Appendix C
Year 2 (2015 Permit)
Stormwater Discharge Monitoring Data, Shallow Groundwater UICs

(Laboratory reports and Excel database are provided on a separate CD)

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Appendix C

Year 2 (2015 Permit), Stormwater Discharge Monitoring Data
Shallow Groundwater UICs

This report presents the stormwater discharge monitoring data collected in Year 2 (July 1, 2016, to June 30, 2017) of the City of Portland's (City's) 2015 Water Pollution Control Facilities (WPCF) Permit No. 102830 for Class V Stormwater Underground Injection Control Systems (UICs). Year 2 (2015 Permit) sampling was performed in accordance with the City's 2015 Stormwater Discharge Monitoring Plan (SDMP). This report is divided into the following sections detailing the locations sampled and the final results from the laboratory analysis:

1. Introduction
2. Sampling design
    - Year 2 Monitoring Locations
    - Chemical Analysis
3. Results, Exceedances, and Response Actions
4. Analytical Data Validation

As required in Schedule B.5 of the 2015 Permit, a spreadsheet of all data provided in the analytical laboratory reports is included in Table 1 (attached, along with a CD containing laboratory datasheets and a Microsoft Excel database).

Introduction

The City has prepared this report to be included as part of the UIC Management Plan (UICMP) annual report in compliance with Schedule B.5 its 2015 Permit. The Oregon Department of Environmental Quality (DEQ) renewed the City's WPCF Permit Number 102830 in June 2015, which approved the City's required March 24, 2015, SDMP. The SDMP describes the stormwater monitoring strategy that the City will use throughout its second WPCF Permit term (June 2015 to May 2025) to evaluate stormwater discharges from public rights-of-way to City-owned UICs in areas of shallow groundwater.[1] Monitoring is conducted to demonstrate that the City's UIC Program protects beneficial uses of groundwater, meets WPCF Permit requirements, and satisfies requirements of the federal Safe Drinking Water Act and state UIC and groundwater protection regulations (OAR Division 340, Chapters 44 and 40, respectively).

Sampling Design

To comply with the monitoring requirements of the 2015 Permit, the City implemented a program to sample stormwater entering the City's UIC system from a subset of UICs located in areas of shallow groundwater and compared stormwater data to permit Action Levels.

[1] Areas of shallow groundwater refer to locations where UICs have less than 5 feet of vertical separation distance between the bottom of the UIC and the seasonal high groundwater level. Seasonal high groundwater is discussed in Snyder's U.S. Geological Survey Report, *Estimated Depth to Ground Water and Configuration of the Water Table in the Portland, Oregon, Area* 2008-5059 (2008), http://pubs.usgs.gov/sir/2008/5059/.

Approximately 120 UICs are located in areas of shallow groundwater. During the 2015 Permit time period, a sample of 75 UICs will be selected from the list of UICs located in shallow groundwater. The 75 UICs are divided into five panels of 15 UICs each. Over the course of the 10-year permit, each panel will be sampled twice to achieve monitoring objectives in the SDMP. With a sample size of 75, approximately 62% of the UICs located in shallow groundwater will be sampled at the end of the 10-year period. A finite population correction[2] will reduce the width of confidence intervals associated with this design by almost 50% in comparison to a sample size of 75 UICs selected from a population of 10,000. This design therefore has the equivalent power of a much larger sample from the entire UIC population.

A Generalized Random Tesselation Stratified (GRTS) survey design[3] will be used to select the 75 UICs in areas of shallow groundwater. A GRTS design will result in a random sample that is spatially balanced (i.e., a sample with a spatial distribution that is similar to the spatial distribution of the population).

The GRTS design also helps simplify the implementation of a sample design if some UICs are unsuitable for sampling. A GRTS sample draw is an ordered list of locations that can be evaluated for sampling sequentially. The first 75 UICs on the list that are suitable for sampling are used, with sequential blocks of 15 UICs making up each of the five panels. To help in choosing 75 UICs to sample, the entire population of UICs located in shallow groundwater areas was placed into random order using the R package spsurvey.[4]

Year 2 Monitoring Locations

Year 2 (2015 Permit) monitoring locations are 15 shallow groundwater sites selected in accordance with the SDMP (Table 2, Figure 1, and Figure 2, attached). On November 14, 2016, the City submitted a letter to DEQ that listed the 15 sites to be sampled. This letter explains why, based on pre-sampling field inspections, seven sites (SG-028, SG-030, SG-034, SG-037, SG-041, SG-042, and SG043) were removed and replaced in accordance with 2015 Sampling and Analysis Plan (SAP) procedures. See Table 2 and Figure 2 for site-specific information.

Chemical Analysis

As identified in Table 1 of the 2015 Permit, six pollutants are required to be sampled and analyzed for each monitoring location (Benzo[a]pyrene, Pentachlorophenol, Di(2-ethylhexyl)phthalate, Total Lead, Total Zinc, and Total Copper). The list of pollutants and

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[2] When sampling more than approximately 5% of a finite population, a finite population correction is applied to the standard error of parameter estimates (e.g., annual trends, means, or population percentiles). This correction can significantly increase the precision of parameter estimates when a large proportion of the population is sampled (http://en.wikipedia.org/wiki/Standard_error#Correction_for_finite_population).

[3] Stevens, D.L., Jr., and A.R. Olsen. 2004. "Spatially-balanced sampling of natural resources." *Journal of the American Statistical Association*. 99: 262-278. In collaboration with EPA, the City utilized the GRTS design to select its UIC stormwater monitoring program locations sampled for 2005 Permit compliance.

[4] Kincaid, T. M. and A.R. Olsen. 2013. *spsurvey: Spatial Survey Design and Analysis*. R package version 2.6. (http://www.epa.gov/nheerl/arm/).

sampling and analytical methods can be found in the SDMP. Monitoring results are summarized below.

Results, Exceedances, and Response Actions

The analytical results from the 15 shallow groundwater monitoring locations are attached in Table 1. All laboratory data sheets are included on the CD included with the report. Review of the data indicated no Permit Table 1 Action Levels were exceeded, thus no response actions were required. Collected data were also consistent with UIC monitoring that was conducted in the first WPCF Permit term.

Analytical Data Validation

Analytical results were reviewed to ensure that the data quality objectives defined in the 2015 Quality Assurance Project Plan were achieved, and they were determined to be acceptable and usable. A data usability report is included as an attachment.

Attachments:

- Table 1 - Year 2 (2015 Permit) Monitoring Results
- Table 2 - Year 2 (2015 Permit) UIC Monitoring Location Information
- Figures 1 and 2 - Year 2 (2015 Permit) UIC Monitoring Locations
- Data Usability Report
- CD containing laboratory reports and Microsoft Excel database

Table 1: Year 2 (2015 Permit) Monitoring Results

				Analyte	Pentachlorophenol		DEHP		Benzo(a)pyrene		Copper		Lead		Zinc	
				MADL (ug/L)	10		300		2.0		1,300		500		50,000	
				Method	EPA 515.4		EPA 8270-SIM		EPA 8270-SIM		EPA 200.8		EPA 200.8		EPA 200.8	
Site Id	Location Description	Traffic	Node	Date												
SG-022	11246 SE Harold St	>1000	AMY402	10/13/16 11:50	=	0.057	=	1.3	=	0.012	=	5.12	=	2.23	=	16.8
SG-024	12830 SE Holgate	>1000	ADT454	11/23/16 10:26	=	0.647	=	2.2	=	0.011	=	4.77	=	1.23	=	30.2
SG-025	12010 SE Reedway St	<1000	ADV196	10/5/16 12:39	=	0.08	=	1.3	<	0.01	=	7.54	=	3.25	=	23.3
SG-025	Field Duplicate	<1000	ADV196	10/5/16 0:00	=	0.077	=	1.2	<	0.01	=	7.59	=	3.33	=	23.4
SG-026	5712 SE 103rd Ave	>1000	AMT874	10/13/16 11:27	=	0.099	=	1.1	<	0.01	=	4.74	=	2.41	=	23.2
SG-027	11501 SE Foster Rd	>1000	ADW303	11/14/16 10:54	=	1.4	=	8.2	=	0.023	=	14.3	=	8.94	=	50.9
SG-029	5500 SE 121st Ave	>1000	ADU735	10/13/16 12:07	=	0.197	=	1.6	<	0.01	=	4.78	=	2.37	=	26.3
SG-031	8111 NE Holman St	<1000	ADV384	10/13/16 9:22	=	0.148	=	0.65	<	0.01	=	3.41	=	0.953	=	22.7
SG-032	13658 SE Cora St	<1000	ADT474	10/13/16 13:15	=	0.058	=	1.8	=	0.014	=	3.52	=	0.633	=	11.8
SG-033	5423 SE 121st Ave	<1000	ADU734	10/5/16 12:01	=	0.098	=	0.86	<	0.01	=	4.56	=	1.11	=	13.7
SG-036	5544 SE 128th Ave	>1000	ADT689	10/13/16 12:49	=	0.43	=	0.85	=	0.018	=	4.54	=	0.942	=	19.1
SG-036	Field Duplicate	<1000	ADT689	10/13/16 0:00	=	0.415	=	0.81	=	0.019	=	4.68	=	0.98	=	19.8
SG-038	11134 SE Steels St	<1000	ADU731	10/5/16 13:07	=	0.117	=	0.57	<	0.01	=	8.48	=	0.738	=	14.8
SG-039	5918 SE 122nd Ave	>1000	ADV203	10/13/16 13:44	=	0.576	=	2.6	=	0.015	=	5.59	=	1.58	=	26.2
SG-040	12920 SE Holgate	>1000	ADT453	11/23/16 8:56	=	0.152	=	0.88	<	0.01	JB	1.93	=	0.499	=	11.8
SG-044	4406 SE 135th Ave	<1000	AMX686	10/13/16 10:19	=	0.119	<	0.5	<	0.01	=	3.07	=	0.62	=	6.88
SG-045	12532 SE Ellis St	<1000	ADT688	10/13/16 12:33	=	0.061	=	1.4	=	0.018	=	11.1	=	4.01	=	26.8

Notes:

All concentrations in micrograms/per liter (ug/l).

JB = Estimated due field blank contamination

Table 2: Year 2 (2015 Permit) UIC Monitoring Location Information

Location Code	Approximate Address[a]	Traffic Category[b]	Predominant Land Use[c]	BES UIC ID[d]	DEQ UIC Id	Latitude	Longitude	UIC Depth (feet)	Pretreatment System[e]	Vertical Separation Distance[f]	Distance to Nearest Well (ft)[g]	Within Two-year Time of Travel from public drinking water well?
SG-022[h]	11246 SE HAROLD ST	Collector	SFR	AQT769	10102-9792	45.482898	-122.547011	26	Sed MH	-4	898	NO
SG-024	12830 SE HOLGATE BLVD	Collector	SFR	ADT454	10102-6315	45.48972702	-122.5324173	20.6	Sed MH	0	1045	NO
SG-025	12010 SE REEDWAY ST	Residential	SFR	ADV196	10102-5269	45.48127365	-122.5393906	28'	Sed MH	-13	962	NO
SG-026	5712 SE 103RD AVE	Collector	SFR	AMT874	10102-117	45.48089981	-122.557251	21.2'	Bioswale, Sed MH	0	1457	NO
SG-027[h]	11501 SE FOSTER RD	Collector	IND	AQT809	10102-9812	45.476524	-122.544465	16.9'	Sed MH	-6	1247	NO
SG-029	5500 SE 121ST AVE	Collector	MFR	ADU735	10102-5914	45.48327636	-122.5389481	30'	Sed MH	-9	955	NO
SG-031	8111 NE HOLMAN ST	Residential	COM	ADV384	10102-3106	45.56826782	-122.5786972	14'	Sed MH	-10	2314	NO
SG-032	13658 SE CORA ST	Residential	SFR	ADT474	10102-6334	45.4914627	-122.5222931	19.7'	Sed MH	1	610	NO
SG-033	5423 SE 121ST AVE	Residential	MFR	ADU734	10102-5912	45.48351287	-122.5389404	30'	Sed MH	-8	981	NO
SG-036	5544 SE 128TH AVE	Collector	SFR	ADT689	10102-5294	45.48270797	-122.5321579	30'	Sed MH	-8	1781	NO
SG-038	11134 SE STEELE ST	Collector	SFR	ADU731	10102-5910	45.48452758	-122.5483704	30.1'	Sed MH	-2	1074	NO
SG-039	5918 SE 122ND AVE	Collector	MFR	ADV203	10102-5286	45.47868728	-122.537056	30'	Sed MH	-1	1096	NO
SG-040	12920 SE HOLGATE BLVD	Collector	SFR	ADT453	10102-6314	45.48973464	-122.5313339	19.6'	Sed MH	0	1112	NO
SG-044	4406 SE 135TH AVE	Residential	SFR	AMX686	10102-925	45.49053573	-122.5248871	25.4'	Sed MH	-9	1003	NO
SG-045	12532 SE ELLIS ST	Residential	SFR	ADT688	10102-5293	45.48248672	-122.5341415	30'	Sed MH	-8	2137	NO

Notes:

[a] Addresses should not be considered precise location information and are subject to change as City staff better describe the physical UIC locations relative to nearby properties. UIC street addresses are assigned relative to nearby properties for general locating purposes. Latitude and longitude should be relied upon for accurate locating of UICs.

[b] Traffic Category (Residential is = <1000; Collector is >1000 Trips per day).

[c] COM = commerical; POS = Parks and Open Space; SFR = Single Family Residential; MFR = Multifamily Residential; IND = Industrial

[d] BES UIC number is obtained from the BES Hansen database.

[e] Sed MH = Sedimentation manhole

[f] The estimated separation distance is defined as the approximate depth in feet from the bottom-most perforation in the UIC to the approximate seasonal-high groundwater level. The bottom-most perforation is defined as the bottom of the UIC – 2 feet. Two feet were added to all separation distance calculations to account for the standard depth of the sediment trap ring on standard City UIC design. This information is reported to DEQ by the City as “Depth to groundwater” (UIC Database Report) for inclusion in DEQ’s UIC database. Reported to nearest foot. Separation distances are based on December 2008 USGS depth to groundwater data (Snyder, D.T., 2008, Estimated depth to groundwater and configuration of the water table in the Portland, Oregon area: U.S. Geological Survey Scientific Investigations Report 2008-5095, 40p. Available at http://pubs.usgs.cov/sir/2008/5059).

[g] Horizontal distance to nearest groundwater drinking water well (e.g., muncipal, domestic, irrigation).

[h] Location was part of the Category 3 projects and UIC was updated to reflect work completed at the site.

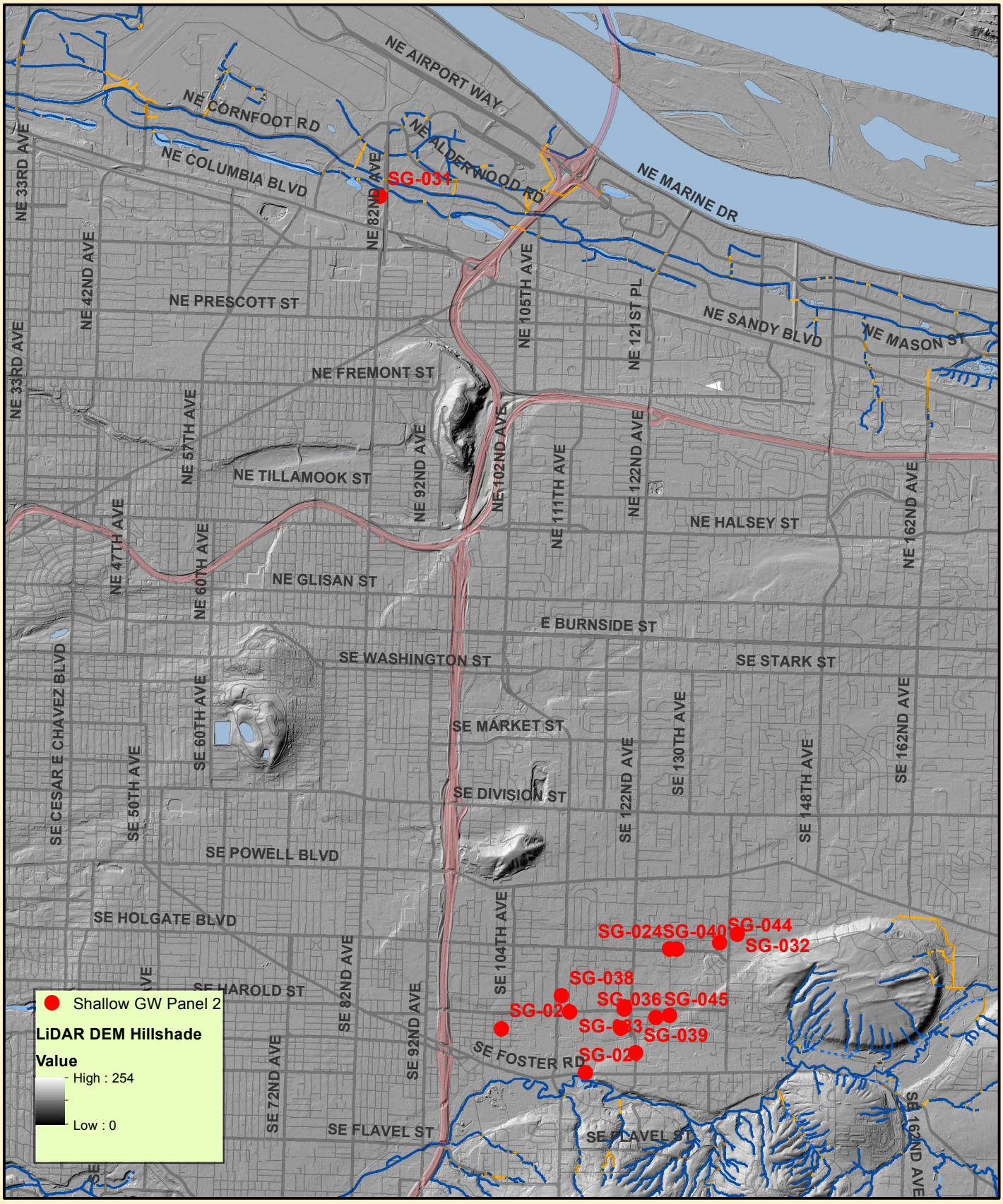

Figure 1
Year 2(2015 Permit) UIC Monitoring Locations

Investigations & Monitoring Services
Bureau of Environmental Services
City of Portland, Oregon

Source: ESRI Data & Maps CD
Created in ArcGIS 10.2 using ArcMap

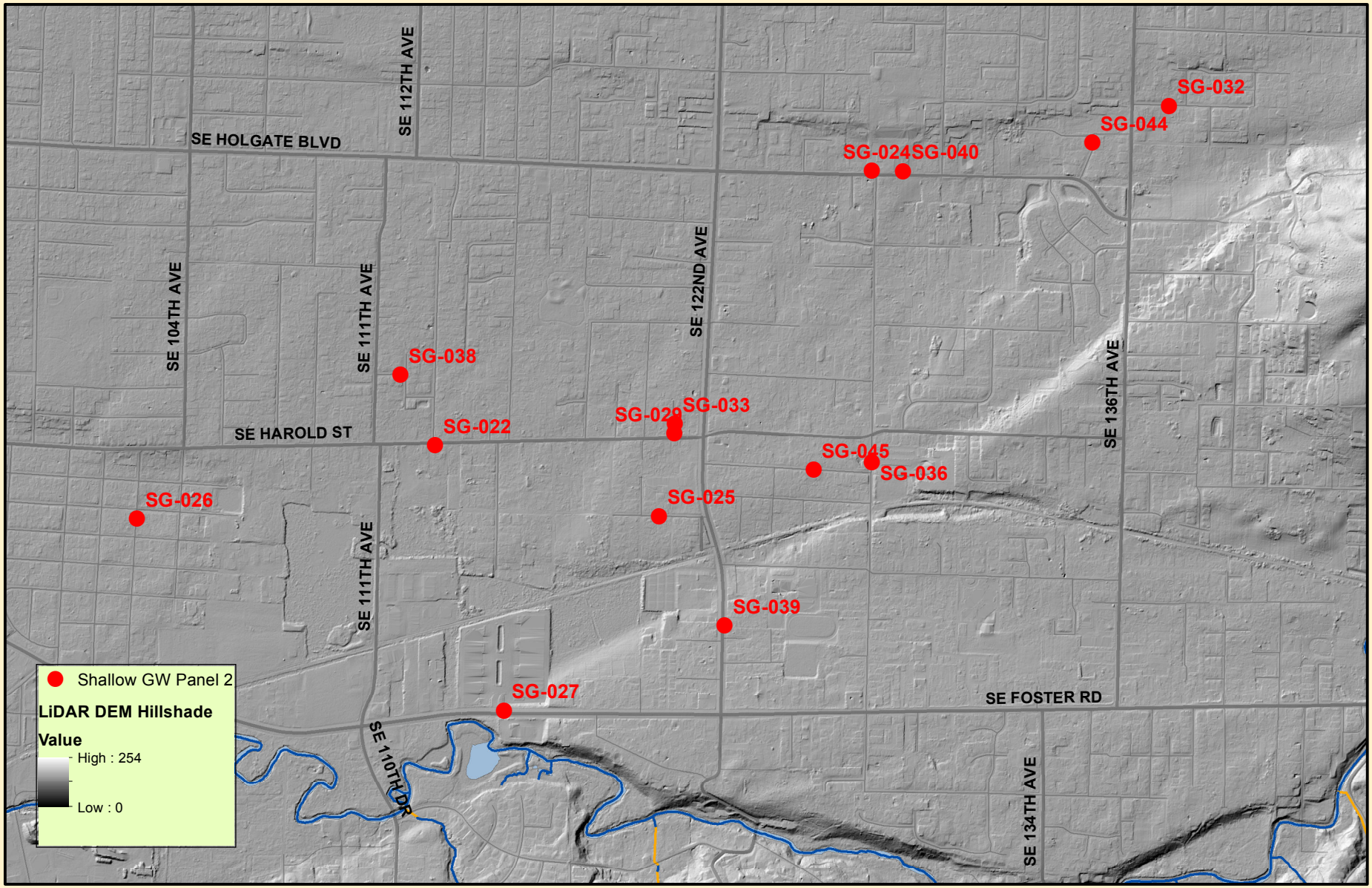

Figure 2
Year 2 (2015 Permit) UIC SE Monitoring Locations

Investigations & Monitoring Services
Bureau of Environmental Services
City of Portland, Oregon

Source: ESRI Data & Maps CD
Created in ArcGIS 10.2 using ArcMap

CITY OF PORTLAND BUREAU OF ENVIRONMENTAL SERVICES
UIC PROGRAM STORMWATER MONITORING
DATA USABILITY REPORT

YEAR 12 MONITORING
OCTOBER 2016 – NOVEMBER 2017

1.0 INTRODUCTION

Analytical results for stormwater samples collected during Permit Year 12 (PY 12) were reviewed to evaluate data usability and adherence to project data quality objectives (DQOs). All data were evaluated using the project *Quality Assurance Project Plan* (QAPP) and *U.S. EPA Contract Laboratory Program National Functional Guidelines* (NFGs) *for Data Review* (BES 2015, EPA 2014a, 2014b) for guidance in evaluating the following:

- Field practices, field quality control (QC) samples, daily activity logs, and sample collection logs;
- Sample COC and receipt documentation, preparation and analytical holding times, and reporting and detection limits for chemicals of interest; and
- Laboratory data quality, in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC) as described in Section 2.5 of the QAPP.

2.0 SAMPLING SUMMARY

The City Bureau of Environmental Services (BES) Field Operations section performed sample collection and field parameter measurements for all compliance monitoring. Samples were collected from 15 locations during one "event" from October 5, 2016 through November 23, 2017. Sample locations and dates are summarized in Table 1 attached to this summary.

Samples were collected in general accordance with the *Sampling and Analyses Plan* (SAP) and QAPP, contained in the final UIC *Stormwater Discharge Monitoring Plan* (SDMP). The SDMP includes all stormwater monitoring conducted at City UICs for UIC permit compliance.

3.0 ANALYTICAL SUMMARY

WPCL performed analyses for all compliance samples collected for PY 12. Laboratory procedures were performed in general accordance with the QAPP except as noted below. The permit-required analytes measured during PY12 are listed below.

Analyte	Method	MRL (µg/L)	MADL (µg/L)	Lab
Pentachlorophenol	EPA 515.4	0.04	10	WPCL
Di(2-ethylhexyl)phthalate	EPA 8270-SIM	1.0	60	WPCL

Analyte	Method	MRL (µg/L)	MADL (µg/L)	Lab
Benzo(a)pyrene	EPA 8270-SIM	0.01	2.0	WPCL
Total Copper	EPA 200.8	0.2	1,300	WPCL
Total Lead	EPA 200.8	0.1	500	WPCL
Total Zinc	EPA 200.8	0.5	5,000	WPCL

MRL = method reporting limit
MADL = maximum allowable discharge limit

4.0 QAPP COMPLIANCE AND DATA USABILITY

BES Investigation & Monitoring Services (IMS) conducted an independent data usability assessment to ensure the data are usable. Findings are summarized below.

4.1 Field Practices

Daily Activity Logs

Daily activity logs consist of daily field reports (DFRs) and field data sheets (FDSs) which are included in this report as Attachments 1 and 2, respectively. DFRs and FDSs are used to record general and sample-specific information regarding site conditions, time of sample collection, visual stormwater observations, sample collection difficulties, deviations from the SDMP, and any information relating to potential pollutant sources. These logs were reviewed by both the Field Operations team leader and by IMS for completeness and consistency. No significant issues were identified during review of field documents.

Field measurements including temperature, conductivity, and pH are recorded on WPCL COCs so that field data can be entered into the LIMS by the WPCL sample custodian. COCs are included with the analytical laboratory reports in Appendix E of the PY12 Annual Report.

Field and Lab QC Samples

One equipment blank per year and one field decontamination blank per event were collected and analyzed for the same parameters as stormwater samples. Field duplicate samples are collected at a frequency of one duplicate for every 10 locations sampled. Extra sample volume is also collected by field teams at selected locations to provide enough volume to perform matrix QC analyses. Typically, a laboratory will choose samples at random for MS/MSD analyses; however, for this project there is an interest in evaluating potential matrix effects specific to stormwater discharged to publicly-owned UICs. Results of field and laboratory QC samples are discussed in respective sections below.

No issues were encountered that required resampling.

4.2 Data Usability Assessment

General

Discrete samples were collected at 15 sample locations, in addition to two field duplicates, one field decontamination blank, and one equipment blank. Samples were delivered to WPCL on the same business day that they were collected. Laboratory sample receipt forms indicate that all sample containers arrived intact, and all container labels matched the COC documentation.

Some data were flagged as estimated using various flags to illustrate specific laboratory QC failures. Following review of laboratory reports, case narratives, and field QC data by IMS, some of these flags were carried through as appropriate, and replaced with qualifiers presented below. Additional qualifiers were added, where necessary. Qualified data are still considered valid and usable (though should be used with caution), except for results that may have been qualified with an "R" (rejected). Qualifiers used for PY 12 Event reporting are listed below:

J	Estimated concentration
JB	Estimated due to blank contamination
U	Not detected above MDL

Note that laboratory PARCC review for this report is generally limited to permit-required analytes and analyses necessary for reporting. For example, laboratory QC is reviewed for all samples analyzed by EPA Method 8270-SIM; however, RPDs for field duplicates are only calculated for UIC permit-required analytes. Additional review is conducted where laboratory QC issues indicate more pervasive issues that may impact data quality for analytes not required for permit compliance monitoring.

Method Detection Limits

All method reporting limit (MRL) and detection limit (MDL) targets for permit-required analytes were met as specified in the QAPP (BES 2015).

MRLs were increased for selected analytes on individual samples where dilution was required in order to quantify analytes detected that were outside initial instrument calibration. Several samples required dilutions due to matrix interference for individual analytes. MRLs and MDLs did not exceed MADLs for any "non-detect" sample analytical results.

Matrix Spikes

Extra sample volume is collected by field crews at one out of every ten sample locations so that matrix QC can be performed on matrices specific to this monitoring effort. Where the laboratory does not have sufficient volume, an LCS duplicate sample is analyzed in accordance with the respective methods.

4.2.1 Holding Times

Maximum allowable holding times, measured from the time of sample collection to the time of preparation or analysis, were met for each project sample collected for PY12 permit compliance.

4.2.2 Blanks

In accordance with EPA guidelines, positive sample results should be reported unless the concentration of the compound in the project sample is less than or equal to 10 times (10x) the amount in any blank for metals and the common organic laboratory contaminants (methylene chloride, acetone, 2-butanone, cyclohexane, and phthalate esters), or 5 times (5x) the amount for other target compounds. Target compounds were not detected in associated blank samples (trip, equipment, method) prepared and analyzed concurrently with the project samples, except for the following:

Analysis	Sample	Analyte	Concentration (µg/L)	Samples Affected, Comments
200.8	FDBLANK	Copper Zinc	0.263 0.656	SG-040 copper results qualified with JB, all other sample results > 10x FDBLANK result

4.2.3 System Monitoring Compounds

System monitoring/surrogate compounds are added to each sample prior to analysis of organic parameters by EPA methods 8270-SIM and 515.4 to confirm the efficiency of the sample preparation procedure. The calculated recovery for each surrogate compound was evaluated to confirm the accuracy of the reported results. All surrogate recoveries were within the acceptance limits specified in the QAPP.

4.2.4 Laboratory Control Samples

For Laboratory Control Samples (LCSs), samples of deionized water are analyzed following the addition of a known amount of analyte in order to confirm the ability of the analytical instrument to accurately quantify target compounds. LCSs were analyzed at the appropriate QAPP-specified frequency. Additionally, all LCS recoveries were within the acceptance limits for accuracy specified in the QAPP.

4.2.5 Matrix Spike/Matrix Spike Duplicates

For Matrix Spikes (MS)/Matrix Spike Duplicates (MSD), stormwater samples are analyzed following the addition of a known amount of analyte in order to evaluate any matrix effects that interfere with the ability of the analytical instrument to accurately quantify target compounds. Typically, results are not qualified based on MS/MSD results alone unless recoveries are well outside control limits. MS/MSDs were analyzed at the appropriate QAPP-specified frequency. Additionally, all MS recoveries and MS/MSD relative percent differences (RPDs) were within the acceptance limits for accuracy specified in the QAPP except as noted below:

Analysis	Batch	Samples Affected	Comments
8270-SIM	B16J244	none	Pentachlorophenol MS/MSD results (229%/239%) above laboratory acceptance limit. Pentachlorophenol QC included in this report though no sample results were reported by 8270-SIM as pentachlorophenol is reported by method 515.4.
515.4	B16K275	none	Acifluorfen (138%) recovery slightly high, analyte not detected, no action taken.
8270-SIM	B16J408	none	Numerous MS/MSD recoveries outside laboratory acceptance limits, source sample from different project, no action taken.
515.4	B16K115	none	Acifluorfen (304%) and Dinoseb (155%) recoveries slightly high, analytes not detected, no action taken.

4.2.6 Duplicates

Field and laboratory duplicate samples were analyzed at the appropriate frequency and all recoveries were within the range specified in the QAPP.

4.3 Data Usability Summary

Appropriate sample collection and analytical methods were used for all samples and analyses, ensuring good comparability with other data. Analytical accuracy and precision were determined to be generally acceptable, with noted exceptions. Qualifiers were assigned based on other analytical QC results that exceeded project data quality criteria.

All other data reported should be considered valid as reported, representative of the samples collected, and acceptable for further use.

5.0 REFERENCES

City of Portland Bureau of Environmental Services (BES). 2015. *Quality Assurance Project Plan* - Stormwater Underground Injection Control System Monitoring. Prepared for Oregon Department of Environmental Quality (ODEQ). August 2006, revised March 2015.

City of Portland Bureau of Environmental Services (BES). 2015. *Final Stormwater Discharge Monitoring Plan* – consists of *Sampling and Analysis Plan* and *Quality Assurance Project Plan*. Prepared for Oregon Department of Environmental Quality (ODEQ). August 2006, revised March 2015.

EPA 2002. Guidance on Environmental Data Verification and Data Validation. EPA-240-R-02-004 (EPA QA/G-8). Office of Environmental Information. November 2002.

EPA 2014a. USEPA National Functional Guidelines for Superfund Inorganic Methods Data Review. EPA-540-R-14-001 (OSWER 9335.0-131). Office of Superfund Remediation and Technology Innovation (OSTRI). August 2014.

EPA 2014b. USEPA Contract Laboratory Program National Functional Guidelines for Organic Superfund Data Review. EPA-540-R-14-002 (OSWER 9335.0-132). Office of Superfund Remediation and Technology Innovation (OSTRI). August 2014.

6.0 GENERAL

This summary report was prepared by the IMS sections of BES. For any questions concerning this report, contact Aaron Wieting at 503-823-5437.

Date of Final Report: July 24, 2017

Prepared by: Aaron B. Wieting, R.G., BES IMS

Reviewed by: Joel Bowker, R.G., BES UIC Program

TABLE 1: UIC Permit Year 12 Monitoring Locations

Location Code	Location Address	Traffic	Node
SG-022	11246 SE Harold St	>1000	AMY402
SG-024	12830 SE Holgate Blvd	>1000	ADT454
SG-025	12010 SE Reedway St	< 1000	ADV196
SG-026	5712 SE 103rd Ave	>1000	AMT874
SG-027	11501 SE Foster Rd	>1000	ADW303
SG-029	5500 SE 121st Ave	>1000	ADU735
SG-031	8111 NE Holman St	< 1000	ADV384
SG-032	13658 SE Cora St	< 1000	ADT474
SG-033	5423 SE 121st Ave	< 1000	ADU734
SG-036	5544 SE 128th Ave	>1000	ADT689
SG-038	11134 SE Steele St	< 1000	ADU731
SG-039	5918 SE 122nd Ave	>1000	ADV203
SG-040	12920 SE Holgate Blvd	>1000	ADT453
SG-044	4406 SE 135th Ave	< 1000	AMX686
SG-045	12532 SE Ellis St	< 1000	ADT688

TABLE 2: UIC Permit Year 12 Field Duplicate Precision

Constituent	Units	Precision	SG-025			SG-036		
		DQO	Primary	DUP	RPD	Primary	DUP	RPD
Benzo(a)pyrene	µg/L	50	< 0.01	< 0.01	**0.0**	0.018	0.019	**5.4**
DEHP	µg/L	50	1.3	1.2	**8.0**	0.85	0.81	**4.8**
Copper	µg/L	20	7.54	7.59	**0.7**	4.54	4.68	**3.0**
Lead	µg/L	20	3.25	3.33	**2.4**	0.942	0.98	**4.0**
Pentachlorophenol	µg/L	30	0.08	0.077	**3.8**	0.43	0.415	**3.6**
Zinc	µg/L	20	23.3	23.4	**0.4**	19.1	19.8	**3.6**
Notes:								
RPD = Relative Percent Difference								
DEHP = bis 2-ethylhexyl phthalate								