benthos at a location within 300 meters.

In April 2014, all sites, except 798, 874, 886, 900 and 977 were field verified. Three sites were difficult to determine; therefore, on June 25, 2014 Brandi Lubliner and Anne Dettlebach from Ecology, toured sites 459, 512, and 886. They determined that site 512 remains a "maybe" but sites 459 and 886 were not samplable due to flow. The results of the desktop and field evaluations are presented in Table 1. In summary, the list included 7 sites that were to be sampled beginning October 1, 2014. The final 7 sites are listed in Table 2 with the initial and final GPS coordinates.

Table 1: Original City of Redmond Sites, Locations, and Notes about Each Location.

ORDER	LON_DD	LAT_DD	Sample Yes/No	WRIA	Subwater-shed Name	NHD GNIS	Notes	LandType/Owner	Redmond Location
41	-122.091069	47.68306	No	8	Bear Creek	Bear Creek	Not wadable, too deep, too swift	Friendly Village developed open space	Bear Creek at Friendly Village
58	-122.089474	47.687881	No	8	Bear Creek	Bear Creek	Not wadable, too deep, too swift, 50 m from site 784	Elm Court, developed open space	Bear Creek at Novelty Hill
158	~~-122.142431~~ -122.141	~~47.683244~~ 47.683	Yes	8	Bear Creek-Sammamish River	Peters Creek	Move site downstream 73m	Arena Sports (no access) Seneca (NGPE) City of Redmond, Wallace (NPGE), developed medium intensity	Peter's at Arena Sports, via Seneca, walk upstream
221	-122.093184	47.679188	No	8	Bear Creek	Bear Creek	Not wadable, too deep, too swift, bottom is muddy, access is challenging	WASHDOT CB Richard Ellis NGPE , herbaceous	Bear Creek at Evans Confluence
419	-122.091832	47.678924	No	8	Bear Creek	Evans Creek	Not wadable, too deep, too swift, channel incised	WASHDOT CB Richard Ellis NGPE, hay/ pasture	Evans upstream of Bear Confluence
459	-122.113141	47.6999	No	8	Bear Creek-Sammamish River		Channel braided and dry as of June 2014. Headwater channel-multiple joining channels	City of Redmond, developed low intensity	Headwaters of High School Creek
512	-122.117131	47.667758	Maybe	8	Bear Creek	Bear	Not wadeable, too deep, too	City of Redmond,	Mouth of Bear Creek

ORDER	LON_DD	LAT_DD	Sample Yes/No	WRIA	Subwater-shed Name	NHD GNIS	Notes	LandType/Owner	Redmond Location
						Creek	swift. Under Construction. Completion date approx. 9/14	developed open space	
626	-122.098486	47.677608	Yes	8	Bear Creek	Bear Creek	Not wadable in high flow. Bridge sampling/ for estimated flow use King County gage installed at Union Hill Road and Bear Creek. Bridge removal expected within 2 years	Swedish NGPE, shrub/scrub, replanted buffer in 2010, developed open space	Behind Swedish Medical Center
656	-122.125271	47.710295	Yes	8	Bear Creek-Sammamish River		Rechannelization completed in 2013	Greystone, NGPE plat not finale developed open space	High School Creek upstream of NE 124th
657	-122.091099	47.702746	No	8	Bear Creek	Bear Creek	Not wadable, too deep, too swift, not safe, access issues	M&M Autobody not friendly, not working with us, developed medium intensity	Up and downstream is out of Redmond City limits
736	~~-122.1450~~ 122.142	~~47.688406~~ 47.688	Yes	8	Bear Creek-Sammamish River	Willows Creek	Move location to nearest stream 270 m to the southeast	PSE Easement, developed medium intensity	Willows Creek at Overlake Church
753	-122.151274	47.683061	No	8	Bear Creek-Sammamish River	Willows Creek	Not accessible, not unidirectional flow, no defined right and left bank, change of land use and greater than 25% increase in flows downstream	Emergent herbaceous wetlands PSE transmission lines, easement	Willows Creek at PSE property
784	-122.089709	47.688351	No	8	Bear Creek	Bear Creek	Not wadable, too deep, too swift, not safe, 50 m from site 58	Elm Court, developed open Space	Bear Creek and Novelty Hill Road

ORDER	LON_DD	LAT_DD	Sample Yes/No	WRIA	Subwater-shed Name	NHD GNIS	Notes	LandType/Owner	Redmond Location
798	-122.114555	47.65697	No	8	Bear Creek-Sammamish River	Sammamish River	Not wadable, in Sammamish River	Park/Non Wilderness, developed open space	Sammamish River at Marymoor Park
814	~~-122.159812~~ -122.157	~~47.686714~~ 47.686	Yes	8	Bear Creek-Sammamish River		Move site downstream 270m, site is not located on a stream	PSE Transmission lines, easement, developed open space	Gun Club
874	-122.139456	47.651246	No	8	Bear Creek-Sammamish River		There is not a stream within 0.5 mile	Nintendo of America, developed high intensity	Nintendo Property, on the green roof
885	-122.157503	47.681774	Yes	8	Bear Creek-Sammamish River	Willows Creek	Channel is braided but have collected benthos in past years	Deciduous forest, Redmond City Park and Maple Brook Lane Homeowners Association	Willows Headwaters
886	-122.12775	47.710834	No	8	Bear Creek-Sammamish River		Site dry 4-6 months per year	City of Redmond	Kensington Estates Rehabilitation Project in 2010
900	-122.083631	47.635625	No	8	Lake Sammamish-Sammamish River		Not a qualifying stream. Site is in a lake.		Sammamish River
977	-122.080264	47.632008	No	8	Lake Sammamish-Sammamish River		Not a qualifying stream. Site is in a lake.		Sammamish River

Table 2: Final City of Redmond Site List

EIM_Location_ID	Field Site ID	Latitude	Longitude	Stream Name	STRAH_ORD	New Latitude	New Longitude	Feet from Original	Basin SQ. Miles
RSM06600-050295	158-WUGA	47.683	-122.141	Peters	1	47.683159	-122.142	142	1.50
RSM06600-165607	512-WUGA	47.66776	-122.117	Bear Creek	3	47.668001	-122.117	89	49.91
RSM06600-193111	626-WUGA	47.67761	-122.098	Bear Creek	3	47.677582	-122.098	38	48.53
RSM06600-209463	656-WUGA	47.7103	-122.125	High School	1	47.710185	-122.125	40	0.59
RSM06600-220119	736-WUGA	47.688	-122.142	Willows at Church	1	47.68798	-122.142	16	0.44
RSM06600-256359	814-WUGA	47.686	-122.157	Gun Club	1	47.685769	-122.153	1070	0.20
RSM06600-275671	885-WUGA	47.68177	-122.158	Willows headwaters	1	47.681815	-122.154	784	0.33

ANCILLARY SITE INFORMATION

(Taken directly from the 2013 City of Redmond Citywide Watershed Management Plan-Prepared for the City of Redmond, Public Works Department, by Herrera Environmental Consultants, Inc.)

PETERS CREEK

Peters Creek is located in the west-central portion of the City. It enters the left bank of the Sammamish River north of 90th Street. The "west branch" tributary joins the main stem just upstream of NE 87th Street. The upstream portion of the left bank tributary has its headwaters in Grass Lawn Community Park. The entire stream length (21,325 linear feet) is located within the City, and 12,250 linear feet is designated as a Class II stream. An average of 1.9 stormwater outfalls can be found per 1,000 feet along the creek.

The Peters Creek watershed is 1,045 acres (1,007 acres of which is located in the City). The watershed is highly developed with predominantly single-family dwellings. Land cover is predominantly landscaped yards.

A high-flow bypass structure is located on the main stem of Peters Creek at Old Redmond Road. This drainage structure is designed to bypass flows greater than the 2-year recurrence interval to a separate storm drainage conveyance system that drains directly to the Sammamish River. The intended purpose of this bypass feature is to reduce stream bank erosion caused by high flows in Peters Creek main stem, while maintaining base flows (City of Redmond 2008). This bypass structure generally functions as intended. The City has constructed a variety of other enhancements in the watershed including fish passable weirs at the mouth of Peters Creek, replaced multiple culverts, stabilized channel segments and rehabilitated riparian buffers in several locations. However, there are still many portions of Peters Creek that need rehabilitation.

In general, water quality in Peters Creek is compromised due to the high level of development in the watershed. Ecology included the left bank tributary of Peters Creek from the confluence with the main stem upstream to Redmond Way on the 2008 Section 303(d) list as a Category 5 waterbody due to impairment from low dissolved oxygen concentrations, high temperature, and high fecal coliform bacteria concentrations (Ecology 2008c). The median B-IBI score for Peters Creek based on data collected by the City as part of the Annual Benthic Monitoring study (2002 through 2010) is 20, indicating poor conditions (PSSB 2011).

Riparian habitat on Peters Creek is fair, and is composed of primarily deciduous species and some coniferous species. Riparian habitat is the highest quality in the ravines in the upper portion of the watershed, but is impacted by roads and development in the lower portion of the watershed (Washington Trout 2005). There is a high level of encroachment (19 percent) into the 30-foot riparian buffer.

There are 10 full barriers to fish passage and 6 other partial barriers throughout the watershed. However, surveys by Washington Trout indicated significant salmonid use. These surveys indicate there are many more fish using Peters Creek than was previously documented (Washington Trout 2005).

BEAR CREEK

Bear Creek is entirely a lowland stream system, originating in a large area of forests and wetlands in south Snohomish County and north King County. The Bear Creek watershed represents one of the most important salmonid bearing system in the entire Sammamish River watershed. The Bear Creek watershed covers approximately 32,100 acres (50 square miles). Bear Creek is a right bank tributary of the Sammamish River. With the headwaters located in protected land, Upper Bear Creek has a relatively high level of watershed function resulting from a low impervious surface percentage, few street crossings, and a high level of forest cover and riparian forest.

Lower Bear Creek has a moderate level of watershed function, due primarily to higher impervious surface percentage and consequent stormwater impacts, from both poorer water quality and inadequate flow control.

Land use in the Bear Creek drainage area within the city limits is highly urbanized with 26 percent of the land used for commercial development. Open space (primarily agriculture) makes up 15 percent of the land use.

A portion of Bear Creek is listed as a Category 4A waterbody for high fecal coliform bacteria concentrations, high temperature, and low dissolved oxygen concentrations (Ecology 2008c). As described in *Chapter 2: Regulatory Drivers*, this category means that a characteristic use is impaired by these pollutants; however, TMDL studies (Ecology 2008a, 2008b) and a water quality implementation plan (Ecology 2011b) addressing these sources of impairment has already been developed and approved by the USEPA.

The headwaters of Bear Creek have wide riparian buffers; however, in the lower reaches there is much less forested riparian buffer (LWCS/WRIA8 2005). In many reaches, woody vegetation has been totally cleared right up to the stream edge and development has occurred within the

regulatory buffer (Kerwin 2001). Pursuant to the City's SMP, buffers of 150 feet are required on either side of Bear Creek west of Avondale Road, and an additional 50-foot outer buffer is required east of Avondale Road.

WILLOWS CREEK

Willows Creek is located in the west-central portion of the City, entering the left bank of the Sammamish River north of 95th Street. Willows Creek runs west to east with about a third of its watershed represented by three headwater tributaries that combine at the upper end of a large central wetland. Steep slopes occur along the edge of the plateau at the upper end of the undeveloped central portion of the watershed. Nearly all of the system is piped above the valley walls. It appears that in the past a major tributary joined the main stem of the creek on the left bank near Willows Road. This tributary is currently isolated from the rest of the system, but it may be possible to realign the channel to combine the flows in the future. While the tributary is highly degraded in its lowest reaches, the valley wall reaches generally have broad forested buffers, and fair quality instream habitat. The total stream length is 13,040 linear feet, all of which is located within the City limits and 9,835 linear feet of which is designated as a Class II stream. An average of 1.1 stormwater outfalls can be found per 1,000 feet along the creek.

In the 463-acre watershed for Willows Creek, the dominant land uses are single-family residential and parks and undeveloped land. The watershed includes a Puget Sound Energy power line right-of-way, a generally grassy corridor that also includes the Puget Powerline Trail. Several of the headwater tributaries are located in large protected open space areas upstream of Willows Creek Business Park. Land cover in the watershed is dominated by forest and landscaped areas.

A left bank tributary of Willows Creek is listed on the 2008 Section 303(d) list as a Category 5 waterbody for low dissolved oxygen and high fecal coliform bacteria (Ecology 2008c). Willows Creek is also listed as Category 2 waterbody for temperature. However, the mapping for this tributary is inaccurate; the tributary, known as Gun Club Tributary, does not connect with Willows Creek. The Gun Club Tributary is a Class III stream with wooded buffers. All indicators show that the hydrology supporting the Gun Club Tributary is relatively stable. The median B-IBI score for Willows Creek based on data collected by the City as part of the Annual Benthic Monitoring study (2002 through 2010) is 22, indicating poor conditions (PSSB 2011). Riparian conditions are generally poor in the lower reach, with inadequate tree and shrub cover due to Puget Sound Energy's policy of preventing tree establishment under their power

lines. A relatively high level (17 percent) of development is encroaching into the 30-foot stream buffer. In the upper reach, most of the riparian zone is protected in large NGPEs, large tracts, or utility corridor open space.

There are 14 partial fish passage barriers on the middle reach, and one complete barrier at the power line culvert near the headwaters, approximately 5,500 feet upstream of the mouth (Washington Trout 2005). Significant salmonid use has been observed on the main stem (Washington Trout 2005). A few pairs of Coho salmon have been regularly observed spawning in Willows Creek.

HIGH SCHOOL CREEK

High School Creek is a right bank tributary of the Sammamish River that is located in the northern portion of the City. A major portion of the upper watershed is located in the City, while the other main tributary as well as the valley portion is located in unincorporated King County. The stream length within the City is 14,650 feet, 8,505 feet of which is designated as a Class II stream. A left bank tributary, Kensington Tributary enters High School Creek near Redmond Woodinville Road.

A King County channel relocation project was recently completed on the downstream reach of this tributary, including a culvert replacement under NE 124th Street and rehabilitation of an adjacent wetland. Upstream of the relocation project, the tributary flows through wetlands in a narrow ravine. The main stem of High School Creek flows through a future development project with a short, highly degraded section of the stream. Upstream of this impacted reach, the stream enters a densely forested ravine with a thick understory. There is a 4-acre manmade pond at the headwaters of High School Creek.

The High School Creek watershed is approximately 1,686 acres, of which 635 acres are located in the City. Land use in the City portion of the watershed is predominantly single family residences, which are characterized by large lots that transition to more dense development. While land cover is mostly landscaping, there are significant areas of established forest buffering the streams along steep ravines. Twenty-seven percent of the watershed within the City is considered EIS.

The riparian buffer is in good condition in the channel relocation reach in the valley. The adjacent rehabilitated wetland provides additional buffer. Further upstream, the steep ravine provides a relatively wide riparian buffer of mostly deciduous trees and wetlands with invasive plant species. Near 167th Place NE, the valley becomes less confined and residential development begins to infringe on the riparian buffer (Washington Trout 2005).

There are eight fish passage barriers on High School Creek including seven partial barriers and two complete barriers. One complete barrier (a perched culvert) south of NE 116th Street has been replaced with a fish passable culvert. There are additional downstream barriers outside of the city limits. Significant salmonid use has been observed in High School Creek based on Washington Trout surveys (Washington Trout 2005). There are anecdotal reports of Coho salmon using the lowest reach and documented cutthroat trout in the reach through the ravine (Washington Trout 2005).

High School Creek has multiple channels with older uncontrolled development contributing runoff to the upper reaches. The upper watershed is mostly developed with low density residential, some of which is under development pressure in the near future. High School Creek also has intact wetlands and forested buffers.

Table 3. Summary of Existing Watershed, Fish Use, and Water Quality Conditions for Class II Streams.

	Peters	Willows	High School	High School	Idylwood	Mackey
Land Cover						
% Forest [a]	9%	28%	20%	20%	16%	90%
% Pasture [b]	1%	14%	10%	10%	1%	9%
% Landscape [c]	48%	32%	43%	43%	51%	1%
%Effective Impervious Surface [d]	42%	26%	27%	27%	32%	0%
Land Use [e]						
% Commercial	5%	15%	11%	11%	2%	0%
% Industrial	8%	8%	0%	0%	0%	0%
% Roads [f]	17%	6%	14%	14%	20%	0%
% Single-Family Residential [g]	46%	36%	62%	62%	59%	0%
% Multifamily Residential [h]	15%	0%	0%	0%	1%	0%
% Parks and undeveloped land [i]	8%	35%	12%	12%	19%	100%
Physical Parameters						
Watershed Area (Acres inside City Limits) [j]	1,007	453	635	635	152	172
Total Watershed Area (Acres inside and outside of City Limits) [k]	1,045	453	1,686	1,686	426	1,138
Total Stream Length In City (feet) [l]	21,325	13,040	14,650	14,650	4,330	10,230
Class II Stream Length In City (feet) [l]	12,250	9,835	8,505	8,505	3,920	4,920
Total Stream Length (feet) [m]	21,325	13,040	34,346	34,346	8,067	27,040
Class II Stream Length (feet) [m]	12,250	9,835	23,763	23,763	4,732	17,897
Fish Use						
Significant Salmonid Use (y/n) [n]	No	No	Yes	Yes	No	Yes
Chinook Salmon (Washington Trout 2004 and 2005)	No	No	No	No	No	NS
Coho Use (Washington Trout 2004 and 2005)	Yes	Yes	No	No	No	NS
Other Salmonid Use (Observed by Redmond Staff)	Yes	Yes	Yes	Yes	Yes	Yes
Habitat						
Large Woody Debris / 100 LF [o]	3.6	3.8	4.4	4.4	9.2	15
Tree Canopy % Cover in Buffers [p]	57	59	67	67	56	82
300-foot Buffer % Vegetated [q]	27%	53%	57%	57%	15%	84%
100-foot Buffer % Vegetated [q]	55%	69%	78%	78%	46%	89%

a Forested areas were delineated using aerial photography by NHC (2006), and updated based on 2010 aerials by City of Redmond.
b Pasture areas were delineated using aerial photography by NHC (2006), and updated based on 2010 aerials by City of Redmond.
c Landscape is the area in developed watersheds that is not effective impervious. Developed areas (all areas not pasture or forest) were identified as effective impervious or landscaped based on literature values for each land use.
d Effective Impervious is the area in developed watersheds that is impervious and directly connected to the storm drain system. Developed areas (all areas not pasture or forest) were identified as effective impervious or landscaped based on literature values for each land use.
e Land use designations are parcel based and calculated by summing different land use types into the categories presented from a maintained City of Redmond Land Use GIS database. Function and structure code combinations were used for each land use type.
f Roads include the right-of-way parcel, private, and public roads.
g Single-family is further differentiated by development density. To determine the split between effective impervious and landscape, four categories of single-family were developed based on parcel size.
h Multifamily includes condos and apartments. Commercial first story with dwelling units above are included in commercial area calculation.
i Undeveloped land includes areas that are forest and pasture as well as other areas that are not developed.
j Includes stormwater conveyance and topographic based watershed.
k Total acres of stream area in and outside city limits. King County data was used outside city limits.
l Limited to the city limits.
m Not limited to the city limits; includes streams in other jurisdictions.
n Observed significant salmonid use is greater than 50 fish per 100 linear feet of channel, taken from Washington Trout stream surveys (2004 and 2005) and Redmond staff observations.
o Large Woody Debris - wood at least 10 inches in diameter and 10 feet long, in or over bankful channel counted by field crews. Weighted average of LWD density over walked channel length.
p Tree canopy including trees a minimum 10-foot diameter canopy within regulatory buffers (for open channel stream reaches within the city limits). Digitized from 2007 aerial photos.
q Higher values –equate to more vegetation. All vegetation excluding landscaped and mowed or plowed land is included - trees, shrubs, and unmowed grasses. Limited to city limits.

TABLE 4. PERCENTAGE OF LAND USE UPSTREAM OF SAMPLE SITE DRAINING TO BASIN.

Data was obtained by USGS land cover data overlaid with King County zoning and City of Redmond data layers.

	736_WUGA	512_WUGA	885_WUGA	158_WUGA	814_WUGA	626_WUGA	656_WUGA
1-2 Res	27%	21%	37%	47%	43%	21%	36%
3-4 Res	10%	4%	13%	18%	7%	4%	23%
5> Res	3%	0%	4%	1%	0%	0%	1%
Agriculture	0%	1%	0%	0%	0%	1%	0%
Commercial	3%	2%	1%	11%	0%	1%	0%
Forest	48%	70%	45%	18%	49%	72%	40%
Industrial	8%	1%	0%	5%	0%	0%	0%
Water	0%	0%	0%	0%	0%	0%	0%

WATER QUALITY MONITORING

Redmond conducted monthly water quality grab sampling at each of the 7 sites from October 2014 through September 2015. Dates, times and results are listed in the Water Quality Index Spreadsheets shown below. Each site was monitored in situ for temperature, pH, conductivity and dissolved oxygen. Grab samples were also collected and sent to AmTest Analytical in Kirkland (fecal coliforms only) and to Manchester Environmental Laboratory (MEL). Analysis of monthly grab sampling by MEL included total phosphorus, ortho-phosphate, turbidity, total suspended solids, chloride, hardness, ammonia, total nitrogen and nitrate-nitrite-N.

Peters Creek, Site 158 has a WQI score of 58. The primary reasons for the low score are high fecals in February, and May through September. High phosphorus levels also contributed to a low score.

Willows Creek, Site 736 has a WQI score of 62. High temperatures and low dissolved oxygen in July and August affected the score. Additionally, high fecal coliforms in July, August and September lowered the score.

Willows Creek near the headwaters, Site 885, has a WQI score of 49. February had a fecal coliform sample of 530 cfu's and July's sample had a fecal coliform sample of 300 cfu's, well above the geometric mean of 50 cfu's. Total nitrogen and total phosphorus tends to be high in this reach.

High School Creek, Site 656, has a WQI score of 51. Low phosphorus, high fecal coliform hits in several months and some high TSS samples contributed to the low score.

Gun Club, Site 814 scored 42 on the WQI. Fecal coliforms were high in February (390 cfu's), May (2600 cfu's), June (480 cfu's), July (840 cfu's), August (410 cfu's) and September (110 cfu's). TSS and nitrogen are also factors contributing to the low WQI.

Bear at the mouth, Site 512, scored a 42 WQI and suffered from high fecals (610 in February and 920 in July), high nitrogen and elevated temperatures particularly in June with 18.4 C, July with 20.2 C and September with 16.5 C. This site was newly channelized just one month prior to sampling. The riparian zone is immature as is the stream bed.

Bear at Swedish Medical Center, Site 626, scored the lowest of all the sites with a WQI of 38. Fecal coliforms were over 100 cfu's for 6 of the 12 months and were between 50 and 100 for another 2 months. Nitrogen levels are high, temperatures were above 16.5 in June, July and August and total phosphorus is a concern. This reach of Bear is upstream site 512. This site is a slow moving reach through canary grass fields.

Table 5a: Water Quality Index (WQI) calculation sheets from Ecology. Peters Creek, site 512.

A Water Quality Index for Washington State streams (Version 6: 2014.06.11).

Station:	Peters NPDES
Recreation Use:	Extraordinary
Aquatic Life (Temperature):	Core(16)
Aquatic Life (Oxygen):	Core
Supplemental Spawning:	09/15 to 05/15
Ecoregion:	2
Small Puget Sound Stream:	Yes

Calc Interim WQI scores | Calc Constituent & Overall Scores

OutSeason 5
SupSpawn 506

KEY
Input
Low Concern
Moderate Concern
High Concern

Default Curve No.:	53	26	41	272	82	506	262	92	
Curve to Use:	53	26	41	272	82	506	262	92	
	FC	Oxygen	pH	TP	TSS	Temp	TN	Turbidity	Monthly
Date	col/100mL	mg/L	std. Units	mg/L	mg/L	C	mg/L	NTU	Scores
10/16/2014 10:00	40	9.9	7.93	0.0772	24	12.9	1.28	1.7	81
11/5/2014 11:50	16	9.97	7.71	0.0627	2	12.4	1.04	2.2	80
12/1/2014 11:30	54	12.56	7.78	0.0495	3	4.6	1.3	3.3	84
1/6/2015 11:10	50	11.31	7.72	0.0496	4	8.4	1.11	3.6	85
2/2/2015 11:00	460	11.52	7.5	0.105	46	7.7	0.615	23	63
3/2/2015 11:00	28	11.57	7.97	0.0574	3	8.1	1.16	3.3	84
4/1/2015 11:00	46	11.38	7.82	0.0574	3	9.5	1.02	2.9	83
5/7/2015 11:20	220	10.73	7.92	0.0504	3	10.5	1.02	2.9	67
6/9/2015 11:30	250	9.54	7.75	0.0804	3	14	1.3	2.3	66
7/9/2015 9:50	520	9.32	7.89	0.0831	3	15.6	1.27	2.3	50
8/4/2015 11:00	200	9.4	7.99	0.0833	2	15	1.3	1.9	62
9/28/2015 11:10	130	10.43	7.94	0.0704	2	10.7	1.27	1.5	80
Constituent Scores:	51	78	93	66	79	80	89	88	
							Overall Score:		58

Table 5b: Water Quality Index (WQI) calculation sheets from Ecology. Bear Creek/ at the Sammamish River, site 512.

A Water Quality Index for Washington State streams (Version 6: 2014.06.11).

Station:	Bear Mouth
Recreation Use:	Extraordinary
Aquatic Life (Temperature):	Core(16)
Aquatic Life (Oxygen):	Core
Supplemental Spawning:	09/15 to 05/15
Ecoregion:	2
Small Puget Sound Stream:	No

Calc Interim WQI scores | Calc Constituent & Overall Scores

KEY
Input
Low Concern
Moderate Concern
High Concern

OutSeason 5
SupSpawn 506

	FC	Oxygen	pH	TP	TSS	Temp	TN	Turbidity	Monthly
Default Curve No.:	53	26	41	72	82	506	62	92	
Curve to Use:	53	26	41	72	82	506	62	92	
Date	col/100mL	mg/L	std. Units	mg/L	mg/L	C	mg/L	NTU	Scores
10/8/2014 10:10	80	9.2	7.7	0.049	5	14.7	0.619	2.8	49
11/17/2014 11:00	44	12.66	7.51	0.0477	8	1.9	0.844	5.1	74
12/2/2014 11:30	34	12.64	7.28	0.0471	11	1.8	0.967	5.7	87
1/7/2015 10:30	26	11.48	7.32	0.0346	9	6.3	1.08	4.1	93
2/5/2015 11:00	610	10.79	7.35	0.0921	49	7.9	0.887	17	34
3/4/2015 11:00	32	12.07	7.66	0.0342	28	4.7	0.837	4.6	92
4/2/2015 11:00	66	10.56	7.36	0.0422	9	10.1	0.697	4.3	75
5/11/2015 10:40	98	9.55	7.67	0.0422	9	14.2	0.697	4.3	63
6/24/2015 11:00	110	9.48	7.97	0.0447	4	18.4	0.533	2.7	53
7/9/2015 10:30	920	9.61	8.13	0.039	6	20.2	0.34	2.5	38
8/27/2015 9:50	98	9.4	7.78	0.0273	4	16.5	0.355	1.8	71
9/29/2015 10:30	200	9.99	7.76	0.0196	4	11.3	0.543	1.8	74
Constituent Scores:	47	77	90	64	81	63	40	88	
							Overall Score:		41

Table 5c: Water Quality Index (WQI) calculation sheets from Ecology. Gun Club Creek, site 814.

A Water Quality Index for Washington State streams (Version 6: 2014.06.11).

Station:	NPDES Gun Club
Recreation Use:	Extraordinary
Aquatic Life (Temperature):	Core(16)
Aquatic Life (Oxygen):	Core
Supplemental Spawning:	09/15 to 05/15
Ecoregion:	2
Small Puget Sound Stream:	Yes

Calc Interim WQI scores | Calc Constituent & Overall Scores

KEY
Input
Low Concern
Moderate Concern
High Concern

OutSeason 5
SupSpawn 506

	Default Curve No.:	53	26	41	272	82	506	262	92	
	Curve to Use:	53	26	41	272	82	506	262	92	
	Date	FC col/100mL	Oxygen mg/L	pH std. Units	TP mg/L	TSS mg/L	Temp C	TN mg/L	Turbidity NTU	Monthly Scores
	10/16/2014 11:00	50	10.03	8.05	0.0582	3	14	0.678	2	83
	11/5/2015 11:20	20	10.29	7.82	0.0351	2	12	1.66	3.9	90
	12/1/2014 10:30	30	13.08	7.72	0.0268	3	3.7	1.95	5.3	95
	1/6/2015 10:00	26	11.66	7.65	0.0393	30	7.8	1.58	6.3	91
	2/2/2015 10:30	390	11.66	7.75	0.0625	23	7.5	0.945	11	59
	3/2/2015 10:40	70	11.65	7.87	0.0396	3	7.4	1.28	2.6	87
	4/1/2015 10:30	32	11.51	7.76	0.042	5	9	1.24	4.4	88
	5/7/2015 10:20	2600	11.12	7.91	0.042	5	9.4	1.24	4.4	40
	6/9/2015 10:50	480	9.67	7.85	0.0699	11	14.3	0.75	8.7	58
	7/22/2015 14:20	840	9.31	8.03	0.0696	37	16.6	0.693	2.6	40
	8/4/2015 10:00	410	9.39	8.2	0.0732	37	16.1	0.662	6.3	47
	9/28/2015 9:50	110	10.91	8.1	0.0528	2	10.2	0.69	1.9	83
	Constituent Scores:	33	78	88	76	66	76	70	82	
								Overall Score:		42

Table 5d: Water Quality Index (WQI) calculation sheets from Ecology. High School Stream, site 656.

A Water Quality Index for Washington State streams (Version 6: 2014.06.11).

Station:	PDES High Scho
Recreation Use:	Extraordinary
Aquatic Life (Temperature):	Core(16)
Aquatic Life (Oxygen):	Core
Supplemental Spawning:	09/15 to 05/15
Ecoregion:	2
Small Puget Sound Stream:	Yes

Calc Interim WQI scores | Calc Constituent & Overall Scores

KEY
Input
Low Concern
Moderate Concern
High Concern

OutSeason 5
SupSpawn 506

	FC	Oxygen	pH	TP	TSS	Temp	TN	Turbidity	Monthly
Default Curve No.:	53	26	41	272	82	506	262	92	
Curve to Use:	53	26	41	272	82	506	262	92	
Date	col/100mL	mg/L	std. Units	mg/L	mg/L	C	mg/L	NTU	Scores
10/16/2014 11:00	30	9.99	7.93	0.0835	1	13.2	0.541	0.8	88
11/5/2014 9:30	38	10.57	7.66	0.0336	5	11.9	0.756	2.9	90
12/1/2014 9:40	110	13.36	7.59	0.0274	3	3.2	0.964	1.9	85
1/6/2015 9:20	22	11.82	7.57	0.0296	3	7.3	1.03	2.2	95
2/2/2015 9:20	650	11.89	7.6	0.238	210	7.1	1.07	75	42
3/2/2015 9:40	4	11.94	7.81	0.0341	2	6.6	1.04	1.4	96
4/1/2015 9:40	44	11.52	7.73	0.0341	5	9.4	0.682	2.4	92
5/7/2015 9:50	56	11.13	7.74	0.0318	5	9.1	0.682	2.4	88
6/9/2015 10:00	350	9.9	7.78	0.0861	65	14	0.647	8.5	53
7/1/2015 9:00	380	9.2	7.87	0.107	3	16.1	0.543	1.5	60
8/4/2015 9:30	450	9.23	7.99	0.126	2	16	0.417	1.7	58
9/28/2015 9:10	27	10.91	7.91	0.084	1	9.3	0.437	0.5	94
Constituent Scores:	48	77	93	40	65	79	97	76	
							Overall Score:		51

Table 5e: Water Quality Index (WQI) calculation sheets from Ecology. Willows at Overlake Church, Site 736

A Water Quality Index for Washington State streams (Version 6: 2014.06.11).

Station:	NPDES Willows O
Recreation Use:	Extraordinary
Aquatic Life (Temperature):	Core(16)
Aquatic Life (Oxygen):	Core
Supplemental Spawning:	09/15 to 05/15
Ecoregion:	2
Small Puget Sound Stream:	Yes

Calc Interim WQI scores | Calc Constituent & Overall Scores

KEY
Input
Low Concern
Moderate Concern
High Concern

Default Curve No.:	53	26	41	272	82	506	262	92	
Curve to Use:	53	26	41	272	82	506	262	92	
	FC	Oxygen	pH	TP	TSS	Temp	TN	Turbidity	Monthly
Date	col/100mL	mg/L	std. Units	mg/L	mg/L	C	mg/L	NTU	Scores
10/6/2014 12:30	30	9.1	7.5	0.0581	10	13.9	0.312	22	68
11/5/2015 10:30	28	9.86	7.55	0.0414	1	11.7	0.483	1.2	86
12/1/2015 11:00	36	12.95	7.56	0.0409	5	2.8	0.786	3.2	91
1/6/2015 10:40	2	11.79	7.55	0.0322	1	7.3	0.859	1.1	97
2/2/2015 10:00	2	11.93	7.66	0.0391	2	6.7	0.622	1.9	96
3/2/2015 10:20	2	13.1	7.93	0.0349	1	6.8	0.749	1.2	96
4/1/2015 11:30	4	12.8	7.92	0.0349	1	9.1	0.461	1.2	95
5/7/2015 10:50	10	10.92	7.78	0.0424	1	9.8	0.461	1.2	89
6/9/2015 11:10	20	9.44	7.67	0.0787	2	15.6	0.4	1.2	89
7/8/2015 7:40	110	7.96	7.78	0.0711	3	16.8	0.213	1.7	80
8/4/2015 10:30	100	8.18	7.77	0.0779	26	17.1	0.222	1.1	57
9/28/2015 11:40	180	9.75	7.73	0.0587	2	10.7	0.382	3	77
Constituent Scores:	68	81	94	79	81	76	100	83	
							Overall Score:		62

Table 5f: Water Quality Index (WQI) calculation sheets from Ecology. Willows Headwaters Site 885

A Water Quality Index for Washington State streams (Version 6: 2014.06.11).

Station:	PDES Willows HV
Recreation Use:	Extraordinary
Aquatic Life (Temperature):	Core(16)
Aquatic Life (Oxygen):	Core
Supplemental Spawning:	09/15 to 05/15
Ecoregion:	2
Small Puget Sound Stream:	Yes

Calc Interim WQI scores | Calc Constituent & Overall Scores

OutSeason 5
SupSpawn 506

KEY
Input
Low Concern
Moderate Concern
High Concern

	FC	Oxygen	pH	TP	TSS	Temp	TN	Turbidity	Monthly
Default Curve No.:	53	26	41	272	82	506	262	92	
Curve to Use:	53	26	41	272	82	506	262	92	
Date	col/100mL	mg/L	std. Units	mg/L	mg/L	C	mg/L	NTU	Scores
10/8/2014 9:20	60	10.41	8.06	0.0794	8	12.4	1.8	4.8	77
11/17/2014 9:30	19	12.44	7.96	0.062	6	5.4	1.86	3.5	84
12/2/2014 10:30	10	12.77	7.92	0.0627	11	4.9	1.82	5.5	84
1/7/2015 10:00	10	11.32	7.88	0.0691	10	8.1	1.8	3.8	82
2/5/2015 9:40	530	11.19	7.47	0.255	397	8.6	1	50	40
3/4/2015 10:00	8	12.22	7.9	0.066	8	6	1.82	5	84
4/2/2015 9:50	32	11.25	7.78	0.066	13	9.4	1.78	5.2	80
5/11/2015 9:10	12	10.52	7.92	0.0735	13	10.9	1.78	5.2	78
6/24/2015 9:40	92	10.23	8.09	0.0822	8	12.7	1.88	3.6	73
7/22/2015 7:30	300	9.82	7.87	0.101	20	13	1.89	6.2	34
8/27/2015 8:40	46	10.15	7.92	0.0778	8	12.6	1.92	2.5	87
9/29/2015 9:30	25	10.83	7.93	0.0714	9	10.1	1.86	3.6	90
Constituent Scores:	58	83	91	50	61	82	42	77	
							Overall Score:		49

Table 5g: Water Quality Index (WQI) calculation sheets from Ecology. Bear Creek behind Swedish Medical Center Site 626

A Water Quality Index for Washington State streams (Version 6: 2014.06.11).

Station:	PDES Bear Swed
Recreation Use:	Extraordinary
Aquatic Life (Temperature):	Core(16)
Aquatic Life (Oxygen):	Core
Supplemental Spawning:	09/15 to 05/15
Ecoregion:	2
Small Puget Sound Stream:	No

Calc Interim WQI scores | Calc Constituent & Overall Scores

KEY
Input
Low Concern
Moderate Concern
High Concern

Default Curve No.:	53	26	41	72	82	506	62	92	
Curve to Use:	53	26	41	72	82	506	62	92	
Date	FC col/100mL	Oxygen mg/L	pH std. Units	TP mg/L	TSS mg/L	Temp C	TN mg/L	Turbidity NTU	Monthly Scores
10/8/2014 10:50	110	9.25	7.64	0.0448	2	14.6	0.629	2.1	47
11/17/2015 10:10	43	12.56	7.39	0.043	7	1.8	0.879	3.5	89
12/2/2014 12:00	44	12.47	7.78	0.043	10	1.9	0.969	4.8	88
1/7/2015 11:00	22	11.32	7.34	0.0322	9	6.2	1.05	4.5	93
2/5/2015 10:20	590	10.68	7.34	0.0974	50	7.9	0.904	18	33
3/4/2015 10:30	46	12.08	7.44	0.0341	10	4.5	0.836	4.7	93
4/2/2015 10:30	84	10.28	7.09	0.0341	7	10.1	0.703	4.3	82
5/7/2015 10:00	64	9.46	7.51	0.0387	7	14	0.703	4	64
6/9/2015 10:30	140	9.66	7.93	0.0438	3	18.1	0.557	2.1	53
7/9/2015 10:00	370	8.77	7.7	0.0403	2	20.5	0.408	2.2	33
8/27/2015 9:20	180	9.32	7.86	0.0302	2	16.3	0.386	1.3	62
9/29/2015 10:00	110	10.19	7.71	0.0308	3	11.1	0.569	2	65
Constituent Scores:	53	72	94	65	86	62	41	89	
							Overall Score:		38

WATERSHED HEALTH MONITORING

During July, August and September of 2015, Redmond conducted watershed health monitoring for the 7 sites named in previous sections. Benthos, periphyton, chlorophyll a, sediments and habitat information were collected. Benthos, habitat, and periphyton results were not provided to the City as of December 31, 2015 and thus, will not be found in this report.

Table 6: Date and time of beginning of habitat collection. Note that habitat was done over 1 entire day and flagging, benthos, periphyton, waters and sediments may have been collected on another day.

Site Number/Name	Habitat Collection	Sediment	Sediment W.O#
158-Peters Creek	7/1/15 07:00	7/1/15 07:00 9/2/15 07:00	1507038-01 1509061-01 2nd
512-Bear Creek Mouth	7/29/15 07:00	7/28/15 10:00 7/28/15 10:00 DUP	1507038-03 1507038-07 DUP
626-Bear behind Swedish	8/25/15 09:00	8/25/15 10:00	1508034-01
656-High School Creek	7/15/15 07:30	7/15/15 07:00	1507038-04
736-Willows/Overlake Church	7/8/15 08:00	7/8/15 07:00	1507038-02
814-Gun Club Creek	8/8/15 09:00	9/8/15 07:00	1509061-02
885-Willows Headwaters	7/22/15 07:00	7/22/15 09:00	1507038-06

PETERS CREEK-SITE 158

This reach of Peters Creek flows from west to east beginning with the most upstream point around Willows Road and most downstream point at NE 151st. The site is located along the valley in Redmond, flanked by industrial/commercial sites and office parks. Immediately upstream of the sample site is an indoor soccer complex and a gas station. To the north is a car repair shop and warehouse businesses (fitness facility and a commercial paint store). To the south (left bank) is building supply with an active outdoor operation (forklifts, light industrial activities). The riparian

zone is narrow and the parking lot and business operations encroach into the 30' riparian buffer zone.

Habitat monitoring started on July 1, 2015. The site had been previously flagged and GPS on June 18th. On July 1, 2015, a team of two people collected benthos, periphyton and sediment and another team of 2 people collected habitat data. The benthic, periphyton and chlorophyll a samples were processed and preserved at the site. The data was collected per the Ecology protocol delineated in Appendix G—QAPP. Once enough sediment was collected, the sample was taken back to the Sammamish River Business Park, City of Redmond Surface Water Quality Laboratory and sieved, processed, labeled and stored.

A collection error on this first effort resulted in MEL contacting Redmond and informing that the samples were unacceptable due to too much water and could not be processed. On September 2, 2015 a second, complete set of sediment samples was collected and processed according to protocol. MEL ended up analyzing both samples.

MEL explained that once the sample was sieved, that bottles had to settle and the liquid needed to be piped off. For this to occur, the samples had to settle overnight. This resulted in a shift in sample collection for the remaining sites. Logistically, Redmond could no longer take the sediment samples to the MEL locker pickup on the same day they were collected. This extra day would mean water samples would expire. So the new sampling schedule was to collect water one day, sediments on one day and habitat assessment on another.

BEAR CREEK MOUTH-SITE 512

This site is located just upstream of the mouth. In the summer of 2014 about ½ mile of channel was moved further to the south allow for the widening of SR520. Meanders, large woody debris, a newly planted riparian zone and cobble installation were part of the restoration activities. Bear was diverted into this new channel in August of 2014 for the first time. The sampling reach (300m) is located entirely within the site restoration.

The sampling site is flanked by SR520 to the south, Redmond Town Center Mall to the north and just upstream are shopping malls, Redmond Way and Bear Creek Parkway. The riparian buffer zone immediately adjacent to the sampling site is greater than 200 ft. but it is immature. Parking lots and business activities encroach on the buffer in the reach immediately upstream.

The site was flagged and GPS on July 27, 2015, sediment, periphyton and benthos were collected on July 28, 2015, and habitat assessment was conducted on July 29th. MEL work order #'s are 150738-03 and 1507038-07. This site was chosen as the duplicate sample, therefore 2 sets of sediment data exist.

Pesticides were not detected in either sample. Bases/Neutrals/Acids (BNAs) were above the RL for Chrysene, Fluoranthene, Phenanthrene, Pyrene and Retene for sample 150738-03 and no BNAs were found above the RL for sample # 1507038-07. Metal results are presented in Table 7 alongside the Washington State Department of Ecology SCUM II for freshwater benthic protection standards for comparison. PCB and PBDE congener laboratory results can be found in the appendices.

BEAR CREEK BEHIND SWEDISH MEDICAL CENTER-SITE 626

This reach is downstream of the Bear/Evans confluence and flows through an open field of canary grasses in the upper part of the reach and poplar trees in the downstream section. This channel is slow moving, silted bottom with very little cobble, woody debris or shade. The reach is plagued with *Brazilian Elodea* and is overgrown with algae. Stream channel is monotonous and there is little diversity. Deer, heron and small birds are often seen in the area.

To the north of the site exist a former farm and grass fields. To the south of the site is an office park and medical center. The buffer in the reach is greater than 150' and has been replanted within the last 10 years. Pockets of homeless encampments have been observed in the area.

Site was flagged on July 28th, sediments, benthos and periphyton were collected on August 25, 2015 and habitat survey on August 26, 2015. Three people conducted the habitat survey due to the size of this site.

BNA results showed Benzo (a) pyrene, Chrysene, Fluoranthene, Pyrene and Retene above the RL. Dichlobenil results are 0.035 mg/kg. All other pesticides were non-detectable. Metal results are shown in Table 7. PCB and PBDE congener laboratory results can be found in the appendices.

HIGH SCHOOL CREEK-SITE 656

The High School Creek reach site stretches from NE 116th Street upstream 150 meters. The entire reach was rechannelized in 2013 including large woody debris, meanders, riparian planting and other stream complexity enhancements. Many of the large trees within the reach were maintained and thus, the channel is well-shaded.

To the west of the channel is a natural protection easement. To the east is a single family residence that is within 100 feet of the stream. Upstream of the site is a steep ravine that ascends about 100 feet to the hill above. This area is relatively undeveloped due to the steep slopes, but, once on top of the hill, single family residences dominate the landscape. Several large plats have been in some stage of development since 2005. This area of Redmond has experienced a high degree of development over the last decade.

Redmond has collected benthos and monthly water quality grab samples on this stream for multiple years and thus, has quite a bit of data on the stream. Stream flows during the summer of 2015 have not been observed to be that low since monitoring began in 2001. Low stream flows created a channeling environment from which to collect monthly grab samples and bugs. The day before monthly grab sampling, a hole deep enough to submerge a 1000 ml sample bottle, was created to facilitate collection.

Habitat assessment data and sediment samples were collected on 7/15/2015 under MEL work order # 1507038-04. Metal and pesticide results are shown in Table 7. PCB and PBDE congener laboratory results can be found in the appendices.

WILLOWS AT OVERLAKE CHURCH-SITE 736

Habitat assessment, sediment, benthos, and periphyton were collected on 7/8/2015. A team of 2 people collected the samples while another team of 2 did the habitat assessment. The sampling reach of this Willows site is located about 600 m upstream from the mouth at the Sammamish River. Willow's headwaters are located on the west side of Redmond around 250 feet in elevation. The stream branches predominately drain single family residential areas and some roads. Willows has very little stormwater influence. As the stream moves from west to east, it hits the valley floor and spreads out into braided channels and wetlands across the Puget Sound Energy easement dominated by grasses. The channel reforms in the business park just west of Willows Road.

The sampling reach is located within a Puget Sound Energy power line easement. The properties to the south of the stream are light industrial and encroach into the buffer. A project was completed in the early 2000's to move Willows from underneath an industrial building. The corner of that building is now within 20 feet of the stream channel.

The property to the north of the sampling site is a large church with a giant parking lot. The paved area comes within 20 meters of the stream. A paved walking path is between the stream and the parking lot.

The stream is very slow moving through this reach. The slope across the valley floor to the Sammamish River is shallow. Puget Power trims the trees every year and discards the branches in the stream which cause the stream to spread out and go around them. The area immediately upstream floods the streets and parking lots during periods of heavy rain probably due to combined factors of embedded stream bottom, shallow slope and other factors.

Metal and pesticide results are shown in table 10 below. PCB and PBDE congener laboratory results can be found in the appendices.

WILLOWS HEADWATERS-SITE 885

This site is located downstream of a steep ravine, east of Redmond Way. It is located upstream of one of the 3 main branches that contribute to the stream. The site is surrounded by undeveloped land within about 200 meters. Single family homes and roads make up the majority of the development upstream. The riparian buffer zone is relatively intact with mature trees to provide shade.

The stream channel has moved around in recent years. Stream flows can be high, allowing for sediment redistribution. Fallen trees and sediment contribute to channel braiding and rerouting. There is human influence in the area as observed by the bicycle jumps that are created and destroyed on the stream bank and several treehouses that have been built over the years.

Sediment, benthos, and periphyton were collected on 7/22/2015. PAL had non-detects for all pesticides except dichlobenil at 0.023 mg/kg.

BNA and metal results are shown in Table 7. PCB and PBDE congener laboratory results can be found in the appendices.

GUN CLUB-SITE 814

Gun Club Creek is located in a valley between the Gun Club and single family residential plats. The entire stream upslope from the sampling reach is in a steep ravine and punctuated by errant bullets from the rifle range. The original sample location was in this impossibly located area. In order to gain access and avoid stray gun fire, the sampling location was moved downstream to the first samplable location (about 300 meters).

The final sampling location is in a treed buffer area. To the southeast about 100 meters is a large residential development of single family houses. The only other development upstream of the sampling location within 200m is a paved footpath and set of stairs. Immediately to the south is a business park. Gun Club disappears under Willows Road and never resurfaces.

This site nearly went dry during the summer of 2015. Sampling holes needed to be carved out of the sediment in order to fill grab sample bottles. This was unusual. Base flows are usually robust for this tributary during summer months.

Metal results are shown in Table 7. PCB and PBDE congener laboratory results can be found in the appendices.

Table 7: Excerpt from SCUM II, March 2015-Ecology table 8-1 alongside Redmond sample data.
Freshwater sediment chemical criteria for protection of the benthic community.

Analyte	SCO	CSL	Peters 158	Willows Overlake 736	High School 656	Willows Headwaters 885	Bear Mouth 512	Gun Club 814	Bear Swedish 626
Total sulfides	39	61							
Metals	**mg/kg dw**								
Arsenic	14	120	15.1	13.0	12.3	29.4	1.70	14.7	11.5
Cadmium	2.1	5.4	0.349	0.392	0.374	0.229	0.062	0.396	0.343
Chromium	72	88	48.3	40.9	53.8	51.4	13.2	48.2	49.0
Copper	400	1200	42.3	31.3	30.3	34.1	4.58	22.9	21.4
Lead*	360	*> 1300*	31.9	16.5	20.5	14.1	2.96	**219**	15.4
Silver*	0.57	1.7	0.101	0.100	0.100	0.100	0.100	0.100	0.100
Zinc*	3200	*>4200*	311	134	214	139	22.2	240	101

Phthalates	**pg/kg dw**								
Bis(2-Ethylhexyl)phthalate	130	16	110/89	120	98				
Analyte	**SCO**	**CSL**	**Peters 158**	**Willows Overlake 736**	**High School 656**	**Willows Headwaters 885**	**Bear Mouth 512**	**Gun Club 814**	**Bear Swedish 626**
Pesticides and PCBs	**pg/kg dw**								
2,4,- D			ND	ND	ND	ND	ND	ND	ND
Triclopr			ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos			ND	ND	ND	ND	ND	ND	ND
Dichlobenil			0.019	0.053	0.035	0.023	ND	.013	0.0092
Carbaryl			ND	ND	ND	ND	ND	ND	ND
Analyte-cont	**SCO**	**CSL**	**Peters 158**	**Willows Overlake 736**	**High School 656**	**Willows Headwaters 885**	**Bear Mouth 512**	**Gun Club 814**	**Bear Swedish 626**
DCPMU			ND	ND	ND	ND	ND	ND	ND
Diuron			ND	ND	ND	ND	ND	ND	ND
Polycyclic Aromatic Hydrocarbons*	**pg/kg dw**								
Phenanthrene			140/87	63	33	25	45	22	27
Anthracene			16/17	63	33	38	33	22	27

Fluoranthene			180/210	63	27	42	74	22	51
Pyrene			140/150	63	33	29	60	22	43
Benz[a]anthracene			60/75	63	33	38	22	22	27
Chrysene			91/110	63	33	38	42	22	35
Benzo(k)fluoranthene			73/83	63	33	38	33	22	27
Benzo(b)fluoranthene			80/98	63	33	38	33	22	27
Benzo[a]pyrene			88/99	63	33	38	33	22	36
Indeno[1,2,3-c,d]pyrene			84/69	63	33	38	33	22	27
Dibenzo[a,h]anthracene			39/36	130	67	76	66	43	51
Benzo[g,h,i]perylene			76/60	130	29	76	66	43	55
Retene			61/26	63	130	710	170	63	53

- Reporting limits (RL) and minimum detection limits (MDL) were different for each sample. The RL and MDL varied due to amount of sample that was available for analysis. Therefore, the numbers reported above are only the raw number reported by the laboratory and are not relative their respective RL or MDL.

SUMMARY OF COSTS

City of Redmond NPDES-RSMP Monitoring
1-Mar-16

Costs	2015-2016 NPDES Monitoring
Laboratory Costs	
MEL	
Sediment	$23,785.00
Water Qality	$15,180.00
AmTest	
Fecals	$2,100.00
Rithron	$1,000.00
Periphyton	*$2100.00
Benthos	*$1785.00
Supplies	
Hach	$4,287.37
Cole Palmer	$634.65
Sigma Aldrich	$1,502.60
Forestry Supplies	$1,431.92
Ben Meadows	$1,379.03
Home Depot	$100.40
Amazon	$194.94
Certified Materials Testing	$30.84
General and administrative	
WCC Crew Time (hrs)	304 hours
Redmond Employee Time (hrs)	526 hours
Total	**$51,626.75**

*estimates only

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City of Redmond

NPDES Annual Report Covering 2016

Attachment 10:

Watershed Management Plan Implementation Report

March 23rd, 2017

RE: REDMOND'S WATERSHED MANAGEMENT PLAN IMPLEMENTATION STATUS REPORT 2017

On February 5th, 2014, Washington Department of Ecology issued an approval of Redmond's Citywide Watershed Management Plan (WMP) as an alternative to meeting certain on-site stormwater management, flow control, and runoff treatment requirements in Appendix 1 of the NPDES Phase II Western Washington Municipal Stormwater Permit. One condition of the approval is an annual report of progress implementing the program. Since approval Redmond has been actively implementing various aspects of the WMP. In 2017, Redmond has done the following to implement the WMP.

Watershed Management Effectiveness Monitoring Program

The City of Redmond has fully implemented the Paired Watershed Study. Seven creeks are being monitored. Three are targeted for restoration (one of which is in King County), two are relatively pristine reference creeks, and two are control creeks that are not currently targeted for restoration. Continuous stream gauging continued through 2016. Water quality, habitat, sediment sampling occurred in 2016.

The monitoring program is currently funded through 2018 but was approved by the RSMP to be funded for 10 years. The monitoring program is designed to detect changes in the receiving waters that are being targeted for capital investments and programmatic activities aimed at improving in-stream health. The projects and activities will be applied to each watershed one by one to make sure if we see an in-stream improvement we know what worked. WY 2016 data will provide a baseline, existing conditions analysis. Data will be available through King County's hydrologic website and Ecology's EIM.

The QAPP can be downloaded from:
https://www.redmond.gov/Environment/StreamsHabitat/lakesriversstreams/WatershedManagement/

Tosh Creek Watershed Restoration Plan

Redmond completed a detailed restoration plan for Tosh Creek in 2015, one of the creeks identified in the WMP as highest restoration or most likely to demonstrate an ecological lift. Tosh creek watershed is fully developed with a mix of commercial, multifamily, and low density residential development. The City is working with residence in Tosh Creek's watershed to identify projects and establish a schedule for implementation.

The Tosh Creek Restoration Plan can be downloaded from:
http://www.redmond.gov/cms/One.aspx?portalId=169&pageId=119958

Monticello Creek Watershed Restoration Plan

Redmond has initiated a detailed restoration plan for Monticello Creek, one of the creeks identified in the WMP as highest restoration and likely to demonstrate an ecological lift. NEP funding has been provided for the plan and Ecology will review and approve the plan. Redmond has selected Osborne Consulting and King County to perform the work. Once completed, the Monticello Creek Watershed Restoration Plan will identify projects that Redmond plans to build to restore Monticello Creek and predesigns for projects that will be ready for development into full designs and construction. This effort is coordinated with the NPDES municipal stormwater permit watershed planning requirement led by King County for the Bear Creek Watershed (see below).

The Monticello Creek Restoration website (plan will be posted here in 2016):
http://www.redmond.gov/Environment/StreamsHabitat/lakesriversstreams/monticellocreek/

Street Sweeping for Water Quality Pilot Project

The City of Redmond was successful at securing Waterworks grant funding to perform street sweeping for water quality in Monticello Creek's watershed. Now that we have a full year of baseline data for all creeks, this pilot project will be the first implemented to measure its effect at improving water quality in the creek. This is a programmatic BMP that will include sweeping the streets one time per month for one year, then two times a month the second year. Additional standard street sweeping will continue as always, but documented, so that the application of increased street sweeping for water quality can be easily replicated if successful at improving in-stream water quality (and sediment quality). The grant agreement and contract for the pilot street sweeper are underway and the city plans to initiate the program in April or May 2017.

Tracking System for Stormwater Control Transfers

Part of the Watershed Management Plan approval was the approval of Redmond using a stormwater control transfer program to assist other revenue sources in funding restoration of creeks in Redmond. As part of the approval process, Redmond worked closely with Ecology on the rules of a transfer program. The City has developed a tracking system that will be used by development/redevelopment projects to determine if the transfer program is good option for their project's stormwater management requirements. The Watershed

Management Plan provides the requirements of the stormwater control transfer program, the requirements were used to develop the tracking tool. The tracking tool is complete but will not be used until a stormwater retrofit is complete to allow for transfers to occur (also a condition of approval). Redmond will download reports from the tracking tool and submit those as part of its annual reports once a retrofit is complete.

The tracking tool can be downloaded from:
https://www.redmond.gov/Environment/StreamsHabitat/lakesriversstreams/WatershedManagement/

NPDES Bear Creek Watershed Planning – King County Lead

Redmond, Woodinville, WSDOT and Snohomish County are partners to the NPDES Bear Creek Watershed Planning project lead by King County. The study area excludes Bear Creek downstream of the confluence with Evans Creek. Bear Creek was identified in Redmond's Watershed Management Plan as a high priority for restoration. The Bear Creek plan will include existing conditions assessment, in-depth modeling and estimation of needs to keep Bear Creek heathy now and into the future, and an implementation plan. The project is underway and will be completed in 2018. The project's website is:

http://www.kingcounty.gov/environment/watersheds/sammamish/bear-creek/bear-creek-stormwater-plan.aspx

Building Cities in the Rain and Ecology Stormwater Control Transfer Program Guidance

Redmond worked closely with Ecology, Commerce, Puget Sound Regional Council, environmental groups, and other local governments to create guidance for prioritizing creeks for restoration and the requirements to develop a stormwater control transfer program. Building Cities in the Rain guidance was finalized in 2016, which provides guidance to local governments on how to prioritize creeks for restoration. Both can be downloaded from Commerce's website:

https://www.ezview.wa.gov/site/alias__1780/overview/34828/overview.aspx

In addition to the above implementation activities, one activity that is called out in the approval letter has not been initiated. This is the establishment of fees to allow

participation in the stormwater control transfer program. We have not done this because the option to pay a fee for a stormwater control transfer is not going to be possible until a stormwater retrofit is built. To establish a fee, we would prefer to better understand the cost of stormwater retrofits.

If you have any questions about this status report, or need additional information to fulfill the status report requirement of the February 5th 2014 approval letter, please feel free to contact me at (425)556-2741 or ajrheaume@redmond.gov.

Respectfully,

Andy Rheaume
Senior Watershed Planner