Appendix D

Year 5 (2015 Permit), Stormwater Discharge Monitoring Data, Shallow Groundwater UICs

This report presents the stormwater discharge monitoring data collected in Year 5 (July 1, 2019, to June 30, 2020) of the City of Portland (City) 2015 Water Pollution Control Facilities (WPCF) Permit No. 102830 for Class V Stormwater Underground Injection Control Systems (UICs). Year 5 (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 5 Monitoring Locations
    - Chemical Analysis
3. Results, Exceedances, and Response Actions
4. Analytical Data Validation

As required in Schedule B.5 of the 2015 Permit, data provided in the analytical laboratory reports are included as Table 2. A CD of the laboratory reports and an Excel spreadsheet are also included.

Introduction

The City has prepared this report to be included as part of the UIC Management Plan annual report in compliance with Schedule B.5 its 2015 WPCF Permit.[1] The Oregon Department of Environmental Quality (DEQ) issued the City's second 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.[2] 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 regulations.

[1] The full name of the permit is the Water Pollution Facilities Permit for Class V Stormwater Underground Injection Control Systems.

[2] Areas of shallow groundwater refer to locations where UICs have < 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 USGS Report 2008-5059, *Estimated Depth to Ground Water and Configuration of the Water Table in the Portland, Oregon, Area* (2008), http://pubs.usgs.gov/sir/2008/5059.

Sampling Design

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

There are approximately 120 UICs located in areas of shallow groundwater. Over the length of the 2015 Permit, a sample of 75 UICs was selected from the list of UICs located in shallow groundwater. The 75 UICs were broken up 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 61 percent of the UICs located in shallow groundwater will be sampled at the end of the 10-year period. A finite population correction[3] will reduce the width of confidence intervals associated with this design by almost 50 percent, 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[4] was used to select the 75 locations from the list of UICs in areas of shallow groundwater. The 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 allows for simplifying the implementation of a sample design when some UICs are not suitable for sampling. A GRTS sample draw is an ordered list of sample locations that can be evaluated for sampling sequentially. The first 75 UICs on the list that are suitable for sampling are used as the sample, with sequential blocks of 15 UICs making up each of the five panels. For the purpose of 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.[5]

Year 5 Monitoring Locations

Year 5 (2015 Permit) monitoring locations are 15 shallow groundwater sites developed in accordance with the SDMP (Table 1, Figure 1, and Figure 2, attached). On November 13th, 2019, the City submitted to DEQ a letter that listed the 15 sites to be sampled. This letter explains why, based on presampling field inspections, 10 sites (SG-075, SG-076, SG-082, SG-091, SG-093, SG-097, SG-100, SG-101, SG-106, and SG-107) were removed and replaced in accordance with

---

[3] When sampling more than approximately 5 percent 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).

[4] 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 the U.S. Environmental Protection Agency, the City utilized the GRTS design to select its UIC stormwater monitoring program locations sampled for 2005 Permit compliance.

[5] 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).

2015 Sampling and Analysis Plan procedures. See Table 1 and Figures 1 and 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 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 2. All laboratory data sheets are included on a CD included with this report. Review of the data indicated no Permit Table 1 Action Levels were exceeded, and 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 Quality Assurance Project Plan were achieved, and they were determined to be acceptable and usable. A data usability report is attached.

Attachments:

- Table 1 - Year 5 (2015 Permit) UIC Monitoring Location Information
- Table 2 - Year 5 (2015 Permit) Monitoring Results
- Figures 1 and 2 - Year 5 (2015 Permit) UIC Monitoring Location Site Maps
- Data Usability Report
- CD containing lab data sheets and Microsoft Excel database

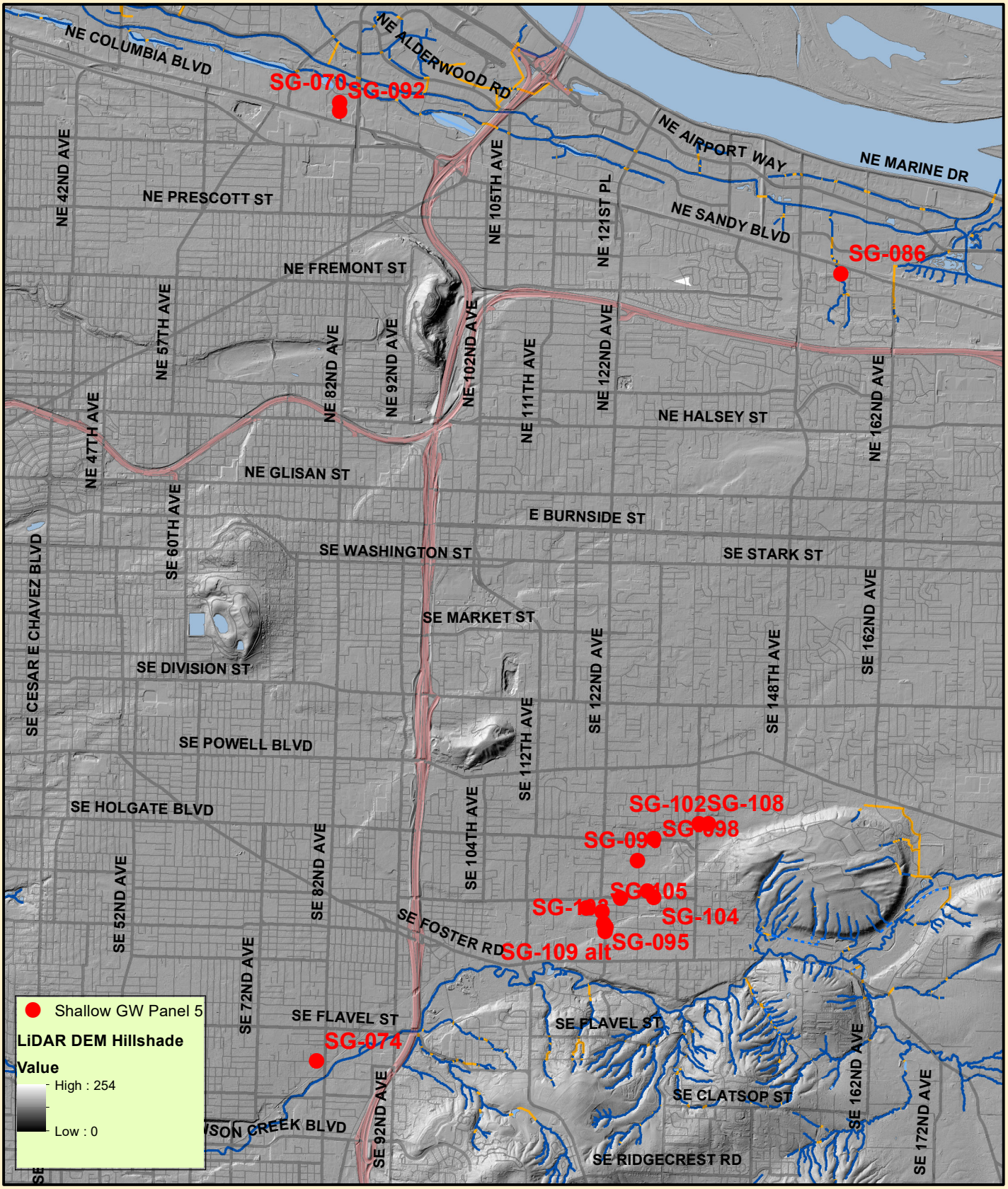

Figure 1
Year 5 (2015 Permit) UIC Monitoring Locations

ENVIRONMENTAL SERVICES
CITY OF PORTLAND

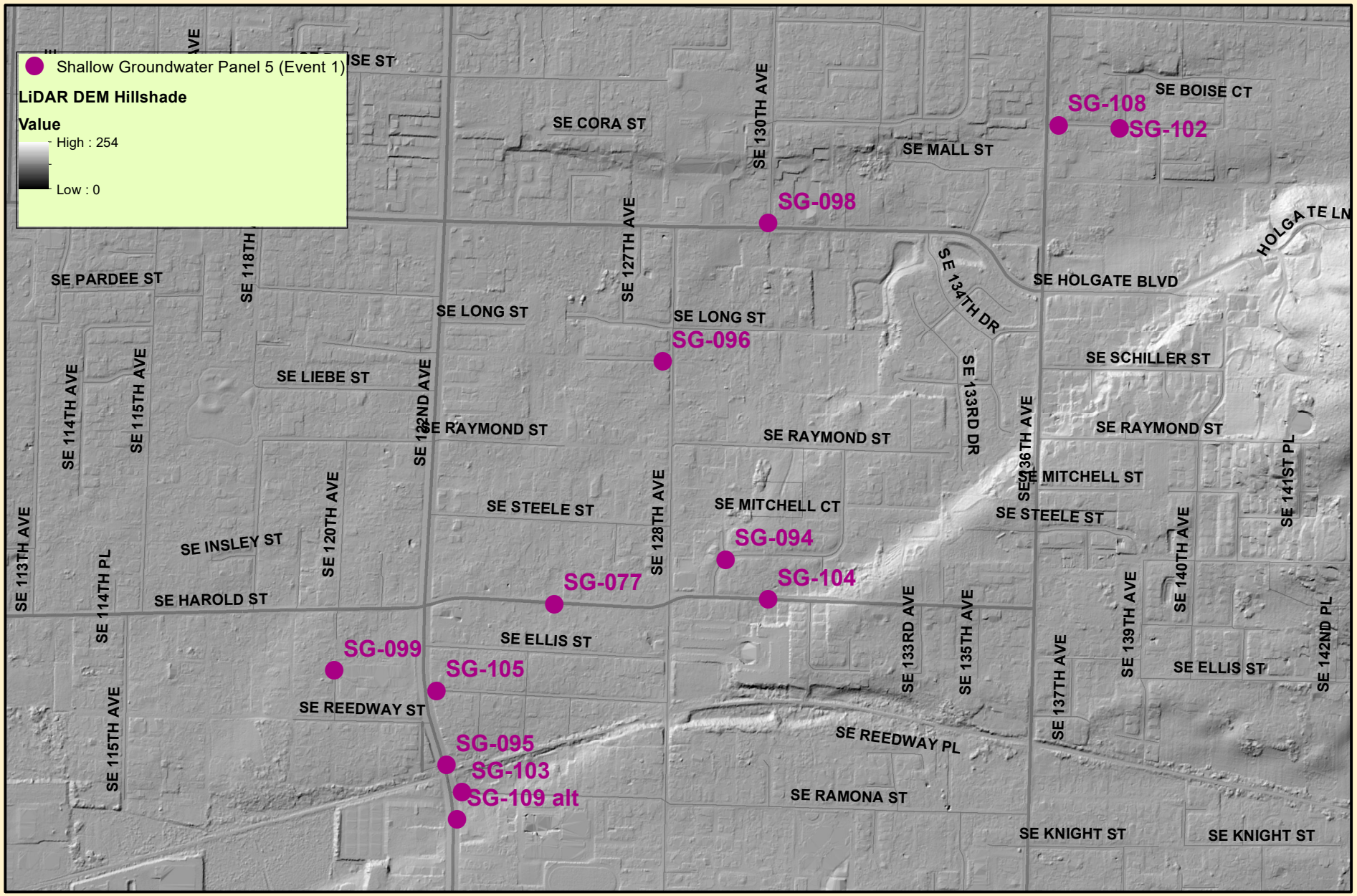

Figure 2
Year 5 (2015 Permit) UIC SE Monitoring Locations

ENVIRONMENTAL SERVICES
CITY OF PORTLAND

Table 1: Year 5 (2015 Permit) UIC Monitoring Locations

Site ID	Approximate Address	DEQ UIC ID	BES UIC ID	Latitude	Longitude	Traffic Category (TPD)	UIC Depth (feet)	Pretreatment System	Verticle Separation Distance(ft)	Distance to Nearest Well (ft)	Within Two-year Time of Travel from public drinking water well?
SG-070	6135 NE 80TH AVE	10102-9787	AQT758	45.56728363	-122.58050537	> 1000	13.4'	Sed MH	-10	2160	NO
SG-074	8100 SE CRYSTAL SPRINGS BLVD	10102-5347	AMR553	45.46509552	-122.58024597	< 1000	30'	Sed MH	-13	1136	NO
SG-077	12500 SE HAROLD ST	10102-232	AMS283	45.48330688	-122.53488159	> 1000	25'	Sed MH	-5	1986	NO
SG-086	3734 NE 154TH AVE	10102-4041	ADR048	45.55039215	-122.50386047	< 1000	30.2'	Sed MH	3	734	NO
SG-092	6015 NE 80TH AVE	10102-9786	AQT757	45.56639480	-122.58049774	> 1000	25.4'	Sed MH	-14	2399	NO
SG-094	12908 SE MITCHELL ST	10102-5938	ADU758	45.48411178	-122.53086853	< 1000	21'	No Sed MH	3	1173	NO
SG-095	5732 SE 122ND AVE	10102-9795	AQT782	45.48059082	-122.53733062	> 1000	25.4'	Sed MH	-8	1525	NO
SG-096	12780 SE SCHILLER ST	10102-5924	ADU743	45.48738098	-122.53247070	> 1000	15.4'	Sed MH	1	898	NO
SG-098	4425 SE 130TH AVE	10102-9811	AQT807	45.48972702	-122.53005981	> 1000	11	Sed MH	5	999	NO
SG-099	5605 SE 120TH AVE	10102-5270	ADV197	45.48211669	-122.54003906	< 1000	26'	No Sed MH	-5	680	NO
SG-102	13722 SE CORA ST	10102-6332	ADT472	45.49144363	-122.52182769	< 1000	19'	Bioswale, Sed MH	1	551	NO
SG-103	12230 SE RAMONA ST	10102-5289	ADT683	45.48014068	-122.53694915	> 1000	19.5'	Sed MH	-3	1592	NO
SG-104	13000 SE HAROLD ST	10102-5936	ADU755	45.48346710	-122.52983856	> 1000	29'	Sed MH	-3	1307	NO
SG-105	12221 SE REEDWAY ST	10102-5295	ADT690	45.48181915	-122.53762054	> 1000	27'	Sed MH	-7	1308	NO
SG-108	13612 SE CORA ST	10102-6331	ADT471	45.49146652	-122.52326202	> 1000	21'	No Sed MH	-1	778	NO

Table 2: Permit Required 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-070	6135 NE 80th Ave (>1000)	>1000	AQT758	12/19/19 14:27	=	0.128	=	2.2	=	0.013	=	5.79	=	1.44	=	28
SG-074	8100 SE Crystal Springs Blvd	<1000	AMR553	9/17/19 9:39	=	0.167	=	2.2	=	0.014	=	11	=	4.33	=	83.1
SG-077	12500 SE Harold St (>1000)	>1000	AMS283	12/19/19 13:03	=	0.157	=	1.9	=	0.019	=	2.98	=	1.17	=	16.4
SG-086	3734 NE 154th Ave (<1000)	<1000	ADR048	12/19/19 13:30	=	0.032	=	0.66	<	0.01	=	3.24	=	0.748	=	14.3
SG-092	6015 NE 80th Ave (>1000)	>1000	AQT757	1/6/20 10:07	=	0.16	=	3.8	=	0.021	=	8.8	=	3.26	=	52.2
SG-094	12908 SE Mitchell St (<1000)	<1000	ADU758	12/12/19 12:17	=	0.121	=	1.6	=	0.015	=	3.49	=	1.6	=	18.6
SG-095	5732 SE 122nd Ave (>1000)	>1000	ADW321	1/6/20 10:57	=	0.163	=	9.7	<	0.05	=	14.1	=	5.18	=	67.8
SG-096	12780 SE Schiller St (>1000)	>1000	ADU743	12/12/19 11:46	=	0.08	=	1	=	0.026	=	5.7	=	2.96	=	28.5
SG-098	4425 SE 130th Ave (>1000)	>1000	AQT807	12/12/19 13:40	=	1.04	=	4.8	=	0.046	=	11.2	=	7.73	=	61.4
SG-098 DUP	4425 SE 130th Ave (>1000)	>1000	AQT807	12/12/19 13:40	=	1.02	=	5.1	=	0.046	=	11.4	=	7.59	=	60.8
SG-099	5605 SE 120th Ave (<1000)	<1000	ADV197	12/12/19 12:51	=	1.26	=	6.2	=	0.052	=	20.3	=	19	=	126
SG-102	13722 SE Cora St (<1000)	<1000	ADT472	12/12/19 13:21	=	0.535	=	2.8	=	0.033	=	6.83	=	4.64	=	33.9
SG-103	12230 SE Ramona St (>1000)	>1000	ADT683	12/12/19 11:54	=	0.58	=	5.5	=	0.019	=	11.7	=	4.66	=	57.8
SG-103 DUP	12230 SE Ramona St (>1000)	>1000	ADT683	12/12/19 11:54	=	0.581	=	6.6	=	0.022	=	11.5	=	4.33	=	56.2
SG-104	13000 SE Harold St (>1000)	>1000	ADU755	12/12/19 13:00	=	0.088	=	5.2	=	0.097	=	13.4	=	6.34	=	61.9
SG-105	12221 SE Reedway St (>1000)	>1000	ADT690	12/12/19 11:18	=	0.251	=	1.9	=	0.015	=	5.83	=	1.85	=	30.7
SG-108	13612 SE Cora St (>1000)	>1000	ADT471	12/12/19 11:02	=	0.249	=	7.6	=	0.039	=	14.5	=	11.2	=	87.3

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

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

YEAR 15 MONITORING
SEPTEMBER 2019 – JANUARY 2020

1.0 INTRODUCTION

Analytical results for stormwater samples collected during Permit Year 5 of the 2015 Water Pollution Control Facilities (WPCF) Permit (PY 15) 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 2017a, 2017b) for guidance in evaluating the following:

- Field practices, field quality control (QC) samples, daily activity logs, and sample collection logs;
- Sample chain of custody (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 September 17, 2019 through January 6, 2020. Sample locations 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 15. Laboratory procedures were performed in general accordance with the QAPP except as noted below. The permit-required analytes measured during PY15 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 PY15 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 quality control (QC) analyses. Typically, a laboratory will choose samples at random for matrix spike / matrix spike duplicate (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. Several UICs that were in the original work order were replaced as they were part of multi-UIC systems that had been sampled in previous years. Samples SG-070, SG-074, and SG-092 had to be sampled from the sedimentation manholes

instead of the UICs. All three locations are former UICs which had no sedimentation manhole and were converted to sedimentation manholes with a new UIC downstream. However, the former UICs were not sealed properly and the new UICs did not receive flow during sampling efforts.

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 15 Event reporting are listed below:

J	Estimated concentration
J+	Estimated, possible/probable high bias
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, relative percent differences (RPDs) for field duplicates are only calculated for UIC permit-required analytes. This review also includes parameters collected for municipal separate storm sewer system (MS4) permit compliance. Additional review may be 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 Permit action levels 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, a laboratory control sample (LCS) duplicate 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 PY15 permit compliance except for the following:

Analysis	Sample	Samples Affected, Comments
365.2	MS3	None, lab reanalyzed MS3 sample slightly outside hold time, source sample from different project, MS2 recovery acceptable and analyzed within hold time.

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
8270-SIM	Method blank (B19I326)	Naphthalene	> ½ MRL	SG-074 result JB-qualified for blank result < sample result, matrix spike results also above acceptance limit
8270-SIM	Method blank (B19L357)	Fluorene, Naphthalene, Di-n-octyl phthalate	> ½ MRL, > ½ MRL, 0.84	SG-086 Fluorene and Naphthalene detections qualified with "JB", no other action taken.

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 except as noted below:

Analysis	Batch	Samples Affected	Comments
515.4	B19L353	none	2,4-Dichlorophenylacetic acid result (141%) slightly above laboratory acceptance limit for LCS, LCS results acceptable, no action taken.
515.4	B19L354	none	2,4-Dichlorophenylacetic acid result (133%) slightly above laboratory acceptance limit for LCS, LCS results acceptable, no action taken.

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 except for the following:

Analysis	Batch	Samples Affected	Comments
515.4	B19L354	none	Acifluorfen (175%) and Dinoseb (176%) recoveries above laboratory acceptance limit, analytes not detected, no action taken.

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 RPDs were within the acceptance limits for accuracy specified in the QAPP except as noted below:

Analysis	Batch	Samples Affected	Comments
8270-SIM	B19I326	SG-074	Naphthalene MS2 result (135%) slightly above laboratory acceptance limit. Associated sample result qualified due to low-level blank contamination, no additional action taken.
8270-SIM	B19L181	none	Chrysene MSD result (140%) slightly above laboratory acceptance limit, source sample from different project, RPD acceptable, no other QC issues, no action taken.
SM5310B	B19L351	none	Total organic carbon MS1 (68%) result below laboratory acceptance limit. Source sample from different project, MS2 recovery acceptable, no action taken.
515.4	B19L354	none	Acifluorfen (182%) and Dinoseb (191%) MS 1recoveries above laboratory acceptance limit, analytes not detected, no action taken.
8270-SIM	B19L356	none	Acenaphthylene (140%) and Naphthalene (139%) MSD results slightly above laboratory acceptance limits. RPDs acceptable, no other QC issues, no action taken.
8270-SIM	B19L357	none	Di-n-octyl phthalate (202%/210%) MS/MSD results slightly above laboratory acceptance limits. RPDs acceptable, associated detections qualified with “J+” due to high CCV results.
515.4	B20A219	none	Acifluorfen (162%) and Dinoseb (171%) MS1 recoveries above laboratory acceptance limit, 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 except as noted below:

Analysis	Batch, Sample	Analyte	Concentration (µg/L)	Samples Affected, Comments
365.2	B19L198, Other project	Orthophosphate	< 0.020/0.22 (NA)	Laboratory duplicate RPD failed, results < 5x MRL, no action taken.
SM5310B	B19L391, Other project	Carbon, total Organic	12.6/17.6 (33%)	Laboratory duplicate RPD failed, source sample from different project, 2nd duplicate RPD acceptable, no action taken.
WPCL SOP10	B19L455, Other project	Mercury, dissolved	0.000626/0.000852 (31%)	Laboratory duplicate RPD failed, source sample from different project, results < 5x MRL, no action taken.
WPCL SOP10	B20A079, Other project	Mercury, dissolved	0.000815/0.000607 (29%)	Laboratory duplicate RPD failed, source sample from different project, results < 5x MRL, no action taken.
WPCL SOP10	SG-103	Mercury, dissolved	0.00104/0.0013 (20.7%)	Field duplicate RPD failed, results < 5x MRL, no action taken.

4.2.7 Other QC Issues

Continuing calibration verification (CCV) results were high in several batches for butyl benzyl phthalate, di-n-butyl phthalate, di-n-octyl phthalate, and bis(2-ethylhexyl)phthalate. Di-n-octyl phthalate and bis(2-ethylhexyl)phthalate detections for samples SG-070, SG-077, SG-086, SG-094, SG-096, SG-098, SG-099, SG-098DUP, SG-102, SG-103, SG-103DUP, SG-104, SG-105, SG-108 were qualified with "J+" for estimated, potential high bias. The other analytes were not detected and no other action was taken.

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 2017a. USEPA National Functional Guidelines for Superfund Inorganic Methods Data Review. EPA-540-R-2017-001 (OLEM 9335.0-135). Office of Superfund Remediation and Technology Innovation (OSTRI). January 2017.

EPA 2017b. USEPA Contract Laboratory Program National Functional Guidelines for Organic Superfund Data Review. EPA-540-R-2017-002 (OLEM 9335.0-136). Office of Superfund Remediation and Technology Innovation (OSTRI). January 2017.

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: May 1, 2020

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

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

TABLE 1: UIC Permit Year 15 Monitoring Locations

Location Code	Location Address	Traffic	Node
SG-070	6135 NE 80th Ave	>1000	AQT758
SG-074	8100 SE Crystal Springs Blvd	<1000	AMR553
SG-077	12500 SE Harold St	>1000	AMS283
SG-086	3734 NE 154th Ave	<1000	ADR048
SG-092	6015 NE 80th Ave	>1000	AQT757
SG-094	12908 SE Mitchell St	<1000	ADU758
SG-095	5732 SE 122nd Ave	>1000	ADW321
SG-096	12780 SE Schiller St	>1000	ADU743
SG-098	4425 SE 130th Ave	>1000	AQT807
SG-099	5605 SE 120th Ave	<1000	ADV197
SG-102	13722 SE Cora St	<1000	ADT472
SG-103	12230 SE Ramona St	>1000	ADT683
SG-104	13000 SE Harold St	>1000	ADU755
SG-105	12221 SE Reedway St	>1000	ADT690
SG-108	13612 SE Cora St	>1000	ADT471

TABLE 2: UIC Permit Year 15 Field Duplicate Precision

UIC Permit Monitoring Year 15 September 17, 2019 - January 6, 2020 Field Duplicate Precision								
Constituent	**Units**	**Precision**	**SG-098**			**SG-103**		
		DQO	**Primary**	**DUP**	**RPD**	**Primary**	**DUP**	**RPD**
Benzo(a)pyrene	µg/L	50	0.046	0.046	**0.0**	0.019	0.022	**14.6**
DEHP	µg/L	50	4.8	5.1	**6.1**	5.5	6.6	**18.2**
Copper	µg/L	20	11.2	11.4	**1.8**	11.7	11.5	**1.7**
Lead	µg/L	20	7.73	7.59	**1.8**	4.66	4.33	**7.3**
Pentachlorophenol	µg/L	30	1.04	1.02	**1.9**	0.58	0.581	**0.2**
Zinc	µg/L	20	61.4	60.8	**1.0**	57.8	56.2	**2.8**

Notes:

RPD = Relative Percent Difference

DEHP = bis 2-ethylhexyl phthalate