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April 27, 2018

Mr. Bob Schwarz
Oregon Department of Environmental Quality
Eastern Region
400 E. Scenic Drive, Suite 307
The Dalles, Oregon 97058

SUBJECT: Submittal of 2017 Annual Environmental Monitoring Report
Riverbed Landfill Solid Waste Disposal Site Permit No. 345
Yamhill County, Oregon

Dear Mr. Schwarz:

This letter accompanies the enclosed two copies of the 2017 annual environmental monitoring report (AEMR) for the Riverbend Landfill (RL) and provides a Statement of Compliance, per Section 17.3 of RL's Solid Waste Disposal Permit (SWDP) 345 issued to Riverbend Landfill Co. (RLC) from Oregon Department of Environmental Quality (DEQ) on December 3, 1999.

SCS Engineers (SCS), in Portland, Oregon prepared the 2017 AEMR at the request of RLC. The 2017 AEMR presents and evaluates the RL environmental monitoring data in 2017, consistent with the RL's SWDP and DEQ-approved environmental monitoring plan (EMP) dated December 2014.

Statement of Compliance Per Section 17.3 of SWDP

Evaluation of the 2017 compliance groundwater monitoring data did not identify any significant change in groundwater quality at RL's point-of-compliance boundary, as defined in the site's SWDP and EMP, which has not been previously reported to and addressed with the DEQ.

Comparison of the 2017 compliance groundwater analytical results to the EMP-required data evaluation standards, which include prescriptive or statistically-derived concentration limits, showed the following notable results:

- No verified concentrations of volatile organic compounds (i.e., action limits or permit-specific concentration limits) were detected in groundwater samples collected from the site compliance wells in 2017, consistent with historical results.

- Three or more inorganic parameters were not detected at concentrations above their respective site-specific limits in site compliance wells during a single semiannual monitoring event, except for well MW-12A. An informal preliminary assessment of MW-12A groundwater quality, originally initiated in 2016, continued in 2017 to evaluate the source of the change in MW-12A inorganic groundwater quality. Results of the IPA will be reported to the DEQ in May 2018 under separate cover.

- Nitrate-nitrite was detected above its primary groundwater quality standard (i.e., Oregon numerical groundwater quality reference level) in the MW-12A sample collected in November 2017. Nitrate-nitrite concentrations above the primary standard in MW-12A groundwater have previously been reported to the DEQ and are being further evaluated as part of the on-going IPA of MW-12A groundwater quality.

- Consistent with previous results reported to the DEQ, dissolved iron, dissolved manganese, and/or total dissolved solids were detected at concentrations above their secondary groundwater quality standards (i.e., Oregon numerical groundwater quality guidance levels) in groundwater samples collected from a subset of site compliance wells in 2017. Conclusions from past evaluations of site groundwater have attributed the concentrations of these parameters in site groundwater to be reflective of natural variation in groundwater chemistry.

Please contact me (602) 757-3352 if you have any questions related to the contents of the AEMR.

Sincerely,

James L. Denson, Jr.
PNW/BC Environmental Protection Manager

Enclosure – RL's 2017 AEMR (hardcopy and electronic)

Cc (w/enclosure): Marc Stevens, DEQ
Sherrie Mathison, Yamhill County
Greg Hemmen, WM
Morgan Ireland, WM
Mark Verwiel, WM
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SCS ENGINEERS

2017 Annual Environmental Monitoring Report

Riverbend Landfill
McMinnville, Oregon

Prepared for:

Riverbend Landfill Co.
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WASTE MANAGEMENT

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April 27, 2018
File No. 04208022.18

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McMinnville, Oregon

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Appendix A Historical Groundwater Elevation Data (including Hydrographs), and Field Water Quality Monitoring Results for Groundwater and Leachate Management System Samples

Appendix F Geochemical Diagrams (Piper [Trilinear] and Stiff Plots) for Groundwater and Leachate Management System Samples

Appendices listed below are only provided in electronic format on the compact disc (CD) attached to this report:

Appendix B Field Documentation

Appendix C 2017 Laboratory Analytical Reports (Including Chain-of-Custody Forms, Cation-Anion Balance Data, and Laboratory QA/QC Documentation) and TestAmerica Laboratories ORELAP Certification

Appendix D Results of Field and Laboratory QA/QC Review

Appendix E Time-Concentration Graphs of 2017 and Historical Groundwater, Surface Water, and Leachate Management System Samples Analytical Data

ACRONYMS AND ABBREVIATIONS

AEMR	annual environmental monitoring report
Alexin	Alexin Analytical Laboratories, Inc.
Ca	calcium
CD	compact disk
Cl	chloride
COC	chain of custody
DEQ	Oregon Department of Environmental Quality
DO	dissolved oxygen
EMP	environmental monitoring plan
Fe	iron
FGPM	Final Grading Plan Modificaiton
FSDS	field sampling data sheet
ft/ft	feet per foot
ft/yr	feet per year
gal/acre/day	gallons-per-acre-per-day
GCCS	gas collection and control system
GEM	CES LandTec GEM™ 2000 or 5000 Landfill Gas Analyzer
HCO_3	bicarbonate alkalinity
K	potassium
LCRS	leachate collection and removal system
LDS	secondary leak detection system
LEL	lower explosive limit
LFG	landfill gas
LMS	leachate management system
MEK	2-butanone
Mg	magnesium
mg/L	milligrams per liter
Mn	manganese
MSE	mechanically stabilized earthen
Na	sodium
NGQGL	numerical groundwater quality guidance level
NGQRL	numerical groundwater quality reference level
ORELAP	Oregon Environmental Laboratory Accreditation Program
ORP	oxidation-reduction potential
PQL	practical quantitation limit
QA/QC	quality assurance/quality control
SCS	SCS Engineers
RL	Riverbend Landfill
RLC	Riverbend Landfill Co.
SM	Standard Methods
SMP	stability monitoring plan
SO_4	sulfate
SSL	site-specific concentration limit
S.U.	standard units

ACRONYMS AND ABBREVIATIONS (CONTINUED)

SWDP	solid waste disposal site permit
TestAmerica	TestAmerica Laboratories, Inc.
TDS	total dissolved solids
TICs	tentatively identified compounds
TOC	total organic carbon
VOC	volatile organic compound
WBZ	water-bearing zone
WM	Waste Management

EXECUTIVE SUMMARY

This annual environmental monitoring report presents and evaluates monitoring data for groundwater, surface water, leachate management system (LMS) liquids (leachate and secondary leak detection system [LDS] liquids), and landfill gas (LFG) collected during 2017 at Riverbend Landfill (RL) in Yamhill County, Oregon. Monitoring and reporting were performed in 2017 consistent with the requirements of (1) RL's solid waste disposal site permit 345, issued by the Oregon Department of Environmental Quality (DEQ) on December 3, 1999, and subsequent addenda, and (2) RL's approved environmental monitoring plan (SCS Engineers [SCS], 2014b).

Results and Conclusions

Compliance Well Groundwater Quality

Analytical results of groundwater samples collected in 2017 from the site's compliance monitoring well network did not indicate a potential change in groundwater quality related to a release from the facility, except for MW-12A analytical results that is further discussed below. Confirmed concentrations of volatile organic compounds (VOCs) were not detected in compliance well groundwater samples in 2017. The concentrations of three or more site-specific inorganic parameters were not detected above their respective statistically-derived site-specific limits (SSLs) in any groundwater samples collected from a single compliance well during a semiannual monitoring event in 2017, except in MW-12A groundwater samples as described below.

MW-12A Groundwater Quality Informal Preliminary Assessment

The informal preliminary assessment (IPA) activities continued in 2017 to further evaluate the source of changes in the inorganic chemistry of groundwater samples collected from well MW-12A, consistent with a DEQ-approved work plan (SCS, 2017a). An interim report providing a preliminary evaluation of the first phase of the IPA was submitted to the DEQ in October 2017 (SCS, 2017d). The interim IPA results indicated that the source of the change in the inorganic chemistry of MW-12A groundwater is not related to the site's LMS, but is likely related to the influence of surface water that seasonally ponds in the area near and north of MW-12A.

Consistent with the work plan, IPA activities continued through the first quarter 2018. A final report presenting the results and findings of the IPA will be provided to the DEQ under separate cover. The final IPA report is due by May 27, 2018, which is 60 days after receipt of the first quarter 2018 final laboratory analytical report, consistent with the schedule in the work plan.

MW-5A and MW-5B Groundwater Quality

Low-level concentrations of VOCs were detected in groundwater samples collected from detection monitoring well MW-5A in 2017, consistent with previous results. Results of a remedial investigation performed in 1993 demonstrated that LFG is the source of VOCs impacting groundwater in the shallow water-bearing zone (WBZ) in the MW-5A area. The concentrations of VOCs detected historically in MW-5A have significantly decreased in response to active LFG collection at RL. Confirmed concentrations of VOCs were not detected in the groundwater sample collected in 2017 from detection well MW-5B (located adjacent to MW-5A and screened in the deep WBZ) or in compliance wells located hydraulically downgradient of MW-5A (including MW-12A), consistent with historical results.

MW-5A inorganic groundwater quality was further evaluated in 2017, as part of the MW-12A IPA, and in response to an increasing trend identified for field-measured conductance. This evaluation included non-routine (i.e., not required by the EMP) sampling and analysis of select inorganic parameters in groundwater sample collected from MW-5A. Results of the evaluation suggest that the source of the increasing conductance and other inorganic parameters is not related to the site's LMS, but is likely related to the same influence of surface water that seasonally ponds in the area south of MW-5A (i.e., north of MW-12A) that is attributed to the change of inorganic chemistry of MW-12A groundwater.

Groundwater Quality in Poplar Tree Farm Detection Wells and Piezometers

Analytical results of groundwater samples collected in 2017 from detection wells MW-19A and MW-20A located downgradient of the south and north poplar tree farm areas, respectively, continue to show incremental improvements (i.e., recent decreases or stabilized concentrations for inorganic parameters compared to historical increasing trends) in localized water quality in the shallow WBZ at these locations. These improvements are likely related to the suspension of leachate irrigation in the poplar tree farm areas in 2013. It should also be noted that no changes in groundwater quality were observed in the samples collected from MW-20B screened in the deep WBZ adjacent to MW-20A, consistent with historical results.

As part of a continued evaluation of the groundwater quality near MW-20A, RL routinely monitors groundwater quality at piezometer P-07A located south of MW-20A. Laboratory results of groundwater samples collected from P-07A in 2017 (and since 2012) indicate that chloride concentrations are significantly lower than recent chloride concentrations detected in MW-20A groundwater. Additionally, none of the increasing concentration trends identified in MW-20A groundwater were identified in P-07A groundwater, consistent with previous results.

Landfill Leachate Management Systems

The 2017 pumping volume data showed that the small volumes of liquids detected in and pumped from the LDSs (compared to the volumes pumped from the associated primary leachate collection and removal systems [LCRS]) are not attributed to leachate leakage through the primary liner systems. Analytical results of liquid samples collected from the LCRSs and LDSs in 2017 are generally consistent with historical results.

VOCs were not detected in liquid samples collected from LDS Sumps 4/5 S and 8 S. Low-level VOCs (acetone, benzene, and/or naphthalene) were detected in the LDS Sump 6/7 S liquid sample, which is consistent with previous results that have shown sporadic detections of these and other VOCs in this sump.

Four VOCs (acetone, benzene, 2-butanone [MEK], and toluene) were detected in the LDS Sump 9 S liquid sample. Detections of these VOCs, which are chemicals typically found in primers and adhesives used for constructing the LMS, are likely attributed to past construction and maintenance activities on the Module 9 LDS pumping and conveyance system. Acetone, MEK, and toluene detected in 2017 show significant decreases in concentrations compared to 2016 levels. As noted in the 2016 AEMR (SCS, 2017b), the concentrations of these VOCs are expected to attenuate relatively quickly. It should be noted that liquids that accumulate in the LDS sumps are pumped from the sumps and into RL's primary LCRS. These sporadic detections have not contributed to

groundwater quality changes as no changes in groundwater quality have occurred downgradient of Modules 6/7 and 9 at compliance monitoring well pair MW-16A/B and MW-21A/B, respectively.

Leachate Pond and Leachate Pond Secondary Detection System

An additional geomembrane liner was installed on the leachate pond in September/October 2017 to reduce the potential of leachate in the pond to transmit to the pond LDS sump. The following 2017 monitoring results that suggests this enhancement to be effective:

- Only 49 and 603 gallons were pumped from the pond LDS in November and December 2017, respectively, following construction of this additional liner. For comparison, 11,314 and 30,705 gallons were pumped from the leachate pond LDS in November and December 2016, respectively (SCS, 2017b). It is anticipated that liquid accumulation in the leachate pond LDS sump will continue to decrease over time.

- Elevated concentrations of acetone and MEK that were previously detected in leachate pond LDS liquid samples, including April 2017, were not detected in the November 2017 sample. The VOC signature in the April and November 2017 leachate pond samples were generally consistent with previous results, including elevated concentrations of acetone and MEK.

- Some indicator parameters (chemical oxygen demand, total organic carbon, and total dissolved solids) in the November 2017 leachate pond LDS sample showed notable decreases in concentrations compared to the April 2017 results.

Analytical results of liquid samples collected from the leachate pond and pond LDS in 2017 continued to show similarities in their ionic chemistries. Overall, the November 2017 leachate pond LDS sample analytical results suggest that the additional liner has been effective at reducing the potential for leachate to transmit into LDS sump. It is anticipated that the chemistry of the leachate pond LDS sump liquids will continue to show a different signature from the leachate pond samples over time.

The analytical results of groundwater samples collected from monitoring wells in the vicinity of the leachate pond (i.e., wells MW-14A/B, MW-21A/B, and MW-22A) did not show any changes in groundwater quality. These results indicate that liquids in the pond LDS sump are being effectively contained and removed, and that these liquids have not affected groundwater quality in the area near the leachate pond.

Landfill Gas Monitoring Results

Quarterly LFG monitoring performed in 2017 did not detect methane in the perimeter (compliance) LFG monitoring probes or in any facility structures above their respective regulatory compliance levels, consistent with previous results. The 2017 compliance LFG monitoring results continues to show that RL's management of the facility's LFG collection and control system has been effective at preventing lateral LFG migration in the subsurface at the compliance boundary and into facility structures.

1.0 INTRODUCTION

1.1 TERMS OF REFERENCE

This annual environmental monitoring report (AEMR), prepared by SCS Engineers (SCS), in Portland, Oregon, on behalf of Riverbend Landfill Co. (RLC), presents and evaluates monitoring data for groundwater, surface water, leachate management system (LMS) liquids, and landfill gas (LFG) collected during 2017 at Riverbend Landfill (RL) in Yamhill County, Oregon (Figure 1-1). The 2017 monitoring and reporting were consistent with the requirements in (1) RL's solid waste disposal site permit (SWDP) 345, issued by the Oregon Department of Environmental Quality (DEQ) on December 3, 1999 and subsequent addenda, and (2) RL's DEQ-approved environmental monitoring plan (EMP; SCS, 2014b).

SCS performed the 2017 compliance monitoring activities for groundwater, surface water, LMS liquids, and LFG. RL personnel were responsible for management and performance monitoring of the LMS in 2017. TestAmerica Laboratories (TestAmerica) in Denver, Colorado, analyzed all groundwater, surface water, and LMS liquid samples collected in 2017, except for the bacteria analyses (*E. coli* and fecal coliform) of surface water samples which were performed by Alexin Analytical Laboratories, Inc. (Alexin) in Tigard, Oregon.

1.2 SITE DESCRIPTION

RL is located approximately three miles southwest of McMinnville, Oregon, in Yamhill County (Figure 1-1). RL is owned and operated by RLC and is permitted by the DEQ to receive municipal solid waste and approved special waste.

The RL property is over 500 acres. Encompassed within the RL property is the active landfill and ancillary facilities, north and south poplar tree project, a former recreational vehicle park west to southwest of the landfill, and undeveloped land south of the landfill extending to the South Yamhill River (see Figure 1-2). Agricultural land surrounds the landfill site. The landfill has nine constructed modules (Modules 1 through 9) covering approximately 87 acres (see Figure 1-2). The north and south poplar tree farm areas occupy approximately 43 acres.

1.3 SIGNIFICANT 2017 ACTIVITIES

Significant site and monitoring activities performed at RL in 2017, some of which are not discussed elsewhere in this report, include the following:

- Submitted the 2016 AEMR to the DEQ (SCS, 2017b). The DEQ approved the 2016 AEMR in a letter dated June 8, 2017 (DEQ, 2017b) and noted that (1) the 2016 AEMR documented compliance with RL's EMP and the SWDP and (2) monitoring results did not indicate any significant change in groundwater quality at the compliance wells in 2016, except for well MW-12A (see next bullet).

- Continued an informal preliminary assessment (IPA) in 2017 to further evaluate the source of changes in the inorganic chemistry of groundwater samples collected from well MW-12A. An interim report providing a preliminary evaluation of the first phase of the IPA was submitted to the DEQ in October 2017 (SCS, 2017d). Consistent with the DEQ-approved IPA work plan (SCS, 2017a), IPA activities continued through the first quarter 2018. A final report presenting the results and findings of the IPA will be provided to the DEQ under separate cover in May 2018.

- Stormwater monitoring was conducted in 2017 under the provisions of RL's National Pollutant Discharge Elimination System Permit 1200-Z and RL's stormwater pollution control plan. The 2016-2017 (July 1, 2016 to June 30, 2017) stormwater monitoring results were reported to the DEQ in July 2017 (SCS, 2017c).

- Performed confirmation soil sampling on July 25 and August 23, 2017 in response to leachate spills identified at RL during construction activities on July 21 and August 23, 2017, respectively. Results of the confirmation soil sampling were reported to the DEQ on August 16, 2017 (WM, 2017a) and September 21, 2017 (WM, 2017b).

- Constructed the leachate pond's additional geomembrane liner in September and October 2017.

- Performed remediation of a leachate release originating from a leachate header located at the site's leachate pond on September 23 through 25, 2017. A report documenting the spill response and cleanup activities was submitted to the DEQ in October 2017 (WM, 2017c).

- Submitted a non-routine (i.e., not required by RL's EMP) semiannual environmental monitoring report to the DEQ, per the DEQ's request (SCS, 2017e). The semiannual environmental monitoring report presented and evaluated the monitoring results collected as part of RL's Spring (April) 2017 semiannual monitoring event.

- Performed routine monitoring and inspections of the mechanically-stabilized earthen (MSE) berm in 2017. Instrumentation monitoring activities related to the MSE berm were performed in accordance with the stability monitoring plan (SMP). Extensometer and piezometer measurements obtained throughout 2017 indicated settlement and small changes in pore pressure consistent with the design parameters (Geosyntec, 2018).

- Expanded the gas collection and control system (GCCS) in 2017 by installing and constructing 37 new vertical gas collection wells to enhance LFG collection.

1.4 SUPPLEMENTAL INFORMATION PROVIDED IN REPORT

The following supporting documentation is provided in the report appendices:

- Appendix A: Historical groundwater elevations (including hydrographs), and field water quality monitoring results for groundwater and LMS samples.

- Appendix B (included only on the attached compact disc [CD]): Field documentation, including groundwater elevation survey forms, field sampling data sheets (FSDSs), site inspection checklists, and field report forms.

- Appendix C (included only on the attached CD): Laboratory analytical reports, including chain-of-custody (COC) forms, cation-anion balance data, and laboratory quality assurance/quality control (QA/QC) documentation for groundwater, surface water, LMS samples collected in 2017. Appendix C also includes a copy of the TestAmerica's Oregon Environmental Laboratory Accreditation Program (ORELAP) certification.

- Appendix D (included only on the attached CD): Results of the field and laboratory QA/QC reviews.

- Appendix E (included only on the attached CD): Time-concentration graphs of 2017 and historical groundwater, surface water, and LMS analytical data.

- Appendix F: Geochemical diagrams (Piper [Trilinear] and Stiff Plots) for groundwater and LMS samples.

The CD provided with this AEMR also includes (1) the historical analytical database for groundwater, surface water, and LMS samples in a searchable (Excel) format, and (2) a complete electronic version of this 2017 AEMR.

2.0 HYDROGEOLOGIC SETTING

Numerous local and regional hydrogeologic investigations have been performed in the vicinity of RL. In general, the investigations included (1) interpreting topographic maps, (2) drilling soil borings, (3) installing monitoring wells and piezometers, (4) conducting geophysical investigations, (5) collecting and analyzing soil, groundwater and leachate samples, and (6) analyzing aquifer hydraulic parameters. These studies provide the foundation for hydrogeologic interpretations and the technical basis for the environmental monitoring program at RL.

Most of the interpretive information on the site's geology was obtained from previous RL studies, in particular the additional hydrogeologic investigation conducted by EMCON (1994). Other geologic information was collected during drilling of the boreholes for compliance and detection monitoring wells and piezometers (EMCON, 1995, 1996; CH2M Hill, 2000; SCS, 2015).

2.1 HYDROGEOLOGY

For the purposes of environmental monitoring at RL, groundwater occurs in two water-bearing zones (WBZs): (1) upper (shallow) silt-clay alluvial deposits (both the Willamette Silt and the late-Quaternary alluvium) comprised predominantly of bedded silts, clays, clayey silts and silty clays, and (2) lower (deep) sand-gravel deposits. The Pliocene-age sand-gravel deposits overlay the Eocene bedrock deposits, are predominantly laterally continuous units, and consist mostly of sandy gravels and gravelly sands, with localized interbeds of clayey and silty gravels and clay and silt lenses.

Groundwater elevations measured in site groundwater monitoring wells and piezometers since January 1993 have been used to evaluate the hydraulic parameters and flow characteristics of both WBZs. A description of these two WBZ based on interpretive information collected as part of previous hydrogeologic investigations (EMCON, 1994, 1995, and 1996; CH2M Hill, 2000; SCS, 2015) and groundwater monitoring (elevations and chemistry) performed since 1994 are provided below.

2.1.1 Upper (Shallow) Silt-Clay Water-Bearing Zone

Across most of RL, the groundwater flow direction and gradient in the upper shallow WBZ show minor seasonal and spatial variability, typically in response to variations in seasonal precipitation patterns. The direction of groundwater flow in the upper shallow WBZ is typically south-southeast, toward the South Yamhill River. In the extreme southwestern portion of the site, groundwater flow is predominantly toward the east. The historical seasonal range of groundwater gradients is generally from 0.005 to 0.01 foot per foot (ft/ft). Average groundwater flow velocities in the shallow WBZ generally range from 0.1 to 24.2 feet per year (ft/yr).

Historical groundwater level data for monitoring wells, screened in the upper shallow WBZ near the South Yamhill River, indicate that temporal fluctuations of approximately 10 to 15 feet occur. Groundwater elevations measured in those wells are typically higher than the river elevation, indicating that groundwater in the upper silt-clay WBZ discharges to the river. This relationship between the South Yamhill River and groundwater indicates that the South Yamhill River acts as a hydraulic boundary to groundwater flow in the shallow WBZ.

2.1.2 Lower (Deep) Sand-Gravel Water-Bearing Zone

The groundwater flow direction and gradient in the deep WBZ do not vary significantly as a result of seasonal changes in precipitation. In most areas of RL, groundwater flows toward the southeast, in the direction of the South Yamhill River, and shifts southward as it approaches the South Yamhill River. The historical seasonal range of groundwater gradients is generally from 0.0088 to 0.012 ft/ft. The average groundwater flow velocity in the deep WBZ has been estimated to be about 124 ft/yr.

Interpretation of RL stratigraphic information indicates that the deep WBZ does not receive direct recharge from precipitation in the vicinity of RL due to the presence of the overlying shallow WBZ, which has a relatively low hydraulic conductivity. Furthermore, because the lower sand-gravel stratigraphic unit partially transects the South Yamhill River, the river most likely represents a hydraulic barrier for groundwater in the lower sand-gravel zone. Historically, groundwater elevations measured in wells screened in the lower sand-gravel WBZ near the South Yamhill River were consistently higher than the river elevation. The differences in elevation suggest that groundwater in the lower sand-gravel WBZ was discharging to the river during those time periods.

RL has a production well designated as PW-1, located near the facility entrance. The well is completed in and pumps water from the deep WBZ. There is another production well (MB-1) on the former Bernard property on the east side of the RL entrance that is also active. During the dry season, when PW-1 and MB-1 are used most frequently, groundwater elevations in the deep WBZ are affected (decreased by 10 to 20 feet) in the northwest corner of RL by production well pumping.

3.0 ENVIRONMENTAL MONITORING NETWORKS AND SCHEDULES[1]

3.1 GROUNDWATER MONITORING NETWORK AND SCHEDULE

The groundwater monitoring network at RL is shown in Figure 1-2. Monitoring well and piezometer construction information is summarized in Table 3-1. The wells and piezometers labeled "A" are screened in the upper silt-clay unit, and those labeled "B" are screened in the lower sand-gravel unit, except for the designations of MW-1A and MW-1B, which are reversed. Wells and piezometers with no designation (e.g., MW-2R, P-01) are screened in the upper silt-clay unit.

The 2017 semiannual and annual groundwater monitoring schedule is summarized in Table 3-2 and included the following activities:

- **Compliance monitoring**: MW-12A/B, MW-14A/B, MW-15A/B, MW-16A/B, and MW-21A/B were monitored semiannually in April and November 2017. It should be noted that MW-12A, MW-14A, MW-15A, and MW-16B were resampled on December 27, 2017 to verify the anomalous volatile organic compound (VOC) detections (i.e., acetone and/or chloromethane) identified in these samples results during the November 2017 monitoring event. The results of the resampling effort did not verify the anomalous VOC detections in the November 2017 samples. The resampling results indicate the November 2017 detections of acetone and chloromethane were likely due to laboratory error and/or sampling error.

- **Detection monitoring**: MW-5A/B were monitored for VOC concentrations in groundwater that have been attributed to past LFG effects (EMCON, 1993). Additionally, non-routine (i.e., not required by the EMP) monitoring of MW-5A groundwater for inorganic parameters was performed in 2017. Detection well MW-5A was sampled semiannually in April and November 2017 and detection well MW-5B was sampled annually in April 2017.

- **Poplar tree farm detection monitoring**: MW-19A and MW-20A were monitored semiannually in April and November 2017, and MW-20B was monitored annually in April 2017 (see Figure 1-2). These wells monitor groundwater quality downgradient of the south and north poplar tree farm areas, respectively. Water quality monitoring of piezometers P-05A, P-06A, and P-07A located in and near the north poplar tree farm area was also performed in April 2017.

- **Detection monitoring downgradient of leachate pond:** MW-22A was monitored annually in April 2017 to evaluate groundwater quality in the shallow WBZ south (downgradient) of the leachate pond.

[1] As part of the ongoing MW-12A groundwater IPA activities, additional groundwater, surface water, and LMS liquid samples were collected in 2017. Information related to these additional IPA monitoring activities will be presented to the DEQ in the final IPA report in May 2018.

- **Groundwater elevation monitoring**: Groundwater elevations were monitored semiannually in April and November 2017 in the compliance and detection monitoring wells listed above, and in monitoring wells (and well pairs) MW-1A/B, MW-2R, MW-3A/B, MW-4A/B, MW-6A/B, MW-9A/B(R), MW-22B, MW-24, and MW-23A/B, MW-25A/B, and piezometers P-01, P-02, P-03, SA-BH-1, SA-BH-3, SA-BH-5, SA-BH-6, and GT-10-12. Groundwater elevation was also measured in onsite production well PW-1.

3.2 SURFACE WATER MONITORING NETWORK AND SCHEDULE

Surface water quality samples were collected from the South Yamhill River adjacent to the landfill property in April 2017 at the following locations (see Figure 1-2):

- SYR SW-1 located upstream of the RL operations.
- SYR SW-2 located downstream of the RL operations and near the Unnamed Creek that runs along the eastern property boundary of RL.

3.3 LEACHATE MANAGEMENT SYSTEM MONITORING NETWORK AND SCHEDULE

The LMS monitoring network at RL is shown in Figure 1-2 and includes leachate collection and removal systems (LCRSs) and secondary leak detection systems (LDSs). The LCRSs remove leachate from the landfill modules and convey the leachate to a double-lined collection pond for treatment and disposal. The LDSs provide containment and monitoring below the primary LCRSs.

The 2017 leachate and LDS monitoring schedule is summarized in Table 3-2 and included collecting the following samples:

- Liquid from the leachate pond and the pond LDS semiannually in April and November 2017.
- Leachate from the Modules 1/5, 6/7, 8, and 9 LCRS sumps annually in April 2017.
- Liquid from the Modules 4/5, 6/7, 8, and 9 LDS sumps annually in April 2017.

3.4 LANDFILL GAS MONITORING NETWORK AND SCHEDULE

The LFG monitoring network at RL is shown in Figure 1-2. LFG compliance monitoring is performed to determine whether explosive gases (i.e., methane) are migrating from the landfill into facility structures or at RL's property boundary. Monitoring of the compliance LFG monitoring probes and facility structures were performed quarterly in 2017 at the following locations:

- Compliance boundary LFG probes: CGP-09R, CGP-10R, CGP-11, CGP-12, CGP-13, and CGP-14.

- Facility structures: office building, scale house, maintenance building, operations building, and the landfill gas to energy building.

To supplement the six compliance LFG probes, there are six performance LFG probes (PGP-01 [dual completion], PGP-02 [dual completion], PGP-03, PGP-04, PGP-06, and PGP-08R) designed to monitor the performance of the facility's GCCS. These performance probes are located adjacent to the facility waste modules (Modules 1, 2, 3, and 8; see Figure 1-2) and are not used for compliance LFG monitoring and reporting purposes.

4.0 FIELD PROCEDURES

4.1 GROUNDWATER

During each semiannual monitoring, depth-to-groundwater levels in the site monitoring wells and piezometers were measured using an electronic water-level probe event before groundwater samples were collected. The 2017 and historical depth-to-groundwater measurements and groundwater elevation data are summarized in Appendix A (Table A-1).

Compliance and detection wells were purged and sampled using dedicated QED® bladder pumping systems with pump intakes approximately in the middle of the well screen interval. Piezometers P-05A, P-06A, and P-07A, which are not fitted with dedicated bladder pumps, were purged and sampled using a non-dedicated peristaltic pump.

Traditional Purging. Compliance and detection monitoring wells (and piezometers) screened in the shallow WBZ were sampled using the traditional purging technique that involves purging each well of at least three casing volumes (unless the well purged dry). Purged groundwater was discharged through a flow-through cell to measure field water quality parameters. At a minimum, after each casing volume was purged, water quality parameters (temperature, pH, specific conductance, oxidation-reduction potential [ORP], and dissolved oxygen [DO] content) were measured and recorded on a FSDS (provided in Appendix B). Groundwater in each well was sampled after at least three casing volumes were purged (unless the well purged dry) and the water quality parameters stabilized. After stabilization, representative groundwater samples were collected directly from the dedicated pump discharge tubing and into laboratory-supplied containers. For wells that were purged dry, groundwater samples are collected after the well has either recovered to at least 90 percent of its original water level or within a 24-hour period.

Low Flow Purging. Compliance and detection monitoring wells screened in the lower WBZ were sampled using the low-flow purging and sampling technique. Field-measured water quality parameters (temperature, pH, specific conductance, ORP, and DO content) were recorded at approximately 0.1 to 0.25-gallon intervals during purging. Purge rates were maintained at approximately 400 milliliters per minute or less, and groundwater levels were maintained within 0.3 feet of their initial water level measurement. Groundwater samples were collected once water quality parameters stabilized.

The cumulative volume of groundwater purged and field-measured water quality parameters were recorded on an FSDS after each measurement (see Appendix B). Table A-2 (Appendix A) summarizes historical and 2017 field-measured water quality parameters in groundwater samples collected at RL.

The condition of wells, piezometers, and the surrounding area were noted on the landfill inspection checklist forms (see Appendix B). All wells were in good condition, secure, and accessible.

4.2 SURFACE WATER

Surface water samples were collected at SYR SW-1 and SYR SW-2 by dipping the laboratory-supplied sample bottles into the surface water and allowing the bottles to slowly fill.

4.3 LEACHATE MANAGEMENT SYSTEMS

Liquid samples from the LCRS and LDS sumps were collected using the dedicated submersible pumps installed in each sump's riser pipe. Sample bottles were filled directly from the submersible pump discharge lines. Leachate grab samples were collected from the leachate pond by lowering a non-dedicated, single-use disposable polyvinyl chloride bailer into the leachate pond at four locations. The leachate pond grab samples were then composited, and the composite leachate pond samples were used to fill the sample bottles.

Field parameters (temperature, pH, specific conductance, ORP, and DO) were measured during sampling of each leachate and LDS sump and recorded on FSDSs (provided in Appendix B). Table A-3 (Appendix A) summarizes 2017 and historical field-measured water quality parameters in LMS liquid samples.

4.4 LANDFILL GAS

LFG concentrations (i.e., methane) were measured in RL's LFG monitoring probes and facility structures using a CES LandTec GEM™ 2000 or 5000 landfill gas analyzer (GEM). The probes were purged using the internal pump in the GEM for a minimum of one minute before LFG concentrations were allowed to stabilize and be recorded. The facility structures were monitored for LFG using the GEM in potentially confined areas where air movement may be restricted. At each of these locations, LFG concentrations were recorded after the GEM was allowed to purge and stabilize for at least one minute. LFG was also monitored in facility structures using dedicated continuous methane monitoring devices.

4.5 FIELD QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

All environmental and QA/QC samples were packed in coolers with wet ice and sent using COC protocol by overnight courier to TestAmerica in Denver, Colorado for analysis, except for the surface water samples collected for fecal coliform and *E. coli* analyses which were submitted to Alexin in Tigard, Oregon. The samples shipped and delivered to TestAmerica and Alexin, respectively, arrived at acceptable temperatures and in good condition.

Field QA/QC procedures included (1) collecting at least one field blank and one field duplicate sample for each day of sampling or for every ten samples, which ever was more frequent, and (2) carrying laboratory-supplied trip blanks into the field and submitting the trip blanks with VOC samples to the laboratory for the days VOCs samples were collected in the field.

5.0 LABORATORY METHODS

This section summarizes the laboratory methods and analyses performed in 2017. Analytical laboratory reports (with COCs and cation-anion balance values) are provided in Appendix C on the attached CD. Appendix C also includes a copy of TestAmerica's ORELAP certification.

5.1 ANALYTICAL PARAMETERS FOR ENVIRONMENTAL SAMPLES

Consistent with the site's EMP (SCS, 2014b), the 2017 semiannual environmental monitoring samples were analyzed as follows:

- Groundwater samples were analyzed for the parameters summarized in Table 5-1.
- Surface water samples collected from the South Yamhill River were analyzed for the parameters summarized in Table 5-2.
- LMS samples were analyzed for the parameters summarized in Table 5-3.

5.2 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES AND RESULTS

The results of SCS's QA/QC reviews of the laboratory reports (Appendix C on the attached CD) indicated that the 2017 analytical data were acceptable for their intended use (see Appendix D).

Laboratory data and QA/QC procedures were reviewed to determine whether the data met QC requirements, consistent with the procedures outlined in the EMP. TestAmerica incorporated its laboratory data quality review comments in the QA/QC case narrative of each final laboratory report.

The cation-anion balance results for the routine semiannual and annual samples are summarized in Table 5-4. All cation-anion balances in the groundwater samples collected in 2017 were below the QC guidance level of 10 percent, except for the MW-16A sample (15 percent) collected in the April 2017 (see Table 5-4). The cation-anion balance above the QC guidance level in the April 2017 MW-16A groundwater sample is likely related to the slight increase in several cation concentrations (calcium [Ca], magnesium [Mg], and manganese [Mn]) in this event. It should be noted that the MW-16A cation-anion balance in the November 2017 sample was within the QC guidance level, and Ca, Mg, and Mn concentrations in November 2017 did not show the same uptick noted in April 2017.

Consistent with the SWDP and the EMP, TestAmerica performed a library search for tentatively identified compounds (TICs) during the Method 8260 VOC scan. The TICs are presented in the laboratory reports.

6.0 MONITORING RESULTS AND DATA EVALUATION

6.1 GROUNDWATER ELEVATIONS AND GRADIENTS

The 2017 groundwater elevation data and flow directions were consistent with historical data (and interpretations) reported in previous AEMRs submitted to the DEQ. Historical depth-to-groundwater measurements and groundwater elevation data, including data collected in 2017, are provided in Appendix A (see Table A-1); hydrographs for each well are also provided in Appendix A. The groundwater elevations were plotted on the site map and contoured to depict the groundwater potentiometric surface of the shallow and deep WBZs (see Figures 6-1 through 6-4).

6.1.1 Shallow (Silt-Clay) WBZ

The 2017 shallow WBZ groundwater potentiometric elevation and gradient data were consistent with historical data and showed the following:

- The groundwater flow direction in the shallow WBZ was generally south to southeast, toward the South Yamhill River (see Figures 6-1 and 6-3).
- Groundwater elevations measured in the western and southwestern portion of the site showed that (1) the groundwater flow was more towards the east-southeast (see Figures 6-1 and 6-3), and (2) both the flow direction and hydraulic gradient are influenced by the South Yamhill River.
- The groundwater elevations measured in piezometer P-07A are typically higher than elevations measured in nearby monitoring wells and piezometers resulting in a localized groundwater elevation high centered around this piezometer (see Figures 6-1 and 6-3).
- Horizontal hydraulic gradients in the shallow WBZ in 2017 ranged from approximately 0.006 to 0.080 ft/ft, which were consistent with historical results. The highest gradients occurred in the southwest section of the site near the South Yamhill River.

6.1.2 Deep (Sand-Gravel) WBZ

The 2017 deep WBZ groundwater potentiometric elevation and gradient data were consistent with historical data and showed the following:

- In most areas of RL, groundwater in the deep WBZ flowed generally south to more southeasterly in the eastern portion of the site (see Figures 6-2 and 6-4). The flow direction was more southerly as groundwater approaches the South Yamhill River in the area of wells MW-12B, MW-14B, MW-15B, MW-22B, and MW-23B.
- Horizontal hydraulic gradients in the deep WBZ in 2017 ranged from 0.005 to 0.028 ft/ft. Typically, the gradient is steeper in the southwestern portion of the site where the deep WBZ is thinner.

6.1.3 Vertical Hydraulic Gradients

Trends in groundwater elevations between the shallow and deep WBZs (exhibited by adjacent piezometers and monitoring well pairs) are generally similar, with periods of high and low elevations in both WBZs occurring at the same time of the year. Based on semiannual monitoring data, the highest water levels in the shallow and deep WBZs typically occur during the Spring event, while the lowest elevations occur during the Fall event. The fluctuations are directly influenced by precipitation. Although seasonal trends are similar in the two WBZs, the magnitudes of the water-level fluctuations are variable indicating a low degree of hydraulic connection between the shallow and deep WBZs.

The 2017 monitoring well pair groundwater elevation data (for 17 well pairs) typically show higher water levels in the shallow WBZ than those in the deep WBZ, indicating downward vertical hydraulic gradients (see Table 6-1). For monitoring well pairs MW-9A/BR and MW-14A/B, the 2017 groundwater elevation data showed slight reversals in vertical gradients (upward hydraulic gradients) between the two WBZs during both monitoring events. Slight upward vertical gradients also occurred during the Spring (April) event in well pair MW-21A/B and during the Fall (November) event in well pair MW-16A/B (see Table 6-1).

6.2 GROUNDWATER ANALYTICAL RESULTS

6.2.1 Evaluation of Groundwater Analytical Results

Analytical results of the 2017 groundwater samples collected from the site compliance wells (MW-12A/B, MW-14A/B, MW-15A/B, MW-16A/B, and MW-21A/B) were evaluated to determine whether a potentially significant change in water quality occurred based on the following criteria, consistent with RL's EMP (SCS, 2014b):

- Detection of one or more VOCs above a practical quantitation limit (PQL), which are permit-specific concentration limits for vinyl chloride and action limits for all other VOCs. Any VOC detected and verified (i.e., confirmed during subsequent resampling) at a concentration above the PQL would be considered a change in groundwater quality.

- Confirmed detections of three or more inorganic (non-hazardous) parameters at concentrations (as verified by resampling if necessary) above their respective statistically-derived site-specific limits (SSLs) in a sample collected from a site compliance well during a routine monitoring event. Well-specific SSLs for total organic carbon (TOC), total dissolved solids (TDS), bicarbonate (HCO_3), chloride (Cl), sulfate (SO_4), Mg, dissolved potassium (K), and dissolved sodium (Na) are specified in the EMP (SCS, 2014b) and summarized in Table 6-2.

Additionally, statistical trend analysis was performed on the 2017 and historical inorganic parameter data using the Sen's Test method and the computer software program DUMPStat®. The analysis was conducted on analytical data collected from the compliance wells (MW-12A/B, MW-14A/B, MW-15A/B, MW-16A/B, and MW-21A/B) and detection wells/piezometers (MW-5A, MW-19A, MW-20A, MW-20B, MW-22A, P-05A, P-06A, and P-07A). Statistically significant concentration trends in groundwater collected from these site compliance and detection wells using the 2017 and

historical data set are summarized in Table 6-3, and the trend graphs are provided in Appendix E (included on the attached CD).

6.2.2 Analytical Results for Compliance Well Groundwater Samples

A new significant change in groundwater quality was not identified in 2017 at RL's point-of-compliance boundary, as defined in the site's SWDP and EMP. Analytical results supporting this conclusion are:

- No verified concentrations of VOCs were detected in groundwater samples collected from the site compliance wells, consistent with historical results.

- Three or more inorganic parameters were not detected at concentrations above their respective SSLs in site compliance wells during a single semiannual monitoring event, except for well MW-12A (see Table 6-2). An IPA of MW-12A groundwater quality, was initiated in 2016, and continued in 2017, to evaluate the source of the change in MW-12A inorganic groundwater quality. An update of the MW-12A IPA is provided in Section 6.2.3.

Other notable results based on evaluation of the analytical data for compliance well groundwater samples collected in 2017 include the following:

- The only other parameter detected at a concentration above its SSL was TOC in the MW-15A groundwater sample collected in November 2017 (see Table 6-2). This result does not meet the criteria for a potentially significant change in groundwater quality, as described in Section 6.2.1.

- Acetone was detected in groundwater samples collected in April 2017 from MW-16A, MW-21A, MW-21B, field duplicate sample collected at MW-12A, and field blank samples collected near MW-12A and MW-15A (see Table 6-2). As noted in the case narratives of TestAmerica's analytical reports related to these samples (see Appendix C), the detected acetone concentrations are likely attributed to a laboratory artifact. Results supporting this conclusion include (1) acetone is a common laboratory contaminant, (2) acetone was detected in multiple field blank samples that were prepared with laboratory supplied deionized water, (3) acetone was only detected in the duplicate sample and not the primary sample collected at MW-12A, and (4) acetone was detected in the primary MW-21A sample but not confirmed in the field duplicate sample collected at MW-21A.

- Anomalous concentrations of acetone or chloromethane (CM) were detected in groundwater samples collected in November 2017 from wells MW-12A, MW-14A, MW-15A, and MW-16B, and a trip blank sample. The DEQ was notified of these results (WM, 2017d), and verification resampling was performed on December 27, 2017. Analytical results of verification samples collected from these four monitoring wells did not confirm the November 2017 anomalous results (see Table 6-2).

- Nitrate-nitrite was detected above its groundwater quality standard (i.e., Oregon numerical groundwater quality reference level [NGQRL]) of 10 mg/L in the MW-12A sample collected in November 2017. Nitrate-nitrite concentrations above the NGQRL in MW-12A groundwater have previously been reported to the DEQ and are being further evaluated as part of the on-going IPA of MW-12A groundwater quality (see Section 6.2.3).

- Statistical trend analysis results of the 2017 and historical compliance groundwater analytical data were consistent with previous results, except for two new decreasing statistical trends and five new increasing trends (three of these new trends are related to well MW-12A) (see Table 6-3 and time-concentration graphs provided in Appendix E). Overall, the trend analyses identified a total of 35 decreasing and 22 increasing trends (see Table 6-3).

- No order-of-magnitude increases in parameter concentrations or anomalous data were identified in compliance groundwater analytical data (see time-concentration graphs provided in Appendix E).

- Field water quality parameter values were generally consistent with historical values and trends (see Appendix A, Table A-2). The field-measured pH values were below the secondary standard range of 6.5 to 8.5 standard units (S.U.) in groundwater samples collected from wells MW-12A, MW-14A, MW-15A, MW-16A, and MW-21A. Groundwater collected from site monitoring wells (and piezometers) screened in the shallow (silt-clay) WBZ has been shown to have an intrinsic pH that is often below 6.5 S.U. (USA Waste, Inc., 1997). The DEQ agreed with this conclusion (DEQ, 1998).

- Dissolved iron (Fe), dissolved Mn, and TDS were detected at concentrations above their secondary groundwater quality standards (i.e., Oregon numerical groundwater quality guidance levels [NGQGLs]) of 0.3, 0.05, and 500 mg/L, respectively, in groundwater samples collected from the site compliance wells listed below, consistent previous results:

  - Fe in MW-12B and MW-14B groundwater.
  - Mn in MW-12B, MW-14B, MW-15B, MW-16A, MW-16B, and MW-21B groundwater.
  - TDS in MW-16B groundwater.

  The Fe and Mn concentrations that were above the NGQGLs were consistent with historical concentrations (see Appendix E) previously reported to the DEQ. The results of an IPA conducted in 2001 concluded that the elevated Fe and Mn concentrations in groundwater samples were attributable to natural variation in groundwater chemistry and reflective of background groundwater conditions (HWA Geosciences, Inc., 2001). This conclusion is further supported by Fe and Mn analytical results of upgradient monitoring wells sampled as part of the 5-year comprehensive monitoring event last performed in April 2013 that showed levels above the NGQGLs (SCS, 2014a).

6.2.3 MW-12A Groundwater Quality Informal Preliminary Assessment

The IPA activities were continued in 2017 to further evaluate the source of changes in the inorganic chemistry of groundwater samples collected from well MW-12A, consistent with the work plan (SCS, 2017a) approved by the DEQ (DEQ, 2017a). IPA activities were implemented beginning with the Spring (April) 2017 semiannual monitoring event and were performed periodically throughout 2017.

An interim report providing a preliminary evaluation of the first phase of the IPA was submitted to the DEQ in October 2017 (SCS, 2017d). The interim IPA results indicated that the source of the change in the inorganic chemistry of MW-12A groundwater is not related to the site's LMS, but is likely related to the influence of surface water that seasonally ponds in the area near and north of MW-12A. Surface water in this area either infiltrates to shallow groundwater or comingles with shallow groundwater during periods of seasonal high groundwater elevations. During periods of low or no rainfall when surface water ponding in this area does not occur and does not locally recharge groundwater, parameter concentrations in MW-12A groundwater decrease. The parameter concentrations in ponded surface water samples collected as part of the IPA suggest that this surface water is possibly influenced by stormwater run-off from portions of the landfill directly north of the low-lying area where surface water ponding occurs seasonally. This possible relationship is being further evaluated as part of the on-gong IPA activities.

Consistent with the IPA work plan (SCS, 2017a), IPA activities continued through the first quarter 2018. A final report presenting the results and findings of the IPA will be provided to the DEQ under separate cover. The final IPA report is due by May 27, 2018, which is 60 days after receipt of the first quarter 2018 final laboratory analytical report, consistent with the schedule in the work plan.

6.2.4 Analytical Results for Detection Well Groundwater Samples

6.2.4.1 *Detection Wells MW-5A and MW-5B*

Low concentrations of four VOCs (benzene [April only], chlorobenzene, 1,4-dichlorobenzene, and *cis*-1,2-dichloroethene) were detected in samples collected in 2017 from MW-5A at concentrations that were consistent with recent results (see Table 6-4). Confirmed concentrations of VOCs were not detected in the groundwater sample collected from detection well MW-5B (located adjacent to MW-5A and screened in the deep WBZ) in 2017, or in groundwater collected from compliance monitoring wells located hydraulically downgradient of MW-5A, including MW-12A.

Results of a remedial investigation performed in 1993 (EMCON, 1993) demonstrated that LFG is the source of VOCs impacting shallow groundwater in the MW-5A area. The number and concentrations of VOCs originally detected in MW-5A groundwater have significantly decreased since early 1990s (see Table 6-4 and Figure 6-5). These trends indicate that the active GCCS continues to be effective at (1) reducing VOC concentrations in shallow groundwater near MW-5A and (2) mitigating the lateral migration of VOCs, as noted by the DEQ (DEQ, 2001).

MW-5A inorganic groundwater quality was further evaluated in 2017, as part of the MW-12A IPA, and in response to an increasing trend identified for field-measured conductance (see Appendix, Table A-2). This evaluation included non-routine (i.e., not required by the EMP) sampling and analysis of select inorganic parameters in groundwater sample collected from MW-5A. Results of the evaluation suggest that the source of the increasing conductance and other inorganic parameters is not related to the site's LMS, but is likely related to the same influence of surface water that seasonally ponds in the area south of MW-5A (i.e., north of MW-12A) that is attributed to the change of inorganic chemistry of MW-12A groundwater. Data that support this conclusion include the following:

- Recent analytical results of inorganic parameters in MW-5A groundwater show similar trends as MW-12A (see Appendix E; time-concentration graphs).
- The ionic chemistry of MW-5A groundwater and Module 1/5 leachate (Sump 1/5 P), which is the leachate sump located nearest to MW-5A, collected in 2017 are distinctly different. The ionic signature of Sump 1/5 P leachate is characterized by significantly higher Na and lower Ca and Mg composition than MW-5A groundwater (see Piper [trilinear] diagram shown in Figure 6-6). Additionally, Sump 1/5 P leachate has significantly higher parameter concentrations than MW-5A groundwater (see Stiff diagrams show in Figure 6-7).

6.2.4.2 *Poplar Tree Farm Detection Wells and Piezometers*

Consistent with the EMP, evaluation of analytical results for groundwater samples collected from the detection monitoring wells was performed in 2017 by reviewing the data for order-of-magnitude increases over historical results and using trend analysis.

Analytical results of samples collected in 2017 from detection wells MW-19A and MW-20A located downgradient of the south and north poplar tree farm areas, respectively, continued to show localized groundwater quality changes in the shallow WBZ at these locations that include concentrations of several inorganic parameters above background data. However, the suspension of leachate irrigation in the poplar tree farm areas in 2013 continues to have positive effects on MW-19A and MW-20A water quality. Recent results that support this conclusion include stabilized or decreasing concentrations for (1) Ca, Cl, Mg Na, and TDS in MW-19A groundwater and (2) ammonia, Cl, Ca, Fe, Mg, Mn, Na, and TDS in MW-20A groundwater.[2]

Notable results based on evaluation of the analytical data for groundwater samples collected in 2017 (and historically) from detection wells (MW-19A, MW-20A, and MW-20B) and piezometers (P-05A, P-06A, and P-07A) installed to monitor the poplar tree farm areas include the following:

- No VOCs were detected in detection wells MW-19A, MW-20A, and MW-20B.[3]

[2] Although recent data for these parameters in MW-19A and MW-20A groundwater show stabilized or decreasing concentrations, statistical trend analysis (Sen's Test) of the entire historical data set (2001 through 2017) continues to identify these parameters as statistically significant increasing trends.

[3] VOCs are not required by the site's EMP to be analyzed in piezometer P-05A, P-06A, and P-07A groundwater samples.

- No order-of-magnitude increase in parameter concentrations or anomalous data were identified (see time-concentration graphs provided in Appendix E).

- Statistical trend analysis results were generally consistent with previous results (see Table 6-3 and time-concentration graphs provided in Appendix E), except for the following:

  - Increasing trends for Ca and Na in MW-20B groundwater. It should be noted that the 2017 concentrations of Ca and Na in MW-20B groundwater are within the range of historical data and that the increase above background data are slight.
  - A newly identified increasing trend for Ca in P-06A groundwater. The April 2017 concentration of Ca in P-06A groundwater is within the range of historical results and, the increase above background data is minimal.
  - Decreasing trends for HCO_3, Ca, Cl, and SO_4 in P-07A groundwater.

- Consistent with historical results previously reported to the DEQ, Fe, Mn, and TDS (November only) were detected at concentrations above their NGQGLs of 0.3, 0.05, and 500 mg/L, respectively, in MW-20A groundwater samples collected in 2017. It should be noted that Cl concentrations in MW-20A groundwater continued to decrease and were below the NGQGL of 250 mg/L in 2017.

- Fe and/or Mn were detected at concentrations above their NGQGLs of 0.3 and 0.05 mg/L, respectively, in MW-19A, MW-20B, P-05A, and P-06A groundwater samples collected in 2017, consistent with historical results previously reported to the DEQ.

- As part of a continued evaluation of the groundwater quality near MW-20A, RL continues to monitor piezometer P-07A which is located approximately 300 feet south of MW-20A. Laboratory results of groundwater samples collected from P-07A in 2017 (and since 2012) indicate that Cl concentrations were significantly lower than recent Cl concentrations detected in MW-20A groundwater. Additionally, none of the other increasing concentration trends identified in MW-20A groundwater were identified in P-07A groundwater, consistent with previous results (see Table 6-3).

6.2.5 Geochemical Diagrams

The ionic chemistries of groundwater samples collected in 2017 are generally consistent with historical results. Piper (trilinear) and Stiff diagrams showing the relative concentrations of the common cations and anions in groundwater samples collected in 2017 and historically from the site compliance and detection wells are provided in Appendix F.

6.3 SURFACE WATER ANALYTICAL RESULTS

The analytical results of the South Yamhill River surface water samples collected in 2017 showed uniformity in the concentrations of water quality parameters in samples collected both upstream and downstream of RL. Field water quality parameters and laboratory analytical results of the inorganic parameters in the surface water samples collected in April 2017 are summarized in Tables 6-5 through 6-8.

6.4 LANDFILL GAS MONITORING

The 2017 and historical (since 1997) compliance boundary LFG probe and facility structure monitoring data are summarized in Table 6-9. LFG monitoring performed in 2017 did not detect methane at or above the GEM detection limit of 0.1 percent in any perimeter (compliance) LFG probes (CGP-09R, CGP-10R, CGP-11, CGP-12, CGP-13, and CGP-14) and facility structures (office, scale building, maintenance building, operations building, and landfill gas to energy building). The GEM detection limit is below the regulatory limit of 5 percent by volume (i.e., lower explosive limit [LEL] of methane) for the compliance probes and 1.25 percent (i.e., 25 percent of the LEL of methane) for structures.

7.0 OPERATIONAL AND PERFORMANCE MONITORING RESULTS OF LEACHATE MANAGEMENT SYSTEM

This section presents operational and performance monitoring results for RL's LMS to meet the requirements of SWDP Sections 17.5 and 17.6 for submitting an annual leachate treatment report.

7.1 OPERATION AND MAINTENANCE OF LEACHATE MANAGEMENT SYSTEMS

Other than routine operations and maintenance of RL's LMS, no performance issues were identified in 2017. The following includes the notable maintenance activities completed to the LMS in 2017:

- Installed a leachate collection French drain system along the toe of west slope of Module 9 in May 2017.
- Installed a leachate percolation window to the Module 9 sump as part of Phase 1 of the FGPM construction project.
- Performed routine maintenance activities to the LMS including the following:
  - Replaced transducer in Module 6/7 primary sump in March 2017.
  - Cleaned Module 8 primary sump pump in June 2017.
  - Cleaned Module 1/5 primary sump pump in July 2017.
  - Replaced Module 8 primary sump pump in August 2017.
  - Cleaned (jetted and vacuumed) LMS force mains, cleanouts, and riser piping in September 2017.
  - Cleaned Module 9 primary sump pump in September 2017.
  - Cleaned (jetted and vacuumed) Module 9 secondary riser and LDS sump in October 2017.
  - Cleaned Module 1/5 primary sump pump in October and December 2017.
  - Replaced Module 1/5 primary sump pump in November 2017.

7.2 LCRS AND LANDFILL LDS PUMPING SYSTEM RESULTS

7.2.1 LCRS and LDS Pumping Volumes

The 2017 monthly and annual leachate and LDS liquid pumping volume data are summarized in Table 7-1. Notable results based on these data include the following:

- The total volume of leachate collected by RL's LMS was 23.48 million gallons.
- Monthly leachate pumping volumes from RL's combined LCRSs ranged from 777,940 gallons in July to 4,521,772 gallons in November.

- The total volume of liquid pumped from the landfill LDS sumps was 248,176 gallons. The total volume from the leachate pond LDS sump was 66,137 gallons, which is a significant decrease from 2016 (255,928 gallons). The decrease in the liquids pumped from the leachate pond LDS is likely related to constructing the leachate pond's additional geomembrane liner in September/October 2017. Only 49 and 603 gallons were pumped from the leachate pond LDS in November and December 2017, respectively, following construction of this additional liner. For comparison purposes, 11,314 and 30,705 gallons were pumped from the leachate pond LDS in November and December 2016, respectively (SCS, 2017b).

- The highest volume of liquid from the landfill module LDS sumps was pumped from Sump 4/5S, with significantly less volumes from Sump 6/7S, Sump 8S, and Sump 9S.

In terms of gallons-per-acre-per-day (gal/acre/day), the approximate quantities of liquid generated in 2017 from the LDSs for Modules 6/7 (3.4 to 10.1 gal/acre/day) and Module 8 (less than 1 to 6.4 gal/acre/day) are consistently low. Newer Module 9 shows greater variability (less than 1 to 30 gal/acre/day). For the Modules 4/5 LDS, the data shows variability and consistently higher inflows ranging from 7.4 to 62.7 gal/acre/day. The data from LDSs indicates influence from seasonality, with relatively higher flows coinciding with seasonal high groundwater levels in the Late Fall/Winter and Spring, and relatively lower flows during low groundwater conditions in the Summer. As discussed further in Section 7.3, these results further support the historical conclusion that the liquids detected in and pumped from RL's landfill LDSs are associated with groundwater intrusion and not leakage through the primary landfill liner system.

7.2.2 Leachate Management

Site leachate generated at RL in 2017 was managed by collection, storage, evaporation, and truck-haul to offsite, permitted wastewater treatment facilities. The poplar tree farms have been irrigated exclusively by precipitation since 2013. The truck haul program removed approximately 34.71 million gallons of leachate from the site in 2017, which included liquids collected from RL's GCCS.

7.3 LCRS LEACHATE AND LANDFILL LDS LIQUID ANALYTICAL RESULTS

Time-concentrations graphs presenting the 2017 and historical analytical results for LCRS and LDS samples are provided in Appendix E. Notable results based on evaluation of the LCRS and LDS analytical data are described below:

- No VOCs were detected in liquid samples collected from LDS Sumps 4/5 S and 8 S (see Table 7-2).

- Low-level VOCs (acetone, benzene, and/or naphthalene) were detected in the LDS Sump 6/7 S liquid samples, consistent with previous results that have shown sporadic low-level detections of these VOCs (see Table 7-2). These sporadic detections have not contributed to groundwater quality changes as no changes in groundwater quality have occurred downgradient of Modules 6/7 at compliance monitoring well pair MW-16A/B.

- Four VOCs (acetone, benzene, 2-butanone [MEK], and toluene) were detected in the LDS Module 9 S sump liquid sample. Detections of these VOCs, which are chemicals typically found in primers and adhesives used for constructing the LMS, are likely attributed to past construction and maintenance activities on the Module 9 LDS pumping and conveyance system. Acetone, MEK, and toluene detected in 2017 show significant decreases in concentrations compared to 2016 (see Table 7-2). As noted in the 2016 AEMR (SCS, 2017b), the concentrations of these VOCs are expected to attenuate relatively quickly. These sporadic detections have not contributed to groundwater quality changes as no changes in groundwater quality have occurred downgradient of Module 9 at compliance monitoring well pair MW-21A/B.

- Consistent with historical results, VOCs detected in one or more of the leachate samples collected from the Modules 1/5 P, 6/7 P, 8 P, and 9P included acetone, benzene, MEK, ethylbenzene, methylene chloride, toluene, total xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,4-dichlorobenzene, *cis*-1,2-dichloroethene, isopropylbenzene, 4-isopropyltoluene, naphthalene, and 4-methyl-2-pentanone (see Table 7-2).

- The ionic chemistries of leachate samples collected from the Modules 1/5 P, 6/7 P, 8 P, and 9 P LCRS sumps were different to varying degrees than the ionic chemistries of liquid samples collected from their associated LDS sumps (see Piper [trilinear] and Stiff diagrams provided in Appendix F). The most pronounced difference was in the ionic chemistries between leachate and LDS samples collected from Module 1/5. In general, leachate samples collected from the LCRS sumps are characterized by significantly higher relative concentrations of Cl and Na composition than the LDS samples.

Based on the 2017 liquid pumping data, the limited volume of liquids observed in and pumped from RL's secondary LDS sumps (compared to leachate volumes) are not attributed to potential leachate leakage through the primary liner systems. Instead, these liquids are likely a result from inward gradients from the underlying groundwater, i.e., limited quantities of groundwater that enter the LDSs and are removed by pumping. Analytical results supporting this finding include the following:

- The VOC signature of leachate samples collected from the LCRS sumps were distinctively different than liquid samples collected during the same monitoring event from the LDS sumps associated with the same landfill modules. Also notable is that no VOCs were detected in liquid samples collected from the LDS Sumps 4/5 S and 8 S

- The inorganic chemistries of leachate and LDS liquid samples are different. Leachate impacts to LDS liquids would be expected to affect the inorganic chemistry of LDS liquids, such that there would be a close correlation in inorganic chemistries.

- The geochemical compositions of liquid samples collected from the LDS sumps are either very similar to or closely aligned with the chemistry of groundwater samples collected from the shallow WBZ compliance monitoring wells (see Figure 7-1).

7.4 LEACHATE POND AND LDS LIQUID ANALYTICAL RESULTS

Laboratory reports for liquid samples collected from the leachate pond and the pond LDS sump in April and November 2017 are provided in Appendix C (included on the attached CD). Time-concentration graphs presenting the 2017 and historical analytical results for the leachate pond and LDS samples are provided in Appendix E. Notable results based on an evaluation of the 2017 leachate pond and pond LDS sump analytical data include the following:

- The elevated concentrations of acetone and MEK that were detected in the April 2017 leachate pond LDS liquid sample, consistent with previous results, were not detected in the November 2017 sample after the additional geomembrane liner was installed on the leachate pond. Only a low-level concentration of toluene was detected in the LDS sample collected in November 2017, which was not detected in the corresponding leachate pond sample (see Table 7-2). The VOC signature in the April and November 2017 leachate pond samples were generally consistent with previous results, which included elevated concentrations of acetone and MEK (see Table 7-2).

- Some indicator parameters (chemical oxygen demand, TOC, and TDS) in the November 2017 leachate pond LDS sample showed notable decreases in concentrations compared to the April 2017 results (see Appendix E).

- The ionic chemistries of the leachate pond and the pond LDS liquid samples collected in 2017 were similar (see Piper diagram provided in Appendix F). The samples are characterized by significantly higher concentrations of Na and HCO_3 relative to the other ionic species. The Stiff diagrams for the leachate pond and pond LDS liquid samples also illustrate the similarities in chemistry and parameter concentrations between the pond leachate and pond LDS samples (see Appendix F).

The above results indicate that leachate from the primary liner system continued to be transmitted at relatively low volumes into the leachate pond LDS in 2017, consistent with the findings of an assessment of the leachate pond and LDS (Wallis Engineering, 2013). The volume of liquid pumped from the leachate pond LDS in 2017 decreased significantly compared to previous years, which is attributed to the additional liner that was installed in 2017. With the additional liner installed, it is anticipated that liquid accumulation in the leachate pond LDS sump will continue to decrease over time.

Comparison of groundwater and leachate pond and leachate pond LDS analytical results indicates that liquids in the pond LDS are being effectively contained and removed, and that these liquids have not affected groundwater quality in the area near the leachate pond. The analytical results of groundwater samples collected from monitoring wells in the vicinity of the leachate pond (i.e., wells MW-14A/B, MW-21A/B, and MW-22A) did not show any changes in groundwater quality. Additionally, geochemical evaluation of the groundwater analytical results for samples collected from these wells did not indicate any potential mixing of groundwater with leachate pond or pond LDS liquid (e.g., Cl enrichment) (see Figure 7-2).

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TABLES

Table 3-1
Groundwater Monitoring Network Construction Information
Riverbend Landfill

Well Designation	Hydro-stratigraphic Unit Screened	Date Installation Completed	Eastings[a]	Northings[a]	Ground Elevation[a] (ft-msl)	TOC Elevation[a] (ft-msl)	Boring Depth (ft-bgs)	Boring Diameter (inches)	Well Diameter (inches)	Well Screen Interval (ft-bgs)	Sand Pack Interval (ft-bgs)	Well Seal Interval (ft-bgs)
Monitoring Wells												
MW-1A	Sand-Gravel	6-Sep-89	3999.9	4210.2	153.40	155.30	61.5	10	2	50.0 to 60.0	48.0 to 61.5	3.0 to 48.0
MW-1B	Silt-Clay	8-Sep-89	4001.1	4214.5	153.40	155.00	26.5	10	2	15.0 to 25.0	13.0 to 26.5	3.0 to 13.0
MW-2R	Silt-Clay	29-Jul-16	4966.1	4210.2	144.50	147.02	31.0	10	2	20.0 to 30.0	18.0 to 31.0	3.0 to 18.0
MW-5A	Silt-Clay	8-Sep-92	5490.7	2069.0	132.00	138.73	28.0	10	2	18.0 to 28.0	16.0 to 28.0	3.0 to 16.0
MW-5B	Sand-Gravel	9-Mar-92	5481.2	2073.1	132.80	138.88	44.7	10	2	42.0 to 45.0	40.0 to 45.0	3.0 to 40.0
MW-9A	Silt-Clay	21-Oct-93	6486.5	3663.2	128.10	128.42	24.5	8	2	14.3 to 23.8	27.0 to 40.0	2.0 to 11.0
MW-9BR	Sand-Gravel	24-Aug-94	5903.2	3760.8	124.76	127.40	36.5	10	2	28.2 to 33.7	27.0 to 37.5	2.0 to 26.0
MW-10A	Silt-Clay	28-Oct-93	3501.0	3805.0	150.75	153.21	28.3	8	2	17.3 to 26.8	14.0 to 28.3	2.2 to 14.0
MW-10B	Sand-Gravel	27-Oct-93	3492.5	3795.5	150.76	152.87	69.0	10	2	44.3 to 53.8	40.9 to 55.3	2.0 to 40.9
MW-12A	Silt-Clay	19-Jul-95	5650.8	1676.5	123.80	126.81 [b]	25.5	10	2	15.3 to 24.8	12.0 to 25.5	0.5 to 15.3
MW-12B	Sand-Gravel	19-Jul-95	5643.6	1676.5	124.00	126.05 [b]	49.9	10	2	34.3 to 43.8	31.0 to 45.0	0.5 to 31.0
MW-14A	Silt-Clay	16-Oct-96	4863.8	1652.6	118.80	121.87	21.0	10	2	10.7 to 20.2	7.8 to 21.0	2.2 to 7.8
MW-14B	Sand-Gravel	15-Oct-96	4854.1	1653.7	119.10	123.32	42.0	10	2	31.7 to 41.2	2.85 to 42.0	2.2 to 28.5
MW-15A	Silt-Clay	21-Oct-96	6385.5	2209.1	126.00	130.07	22.8	10	2	12.5 to 22.0	10.0 to 22.8	2.0 to 10.0
MW-15B	Sand-Gravel	21-Oct-96	6393.5	2214.7	126.00	129.73	44.0	10	2	33.2 to 42.7	30.2 to 44.0	2.0 to 30.2
MW-16A	Silt-Clay	23-Oct-96	7010.7	2675.6	126.30	128.89	23.5	10	2	13.5 to 23.0	11.0 to 23.5	1.5 to 11.0
MW-16B	Sand-Gravel	23-Oct-96	7004.3	2670.7	126.30	128.95	45.0	10	2	34.8 to 44.3	31.6 to 45.0	2.0 to 31.6
MW-17A	Silt-Clay	26-Sep-00	1221.4	1431.4	151.12	153.83	24.5	10	2	14.0 to 24.0	11.5 to 24.5	0.5 to 11.5
MW-18A	Silt-Clay	26-Sep-00	2612.9	2938.0	146.77	148.77	26.0	10	2	13.5 to 23.5	11.0 to 24.0	0.5 to 11.0
MW-18B	Sand-Gravel	26-Sep-00	2621.6	2931.1	146.58	148.57	62.0	10	2	47.0 to 53.0	45.0 to 53.0	0.5 to 45.0
MW-19A	Silt-Clay	27-Sep-00	2537.0	1437.0	149.05	151.27	30.0	10	2	18.0 to 28.0	18 .5 to 28.5	0.5 to 16.5
MW-20A	Silt-Clay	26-Sep-00	3776.2	2490.1	127.20	129.92	21.0	10	2	10.0 to 20.0	8.5 to 21.0	0.5 to 8.5
MW-20B	Sand-Gravel	26-Sep-00	3759.5	2491.2	127.10	129.72	40.0	10	2	29.0 to 34.0	26.5 to 95.3	0.5 to 26.5
MW-21A	Silt-Clay	26-Sep-00	4645.5	1945.3	116.18	120.02	13.0	10	2	8.0 to 13.0	7.0 to 23.0	0.5 to 7.0
MW-21B	Sand-Gravel	26-Sep-00	4631.3	1941.6	116.56	119.53	34.0	10	2	21.0 to 26.0	18.5 to 27.0	0.5 to 18.5
MW-22A	Silt-Clay	23-Sep-10	4105.3	1578.5	123.50	125.38	22.5	10	2	10.0 to 20.0	8.0 to 21.0	2.0 to 8.0
MW-22B	Sand-Gravel	23-Sep-10	4110.8	1584.6	123.50	125.43	38.0	10	2	27.0 to 37.0	25.0 to 38.0	2.0 to 25.0
MW-23A	Silt-Clay	18-Aug-10	3281.9	1515.9	129.00	131.79	28.0	10	2	16.0 to 26.0	14.0 to 28.0	2.0 to 14.0
MW-23B	Sand-Gravel	17-Aug-10	3290.0	1516.5	129.00	131.60	42.0	10	2	36.5 to 41.5	34.5 to 42.0	2.0 to 34.5
MW-24A	Silt-Clay	20-Aug-10	2140.0	984.2	147.50	149.93	26.0	10	2	15.0 to 25.0	13.0 to 26.0	2.0 to 13.0
MW-25A	Silt-Clay	22-Jul-15	4218.8	4114.0	153.0	155.62	26.6	6	2	15.0 to 25.0	13.0 to 26.6	2.0 to 13.0
MW-25B	Sand-Gravel	22-Jul-15	4208.3	4114.6	152.8	155.54	90.0	6 and 7	2	75.0 to 85.0	73.0 to 86.0	2.0 to 73.0
Piezometers												
MW-3A	Silt-Clay	23-Jun-93	4430.9	2493.9	138.20	140.81	35.0	8	2	24.0 to 34.0	21.0 to 35.0	2.2 to 21.0
MW-3B	Sand-Gravel	28-Jun-93	4415.6	2496.3	137.80	140.57	63.5	10	2	45.0 to 55.0	42.0 to 56.0	36.8 to 42.0
MW-4A	Silt-Clay	25-May-93	4798.0	2238.7	139.46	142.31	36.0	8	2	26.0 to 36.0	22.5 to 36.0	2.0 to 22.5
MW-4B	Sand-Gravel	10-Jun-93	4805.5	2239.4	139.24	141.81	72.0	10	2	52.0 to 62.0	49.0 to 63.0	47.0 to 49.0
MW-6A	Silt-Clay	24-May-93	6043.5	2437.7	127.00	128.29 [b]	22.5	8	2	11.5 to 21.5	8.5 to 22.5	2.0 to 8.5
MW-6B	Sand-Gravel	9-Jun-93	6054.4	2443.0	127.00	128.59	56.0	8	2	36.0 to 46.0	34.2 to 47.0	2.5 to 34.2
P-01	Silt-Clay	21-Dec-92	5482.1	2038.3	123.20	126.02 [b]	19.0	8	2	8.0 to 18.0	5.9 to 19.0	2.0 to 5.9
P-02	Silt-Clay	22-Dec-92	5498.5	1994.0	121.10	124.02 [b]	18.0	8	2	6.8 to 16.8	5.0 to 18.0	1.0 to 5.0
P-03	Silt-Clay	23-Jun-93	5601.9	1754.2	120.90	123.89 [b]	19.5	8	2	9.0 to 19.0	7.3 to 19.5	2.0 to 9.3
P-05A	Silt-Clay	13-Oct-05	3612.4	2875.1	138.60	140.74	20.0	3.5	1	9.7 to 19.5	7.5 to 20.0	0.5 to 7.5
P-06A	Silt-Clay	13-Oct-05	3363.7	2566.2	129.30	131.58	20.0	3.5	1	9.7 to 19.5	7.5 to 20.0	0.5 to 7.5
P-07A	Silt-Clay	3-Feb-12	3804.2	2168.8	145.70	147.90	31.0	10	2	16.0 to 26.0	14.0 to 26.5	2.0 to 14.0
GT10-1	Silt-Clay	10-Sep-10	3444.2	3211.7	143.80	145.56	66.5	5.9	2	15.0 to 25.0	13.0 to 30.0	2.0 to 13.0/ 30.0 to 65.0
GT10-11	Silt-Clay	9-Sep-10	2518.1	1781.3	149.30	150.08	61.0	5.9	2	15.0 to 25.0	13.0 to 30.0	2.0 to 13.0 / 30.0 to 60.0
GT10-12	Silt-Clay	14-Sep-10	1736.5	1971.4	150.60	152.41	55.0	5.9	2	15.0 to 25.0	13.0 to 30.0	2.0 to 13.0/ 30.0 to 65.0

Table 3-1
Groundwater Monitoring Network Construction Information
Riverbend Landfill

Well Designation	Hydro-stratigraphic Unit Screened	Date Installation Completed	Eastings[a]	Northings[a]	Ground Elevation[a] (ft-msl)	TOC Elevation[a] (ft-msl)	Boring Depth (ft-bgs)	Boring Diameter (inches)	Well Diameter (inches)	Well Screen Interval (ft-bgs)	Sand Pack Interval (ft-bgs)	Well Seal Interval (ft-bgs)
Piezometers (Continued)												
SA-BH-1	Silt-Clay	24-Aug-10	716.6	3175.5	152.80	155.21	23.0	10	2	12.0 to 22.0	10.0 to 23.0	2.0 to 10.0
SA-BH-3	Silt-Clay	24-Aug-10	813.1	1679.7	152.80	155.07	26.5	10	2	12.0 to 22.0	10.0 to 23.5	2.0 to 10/ 23.5 to 25.0
SA-BH-5	Silt-Clay	23-Aug-10	1773.0	586.9	148.60	151.01	28.5	10	2	18.0 to 28.0	15.5 to 28.5	2.0 to 15.5
SA-BH-6	Silt-Clay	29-Sep-10	2895.0	597.7	123.80	125.93	25.0	10	2	14.0 to 24.0	12.0 to 25.0	2.0 to 12.0
Decommissioned Monitoring Wells and Piezometers												
MW-2[c]	Silt-Clay	26-Jan-81	5123.7	4126.2	146.30	148.30	40.0	NA	2	NA	NA	NA
MW-7A[d]	Silt-Clay	26-May-93	4359.8	3103.9	146.70	149.56	32.5	8	2	16.0 to 26.0	13.0 to 27.0	2.5 to 13.0
MW-7B[d]	Sand-Gravel	17-Jun-93	4369.0	3105.4	146.50	149.34	82.6	8	2	49.0 to 59.0	47.2 to 60.0	2.0 to 47.2
MW-8A[e]	Silt-Clay	20-Oct-93	6779.1	2982.3	124.10	126.01	24.5	8	2	13.3 to 22.8	10.2 to 23.5	3.0 to 10.2
MW-8B[e]	Sand-Gravel	25-Oct-93	6770.7	2979.2	124.30	126.81	49.5	8	2	29.3 to 38.8	27.0 to 40.0	2.0 to 27.0
MW-11A[f]	Silt-Clay	21-Oct-93	5340.9	3362.8	143.10	146.33	29.0	8	2	16.3 to 25.8	13.0 to 27.0	2.0 to 13.0
MW-11B[f]	Sand-Gravel	2-Nov-93	5330.6	3357.7	143.10	146.25	73.8	10	2	41.3 to 50.8	38.1 to 51.7	2.0 to 38.1
MW-13A[g]	Silt-Clay	17-Oct-96	4341.2	2093.9	146.60	149.66	44.0	10	2	33.7 to 43.2	31.5 to 44.0	2.0 to 31.5
MW-13B[g]	Sand-Gravel	17-Oct-96	4348.6	2089.7	146.50	149.45	65.5	10	2	55.2 to 64.7	52.1 to 65.5	2.0 to 52.1
P-04A[h]	Silt-Clay	28-Oct-93	4067.0	2530.1	139.00	141.15	32.5	8	2	19.3 to 28.8	15.9 to 29.8	2.0 to 15.9
P-04B[h]	Sand-Gravel	10-Nov-93	4078.5	2531.9	139.00	141.65	75.8	10	2	42.3 to 51.8	39.0 to 52.4	2.0 to 39.0

NOTE:

NA = not available; TOC = top of casing; ft-msl = feet mean sea level; ft-bgs = feet below ground surface.

[a] All monitoring wells and piezometers were re-surveyed in July 2013.

[b] MW-12A, MW-12B, MW-6A, P-01, P-02, and P-03 were re-surveyed in July 2017.

[c] MW-2 was decommissioned in July 2016 to accommodate construction of planned stormwater retention pond.

[d] MW-7A and MW-7B were decommissioned in June 2009 to accommodate construction of landfill Module 8D.

[e] MW-8A and MW-8B were decommissioned between May 1996 (when these wells were last sampled) and March 1997 to accommodate construction of Modules 6 and 7.

[f] MW-11A and MW-11B were decommissioned in May 2012 to accommodate construction of landfill Module 8A.

[g] MW-13A and MW-13B were decommissioned in May 2001 to accommodate construction of the leachate pond.

[h] P-04A and P-04B were decommissioned in June 2013 to accommodate construction of the mechanically stabilized earthen (MSE) berm.

Table 3-2
2017 Groundwater, Surface Water, and Leachate Management Systems Routine Semiannual and Annual Monitoring Schedule Riverbend Landfill

Monitoring Location	Monitoring Function	Spring 2017 Semiannual [a]	Fall 2017 Semiannual [b]
Groundwater			
MW-12A	Compliance	X	X [c]
MW-12B	Compliance	X	X
MW-14A	Compliance	X	X [c]
MW-14B	Compliance	X	X
MW-15A	Compliance	X	X [c]
MW-15B	Compliance	X	X
MW-16A	Compliance	X	X
MW-16B	Compliance	X	X [c]
MW-21A	Compliance	X	X
MW-21B	Compliance	X	X
MW-5A	Detection	X	X
MW-5B	Detection	X	---
MW-19A	Detection	X	X
MW-20A	Detection	X	X
MW-20B	Detection	X	---
MW-22A	Detection	X	---
P-05A	Detection	X	---
P-06A	Detection	X	---
P-07A	Detection	X	---
South Yamhill River Surface Water Samples			
SYR SW-1 (Upstream)	Informational	X	---
SYR SW-2 (Downstream)	Informational	X	---
Leachate Management System Samples			
1/5 P	Detection	X	---
4/5 S	Detection	X	---
6/7 P	Detection	X	---
6/7 S	Detection	X	---
8 P	Detection	X	---
8 S	Detection	X	---
9 P	Detection	X	---
9 S	Detection	X	---
Leachate Pond	Detection	X	X
Leachate Pond Secondary	Detection	X	X

NOTES:

X = sampled; --- = not required to be sampled by the approved environmental monitoring plan; P = primary leachate collection system; S = secondary leak detection system.

[a] Sampling performed from April 18 through April 20, 2017.

[b] Sampling performed from November 7 through November 21, 2017.

[c] MW-12A, MW-14A, MW-15A, and MW-16B were resampled on December 27, 2017 for verification of Fall 2017 monitoring results.

Table 5-1
2017 Analytical Parameter Schedule
for Groundwater Monitoring
Riverbend Landfill

Parameter	Annual and Semiannual Monitoring[a, b, c]	
	Silt-Clay WBZ[d] (Shallow "A" Wells)	Sand-Gravel WBZ[e] (Deep "B" Wells)
Group 1a: Field Indicators		
Specific Conductance	X	X
Dissolved Oxygen	X	X
pH	X	X
Oxidation-Reduction Potential	X	X
Temperature	X	X
Group 1b: Laboratory Indicators		
Total Organic Carbon	X	X
Total Dissolved Solids	X	X
Group 2a: Anions		
Ammonia	X	X
Bicarbonate	X	X
Chloride	X	X
Nitrate+Nitrite	X	X
Sulfate	X	X
Group 2a: Cations		
Calcium	X	X
Iron	X	X
Magnesium	X	X
Manganese	X	X
Potassium	X	X
Sodium	X	X
Group 3: Volatile Organic Compounds (VOCs)[f]		
VOCs	X[g]	X[g]

NOTE:

WBZ = water-bearing zone; X = parameter analyzed as part of the routine semiannual or annual monitoring event; --- = parameter not required to be analyzed for during event.

a Semiannual groundwater monitoring events were performed in the second quarter (Spring) from April 18 through 20, 2017 and in fourth quarter (Fall) on November 7 and 21, 2017. The annual groundwater monitoring event was performed in the Spring event.

b Field duplicate samples were collected once per day or once every 10 samples whichever is most frequent.

c Field blank samples were collected once per day or once every 10 samples whichever is most frequent.

d Includes the following semiannual (1) compliance monitoring wells MW-12A, MW-14A, MW-15A, MW-16A, and MW-21A and (2) detection monitoring wells MW-19A and MW-20A. Piezometers P-05A, P-06A, and P-07A were sampled annually for indicator parameters, anions, and cations in Spring event. Detection well MW-22A was sampled annually in the Spring event.

e Includes the following semiannual compliance monitoring wells: MW-12B, MW-14B, MW-15B, MW-16B, and MW-21B. Detection monitoring well MW-20B was sampled annually in the Spring event.

f All VOCs include a library search to identify any unknown compounds.

g Detection monitoring well MW-5A was sampled for VOCs and inorganic parameters semiannually in the Spring and Fall events and MW-5B was sampled for VOCs annually in the Spring event.

Table 5-2
2017 Analytical Parameter Schedule for the South Yamhill River Surface Water Monitoring Riverbend Landfill

Parameter	Annual Monitoring[a]	
	SYR SW-1 (Upstream)	SYR SW-2 (Downstream)
Group 1a: Field Indicators[b]	X	X
Group 1b: Laboratory and Supplemental Indicators		
Total Alkalinity	X	X
Total Hardness (as $CaCO_3$)	X	X
Laboratory pH	X	X
Specific Conductance	X	X
Chemical Oxygen Demand	X	X
Biological Oxygen Demand	X	X
Fecal Coliform	X	X
E. coli	X	X
Total Kjeldahl Nitrogen	X	X
Total Organic Halogens	X	X
Total Phosphorus	X	X
Orthophosphate	X	X
Total Organic Carbon	X	X
Total Dissolved Solids	X	X
Total Suspended Solids	X	X
Group 2a: Anions		
Ammonia	X	X
Bicarbonate	X	X
Carbonate	X	X
Chloride	X	X
Nitrate+Nitrite	X	X
Silicon	X	X
Sulfate	X	X
Group 2a: Cations		
Calcium	X	X
Iron	X	X
Magnesium	X	X
Manganese	X	X
Potassium	X	X
Sodium	X	X
Group 3: Volatile Organic Compounds (VOCs)[c]		
VOCs	X	X

NOTE:
SYR = South Yamhill River; X = parameter analyzed.

[a] Annual monitoring was performed in the second quarter (Spring) on April 19, 2017.

[b] Field indicators include: pH, temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential.

[c] All VOCs include a library search to identify any unknown compounds.

Table 5-3
2017 Analytical Parameter Schedule for Leachate Management Systems Monitoring Riverbend Landfill

Parameter	Annual and Semiannual Monitoring[a]	
	Semiannual Leachate Pond and LPS	Annual LCRS and Secondary Sumps[b]
Group 1a: Field Indicators[c]	X	X
Group 1b: Laboratory Indicators		
Total Alkalinity	X	X
Total Hardness (as $CaCO_3$)	X	X
Laboratory pH	X	X
Specific Conductance	X	X
Chemical Oxygen Demand	X	X
Total Kjeldahl Nitrogen	X	---
Total Organic Carbon	X	X
Total Dissolved Solids	X	X
Total Suspended Solids	X	X
Group 2a: Anions		
Ammonia	X	X
Bicarbonate	X	X
Carbonate	X	X
Chloride	X	X
Nitrate+Nitrite	X	X
Silicon	X	X
Sulfate	X	X
Group 2a: Cations		
Calcium	X	X
Iron	X	X
Magnesium	X	X
Manganese	X	X
Potassium	X	X
Sodium	X	X
Group 2b: Trace Metals (Total)[d]	X	X
Group 3: Volatile Organic Compounds (VOCs)[e]		
VOCs	X	X

NOTE:

LPS = leachate pond secondary; LCRS = leachate collection and removal system;

X = parameter analyzed; --- parameter not required.

a Semiannual monitoring events were performed in the second quarter (Spring) on April 18, 2017 and in the fourth quarter (Fall) on November 9, 2017.

b Annual sump monitoring locations include: 1/5 P, 4/5 S, 6/7 P, 6/7 S, 8 P, 8 S, 9 P, and 9 S.

c Field indicators include: pH, temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential.

d Group 2b trace metals include: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, and zinc.

e All VOCs include a library search to identify any unknown compounds.

Table 5-4
Cation-Anion Balances for
2017 Laboratory Analytical Data
Riverbend Landfill

Monitoring Location	Spring 2017 Event (%)	Fall 2017 Event (%)
Groundwater		
MW-5A	-0.75	0.46
MW-12A	-1.3	-5.4
MW-12B	2.1	0.02
MW-14A	-5.3	-2.1
MW-14B	1.2	3.4
MW-15A	-0.90	-0.42
MW-15B	-0.41	1.7
MW-16A	15	-2.0
MW-16B	-2.2	-1.0
MW-19A	-3.6	1.2
MW-20A	-2.2	-3.3
MW-20B	0.22	---
MW-21A	0.73	-2.5
MW-21B	-2.9	0.94
MW-22A	0.73	---
Surface Water Samples		
SYR SW-1 (Upstream)	2.5	---
SYR SW-2 (Downstream)	2.6	---
Leachate Management System Liquid Samples		
1/5 P	1.8	---
4/5 S	-3.0	---
6/7 P	-5.8	---
6/7 S	-0.82	---
8 P	12	---
8 S	-4.4	---
9 P	9.6	---
9 S	0.41	---
Leachate Pond	2.8	5.8
Leachate Pond Secondary	7.0	1.9

NOTE:
--- = not required to be sampled during monitoring event.
Cation/anion balance data included in laboratory reports (see attached compact disc).

Table 6-1
Comparison of 2017 Groundwater Elevations and Vertical Gradients in Monitoring Well Pairs (Shallow and Deep Water Bearing Zones)
Riverbend Landfill

Sample Location	Date	Groundwater Elevation (feet-msl)	Gradient (feet)
MW-1B (Shallow)	17-Apr-17	149.56	37.67
MW-1A (Deep)	17-Apr-17	111.89	(Downward)
MW-1B (Shallow)	7-Nov-17	148.71	33.76
MW-1A (Deep)	7-Nov-17	114.95	(Downward)
MW-3A (Shallow)	17-Apr-17	123.03	0.63
MW-3B (Deep)	17-Apr-17	122.40	(Downward)
MW-3A (Shallow)	7-Nov-17	121.95	4.65
MW-3B (Deep)	7-Nov-17	117.30	(Downward)
MW-4A (Shallow)	17-Apr-17	117.53	0.30
MW-4B (Deep)	17-Apr-17	117.23	(Downward)
MW-4A (Shallow)	7-Nov-17	115.64	3.15
MW-4B (Deep)	7-Nov-17	112.49	(Downward)
MW-5A (Shallow)	17-Apr-17	123.08	7.30
MW-5B (Deep)	17-Apr-17	115.78	(Downward)
MW-5A (Shallow)	7-Nov-17	121.61	11.30
MW-5B (Deep)	7-Nov-17	110.31	(Downward)
MW-6A (Shallow)	17-Apr-17	121.85	5.15
MW-6B (Deep)	17-Apr-17	116.70	(Downward)
MW-6A (Shallow)	7-Nov-17	122.35	11.43
MW-6B (Deep)	7-Nov-17	110.92	(Downward)
MW-9A (Shallow)	17-Apr-17	119.97	-4.55
MW-9BR (Deep)	17-Apr-17	124.52	(Upward)
MW-9A (Shallow)	7-Nov-17	115.09	-4.88
MW-9BR (Deep)	7-Nov-17	119.97	(Upward)
MW-10A (Shallow)	17-Apr-17	147.58	20.42
MW-10B (Deep)	17-Apr-17	127.16	(Downward)
MW-10A (Shallow)	7-Nov-17	136.68	11.49
MW-10B (Deep)	7-Nov-17	125.19	(Downward)
MW-12A (Shallow)	17-Apr-17	118.11	5.32
MW-12B (Deep)	17-Apr-17	112.79	(Downward)
MW-12A (Shallow)	7-Nov-17	114.81	7.88
MW-12B (Deep)	7-Nov-17	106.93	(Downward)
MW-14A (Shallow)	17-Apr-17	109.77	-0.54
MW-14B (Deep)	17-Apr-17	110.31	(Upward)
MW-14A (Shallow)	7-Nov-17	105.86	-0.32
MW-14B (Deep)	7-Nov-17	106.18	(Upward)
MW-15A (Shallow)	17-Apr-17	120.95	4.41
MW-15B (Deep)	17-Apr-17	116.54	(Downward)
MW-15A (Shallow)	7-Nov-17	111.10	1.44
MW-15B (Deep)	7-Nov-17	109.66	(Downward)
MW-16A (Shallow)	17-Apr-17	115.43	0.24
MW-16B (Deep)	17-Apr-17	115.19	(Downward)
MW-16A (Shallow)	7-Nov-17	110.11	-0.17
MW-16B (Deep)	7-Nov-17	110.28	(Upward)

Table 6-1
Comparison of 2017 Groundwater Elevations and Vertical Gradients in Monitoring Well Pairs (Shallow and Deep Water Bearing Zones)
Riverbend Landfill

Sample Location	Date	Groundwater Elevation (feet-msl)	Gradient (feet)
MW-18A (Shallow)	17-Apr-17	138.77	6.30
MW-18B (Deep)	17-Apr-17	132.47	(Downward)
MW-18A (Shallow)	7-Nov-17	133.93	7.24
MW-18B (Deep)	7-Nov-17	126.69	(Downward)
MW-20A (Shallow)	17-Apr-17	126.62	1.55
MW-20B (Deep)	17-Apr-17	125.07	(Downward)
MW-20A (Shallow)	7-Nov-17	122.01	2.19
MW-20B (Deep)	7-Nov-17	119.82	(Downward)
MW-21A (Shallow)	17-Apr-17	111.49	-1.82
MW-21B (Deep)	17-Apr-17	113.31	(Upward)
MW-21A (Shallow)	7-Nov-17	111.27	0.64
MW-21B (Deep)	7-Nov-17	110.63	(Downward)
MW-22A (Shallow)	17-Apr-17	111.09	0.31
MW-22B (Deep)	17-Apr-17	110.78	(Downward)
MW-22A (Shallow)	7-Nov-17	105.29	0.34
MW-22B (Deep)	7-Nov-17	104.95	(Downward)
MW-23A (Shallow)	17-Apr-17	117.19	3.56
MW-23B (Deep)	17-Apr-17	113.63	(Downward)
MW-23A (Shallow)	7-Nov-17	112.05	5.25
MW-23B (Deep)	7-Nov-17	106.80	(Downward)
MW-25A (Shallow)	17-Apr-17	148.12	33.43
MW-25B (Deep)	17-Apr-17	114.69	(Downward)
MW-25A (Shallow)	7-Nov-17	147.40	29.95
MW-25B (Deep)	7-Nov-17	117.45	(Downward)

NOTE:
feet-msl = feet mean sea level.

Table 6-2
Comparison of Statistical and Prescriptive Concentration Limits with 2017 Semiannual Compliance Groundwater Analytical Results
Riverbend Landfill

	PSCL	AL	SSLs							
Monitoring Well	Vinyl Chloride[a] (mg/L)	VOCs[b]	Bicarbonate Alkalinity (mg/L)	Chloride (mg/L)	Magnesium Dissolved (mg/L)	Potassium Dissolved (mg/L)	Sodium Dissolved (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
MW-12A Concentration Limits	*0.002*	*(see Note 1)*	*81.3*	*63.4*	*11.5*	*1.20*	*21.8*	---	*240*	*3.2*
MW-12A April 2017 Results	0.001 U	NDs	**130**	**81**	**17**	1.1	**41**	23	**300**	**4.4**
MW-12A April 2017 Results (Dup)	0.001 U	**Acetone**	**130**	**81**	**17**	0.97	**40**	23	**320**	**4.3**
MW-12A July 2017 Results (IPA)	0.001 U	NDs	**110**	**65**	**15**	0.53	**34**	23	**280**	3.0
MW-12A September 2017 Results (IPA)	0.001 U	NDs	**99**	**67**	**15**	0.62	**27**	22	**250**	2.2
MW-12A September 2017 Results (IPA) (Dup)	0.001 U	NDs	**99**	**65**	**15**	0.70	**31**	22	**250**	2.1
MW-12A November 2017 Results	0.001 U	**Acetone**	79	**78**	**19**	1.0	**46**	26	**400**	1.9
MW-12A December 2017 Results (Re)	---	NDs	---	---	---	---	---	---	---	---
MW-12A December 2017 Results (Re) (Dup)	---	NDs	---	---	---	---	---	---	---	---
MW-12B Concentration Limits	*0.002*	*(see Note 1)*	*291*	---	*38.8*	*1.27*	*67.8*	*6.8*	*1,020*	*1.9*
MW-12B April 2017 Results	0.001 U	NDs	160	---	16	0.50 U	18	1.6	280	1.3
MW-12B November 2017 Results	0.001 U	NDs	190	---	20	0.59	26	1.0 U	360	1.2
MW-14A Concentration Limits	*0.002*	*(see Note 1)*	*148*	*33.4*	*16.5*	*0.85*	*15.6*	---	*282*	*3.1*
MW-14A April 2017 Results	0.001 U	NDs	110	5.8	9.9	0.50 U	8.8	---	160	1.0 U
MW-14A November 2017 Results	0.001 U	**Chloromethane**	120	7.8	12.0	0.50 U	10.0	---	200	1.0 U
MW-14A December 2017 Results (Re)	---	NDs	---	---	---	---	---	---	---	---
MW-14B Concentration Limits	*0.002*	*(see Note 1)*	*230*	---	*16.1*	*0.85*	*43.0*	*16.8*	*329*	*3.2*
MW-14B April 2017 Results	0.001 U	NDs	200	---	14	0.56	34	3.9	280	1.3
MW-14B November 2017 Results	0.001 U	NDs	190	---	15	0.58	23	2.0	280	2.1
MW-14B November 2017 Results (Dup)	0.001 U	NDs	200	---	16	0.62	23	1.6	260	2.3
MW-15A Concentration Limits	*0.002*	*(see Note 1)*	*135*	*19.5*	*12.7*	*1.00*	*29.5*	---	*349*	*2.2*
MW-15A April 2017 Results	0.001 U	NDs	30	3.2	3.1	0.50 U	20	---	170	1.0 U
MW-15A November 2017 Results	0.001 U	**Acetone**	28	3.0	2.6	0.50 U	17	---	250	**2.5**
MW-15A December 2017 Results (Re)	---	NDs	---	---	---	---	---	---	---	---
MW-15B Concentration Limits	*0.002*	*(see Note 1)*	*372*	---	*36.3*	*0.68*	*42.2*	*10.7*	*543*	*2.1*
MW-15B November 2017 Results	0.001 U	NDs	270	---	25	0.50 U	32	3.1	340	1.0 U
MW-15B April 2017 Results	0.001 U	NDs	310	---	31	0.50 U	39	1.4	400	1.0 U

Table 6-2
Comparison of Statistical and Prescriptive Concentration Limits with 2017 Semiannual Compliance Groundwater Analytical Results
Riverbend Landfill

	PSCL	AL	SSLs							
Monitoring Well	Vinyl Chloride[a] (mg/L)	VOCs[b]	Bicarbonate Alkalinity (mg/L)	Chloride (mg/L)	Magnesium Dissolved (mg/L)	Potassium Dissolved (mg/L)	Sodium Dissolved (mg/L)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
MW-16A Concentration Limits	*0.002*	*(see Note 1)*	*460*	*14.8*	*32.0*	*0.88*	*59.6*	---	*505*	*5.2*
MW-16A April 2017 Results	0.001 U	**Acetone**	150	9.1	17	0.50 U	38	---	200	1.8
MW-16A April 2017 Results (Dup)	0.001 U	NDs	170	9.1	18	0.50 U	38	---	220	1.7
MW-16A November 2017 Results	0.001 U	NDs	140	10	11	0.50 U	32	---	220	1.4
MW-16B Concentration Limits	*0.002*	*(see Note 1)*	*388*	---	*44.2*	*0.93*	*81.6*	*8.6*	*771*	*2.8*
MW-16B April 2017 Results	0.001 U	NDs	330	---	33	0.57	65	4.1	570	1.2
MW-16B November 2017 Results	0.001 U	**Chloromethane**	360	---	36	0.57	71	3.5	590	1.3
MW-16B December 2017 Results (Re)	---	NDs	---	---	---	---	---	---	---	---
MW-21A Concentration Limits	*0.002*	*(see Note 1)*	*211*	*16.0*	*19.9*	*0.91*	*60.9*	---	*446*	*4.7*
MW-21A April 2017 Results	0.001 U	**Acetone**	120	3.8	10	0.50 U	16	---	170	1.2
MW-21A April 2017 Results (DUP)	0.001 U	NDs	140	3.8	10	0.50 U	17	---	190	1.2
MW-21A November 2017 Results	0.001 U	NDs	99	6.2	9.3	0.50 U	17	---	190	1.5
MW-21B Concentration Limits	*0.002*	*(see Note 1)*	*325*	---	*26.4*	*1.40*	*46.6*	*21.7*	*372*	*5.9*
MW-21B April 2017 Results	0.001 U	**Acetone**	250	---	19	0.81	31	1.2	290	2.4
MW-21B November 2017 Results	0.001 U	NDs	260	---	22	0.87	37	3.1	320	3.0

NOTE:

mg/L = milligrams per liter; --- = not applicable; Dup = field duplicate sample.; --- not applicable; U = not detected at or above the practical quantitation limit (PQL); NDs = no detections;

IPA = informal preliminary assessment event; NS = parameter not required to be sampled and analyzed during the event.

Bold denotes a concentration above a concentration limit.

Note 1: Detection of a volatile organic compound (VOC) above the laboratory derived PQL.

PSCL: Permit-Specific Concentration Limit; a concentration above of a single PSCL not previously reported and explained to the DEQ will trigger verification resampling. Verification of a results above a PSCL would require follow-up actions, consistent with Section 11.5.3 of this Environmental Monitoring Plan (EMP).

AL: Action Limit; a concentration above a single AL not previously reported and explained to the DEQ will trigger verification resampling. Verification of a results above an AL would require follow-up actions, consistent with Section 11.5.3 of this EMP.

SSL: Site-Specific Limit; concentrations above three or more SSLs in a single compliance monitoring well during a monitoring event not previously reported and explained to the DEQ will trigger verification resampling. Verification of three or more concentrations above SSL would require follow-up actions consistent with Section 11.5.3 of this EMP.

[a] PSCL for vinyl chloride in all compliance wells established at the numerical groundwater quality reference level (NGWQRL) of 0.002 mg/L (specified in Table 2 of the Oregon Administrative Rule [OAR] 340-40).

[b] VOCs by U.S. Environmental Protection Agency (EPA) Method 8260B and 8011 except for vinyl chloride which was defined as a PSCL.

Table 6-3
Statistical Trend Analysis Results Based on 2017 and Historical Groundwater Analytical Results
Riverbend Landfill

Sampling Location	Bicarbonate Alkalinity	Ammonia as Nitrogen	Dissolved Calcium	Chloride	Dissolved Iron	Dissolved Magnesium	Dissolved Manganese	Nitrate+ Nitrite	Dissolved Potassium	Dissolved Sodium	Sulfate	Total Dissolved Solids	Total Organic Carbon
Compliance Wells													
MW-12A	Increasing	---	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	---	Increasing	Increasing	Increasing	---
MW-12B	---	Increasing	Decreasing	Decreasing	Increasing	Decreasing	---	---	---	Decreasing	---	Decreasing	---
MW-14A	Increasing	---	---	---	---	---	---	---	---	---	Decreasing	---	---
MW-14B	Increasing	---	Increasing	Increasing	---	Increasing	---	---	---	Increasing	---	Increasing	---
MW-15A	Decreasing	---	Decreasing	Decreasing	---	Decreasing	Decreasing	---	---	---	---	---	---
MW-15B	---	---	Decreasing	Decreasing	---	Decreasing	---	---	---	---	Decreasing	Decreasing	---
MW-16A	Decreasing	Decreasing	Decreasing	Decreasing	---	Decreasing	Decreasing	---	---	Decreasing	Increasing	Decreasing	---
MW-16B	---	---	Decreasing	Decreasing	---	---	---	---	---	---	Decreasing	Decreasing	---
MW-21A	---	---	Decreasing	Decreasing	---	---	---	---	Increasing	Decreasing	Decreasing	Decreasing	---
MW-21B	---	---	Decreasing	---	---	---	---	---	---	Increasing	Decreasing	---	---
Detection Wells and Piezometers													
MW-5A[a]	Increasing	---	Increasing	Increasing	---	Increasing	Increasing	---	---	Increasing	---	Increasing	---
MW-19A	---	---	Increasing	Increasing	Decreasing	Increasing	Decreasing	---	---	Increasing	---	Increasing	---
MW-20A	---	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	---	---	Increasing	---	Increasing	Increasing
MW-20B	---	Increasing	Increasing	---	---	Increasing	---	---	---	Increasing	---	---	---
MW-22A	---	---	---	---	---	---	---	---	---	---	---	---	---
P-05A	---	---	Increasing	Increasing	---	Increasing	---	---	---	Increasing	Decreasing	Increasing	---
P-06A	---	---	Increasing	---	---	---	---	---	---	---	---	---	---
P-07A	Decreasing	---	Decreasing	Decreasing	---	---	---	---	---	---	Decreasing	Decreasing	---

NOTE:

[a] Consistent with the site's environmental monitoring plan, groundwater samples collected in 2017 from MW-5A (and MW-5B) are only required to be analyzed for Group 3 volatile organic compounds. However, MW-5A was analyzed for the site-specific inorganic parameters in 2017 as part of the MW-12A informal preliminary assessment. Additionally, MW-5A has been analyzed for inorganic parameters occasionally in recent years for informational purposes. The statistical trend analysis of MW-5A data presented in this table was performed using the historical data that is available.

--- = no statistical trend identified by DUMPStat.

Indicates new trend identified in 2017 compared to 2016 and historical data.

Table 6-4
Volatile Organic Compounds Detected in Groundwater Samples Collected from MW-5A (µg/L)
Riverbend Landfill

Sample Location	Sample Date	Benzene	Chloro-benzene	Chloro-ethane	1,1-Di-chloro-ethane	Methylene Chloride	Tetra-chloro-ethene	Toluene	Tri-chloro-ethene	Vinyl chloride	Total Xylenes	1,4-Di-chloro-benzene	cis-1,2-Dichloro-ethene	Dichloro-difluoro-methane	trans-1,2-Dichloro-ethene	1,2-Di-chloro-benzene
MW-5A	17-Mar-94	**3.6**	0.5 U	**5.4**	**51**	1.0 U	**14**	0.5 U	**40**	**28**	**0.8**	0.5 U	**200**	**2.6**	**1.6**	0.5 U
MW-5A (Dup)	17-Mar-94	**3.8**	0.5 U	**5.6**	**47**	1.0 U	**14**	0.5 U	**38**	**28**	**0.8**	0.5 U	**190**	**2.6**	**1.9**	0.5 U
MW-5A	15-Jun-94	**3.0**	0.5 U	**5.2**	**63**	1.0 U	**8.2**	0.5 U	**50**	**16**	0.5 U	0.5 U	**230**	**0.6**	**1.2**	0.5 U
MW-5A (Dup)	15-Jun-94	**3.1**	0.5 U	**5.4**	**43**	1.0 U	**9.6**	0.5 U	**35**	**18**	**0.5**	0.5 U	**160**	**0.7**	**1.3**	0.5 U
MW-5A	22-Sep-94	**2.2**	0.5 U	**6.3**	**38 D**	1.0 U	**2.8**	0.5 U	**26**	**13**	0.5 U	0.5 U	**120 D**	**0.6**	**1.5**	0.5 U
MW-5A (Dup)	22-Sep-94	**2.1**	0.5 U	**6.4**	**39 D**	1.0 U	**2.5**	0.5 U	**25**	**13**	0.5 U	0.5 U	**130 D**	**0.7**	**0.9**	0.5 U
MW-5A	9-Dec-94	**2.2**	0.5 U	**2.1**	**35**	1.0 U	**2.4**	0.5 U	**13**	**13**	**0.5**	0.5 U	**170 D**	0.5 U	**0.9**	0.5 U
MW-5A (Dup)	9-Dec-94	**2.3**	0.5 U	**2.3**	**34**	1.0 U	**2.3**	0.5 U	**13**	**13**	**0.6**	0.5 U	**170 D**	0.5 U	**0.9**	0.5 U
MW-5A	28-Mar-95	**1.9**	0.5 U	**2.0**	**31**	1.0 U	**1.0**	0.5 U	**10**	**9.8**	0.5 U	0.5 U	**150 D**	0.5 U	**0.9**	0.5 U
MW-5A (Dup)	28-Mar-95	**1.8**	0.5 U	**2.2**	**31**	1.0 U	**1.2**	0.5 U	**11**	**9.5**	0.5 U	0.5 U	**150 D**	0.5 U	**1.3**	0.5 U
MW-5A	13-Sep-95	**2.2**	0.5 U	**4.0**	**36**	1.0 U	**0.5**	0.5 U	**9.9**	**12**	0.5 U	0.5 U	**210 D**	0.5 U	**1.1**	0.5 U
MW-5A	24-May-96	**1.9**	1.0 U	**2.3**	**26**	1.0 U	1.0 U	1.0 U	**4.2**	**10**	1.0 U	1.0 U	**230 E**	1.0 U	**2.5**	0.5 U
MW-5A (Dup)	24-May-96	**1.9**	1.0 U	**1.7**	**24**	1.0 U	**1.2**	1.0 U	**10**	**9.3**	1.0 U	1.0 U	**200 E**	1.0 U	**3.7**	0.5 U
MW-5A	18-Dec-96	3.1 U	2.5 U	5.9 U	**20**	16 U	10 U	2.5 U	**5.0**	**5.7**	10 U	4.3 U	**100**	6.5 U	4.5 U	0.5 U
MW-5A (Dup)	18-Dec-96	3.1 U	2.5 U	5.9 U	**19**	16 U	10 U	2.5 U	**5.1**	**6.4**	10 U	4.3 U	**110**	6.5 U	4.5 U	0.5 U
MW-5A	2-Apr-97	**2.4**	1.0 U	1.0 U	**18**	**3.3**	1.0 U	1.0 U	**3.8**	**10.0**	1.0 U	**4.9**	**140**	1.0 U	1.0 U	0.5 U
MW-5A (Dup)	2-Apr-97	**1.7**	1.0 U	1.0 U	**19**	1.0 U	1.0 U	1.0 U	**3.1**	**8.1**	1.0 U	**3.8**	**140**	1.0 U	1.0 U	0.5 U
MW-5A	21-May-97	3.1 U	2.5 U	5.9 U	**15**	4.1 U	1.2 U	2.5 U	**4.0**	**6.7**	10 U	4.3 U	**130**	6.5 U	4.5 U	0.5 U
MW-5A	10-Sep-97	1.0 U	1.0 U	1.0 U	1.0 U	**2.9**	1.0 U	1.0 U	**1.9**	**5.1**	1.0 U	1.0 U	**110**	1.0 U	1.0 U	0.5 U
MW-5A	22-Dec-97	**1.2**	1.0 U	1.0 U	**10**	1.0 U	1.0 U	1.0 U	**2.7**	**3.5**	1.0 U	**1.8**	**77**	1.0 U	1.0 U	0.5 U
MW-5A (Dup)	12-Jun-98	**1.1**	1.0 U	1.0 U	**11**	1.0 U	**1.0**	1.0 U	**4.5**	**2.2**	1.0 U	**2.3**	**68**	1.0 U	1.0 U	0.5 U
MW-5A	12-Jun-98	**1.2**	1.0 U	1.0 U	**10**	1.0 U	1.0 U	1.0 U	**4.1**	**2.4**	1.0 U	**2.7**	**69**	1.0 U	1.0 U	0.5 U
MW-5A	8-Jan-99	**1.1**	**0.5 J**	**0.8**	**8.3**	1.0 U	**1.1**	0.5 U	**1.6**	**2.1**	NT	**2.4**	**38**	0.5 U	**0.5**	0.5 U
MW-5A	18-Jun-99	**2.1**	**0.98**	**1.0**	**7.5**	**1.1 B**	0.5 U	0.5 U	0.5 U	**3.6**	0.5 U	**7.8**	**49**	0.5 U	0.5 U	0.5 U
MW-5A	16-Dec-99	**1.7**	**0.77**	**0.56**	**5.1**	0.5 U	0.5 U	0.5 U	0.5 U	**2.6**	0.5 U	**5.3**	**38**	0.5 U	0.5 U	0.5 U
MW-5A (Dup)	16-Dec-99	**1.8**	**0.8**	**0.66**	**5.4**	0.5 U	0.5 U	0.5 U	0.5 U	**2.8**	0.5 U	**5.8**	**40 E**	0.5 U	0.5 U	0.5 U
MW-5A	26-May-00	**1.6**	**0.68**	0.5 U	**6.3**	0.5 U	**0.92**	0.5 U	**2.4**	**1.2**	0.5 U	**5.4**	**33**	0.5 U	0.5 U	0.5 U
MW-5A	9-Nov-00	**1.2**	**0.93**	0.5 U	**3.6**	0.5 U	0.5 U	0.5 U	0.5 U	**1.4**	0.5 U	**7.6**	**21**	0.5 U	0.5 U	0.5 U
MW-5A	25-Apr-01	**1.2**	**0.59**	0.5 U	**3.3**	0.5 U	**0.73**	0.5 U	**1.1**	**0.96**	0.5 U	**5.7**	**20**	0.5 U	0.5 U	0.5 U
MW-5A	7-Nov-01	**1.8**	**0.79**	**0.55**	**3.6**	0.5 U	0.5 U	**0.82**	**0.59**	**0.97**	0.5 U	**5.2**	**25**	0.5 U	0.5 U	0.5 U
MW-5A	15-Apr-02	**1.7**	**0.96**	0.5 U	**2.8**	0.5 U	**0.57**	0.5 U	**0.66**	**0.62**	0.5 U	**7.4**	**18**	0.5 U	0.5 U	0.5 U
MW-5A	10-Oct-02	**1.4**	0.5 U	**0.55**	**2.7**	1.0 U	0.5 U	0.5 U	0.5 U	**0.87**	1.0 U	**5.6**	**17**	0.5 U	0.5 U	0.5 U
MW-5A	14-May-03	**1.5**	**0.95**	0.5 U	**1.7**	1.0 U	0.5 U	0.5 U	0.5 U	**0.94**	1.0 U	**8.0**	**11**	0.5 U	0.5 U	0.5 U
MW-5A	20-Nov-03	**1.7**	**1.2**	0.5 U	**2.1**	1.0 U	0.5 U	0.5 U	0.5 U	**1.4**	1.0 U	**7.7**	**13**	0.5 U	0.5 U	0.5 U

Table 6-4
Volatile Organic Compounds Detected in Groundwater Samples Collected from MW-5A (µg/L)
Riverbend Landfill

Sample Location	Sample Date	Benzene	Chloro-benzene	Chloro-ethane	1,1-Di-chloro-ethane	Methylene Chloride	Tetra-chloro-ethene	Toluene	Tri-chloro-ethene	Vinyl chloride	Total Xylenes	1,4-Di-chloro-benzene	cis-1,2-Dichloro-ethene	Dichloro-difluoro-methane	trans-1,2-Dichloro-ethene	1,2-Di-chloro-benzene
MW-5A	21-Apr-04	**1.2**	**1.0**	0.5 U	**1.6**	1.0 U	0.5 U	0.05 U	0.5 U	**0.77**	1.0 U	0.5 U	**10**	0.5 U	0.5 U	0.5 U
MW-5A	11-Nov-04	**2.5**	**2.0**	0.5 U	**1.0**	1.0 U	0.5 U	0.5 U	0.5 U	**1.2**	1.0 U	**12**	**7.1**	0.5 U	0.5 U	0.5 U
MW-5A	27-May-05	**1.9**	**3.1**	0.5 U	**0.94**	0.5 U	0.5 U	0.5 U	0.5 U	**0.81**	1.0 U	**18**	**6.5**	0.5 U	0.5 U	**0.85**
MW-5A	26-Oct-05	**1.2**	**1.3**	0.5 U	**0.85**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	**6.1**	**6.4**	0.5 U	0.5 U	0.5 U
MW-5A	12-May-06	**1.0**	**1.6**	0.5 U	**0.6**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	**7.9**	**3.7**	0.5 U	0.5 U	0.5 U
MW-5A	9-Oct-06	**0.93**	**1.4**	0.5 U	**0.6**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U	**6.0**	**4.1**	0.5 U	0.5 U	0.5 U
MW-5A	8-May-07	**1.3**	**2.9**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**9.2**	**3.5**	2.0 U	1.0 U	1.0 U
MW-5A	7-Nov-07	**1.3**	**2.7**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**7.1**	**4.0**	2.0 U	1.0 U	1.0 U
MW-5A	22-May-08	**1.2**	**3.0**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**7.3**	**3.9**	2.0 U	1.0 U	1.0 U
MW-5A	12-Nov-08	**2.5**	**6.8**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**11**	**4.7**	2.0 U	1.0 U	1.0 U
MW-5A	6-May-09	**2.7**	**8.4**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**13**	**3.6**	2.0 U	1.0 U	1.0 U
MW-5A	18-Nov-09	**1.5**	**4.8**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**10**	**3.2**	2.0 U	1.0 U	1.0 U
MW-5A	21-Apr-10	**1.0**	**4.5**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**8.2**	**2.3**	2.0 U	1.0 U	1.0 U
MW-5A	6-Oct-10	**1.1**	**3.3**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**6.0**	**2.5**	2.0 U	1.0 U	1.0 U
MW-5A	15-Apr-11	1.0 U	**3.1**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**6.6**	**2.2**	2.0 U	1.0 U	1.0 U
MW-5A	2-Nov-11	1.0 U	**2.8**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**5.3**	**2.4**	2.0 U	1.0 U	1.0 U
MW-5A	1-May-12	1.0 U	**2.5**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**5.3**	**1.8**	2.0 U	1.0 U	1.0 U
MW-5A	15-Nov-12	1.0 U	**2.4**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**5.1**	**1.5**	2.0 U	1.0 U	1.0 U
MW-5A (Dup)	15-Nov-12	1.0 U	**2.4**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**5.2**	**1.5**	2.0 U	1.0 U	1.0 U
MW-5A	10-Apr-13	1.0 U	**2.8**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**6.4**	**1.7**	2.0 U	1.0 U	1.0 U
MW-5A	20-Nov-13	1.0 U	**1.8**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**4.5**	**1.3**	2.0 U	1.0 U	1.0 U
MW-5A	30-Apr-14	1.0 U	**1.6**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**3.5**	**1.1**	2.0 U	1.0 U	1.0 U
MW-5A	18-Nov-14	1.0 U	**2.0**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**3.6**	**1.2**	2.0 U	1.0 U	1.0 U
MW-5A	6-May-15	1.0 U	**2.1**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**4.8**	**1.3**	2.0 U	1.0 U	1.0 U
MW-5A	11-Nov-15	1.0 U	**3.2**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**8.5**	**1.5**	2.0 U	1.0 U	1.0 U
MW-5A	4-May-16	1.0 U	**1.9**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**3.6**	**1.1**	2.0 U	1.0 U	1.0 U
MW-5A	16-Nov-16	1.0 U	**2.8**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**5.8**	**1.3**	2.0 U	1.0 U	1.0 U
MW-5A	18-Apr-17	**1.1**	**3.1**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**6.0**	**1.8**	2.0 U	1.0 U	1.0 U
MW-5A	12-Sep-17	1.0 U	**2.0**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**4.6**	**1.2**	2.0 U	1.0 U	1.0 U
MW-5A	8-Nov-17	1.0 U	**3.3**	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	**6.9**	**1.3**	2.0 U	1.0 U	1.0 U

NOTE:
D = compound identified in analysis at secondary dilution; E = estimated value; J = reported values above instrument detection limit and below reporting limit; U = not detected at or above the reporting limit.

Table 6-5
Field Parameters in Surface Water Samples
Riverbend Landfill

Sample Location	Date Collected	pH (S.U.)	ORP (mV)	Specific Conductance (µS/cm)	Temperature (^{o}C)	Dissolved Oxygen (mg/L)
SYR SW-1 (Upstream)	3-May-12	6.46	94.8	82	11.1	11.28
SYR SW-1 (Upstream)	17-Apr-13	6.17	153.0	96	8.7	12.13
SYR SW-1 (Upstream)	23-May-13	6.96	-70.9	106	14.8	8.81
SYR SW-1 (Upstream)	1-May-14	6.74	113.4	90	14.3	9.76
SYR SW-1 (Upstream)	11-May-15	7.42	92.3	91	16.5	8.37
SYR SW-1 (Upstream)	2-May-16	8.02	15.9	103	18.3	11.06
SYR SW-1 (Upstream)	19-Apr-17	5.83	125.7	89	11.6	11.43
SYR SW-2 (Downstream)	3-May-12	7.04	65.2	82	11.1	11.28
SYR SW-2 (Downstream)	17-Apr-13	5.72	183.8	96	8.2	11.30
SYR SW-2 (Downstream)	23-May-13	6.35	-16.0	106	13.8	9.07
SYR SW-2 (Downstream)	1-May-14	5.82	160.5	90	14.0	8.98
SYR SW-2 (Downstream)	11-May-15	7.58	95.8	85	17.6	7.46
SYR SW-2 (Downstream)	2-May-16	7.94	-3.7	108	18.4	8.86
SYR SW-2 (Downstream)	19-Apr-17	6.55	115.1	79	10.6	10.71

NOTE:
S.U. = standard pH units; mV = millivolts; µS/cm = microSiemens per centimeter; ^{o}C = degrees Celsius;
mg/L = milligrams per liter.

Table 6-6
Anions and Cations in Surface Water Samples
(mg/L)
Riverbend Landfill

Sample Location	Date Collected	Anions						Cations					
		Ammonia	Nitrate+Nitrite	Carbonate	Bicarbonate	Sulfate	Chloride	Calcium	Iron	Magnesium	Manganese	Potassium	Sodium
SYR SW-1 (Upstream)[a]	3-May-12	0.058	0.20	5.0 U	29	4.4	4.8	6.8	0.056	2.5	0.0140	0.50 U	5.3
SYR SW-1 (Upstream)[a]	17-Apr-13	0.050 U	0.28	5.0 U	27	4.8	5.1	6.9	0.037	2.4	0.0096	0.58	5.3
SYR SW-1 (Upstream)	1-May-14	0.050 U	0.36	5.0 U	28	6.2	5.2	6.8	1.100	2.7	0.0220	0.56	5.4
SYR SW-1 (Upstream)	11-May-15	0.050 U	0.17	5.0 U	35	4.3	5.4	8.5	0.440	2.8	0.0180	0.50	6.6
SYR SW-1 (Upstream)	2-May-16	0.050 U	0.19	5.0 U	33	4.5	4.4	8.1	0.520	2.8	0.0190	0.50 U	6.0
SYR SW-1 (Upstream)	19-Apr-17	0.050 U	0.34	5.0 U	26	4.5	4.4	6.7	1.100	2.3	0.0220	0.50 U	5.0
SYR SW-2 (Downstream)[a]	3-May-12	0.050 U	0.23	5.0 U	28	4.6	4.8	6.7	0.038	2.4	0.0120	0.50 U	5.0
SYR SW-2 (Downstream)[a]	17-Apr-13	0.053	0.30	5.0 U	27	4.8	4.9	6.9	0.035	2.4	0.0094	0.51	5.3
SYR SW-2 (Downstream)	1-May-14	0.120	0.43	5.0 U	26	5.1	4.6	6.7	1.200	2.6	0.0240	0.56	5.5
SYR SW-2 (Downstream)	11-May-15	0.050 U	0.17	5.0 U	36	4.3	5.5	8.6	0.540	2.8	0.0220	0.51	6.6
SYR SW-2 (Downstream)	2-May-16	0.050 U	0.05 U	5.0 U	33	4.6	4.5	8.2	0.440	2.8	0.0180	0.52	6.0
SYR SW-2 (Downstream)	19-Apr-17	0.050 U	0.33	5.0 U	26	4.3	3.6	6.4	1.200	2.2	0.0230	0.50 U	4.8

NOTE:

[a] Consistent with the site's updated environmental monitoring plan, laboratory analysis of dissolved-phase cations were replaced with total in 2014.

mg/L = milligrams per liter; U = not detected at or above the method reporting limit listed

Table 6-7
Laboratory Indicator Parameters in Surface Water Samples
Riverbend Landfill

Sample Location	Date Collected	Laboratory pH (S.U.)	Laboratory Specific Conductance (µmhos/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Chemical Oxygen Demand (mg/L)	Total Organic Carbon (mg/L)	Hardness (Dissolved) (as $CaCO_3$) (mg/L)	Total Alkalinity (mg/L)
SYR SW-1 (Upstream)	3-May-12	7.71	80	73	22	10 U	1.3	27	29
SYR SW-1 (Upstream)	17-Apr-13	7.49	84	33	9.2	10 U	1.5	34 B	27
SYR SW-1 (Upstream)	1-May-14	7.38	86	43	16	11	1.0 U	43	28
SYR SW-1 (Upstream)	11-May-15	7.56	120	59	6.8 H	10 U	1.0	53	35
SYR SW-1 (Upstream)	2-May-16	7.57	75	63	6.8	10 U	1.3	38	33
SYR SW-1 (Upstream)	19-Apr-17	7.6	78	71	16	10 U	1.2	22	26
SYR SW-2 (Downstream)	3-May-12	7.65	82	68	31	10 U	1.5	27	28
SYR SW-2 (Downstream)	17-Apr-13	7.55	83	35	11	10 U	1.5	30 B	27
SYR SW-2 (Downstream)	1-May-14	7.36	85	50	18	14	1.0 U	41	26
SYR SW-2 (Downstream)	11-May-15	7.67	110	60	17 H	10 U	1.2	56	36
SYR SW-2 (Downstream)	2-May-16	7.54	72	73	7.2	10 U	1.3	34	33
SYR SW-2 (Downstream)	19-Apr-17	7.7	78	69	15	10 U	1.2	34	26

NOTE:
S.U. = standard pH units; µmhos/cm = micromhos per centimeter; mg/L = milligrams per liter; U = not detected at or above the method reporting limit listed;
B = compound was detected in the associated laboratory method blank sample; H = sample was prepped or analyzed past the analytical holding time.

Table 6-8
Supplemental Parameters in Surface Water Samples
Riverbend Landfill

Sample Location	Date Collected	Fecal Coliform (MPN/100mL)	E. coli (MPN/100mL)	Biochemical Oxygen Demand (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Ortho-phosphate (mg/L)	Total Phosphorus (mg/L)	Total Organic Halogens (ug/L)
SYR SW-1 (Upstream)	3-May-12	300	460	2.4	0.89	0.02 U	0.028	15 U
SYR SW-1 (Upstream)	17-Apr-13	NS	NS	2.0 U	0.50 U	0.02 U	0.020 U	15 U
SYR SW-1 (Upstream)	23-May-13	365	1,046	NS	NS	NS	NS	NS
SYR SW-1 (Upstream)	1-May-14	23	41	2.0 U	0.50 U	0.02 U	0.021	15 U
SYR SW-1 (Upstream)	11-May-15	18	99	2.0 U	0.50 U	0.02 U	0.020 U	17
SYR SW-1 (Upstream)	2-May-16	11	23	2.0 U	2.6	0.02 U	0.020 U	15 U
SYR SW-1 (Upstream)	19-Apr-17	23	28	2.0 U	0.5 U	0.02 U	0.030	15 U
SYR SW-2 (Downstream)	3-May-12	900	260	2.9	0.50 U	0.02 U	0.040	16
SYR SW-2 (Downstream)	17-Apr-13	NS	NS	2.0 U	0.50 U	0.02 U, H	0.020 U	15 U
SYR SW-2 (Downstream)	23-May-13	127	435	NS	NS	NS	NS	NS
SYR SW-2 (Downstream)	1-May-14	33	42	2.0 U	0.50 U	0.02 U	0.021	15 U
SYR SW-2 (Downstream)	11-May-15	11	40	2.0 U	0.50 U	0.02 U	0.020 U	15 U
SYR SW-2 (Downstream)	2-May-16	8.0	22	2.0 U	0.50 U	0.02 U	0.020 U	15 U
SYR SW-2 (Downstream)	19-Apr-17	24.0	27	2.0 U	0.50 U	0.02 U	0.032	15 U

NOTE:
MPN/100mL = most probable number per 100 milliliters; mg/L = milligrams per liter; ug/L = micrograms per liter; U = not detected at or above the method reporting limit listed;
NS = not sampled for or analyzed; H = sample was prepped or analyzed past the analytical holding time.

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Compliance Boundary Landfill Gas Probes		
CGP-09R	8-Oct-97	0.1
CGP-09R	17-Oct-97	0.0
CGP-09R	25-Nov-97	0.0
CGP-09R	15-Dec-97	0.0
CGP-09R	2-Jan-98	0.0
CGP-09R	23-Feb-98	0.0
CGP-09R	5-Mar-98	0.0
CGP-09R	7-Apr-98	0.0
CGP-09R	6-May-98	0.0
CGP-09R	5-Jun-98	0.0
CGP-09R	7-Jul-98	0.0
CGP-09R	4-Aug-98	0.0
CGP-09R	8-Sep-98	0.0
CGP-09R	13-Oct-98	0.0
CGP-09R	10-Nov-98	0.0
CGP-09R	9-Dec-98	0.0
CGP-09R	5-Jan-99	0.0
CGP-09R	4-Feb-99	0.0
CGP-09R	5-Mar-99	0.0
CGP-09R	7-Apr-99	0.0
CGP-09R	13-May-99	0.0
CGP-09R	22-Jun-99	0.0
CGP-09R	9-Jul-99	0.0
CGP-09R	4-Aug-99	0.0
CGP-09R	9-Sep-99	0.0
CGP-09R	8-Oct-99	0.0
CGP-09R	10-Nov-99	0.0
CGP-09R	3-Dec-99	0.0
CGP-09R	6-Jan-00	0.0
CGP-09R	7-Feb-00	0.0
CGP-09R	6-Mar-00	0.0
CGP-09R	7-Apr-00	0.0
CGP-09R	18-May-00	0.0
CGP-09R	6-Jun-00	0.0
CGP-09R	20-Jul-00	0.0
CGP-09R	8-Aug-00	0.0
CGP-09R	7-Sep-00	0.0
CGP-09R	4-Oct-00	0.0
CGP-09R	22-Nov-00	0.0
CGP-09R	8-Dec-00	0.0
CGP-09R	10-Jan-01	0.0
CGP-09R	9-Feb-01	0.0
CGP-09R	1-Mar-01	0.0
CGP-09R	5-Apr-01	0.0
CGP-09R	4-May-01	0.0
CGP-09R	7-Jun-01	0.0
CGP-09R	12-Jul-01	0.0
CGP-09R	7-Aug-01	0.0
CGP-09R	6-Sep-01	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-09R	5-Oct-01	0.0
CGP-09R	1-Nov-01	0.0
CGP-09R	4-Dec-01	0.0
CGP-09R	16-Jan-02	0.0
CGP-09R	5-Feb-02	0.0
CGP-09R	12-Mar-02	0.0
CGP-09R	4-Apr-02	0.0
CGP-09R	2-May-02	0.0
CGP-09R	4-Jun-02	0.0
CGP-09R	5-Jul-02	0.0
CGP-09R	6-Aug-02	0.0
CGP-09R	5-Sep-02	0.0
CGP-09R	10-Oct-02	0.0
CGP-09R	7-Nov-02	0.0
CGP-09R	3-Dec-02	0.0
CGP-09R	9-Jan-03	0.0
CGP-09R	5-Feb-03	0.0
CGP-09R	13-Mar-03	0.0
CGP-09R	3-Apr-03	0.0
CGP-09R	2-May-03	0.0
CGP-09R	4-Jun-03	0.0
CGP-09R	8-Jul-03	0.0
CGP-09R	5-Aug-03	0.0
CGP-09R	16-Sep-03	0.0
CGP-09R	2-Oct-03	0.0
CGP-09R	5-Nov-03	0.0
CGP-09R	4-Dec-03	0.0
CGP-09R	12-Jan-04	0.0
CGP-09R	5-Feb-04	0.0
CGP-09R	5-Mar-04	0.0
CGP-09R	8-Apr-04	0.0
CGP-09R	4-May-04	0.0
CGP-09R	2-Jun-04	0.0
CGP-09R	8-Jul-04	0.0
CGP-09R	4-Aug-04	0.0
CGP-09R	2-Sep-04	0.0
CGP-09R	6-Oct-04	0.0
CGP-09R	1-Nov-04	0.0
CGP-09R	6-Dec-04	0.0
CGP-09R	7-Jan-05	0.0
CGP-09R	7-Feb-05	0.0
CGP-09R	8-Mar-05	0.0
CGP-09R	1-Apr-05	0.0
CGP-09R	5-May-05	0.0
CGP-09R	10-Jun-05	0.0
CGP-09R	1-Jul-05	0.0
CGP-09R	4-Aug-05	0.0
CGP-09R	2-Sep-05	0.0
CGP-09R	3-Oct-05	0.0
CGP-09R	3-Nov-05	0.0
CGP-09R	5-Dec-05	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-09R	26-Jan-06	0.0
CGP-09R	23-Feb-06	0.0
CGP-09R	1-Mar-06	0.0
CGP-09R	5-Apr-06	0.0
CGP-09R	18-May-06	0.0
CGP-09R	2-Jun-06	0.0
CGP-09R	7-Jul-06	0.0
CGP-09R	1-Aug-06	0.0
CGP-09R	12-Sep-06	0.0
CGP-09R	3-Oct-06	0.0
CGP-09R	16-Nov-06	0.0
CGP-09R	12-Dec-06	0.0
CGP-09R	17-Jan-07	0.0
CGP-09R	7-Feb-07	0.0
CGP-09R	2-Mar-07	0.0
CGP-09R	3-Apr-07	0.0
CGP-09R	3-May-07	0.0
CGP-09R	1-Jun-07	0.0
CGP-09R	17-Jul-07	0.0
CGP-09R	21-Aug-07	0.0
CGP-09R	10-Sep-07	0.0
CGP-09R	3-Oct-07	0.0
CGP-09R	1-Nov-07	0.0
CGP-09R	13-Dec-07	0.0
CGP-09R	8-Jan-08	0.0
CGP-09R	25-Feb-08	0.0
CGP-09R	5-Mar-08	0.0
CGP-09R	24-Apr-08	0.0
CGP-09R	2-May-08	0.0
CGP-09R	2-Jun-08	0.0
CGP-09R	15-Jul-08	0.0
CGP-09R	4-Aug-08	0.0
CGP-09R	5-Sep-08	0.0
CGP-09R	21-Oct-08	0.0
CGP-09R	26-Nov-08	0.0
CGP-09R	1-Dec-08	0.0
CGP-09R	14-Jan-09	0.0
CGP-09R	2-Feb-09	0.2
CGP-09R	12-Mar-09	0.0
CGP-09R	10-Apr-09	0.0
CGP-09R	8-May-09	0.2
CGP-09R	8-Jun-09	0.0
CGP-09R	24-Jul-09	0.0
CGP-09R	17-Aug-09	0.0
CGP-09R	24-Sep-09	0.0
CGP-09R	12-Oct-09	0.0
CGP-09R	10-Nov-09	0.0
CGP-09R	28-Dec-09	0.0
CGP-09R	21-Jan-10	0.0
CGP-09R	11-Feb-10	0.0
CGP-09R	10-Mar-10	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-09R	9-Apr-10	0.0
CGP-09R	7-May-10	0.0
CGP-09R	2-Jun-10	0.0
CGP-09R	9-Jul-10	0.0
CGP-09R	4-Aug-10	0.0
CGP-09R	14-Sep-10	0.0
CGP-09R	11-Oct-10	0.0
CGP-09R	5-Nov-10	0.0
CGP-09R	8-Dec-10	0.0
CGP-09R	10-Jan-11	0.0
CGP-09R	17-Feb-11	0.0
CGP-09R	10-Mar-11	0.0
CGP-09R	30-Mar-11	0.0
CGP-09R	21-Apr-11	0.0
CGP-09R	4-May-11	0.0
CGP-09R	11-May-11	0.0
CGP-09R	9-Jun-11	0.0
CGP-09R	8-Jul-11	0.0
CGP-09R	28-Jul-11	0.0
CGP-09R	10-Aug-11	0.0
CGP-09R	9-Sep-11	0.0
CGP-09R	14-Oct-11	0.0
CGP-09R	3-Nov-11	0.0
CGP-09R	9-Nov-11	0.0
CGP-09R	13-Dec-11	0.0
CGP-09R	12-Jan-12	0.0
CGP-09R	4-May-12	0.0
CGP-09R	23-Aug-12	0.0
CGP-09R	15-Nov-12	0.0
CGP-09R	21-Mar-13	0.0
CGP-09R	12-Apr-13	0.0
CGP-09R	12-Jul-13	0.0
CGP-09R	25-Oct-13	0.0
CGP-09R	13-Mar-14	0.0
CGP-09R	2-Jun-14	0.0
CGP-09R	31-Jul-14	0.0
CGP-09R	15-Dec-14	0.0
CGP-09R	4-Mar-15	0.0
CGP-09R	14-May-15	0.0
CGP-09R	16-Jul-15	0.0
CGP-09R	12-Nov-15	0.0
CGP-09R	22-Mar-16	0.0
CGP-09R	7-Apr-16	0.0
CGP-09R	9-Sep-16	0.0
CGP-09R	15-Nov-16	0.0
CGP-09R	1-Mar-17	0.0
CGP-09R	17-Apr-17	0.0
CGP-09R	13-Sep-17	0.0
CGP-09R	8-Nov-17	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-10R	26-Nov-08	0.0
CGP-10R	1-Dec-08	0.0
CGP-10R	14-Jan-09	0.0
CGP-10R	2-Feb-09	0.0
CGP-10R	12-Mar-09	0.0
CGP-10R	10-Apr-09	0.0
CGP-10R	8-May-09	0.0
CGP-10R	8-Jun-09	0.0
CGP-10R	24-Jul-09	0.0
CGP-10R	17-Aug-09	0.0
CGP-10R	24-Sep-09	0.0
CGP-10R	12-Oct-09	0.0
CGP-10R	10-Nov-09	0.0
CGP-10R	28-Dec-09	0.0
CGP-10R	21-Jan-10	0.0
CGP-10R	11-Feb-10	0.0
CGP-10R	10-Mar-10	0.0
CGP-10R	9-Apr-10	0.0
CGP-10R	7-May-10	0.0
CGP-10R	2-Jun-10	0.0
CGP-10R	9-Jul-10	0.0
CGP-10R	4-Aug-10	0.0
CGP-10R	14-Sep-10	0.0
CGP-10R	11-Oct-10	0.0
CGP-10R	5-Nov-10	0.0
CGP-10R	8-Dec-10	0.0
CGP-10R	10-Jan-11	0.0
CGP-10R	17-Feb-11	0.0
CGP-10R	10-Mar-11	0.0
CGP-10R	30-Mar-11	0.0
CGP-10R	21-Apr-11	0.0
CGP-10R	4-May-11	0.0
CGP-10R	11-May-11	0.0
CGP-10R	9-Jun-11	0.0
CGP-10R	8-Jul-11	0.0
CGP-10R	28-Jul-11	0.0
CGP-10R	10-Aug-11	0.0
CGP-10R	9-Sep-11	0.0
CGP-10R	14-Oct-11	0.0
CGP-10R	3-Nov-11	0.0
CGP-10R	9-Nov-11	0.0
CGP-10R	13-Dec-11	0.0
CGP-10R	12-Jan-12	0.0
CGP-10R	4-May-12	0.0
CGP-10R	23-Aug-12	0.0
CGP-10R	15-Nov-12	0.0
CGP-10R	21-Mar-13	0.0
CGP-10R	12-Apr-13	0.0
CGP-10R	12-Jul-13	0.0
CGP-10R	25-Oct-13	0.0
CGP-10R	13-Mar-14	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-10R	2-Jun-14	0.0
CGP-10R	31-Jul-14	0.0
CGP-10R	15-Dec-14	0.0
CGP-10R	4-Mar-15	0.0
CGP-10R	14-May-15	0.0
CGP-10R	16-Jul-15	0.0
CGP-10R	12-Nov-15	0.0
CGP-10R	22-Mar-16	0.0
CGP-10R	7-Apr-16	0.0
CGP-10R	9-Sep-16	0.0
CGP-10R	15-Nov-16	0.0
CGP-10R	1-Mar-17	0.0
CGP-10R	17-Apr-17	0.0
CGP-10R	13-Sep-17	0.0
CGP-10R	8-Nov-17	0.0
CGP-11	8-Oct-97	0.1
CGP-11	17-Oct-97	0.0
CGP-11	25-Nov-97	0.0
CGP-11	15-Dec-97	0.0
CGP-11	2-Jan-98	0.5
CGP-11	23-Feb-98	0.0
CGP-11	5-Mar-98	0.0
CGP-11	7-Apr-98	0.0
CGP-11	6-May-98	0.0
CGP-11	5-Jun-98	0.0
CGP-11	7-Jul-98	0.0
CGP-11	4-Aug-98	0.0
CGP-11	8-Sep-98	0.0
CGP-11	13-Oct-98	0.0
CGP-11	10-Nov-98	0.0
CGP-11	9-Dec-98	0.0
CGP-11	5-Jan-99	0.0
CGP-11	4-Feb-99	0.1
CGP-11	5-Mar-99	0.0
CGP-11	7-Apr-99	0.0
CGP-11	13-May-99	0.0
CGP-11	22-Jun-99	0.0
CGP-11	9-Jul-99	0.0
CGP-11	4-Aug-99	0.0
CGP-11	9-Sep-99	0.0
CGP-11	8-Oct-99	0.0
CGP-11	10-Nov-99	0.0
CGP-11	3-Dec-99	0.0
CGP-11	6-Jan-00	0.0
CGP-11	7-Feb-00	0.0
CGP-11	6-Mar-00	0.0
CGP-11	7-Apr-00	0.0
CGP-11	18-May-00	0.0
CGP-11	6-Jun-00	0.0
CGP-11	20-Jul-00	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-11	8-Aug-00	0.0
CGP-11	7-Sep-00	0.0
CGP-11	4-Oct-00	0.0
CGP-11	22-Nov-00	0.0
CGP-11	8-Dec-00	0.0
CGP-11	10-Jan-01	0.0
CGP-11	9-Feb-01	0.0
CGP-11	1-Mar-01	0.0
CGP-11	5-Apr-01	0.0
CGP-11	4-May-01	0.0
CGP-11	7-Jun-01	0.0
CGP-11	12-Jul-01	0.0
CGP-11	7-Aug-01	0.0
CGP-11	6-Sep-01	0.0
CGP-11	5-Oct-01	0.0
CGP-11	1-Nov-01	0.0
CGP-11	4-Dec-01	0.0
CGP-11	16-Jan-02	0.0
CGP-11	5-Feb-02	0.0
CGP-11	12-Mar-02	0.0
CGP-11	4-Apr-02	0.0
CGP-11	2-May-02	0.0
CGP-11	4-Jun-02	0.0
CGP-11	5-Jul-02	0.0
CGP-11	6-Aug-02	0.0
CGP-11	5-Sep-02	0.0
CGP-11	10-Oct-02	0.0
CGP-11	7-Nov-02	0.0
CGP-11	3-Dec-02	0.0
CGP-11	9-Jan-03	0.0
CGP-11	5-Feb-03	0.0
CGP-11	13-Mar-03	0.0
CGP-11	3-Apr-03	0.0
CGP-11	2-May-03	0.0
CGP-11	4-Jun-03	0.0
CGP-11	8-Jul-03	0.0
CGP-11	5-Aug-03	0.0
CGP-11	16-Sep-03	0.0
CGP-11	2-Oct-03	0.0
CGP-11	5-Nov-03	0.0
CGP-11	4-Dec-03	0.0
CGP-11	12-Jan-04	0.0
CGP-11	5-Feb-04	0.0
CGP-11	5-Mar-04	0.0
CGP-11	8-Apr-04	0.0
CGP-11	4-May-04	0.0
CGP-11	2-Jun-04	0.0
CGP-11	8-Jul-04	0.0
CGP-11	4-Aug-04	0.0
CGP-11	2-Sep-04	0.0
CGP-11	6-Oct-04	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-11	1-Nov-04	0.0
CGP-11	6-Dec-04	0.0
CGP-11	7-Jan-05	0.0
CGP-11	7-Feb-05	0.0
CGP-11	8-Mar-05	0.0
CGP-11	1-Apr-05	0.0
CGP-11	5-May-05	0.0
CGP-11	10-Jun-05	0.0
CGP-11	1-Jul-05	0.0
CGP-11	4-Aug-05	0.0
CGP-11	2-Sep-05	0.0
CGP-11	3-Oct-05	0.0
CGP-11	3-Nov-05	0.0
CGP-11	5-Dec-05	0.0
CGP-11	26-Jan-06	0.0
CGP-11	23-Feb-06	0.0
CGP-11	1-Mar-06	0.0
CGP-11	5-Apr-06	0.0
CGP-11	18-May-06	0.0
CGP-11	2-Jun-06	0.0
CGP-11	7-Jul-06	0.0
CGP-11	1-Aug-06	0.0
CGP-11	12-Sep-06	0.0
CGP-11	3-Oct-06	0.0
CGP-11	16-Nov-06	0.0
CGP-11	12-Dec-06	0.0
CGP-11	17-Jan-07	0.0
CGP-11	7-Feb-07	0.0
CGP-11	2-Mar-07	0.0
CGP-11	3-Apr-07	0.0
CGP-11	3-May-07	0.0
CGP-11	1-Jun-07	0.0
CGP-11	17-Jul-07	0.0
CGP-11	21-Aug-07	0.0
CGP-11	10-Sep-07	0.0
CGP-11	3-Oct-07	0.0
CGP-11	1-Nov-07	0.0
CGP-11	13-Dec-07	0.0
CGP-11	8-Jan-08	0.0
CGP-11	25-Feb-08	0.0
CGP-11	5-Mar-08	0.0
CGP-11	24-Apr-08	0.0
CGP-11	2-May-08	0.0
CGP-11	2-Jun-08	0.0
CGP-11	15-Jul-08	0.0
CGP-11	4-Aug-08	0.0
CGP-11	5-Sep-08	0.0
CGP-11	21-Oct-08	0.0
CGP-11	26-Nov-08	0.0
CGP-11	1-Dec-08	0.0
CGP-11	14-Jan-09	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-11	2-Feb-09	0.0
CGP-11	12-Mar-09	0.0
CGP-11	10-Apr-09	0.0
CGP-11	8-May-09	0.0
CGP-11	8-Jun-09	0.0
CGP-11	24-Jul-09	0.0
CGP-11	17-Aug-09	0.0
CGP-11	24-Sep-09	0.0
CGP-11	12-Oct-09	0.0
CGP-11	10-Nov-09	0.0
CGP-11	28-Dec-09	0.0
CGP-11	21-Jan-10	0.0
CGP-11	11-Feb-10	0.0
CGP-11	10-Mar-10	0.0
CGP-11	9-Apr-10	0.0
CGP-11	7-May-10	0.0
CGP-11	2-Jun-10	0.0
CGP-11	9-Jul-10	0.0
CGP-11	4-Aug-10	0.0
CGP-11	14-Sep-10	0.0
CGP-11	11-Oct-10	0.0
CGP-11	5-Nov-10	0.0
CGP-11	8-Dec-10	0.0
CGP-11	10-Jan-11	0.0
CGP-11	17-Feb-11	0.0
CGP-11	10-Mar-11	0.0
CGP-11	30-Mar-11	0.0
CGP-11	21-Apr-11	0.0
CGP-11	4-May-11	0.0
CGP-11	11-May-11	0.0
CGP-11	9-Jun-11	0.0
CGP-11	8-Jul-11	0.0
CGP-11	28-Jul-11	0.0
CGP-11	10-Aug-11	0.0
CGP-11	9-Sep-11	0.0
CGP-11	14-Oct-11	0.0
CGP-11	3-Nov-11	0.0
CGP-11	10-Nov-11	0.0
CGP-11	13-Dec-11	0.0
CGP-11	12-Jan-12	0.0
CGP-11	4-May-12	0.0
CGP-11	23-Aug-12	0.0
CGP-11	15-Nov-12	0.0
CGP-11	21-Mar-13	0.0
CGP-11	12-Apr-13	0.0
CGP-11	12-Jul-13	0.0
CGP-11	25-Oct-13	0.0
CGP-11	13-Mar-14	0.0
CGP-11	2-Jun-14	0.0
CGP-11	31-Jul-14	0.0
CGP-11	15-Dec-14	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-11	4-Mar-15	0.0
CGP-11	14-May-15	0.0
CGP-11	16-Jul-15	0.0
CGP-11	12-Nov-15	0.0
CGP-11	22-Mar-16	0.0
CGP-11	7-Apr-16	0.0
CGP-11	9-Sep-16	0.0
CGP-11	15-Nov-16	0.0
CGP-11	1-Mar-17	0.0
CGP-11	17-Apr-17	0.0
CGP-11	13-Sep-17	0.0
CGP-11	8-Nov-17	0.0
CGP-12	8-Oct-97	0.0
CGP-12	17-Oct-97	0.0
CGP-12	25-Nov-97	0.0
CGP-12	15-Dec-97	0.0
CGP-12	2-Jan-98	0.0
CGP-12	23-Feb-98	0.0
CGP-12	5-Mar-98	0.0
CGP-12	7-Apr-98	0.0
CGP-12	6-May-98	0.0
CGP-12	5-Jun-98	0.0
CGP-12	7-Jul-98	0.0
CGP-12	4-Aug-98	0.0
CGP-12	8-Sep-98	0.0
CGP-12	13-Oct-98	0.0
CGP-12	10-Nov-98	0.0
CGP-12	9-Dec-98	0.0
CGP-12	5-Jan-99	0.0
CGP-12	4-Feb-99	0.0
CGP-12	5-Mar-99	0.0
CGP-12	7-Apr-99	0.0
CGP-12	13-May-99	0.0
CGP-12	22-Jun-99	0.0
CGP-12	9-Jul-99	0.0
CGP-12	4-Aug-99	0.0
CGP-12	9-Sep-99	0.0
CGP-12	8-Oct-99	0.0
CGP-12	10-Nov-99	0.0
CGP-12	3-Dec-99	0.0
CGP-12	6-Jan-00	0.0
CGP-12	7-Feb-00	0.0
CGP-12	6-Mar-00	0.0
CGP-12	7-Apr-00	0.0
CGP-12	18-May-00	0.0
CGP-12	6-Jun-00	0.0
CGP-12	20-Jul-00	0.0
CGP-12	8-Aug-00	0.0
CGP-12	7-Sep-00	0.0
CGP-12	4-Oct-00	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-12	22-Nov-00	0.0
CGP-12	8-Dec-00	0.0
CGP-12	10-Jan-01	0.0
CGP-12	9-Feb-01	0.0
CGP-12	1-Mar-01	0.0
CGP-12	5-Apr-01	0.0
CGP-12	4-May-01	0.0
CGP-12	7-Jun-01	0.0
CGP-12	12-Jul-01	0.0
CGP-12	7-Aug-01	0.0
CGP-12	6-Sep-01	0.0
CGP-12	5-Oct-01	0.0
CGP-12	1-Nov-01	0.0
CGP-12	4-Dec-01	0.0
CGP-12	16-Jan-02	0.0
CGP-12	5-Feb-02	0.0
CGP-12	12-Mar-02	0.0
CGP-12	4-Apr-02	0.0
CGP-12	2-May-02	0.0
CGP-12	4-Jun-02	0.0
CGP-12	5-Jul-02	0.0
CGP-12	6-Aug-02	0.0
CGP-12	5-Sep-02	0.0
CGP-12	10-Oct-02	0.0
CGP-12	7-Nov-02	0.0
CGP-12	3-Dec-02	0.0
CGP-12	9-Jan-03	0.0
CGP-12	5-Feb-03	0.0
CGP-12	13-Mar-03	0.0
CGP-12	3-Apr-03	0.0
CGP-12	2-May-03	0.0
CGP-12	4-Jun-03	0.0
CGP-12	8-Jul-03	0.0
CGP-12	5-Aug-03	0.0
CGP-12	16-Sep-03	0.0
CGP-12	2-Oct-03	0.0
CGP-12	5-Nov-03	0.0
CGP-12	4-Dec-03	0.0
CGP-12	12-Jan-04	0.0
CGP-12	5-Feb-04	0.0
CGP-12	5-Mar-04	0.0
CGP-12	8-Apr-04	0.0
CGP-12	4-May-04	0.0
CGP-12	2-Jun-04	0.0
CGP-12	8-Jul-04	0.0
CGP-12	4-Aug-04	0.0
CGP-12	2-Sep-04	0.0
CGP-12	6-Oct-04	0.0
CGP-12	1-Nov-04	0.0
CGP-12	6-Dec-04	0.0
CGP-12	7-Jan-05	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-12	7-Feb-05	0.0
CGP-12	8-Mar-05	0.0
CGP-12	1-Apr-05	0.0
CGP-12	5-May-05	0.0
CGP-12	10-Jun-05	0.0
CGP-12	1-Jul-05	0.0
CGP-12	4-Aug-05	0.0
CGP-12	2-Sep-05	0.0
CGP-12	3-Oct-05	0.0
CGP-12	3-Nov-05	0.0
CGP-12	5-Dec-05	0.0
CGP-12	26-Jan-06	0.0
CGP-12	23-Feb-06	0.0
CGP-12	1-Mar-06	0.0
CGP-12	5-Apr-06	0.0
CGP-12	18-May-06	0.0
CGP-12	2-Jun-06	0.0
CGP-12	7-Jul-06	0.0
CGP-12	12-Sep-06	0.0
CGP-12	3-Oct-06	0.0
CGP-12	16-Nov-06	0.0
CGP-12	12-Dec-06	0.0
CGP-12	17-Jan-07	0.0
CGP-12	7-Feb-07	0.0
CGP-12	2-Mar-07	0.0
CGP-12	3-Apr-07	0.0
CGP-12	3-May-07	0.0
CGP-12	1-Jun-07	0.0
CGP-12	17-Jul-07	0.0
CGP-12	21-Aug-07	0.0
CGP-12	10-Sep-07	0.0
CGP-12	3-Oct-07	0.0
CGP-12	1-Nov-07	0.0
CGP-12	13-Dec-07	0.0
CGP-12	8-Jan-08	0.0
CGP-12	25-Feb-08	0.0
CGP-12	5-Mar-08	0.0
CGP-12	24-Apr-08	0.0
CGP-12	2-May-08	0.0
CGP-12	2-Jun-08	0.0
CGP-12	15-Jul-08	0.0
CGP-12	4-Aug-08	0.0
CGP-12	5-Sep-08	0.0
CGP-12	21-Oct-08	0.0
CGP-12	26-Nov-08	0.0
CGP-12	1-Dec-08	0.0
CGP-12	14-Jan-09	0.0
CGP-12	2-Feb-09	0.0
CGP-12	12-Mar-09	0.0
CGP-12	10-Apr-09	0.0
CGP-12	8-May-09	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-12	8-Jun-09	0.0
CGP-12	24-Jul-09	0.0
CGP-12	17-Aug-09	0.0
CGP-12	24-Sep-09	0.0
CGP-12	12-Oct-09	0.0
CGP-12	10-Nov-09	0.0
CGP-12	28-Dec-09	0.0
CGP-12	21-Jan-10	0.0
CGP-12	11-Feb-10	0.0
CGP-12	10-Mar-10	0.0
CGP-12	9-Apr-10	0.0
CGP-12	7-May-10	0.0
CGP-12	2-Jun-10	0.0
CGP-12	9-Jul-10	0.0
CGP-12	4-Aug-10	0.0
CGP-12	14-Sep-10	0.0
CGP-12	11-Oct-10	0.0
CGP-12	5-Nov-10	0.0
CGP-12	8-Dec-10	0.0
CGP-12	10-Jan-11	0.0
CGP-12	17-Feb-11	0.0
CGP-12	10-Mar-11	0.0
CGP-12	30-Mar-11	0.0
CGP-12	21-Apr-11	0.0
CGP-12	4-May-11	0.0
CGP-12	11-May-11	0.0
CGP-12	9-Jun-11	0.0
CGP-12	8-Jul-11	0.0
CGP-12	28-Jul-11	0.0
CGP-12	10-Aug-11	0.0
CGP-12	9-Sep-11	0.0
CGP-12	14-Oct-11	0.0
CGP-12	3-Nov-11	0.0
CGP-12	10-Nov-11	0.0
CGP-12	13-Dec-11	0.0
CGP-12	12-Jan-12	0.0
CGP-12	4-May-12	0.0
CGP-12	23-Aug-12	0.0
CGP-12	15-Nov-12	0.0
CGP-12	21-Mar-13	0.0
CGP-12	12-Apr-13	0.0
CGP-12	12-Jul-13	0.0
CGP-12	25-Oct-13	0.0
CGP-12	13-Mar-14	0.0
CGP-12	2-Jun-14	0.0
CGP-12	31-Jul-14	0.0
CGP-12	15-Dec-14	0.0
CGP-12	4-Mar-15	0.0
CGP-12	14-May-15	0.0
CGP-12	16-Jul-15	0.0
CGP-12	12-Nov-15	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
CGP-12	22-Mar-16	0.0
CGP-12	7-Apr-16	0.0
CGP-12	9-Sep-16	0.0
CGP-12	15-Nov-16	0.0
CGP-12	1-Mar-17	0.0
CGP-12	17-Apr-17	0.0
CGP-12	13-Sep-17	0.0
CGP-12	8-Nov-17	0.0
CGP-13	12-Jul-13	0.0
CGP-13	25-Oct-13	0.0
CGP-13	13-Mar-14	0.0
CGP-13	2-Jun-14	0.0
CGP-13	31-Jul-14	0.0
CGP-13	15-Dec-14	0.0
CGP-13	4-Mar-15	0.0
CGP-13	14-May-15	0.0
CGP-13	16-Jul-15	0.0
CGP-13	12-Nov-15	0.0
CGP-13	22-Mar-16	0.0
CGP-13	7-Apr-16	0.0
CGP-13	9-Sep-16	0.0
CGP-13	15-Nov-16	0.0
CGP-13	1-Mar-17	0.0
CGP-13	17-Apr-17	0.0
CGP-13	13-Sep-17	0.0
CGP-13	8-Nov-17	0.0
CGP-14	13-Mar-14	0.0
CGP-14	2-Jun-14	0.0
CGP-14	31-Jul-14	0.0
CGP-14	15-Dec-14	0.0
CGP-14	4-Mar-15	0.0
CGP-14	14-May-15	0.0
CGP-14	16-Jul-15	0.0
CGP-14	12-Nov-15	0.0
CGP-14	22-Mar-16	0.0
CGP-14	7-Apr-16	0.0
CGP-14	9-Sep-16	0.0
CGP-14	15-Nov-16	0.0
CGP-14	1-Mar-17	0.0
CGP-14	17-Apr-17	0.0
CGP-14	13-Sep-17	0.0
CGP-14	8-Nov-17	0.0
Facility Structures		
Office	8-Oct-97	0.0
Office	17-Oct-97	0.0
Office	25-Nov-97	0.0
Office	15-Dec-97	0.0
Office	2-Jan-98	0.0
Office	23-Feb-98	0.0
Office	5-Mar-98	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Office	7-Apr-98	0.0
Office	6-May-98	0.0
Office	5-Jun-98	0.0
Office	7-Jul-98	0.0
Office	4-Aug-98	0.0
Office	8-Sep-98	0.0
Office	13-Oct-98	0.0
Office	10-Nov-98	0.0
Office	9-Dec-98	0.0
Office	5-Jan-99	0.0
Office	4-Feb-99	0.0
Office	5-Mar-99	0.0
Office	7-Apr-99	0.0
Office	13-May-99	0.0
Office	22-Jun-99	0.0
Office	9-Jul-99	0.0
Office	4-Aug-99	0.0
Office	9-Sep-99	0.0
Office	8-Oct-99	0.0
Office	10-Nov-99	0.0
Office	3-Dec-99	0.0
Office	6-Jan-00	0.0
Office	7-Feb-00	0.0
Office	6-Mar-00	0.0
Office	7-Apr-00	0.0
Office	18-May-00	0.0
Office	6-Jun-00	0.0
Office	20-Jul-00	0.0
Office	8-Aug-00	0.0
Office	7-Sep-00	0.0
Office	4-Oct-00	0.0
Office	22-Nov-00	0.0
Office	8-Dec-00	0.0
Office	10-Jan-01	0.0
Office	9-Feb-01	0.0
Office	1-Mar-01	0.0
Office	5-Apr-01	0.0
Office	4-May-01	0.0
Office	7-Jun-01	0.0
Office	12-Jul-01	0.0
Office	7-Aug-01	0.0
Office	6-Sep-01	0.0
Office	5-Oct-01	0.0
Office	1-Nov-01	0.0
Office	4-Dec-01	0.0
Office	16-Jan-02	0.0
Office	5-Feb-02	0.0
Office	12-Mar-02	0.0
Office	4-Apr-02	0.0
Office	2-May-02	0.0
Office	4-Jun-02	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Office	5-Jul-02	0.0
Office	6-Aug-02	0.0
Office	5-Sep-02	0.0
Office	10-Oct-02	0.0
Office	7-Nov-02	0.0
Office	3-Dec-02	0.0
Office	9-Jan-03	0.0
Office	5-Feb-03	0.0
Office	13-Mar-03	0.0
Office	3-Apr-03	0.0
Office	2-May-03	0.0
Office	4-Jun-03	0.0
Office	8-Jul-03	0.0
Office	5-Aug-03	0.0
Office	16-Sep-03	0.0
Office	2-Oct-03	0.0
Office	5-Nov-03	0.0
Office	4-Dec-03	0.0
Office	12-Jan-04	0.0
Office	5-Feb-04	0.0
Office	5-Mar-04	0.0
Office	8-Apr-04	0.0
Office	4-May-04	0.0
Office	2-Jun-04	0.0
Office	8-Jul-04	0.0
Office	4-Aug-04	0.0
Office	2-Sep-04	0.0
Office	6-Oct-04	0.0
Office	1-Nov-04	0.0
Office	6-Dec-04	0.0
Office	7-Jan-05	0.0
Office	7-Feb-05	0.0
Office	8-Mar-05	0.0
Office	1-Apr-05	0.0
Office	5-May-05	0.0
Office	10-Jun-05	0.0
Office	1-Jul-05	0.0
Office	4-Aug-05	0.0
Office	2-Sep-05	0.0
Office	3-Oct-05	0.0
Office	3-Nov-05	0.0
Office	5-Dec-05	0.0
Office	26-Jan-06	0.0
Office	23-Feb-06	0.0
Office	1-Mar-06	0.0
Office	5-Apr-06	0.0
Office	18-May-06	0.0
Office	2-Jun-06	0.0
Office	7-Jul-06	0.0
Office	1-Aug-06	0.0
Office	12-Sep-06	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Office	3-Oct-06	0.0
Office	16-Nov-06	0.0
Office	17-Jan-07	0.0
Office	7-Feb-07	0.0
Office	2-Mar-07	0.0
Office	3-Apr-07	0.0
Office	3-May-07	0.0
Office	1-Jun-07	0.0
Office	17-Jul-07	0.0
Office	21-Aug-07	0.0
Office	10-Sep-07	0.0
Office	3-Oct-07	0.0
Office	1-Nov-07	0.0
Office	13-Dec-07	0.0
Office	8-Jan-08	0.0
Office	25-Feb-08	0.0
Office	5-Mar-08	0.0
Office	24-Apr-08	0.0
Office	2-May-08	0.0
Office	2-Jun-08	0.0
Office	15-Jul-08	0.0
Office	4-Aug-08	0.0
Office	5-Sep-08	0.0
Office	21-Oct-08	0.0
Office	26-Nov-08	0.0
Office	1-Dec-08	0.0
Office	14-Jan-09	0.0
Office	2-Feb-09	0.0
Office	12-Mar-09	0.0
Office	10-Apr-09	0.0
Office	8-May-09	0.0
Office	8-Jun-09	0.0
Office	24-Jul-09	0.0
Office	17-Aug-09	0.0
Office	24-Sep-09	0.0
Office	12-Oct-09	0.0
Office	10-Nov-09	0.0
Office	28-Dec-09	0.0
Office	21-Jan-10	0.0
Office	11-Feb-10	0.0
Office	10-Mar-10	0.0
Office	9-Apr-10	0.0
Office	7-May-10	0.0
Office	2-Jun-10	0.0
Office	9-Jul-10	0.0
Office	4-Aug-10	0.0
Office	14-Sep-10	0.0
Office	11-Oct-10	0.0
Office	5-Nov-10	0.0
Office	8-Dec-10	0.0
Office	10-Jan-11	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Office	17-Feb-11	0.0
Office	10-Mar-11	0.0
Office	30-Mar-11	0.0
Office	21-Apr-11	0.0
Office	4-May-11	0.0
Office	11-May-11	0.0
Office	9-Jun-11	0.0
Office	8-Jul-11	0.0
Office	28-Jul-11	0.0
Office	10-Aug-11	0.0
Office	9-Sep-11	0.0
Office	14-Oct-11	0.0
Office	3-Nov-11	0.0
Office	9-Nov-11	0.0
Office	13-Dec-11	0.0
Office	12-Jan-12	0.0
Office	4-May-12	0.0
Office	23-Aug-12	0.0
Office	15-Nov-12	0.0
Office	21-Mar-13	0.0
Office	12-Apr-13	0.0
Office	12-Jul-13	0.0
Office	25-Oct-13	0.0
Office	13-Mar-14	0.0
Office	2-Jun-14	0.0
Office	31-Jul-14	0.0
Office	15-Dec-14	0.0
Office	4-Mar-15	0.0
Office	14-May-15	0.0
Office	16-Jul-15	0.0
Office	12-Nov-15	0.0
Office	22-Mar-16	0.0
Office	7-Apr-16	0.0
Office	9-Sep-16	0.0
Office	15-Nov-16	0.0
Office	1-Mar-17	0.0
Office	17-Apr-17	0.0
Office	13-Sep-17	0.0
Office	8-Nov-17	0.0
Scale House	8-Oct-97	0.0
Scale House	17-Oct-97	0.0
Scale House	25-Nov-97	0.0
Scale House	15-Dec-97	0.0
Scale House	2-Jan-98	0.0
Scale House	23-Feb-98	0.0
Scale House	5-Mar-98	0.0
Scale House	7-Apr-98	0.0
Scale House	6-May-98	0.0
Scale House	5-Jun-98	0.0
Scale House	7-Jul-98	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Scale House	4-Aug-98	0.0
Scale House	8-Sep-98	0.0
Scale House	13-Oct-98	0.0
Scale House	10-Nov-98	0.0
Scale House	9-Dec-98	0.0
Scale House	5-Jan-99	0.0
Scale House	4-Feb-99	0.0
Scale House	5-Mar-99	0.0
Scale House	7-Apr-99	0.0
Scale House	13-May-99	0.0
Scale House	22-Jun-99	0.0
Scale House	9-Jul-99	0.0
Scale House	4-Aug-99	0.0
Scale House	9-Sep-99	0.0
Scale House	8-Oct-99	0.0
Scale House	10-Nov-99	0.0
Scale House	3-Dec-99	0.0
Scale House	6-Jan-00	0.0
Scale House	7-Feb-00	0.0
Scale House	6-Mar-00	0.0
Scale House	7-Apr-00	0.0
Scale House	18-May-00	0.0
Scale House	6-Jun-00	0.0
Scale House	20-Jul-00	0.0
Scale House	8-Aug-00	0.0
Scale House	7-Sep-00	0.0
Scale House	4-Oct-00	0.0
Scale House	22-Nov-00	0.0
Scale House	8-Dec-00	0.0
Scale House	10-Jan-01	0.0
Scale House	9-Feb-01	0.0
Scale House	1-Mar-01	0.0
Scale House	5-Apr-01	0.0
Scale House	4-May-01	0.0
Scale House	7-Jun-01	0.0
Scale House	12-Jul-01	0.0
Scale House	7-Aug-01	0.0
Scale House	6-Sep-01	0.0
Scale House	5-Oct-01	0.0
Scale House	1-Nov-01	0.0
Scale House	4-Dec-01	0.0
Scale House	16-Jan-02	0.0
Scale House	5-Feb-02	0.0
Scale House	12-Mar-02	0.0
Scale House	4-Apr-02	0.0
Scale House	2-May-02	0.0
Scale House	4-Jun-02	0.0
Scale House	5-Jul-02	0.0
Scale House	6-Aug-02	0.0
Scale House	5-Sep-02	0.0
Scale House	10-Oct-02	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Scale House	7-Nov-02	0.0
Scale House	3-Dec-02	0.0
Scale House	9-Jan-03	0.0
Scale House	5-Feb-03	0.0
Scale House	13-Mar-03	0.0
Scale House	3-Apr-03	0.0
Scale House	2-May-03	0.0
Scale House	4-Jun-03	0.0
Scale House	8-Jul-03	0.0
Scale House	5-Aug-03	0.0
Scale House	16-Sep-03	0.0
Scale House	2-Oct-03	0.0
Scale House	5-Nov-03	0.0
Scale House	4-Dec-03	0.0
Scale House	12-Jan-04	0.0
Scale House	5-Feb-04	0.0
Scale House	5-Mar-04	0.0
Scale House	8-Apr-04	0.0
Scale House	4-May-04	0.0
Scale House	2-Jun-04	0.0
Scale House	8-Jul-04	0.0
Scale House	4-Aug-04	0.0
Scale House	2-Sep-04	0.0
Scale House	6-Oct-04	0.0
Scale House	1-Nov-04	0.0
Scale House	6-Dec-04	0.0
Scale House	7-Jan-05	0.0
Scale House	7-Feb-05	0.0
Scale House	8-Mar-05	0.0
Scale House	1-Apr-05	0.0
Scale House	5-May-05	0.0
Scale House	10-Jun-05	0.0
Scale House	1-Jul-05	0.0
Scale House	4-Aug-05	0.0
Scale House	2-Sep-05	0.0
Scale House	3-Oct-05	0.0
Scale House	3-Nov-05	0.0
Scale House	5-Dec-05	0.0
Scale House	26-Jan-06	0.0
Scale House	23-Feb-06	0.0
Scale House	1-Mar-06	0.0
Scale House	5-Apr-06	0.0
Scale House	18-May-06	0.0
Scale House	2-Jun-06	0.0
Scale House	7-Jul-06	0.0
Scale House	1-Aug-06	0.0
Scale House	12-Sep-06	0.0
Scale House	3-Oct-06	0.0
Scale House	16-Nov-06	0.0
Scale House	12-Dec-06	0.0
Scale House	17-Jan-07	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Scale House	7-Feb-07	0.0
Scale House	2-Mar-07	0.0
Scale House	3-Apr-07	0.0
Scale House	3-May-07	0.0
Scale House	1-Jun-07	0.0
Scale House	17-Jul-07	0.0
Scale House	21-Aug-07	0.0
Scale House	10-Sep-07	0.0
Scale House	3-Oct-07	0.0
Scale House	1-Nov-07	0.0
Scale House	13-Dec-07	0.0
Scale House	8-Jan-08	0.0
Scale House	25-Feb-08	0.0
Scale House	5-Mar-08	0.0
Scale House	24-Apr-08	0.0
Scale House	2-May-08	0.0
Scale House	2-Jun-08	0.0
Scale House	15-Jul-08	0.0
Scale House	4-Aug-08	0.0
Scale House	5-Sep-08	0.0
Scale House	21-Oct-08	0.0
Scale House	26-Nov-08	0.0
Scale House	1-Dec-08	0.0
Scale House	14-Jan-09	0.0
Scale House	2-Feb-09	0.0
Scale House	12-Mar-09	0.0
Scale House	10-Apr-09	0.0
Scale House	8-May-09	0.0
Scale House	8-Jun-09	0.0
Scale House	24-Jul-09	0.0
Scale House	17-Aug-09	0.0
Scale House	24-Sep-09	0.0
Scale House	12-Oct-09	0.0
Scale House	10-Nov-09	0.0
Scale House	28-Dec-09	0.0
Scale House	21-Jan-10	0.0
Scale House	11-Feb-10	0.0
Scale House	10-Mar-10	0.0
Scale House	9-Apr-10	0.0
Scale House	7-May-10	0.0
Scale House	2-Jun-10	0.0
Scale House	9-Jul-10	0.0
Scale House	4-Aug-10	0.0
Scale House	14-Sep-10	0.0
Scale House	11-Oct-10	0.0
Scale House	5-Nov-10	0.0
Scale House	8-Dec-10	0.0
Scale House	10-Jan-11	0.0
Scale House	17-Feb-11	0.0
Scale House	10-Mar-11	0.0
Scale House	30-Mar-11	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Scale House	21-Apr-11	0.0
Scale House	4-May-11	0.0
Scale House	11-May-11	0.0
Scale House	9-Jun-11	0.0
Scale House	8-Jul-11	0.0
Scale House	28-Jul-11	0.0
Scale House	10-Aug-11	0.0
Scale House	9-Sep-11	0.0
Scale House	14-Oct-11	0.0
Scale House	3-Nov-11	0.0
Scale House	9-Nov-11	0.0
Scale House	13-Dec-11	0.0
Scale House	12-Jan-12	0.0
Scale House	4-May-12	0.0
Scale House	23-Aug-12	0.0
Scale House	15-Nov-12	0.0
Scale House	21-Mar-13	0.0
Scale House	12-Apr-13	0.0
Scale House	12-Jul-13	0.0
Scale House	25-Oct-13	0.0
Scale House[a]	13-Mar-14	0.0
Scale House	2-Jun-14	0.0
Scale House	31-Jul-14	0.0
Scale House	15-Dec-14	0.0
Scale House	4-Mar-15	0.0
Scale House	14-May-15	0.0
Scale House	16-Jul-15	0.0
Scale House	12-Nov-15	0.0
Scale House	22-Mar-16	0.0
Scale House	7-Apr-16	0.0
Scale House	9-Sep-16	0.0
Scale House	15-Nov-16	0.0
Scale House	1-Mar-17	0.0
Scale House	17-Apr-17	0.0
Scale House	13-Sep-17	0.0
Scale House	8-Nov-17	0.0
Maintenance Building	8-Oct-97	0.0
Maintenance Building	17-Oct-97	0.0
Maintenance Building	25-Nov-97	0.0
Maintenance Building	15-Dec-97	0.0
Maintenance Building	2-Jan-98	0.0
Maintenance Building	23-Feb-98	0.0
Maintenance Building	5-Mar-98	0.0
Maintenance Building	7-Apr-98	0.0
Maintenance Building	6-May-98	0.0
Maintenance Building	5-Jun-98	0.0
Maintenance Building	7-Jul-98	0.0
Maintenance Building	4-Aug-98	0.0
Maintenance Building	8-Sep-98	0.0
Maintenance Building	13-Oct-98	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Maintenance Building	10-Nov-98	0.0
Maintenance Building	9-Dec-98	0.0
Maintenance Building	5-Jan-99	0.0
Maintenance Building	4-Feb-99	0.0
Maintenance Building	5-Mar-99	0.0
Maintenance Building	7-Apr-99	0.0
Maintenance Building	13-May-99	0.0
Maintenance Building	22-Jun-99	0.0
Maintenance Building	9-Jul-99	0.0
Maintenance Building	4-Aug-99	0.0
Maintenance Building	9-Sep-99	0.0
Maintenance Building	8-Oct-99	0.0
Maintenance Building	10-Nov-99	0.0
Maintenance Building	3-Dec-99	0.0
Maintenance Building	6-Jan-00	0.0
Maintenance Building	7-Feb-00	0.0
Maintenance Building	6-Mar-00	0.0
Maintenance Building	7-Apr-00	0.0
Maintenance Building	18-May-00	0.0
Maintenance Building	6-Jun-00	0.0
Maintenance Building	20-Jul-00	0.0
Maintenance Building	8-Aug-00	0.0
Maintenance Building	7-Sep-00	0.0
Maintenance Building	4-Oct-00	0.0
Maintenance Building	22-Nov-00	0.0
Maintenance Building	8-Dec-00	0.0
Maintenance Building	10-Jan-01	0.0
Maintenance Building	9-Feb-01	0.0
Maintenance Building	1-Mar-01	0.0
Maintenance Building	5-Apr-01	0.0
Maintenance Building	4-May-01	0.0
Maintenance Building	7-Jun-01	0.0
Maintenance Building	12-Jul-01	0.0
Maintenance Building	7-Aug-01	0.0
Maintenance Building	6-Sep-01	0.0
Maintenance Building	5-Oct-01	0.0
Maintenance Building	1-Nov-01	0.0
Maintenance Building	4-Dec-01	0.0
Maintenance Building	16-Jan-02	0.0
Maintenance Building	5-Feb-02	0.0
Maintenance Building	12-Mar-02	0.0
Maintenance Building	4-Apr-02	0.0
Maintenance Building	2-May-02	0.0
Maintenance Building	4-Jun-02	0.0
Maintenance Building	5-Jul-02	0.0
Maintenance Building	6-Aug-02	0.0
Maintenance Building	5-Sep-02	0.0
Maintenance Building	10-Oct-02	0.0
Maintenance Building	7-Nov-02	0.0
Maintenance Building	3-Dec-02	0.0
Maintenance Building	9-Jan-03	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Maintenance Building	5-Feb-03	0.0
Maintenance Building	13-Mar-03	0.0
Maintenance Building	3-Apr-03	0.0
Maintenance Building	2-May-03	0.0
Maintenance Building	4-Jun-03	0.0
Maintenance Building	8-Jul-03	0.0
Maintenance Building	5-Aug-03	0.0
Maintenance Building	16-Sep-03	0.0
Maintenance Building	2-Oct-03	0.0
Maintenance Building	5-Nov-03	0.0
Maintenance Building	4-Dec-03	0.0
Maintenance Building	12-Jan-04	0.0
Maintenance Building	5-Feb-04	0.0
Maintenance Building	5-Mar-04	0.0
Maintenance Building	8-Apr-04	0.0
Maintenance Building	4-May-04	0.0
Maintenance Building	2-Jun-04	0.0
Maintenance Building	8-Jul-04	0.0
Maintenance Building	4-Aug-04	0.0
Maintenance Building	2-Sep-04	0.0
Maintenance Building	6-Oct-04	0.0
Maintenance Building	1-Nov-04	0.0
Maintenance Building	6-Dec-04	0.0
Maintenance Building	7-Jan-05	0.0
Maintenance Building	7-Feb-05	0.0
Maintenance Building	8-Mar-05	0.0
Maintenance Building	1-Apr-05	0.0
Maintenance Building	5-May-05	0.0
Maintenance Building	10-Jun-05	0.0
Maintenance Building	1-Jul-05	0.0
Maintenance Building	4-Aug-05	0.0
Maintenance Building	2-Sep-05	0.0
Maintenance Building	3-Oct-05	0.0
Maintenance Building	3-Nov-05	0.0
Maintenance Building	5-Dec-05	0.0
Maintenance Building	26-Jan-06	0.0
Maintenance Building	23-Feb-06	0.0
Maintenance Building	1-Mar-06	0.0
Maintenance Building	5-Apr-06	0.0
Maintenance Building	18-May-06	0.0
Maintenance Building	2-Jun-06	0.0
Maintenance Building	7-Jul-06	0.0
Maintenance Building	1-Aug-06	0.0
Maintenance Building	12-Sep-06	0.0
Maintenance Building	3-Oct-06	0.0
Maintenance Building	16-Nov-06	0.0
Maintenance Building	12-Dec-06	0.0
Maintenance Building	17-Jan-07	0.0
Maintenance Building	7-Feb-07	0.0
Maintenance Building	2-Mar-07	0.0
Maintenance Building	3-Apr-07	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Maintenance Building	3-May-07	0.0
Maintenance Building	1-Jun-07	0.0
Maintenance Building	17-Jul-07	0.0
Maintenance Building	21-Aug-07	0.0
Maintenance Building	10-Sep-07	0.0
Maintenance Building	3-Oct-07	0.0
Maintenance Building	1-Nov-07	0.0
Maintenance Building	13-Dec-07	0.0
Maintenance Building	8-Jan-08	0.0
Maintenance Building	25-Feb-08	0.0
Maintenance Building	5-Mar-08	0.0
Maintenance Building	24-Apr-08	0.0
Maintenance Building	2-May-08	0.0
Maintenance Building	2-Jun-08	0.0
Maintenance Building	15-Jul-08	0.0
Maintenance Building	4-Aug-08	0.0
Maintenance Building	5-Sep-08	0.0
Maintenance Building	21-Oct-08	0.0
Maintenance Building	26-Nov-08	0.0
Maintenance Building	1-Dec-08	0.0
Maintenance Building	14-Jan-09	0.0
Maintenance Building	2-Feb-09	0.0
Maintenance Building	12-Mar-09	0.0
Maintenance Building	10-Apr-09	0.0
Maintenance Building	8-May-09	0.0
Maintenance Building	8-Jun-09	0.0
Maintenance Building	24-Jul-09	0.0
Maintenance Building	17-Aug-09	0.0
Maintenance Building	24-Sep-09	0.0
Maintenance Building	12-Oct-09	0.0
Maintenance Building	10-Nov-09	0.0
Maintenance Building	28-Dec-09	0.0
Maintenance Building	21-Jan-10	0.0
Maintenance Building	11-Feb-10	0.0
Maintenance Building	10-Mar-10	0.0
Maintenance Building	9-Apr-10	0.0
Maintenance Building	7-May-10	0.0
Maintenance Building	2-Jun-10	0.0
Maintenance Building	9-Jul-10	0.0
Maintenance Building	4-Aug-10	0.0
Maintenance Building	14-Sep-10	0.0
Maintenance Building	11-Oct-10	0.0
Maintenance Building	5-Nov-10	0.0
Maintenance Building	8-Dec-10	0.0
Maintenance Building	10-Jan-11	0.0
Maintenance Building	17-Feb-11	0.0
Maintenance Building	10-Mar-11	0.0
Maintenance Building	30-Mar-11	0.0
Maintenance Building	21-Apr-11	0.0
Maintenance Building	4-May-11	0.0
Maintenance Building	11-May-11	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Maintenance Building	9-Jun-11	0.0
Maintenance Building	8-Jul-11	0.0
Maintenance Building	28-Jul-11	0.0
Maintenance Building	10-Aug-11	0.0
Maintenance Building	9-Sep-11	0.0
Maintenance Building	14-Oct-11	0.0
Maintenance Building	3-Nov-11	0.0
Maintenance Building	9-Nov-11	0.0
Maintenance Building	13-Dec-11	0.0
Maintenance Building	12-Jan-12	0.0
Maintenance Building	4-May-12	0.0
Maintenance Building	23-Aug-12	0.0
Maintenance Building	15-Nov-12	0.0
Maintenance Building[b]	21-Mar-13	0.0
Maintenance Building	12-Apr-13	0.0
Maintenance Building	12-Jul-13	0.0
Maintenance Building	25-Oct-13	0.0
Maintenance Building	13-Mar-14	0.0
Maintenance Building	2-Jun-14	0.0
Maintenance Building	31-Jul-14	0.0
Maintenance Building	15-Dec-14	0.0
Maintenance Building	4-Mar-15	0.0
Maintenance Building	14-May-15	0.0
Maintenance Building	16-Jul-15	0.0
Maintenance Building	12-Nov-15	0.0
Maintenance Building	22-Mar-16	0.0
Maintenance Building	7-Apr-16	0.0
Maintenance Building	9-Sep-16	0.0
Maintenance Building	15-Nov-16	0.0
Maintenance Building	1-Mar-17	0.0
Maintenance Building	17-Apr-17	0.0
Maintenance Building	13-Sep-17	0.0
Maintenance Building	8-Nov-17	0.0
LFGTE Plant Building	13-Mar-14	0.0
LFGTE Plant Building	2-Jun-14	0.0
LFGTE Plant Building	31-Jul-14	0.0
LFGTE Plant Building	15-Dec-14	0.0
LFGTE Plant Building	4-Mar-15	0.0
LFGTE Plant Building	14-May-15	0.0
LFGTE Plant Building	16-Jul-15	0.0
LFGTE Plant Building	12-Nov-15	0.0
LFGTE Plant Building	22-Mar-16	0.0
LFGTE Plant Building	7-Apr-16	0.0
LFGTE Plant Building	9-Sep-16	0.0
LFGTE Plant Building	15-Nov-16	0.0
LFGTE Plant Building	1-Mar-17	0.0
LFGTE Plant Building	17-Apr-17	0.0
LFGTE Plant Building	13-Sep-17	0.0
LFGTE Plant Building	8-Nov-17	0.0

Table 6-9
Summary of Landfill Gas Monitoring Data
Riverbend Landfill

Sample Location	Date Measured	Methane (Percent)
Operations Building	4-Mar-15	0.0
Operations Building	14-May-15	0.0
Operations Building	16-Jul-15	0.0
Operations Building	12-Nov-15	0.0
Operations Building	22-Mar-16	0.0
Operations Building	7-Apr-16	0.0
Operations Building	9-Sep-16	0.0
Operations Building	15-Nov-16	0.0
Operations Building	1-Mar-17	0.0
Operations Building	17-Apr-17	0.0
Operations Building	13-Sep-17	0.0
Operations Building	8-Nov-17	0.0

NOTE:

LFGTE = landfill gas to energy.

[a] A new scale house was constructed in 2014 as part of front entrance site development activities.

[b] The former maintenance building (and the former gas collection and control system [GCCS] building) was demolished in 2013 to accommodate construction of Phase IA of the mechanically stabilized earthen (MSE) berm. A new maintenance building was constructed in 2013.

Table 7-1
Summary of 2017 Monthly Pumping and Disposal Volumes of Leachate and LDS Liquid
Riverbend Landfill

Monitoring Location	Landfill Module or Area	2017 Monthly Liquid Pumping and Disposal Volumes (Gallons)												2017 Liquid Volume Totals (Gallons)
		January 2017	February 2017	March 2017	April 2017	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017	November 2017	December 2017	
LCRS Pumping Volumes[a]														
1/5P	Modules 1 through 5	1,088,076	1,468,120	1,480,922	930,576	489,220	301,092	228,412	164,156	229,512	1,309,096	2,001,240	1,757,032	**11,447,454**
6/7P[b]	Modules 6 and 7	55,936	47,784	55,236	53,872	53,904	48,768	49,520	54,520	53,584	54,508	53,516	57,580	**638,728**
8P[c]	Module 8	597,644	578,168	648,204	539,200	430,192	352,432	407,032	490,612	353,804	319,540	547,268	428,440	**5,692,536**
9P	Module 9	239,556	352,662	559,302	540,108	137,352	114,360	92,976	82,788	189,114	663,414	1,919,748	813,768	**5,705,148**
Total Module Sump Volumes		**1,981,212**	**2,446,734**	**2,743,664**	**2,063,756**	**1,110,668**	**816,652**	**777,940**	**792,076**	**826,014**	**2,346,558**	**4,521,772**	**3,056,820**	**23,483,866**
LDS Liquid Pumping Volumes														
4/5S	Modules 4 and 5	20,272	22,162	27,867	23,144	18,626	12,339	7,914	5,408	3,886	3,291	6,619	12,120	**163,648**
6/7S	Modules 6 and 7	2,884	3,723	4,793	4,391	3,791	3,140	2,974	2,485	1,924	1,622	1,846	3,042	**36,615**
8S	Module 8	2,437	3,081	4,196	5,388	3,938	1,225	521	1,679	2,607	2,952	4,198	6,104	**38,326**
9S	Module 9	798	780	561	372	740	744	1	785	7	1,015	1,646	2,138	**9,587**
Total Module LDS Sump Volumes		**26,391**	**29,746**	**37,417**	**33,295**	**27,095**	**17,448**	**11,410**	**10,357**	**8,424**	**8,880**	**14,309**	**23,404**	**248,176**
Leachate Pond	LDS	300	1,223	21,070	20,816	9,583	6,107	4,648	845	591	302	49	603	**66,137**
GCCS Liquid Pumping Volumes[d]														
North Tanks	GCCS	575,146	720,417	601,408	517,057	404,528	362,042	357,152	321,938	312,593	385,915	549,613	462,424	**5,570,233**
Con. Sumps	GCCS	61,100	46,736	47,064	41,405	41,667	28,265	23,450	45,916	29,418	50,425	74,073	57,836	**547,355**
Total Volumes		**636,246**	**767,153**	**648,472**	**558,462**	**446,195**	**390,307**	**380,602**	**367,854**	**342,011**	**436,340**	**623,686**	**520,260**	**6,117,588**
Disposal Volumes[e]														
Leachate Pond	**Total Site Disposal Volumes**	**2,288,152**	**2,697,601**	**3,075,045**	**2,790,550**	**2,912,857**	**2,451,605**	**3,134,184**	**3,442,293**	**3,061,278**	**3,311,924**	**2,703,976**	**2,838,360**	**34,707,825**

NOTES:

LCRS = leachate collection and removal system; LDS = secondary leak detection system; P = primary; S = secondary; GCCS = gas collection and control system; Con. = GCCS condensate.

[a] Volume of leachate pumped from each LCRS includes the volume of liquids pumped from its corresponding secondary leak detection sump.

[b] Volume of liquid pumped from the 6/7 P sump also includes liquid from the GCCS Con. Sump #2 that is conveyed to 6/7 P sump.

[c] Volume of liquid pumped from the 8 P sump also includes liquid from the GCCS Con. Sumps #1, 6, 7, and 8 that is conveyed to 8 P sump.

[d] Volume of liquid pumped from the GCCS directly to the leachate pond.

[e] Volume of leachate and liquid disposed of off-site at approved treatment facilities in the truck haul program.

Table 7-2
VOCs Detected in Landfill Module Leachate and LDS Sump Liquid Samples (µg/L)
Riverbend Landfill

Sample Location	Sample Date	Acetone	Benzene	2-Butanone (MEK)	Carbon Disulfide	Chloroethane	Dibromochloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	Ethylbenzene	2-Hexanone	Methylene Chloride	Methyl Isobutyl Ketone	Styrene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl chloride	Total Xylenes	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	cis-1,2-Dichloroethene	Isopropylbenzene	4-Isopropyltoluene	n-Propylbenzene	Naphthalene	p-Cymene	4-Methyl-2-pentanone
1/5 P	30-Dec-97	1,600	ND	2,900	ND	ND	ND	ND	ND	ND	15	ND	ND	ND	ND	ND	11	ND	ND	ND	36	ND	ND	ND	ND	ND	4.0	ND	ND	ND	ND	ND	ND	ND
1/5 P	17-Jun-98	540 D	ND	900 D	ND	ND	ND	ND	ND	ND	18 D	ND	ND	ND	ND	ND	27 D	ND	ND	ND	35 D	ND	ND	ND	ND	ND	4.9 D	ND	ND	ND	ND	ND	ND	ND
1/5 P	8-Jan-99	190	0.2 J	150	ND	ND	ND	0.5 J	ND	ND	1.3	ND	ND	ND	ND	ND	1.0	ND	ND	ND	8.3	ND	ND	2.0 J	0.6 J	ND	3.3	0.4 J	ND	ND	ND	ND	ND	ND
1/5 P	21-Jun-99	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.5	ND	ND	ND	ND	ND	ND	ND
1/5 P	6-Oct-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.1 D	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1/5 P	15-Dec-99	250	2.8	420	ND	ND	ND	ND	ND	ND	28	ND	ND	ND	ND	ND	5.9	ND	ND	ND	38	ND	ND	6.9	3.5	ND	6.6	ND	ND	ND	ND	ND	2.0	ND
1/5 P	26-May-00	150	4.2	250	ND	ND	ND	ND	ND	ND	33	ND	3.8	11	ND	ND	9.8	ND	ND	2.2	56	ND	ND	8.5	3.0	ND	9.0	ND	2.4	ND	7.5	ND	5.7	ND
1/5 P	8-Nov-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	30	ND	5.7	ND	ND	ND	8.5	ND	ND	ND	40	ND	ND	6.7	ND	ND	ND	ND	ND	ND	ND	10	7.6	ND
1/5 P	26-Apr-01	670	ND	840	5.9	ND	ND	ND	ND	ND	8.8	ND	ND	53	ND	ND	9.1	ND	ND	ND	16	ND	ND	ND	ND	ND	4.6	ND	ND	ND	ND	5.8	ND	ND
1/5 P (Dup)	26-Apr-01	720	ND	950	4.5	ND	ND	ND	ND	ND	7.0	ND	ND	48	ND	ND	7.2	ND	ND	ND	7.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.5	ND	ND
1/5 P	15-Apr-02	1,900	ND	3,600	ND	ND	ND	ND	ND	ND	36	ND	7.9	63	ND	ND	22	ND	ND	ND	66	ND	ND	9.5	ND	ND	11	ND	ND	ND	ND	11	ND	ND
1/5 P (Dup)	15-Apr-02	1,200	ND	2,200	ND	ND	ND	ND	ND	ND	34	ND	6.8	45	ND	ND	17	ND	ND	ND	54	ND	ND	9.3	ND	ND	11	ND	ND	ND	ND	12	ND	ND
1/5 P	15-May-03	86	3	79	ND	ND	ND	ND	ND	ND	19	ND	ND	ND	ND	ND	18	ND	ND	1.0	36	ND	ND	4.5	1.7	ND	3.2	1.7	1.1	5.0	ND	7.1	ND	ND
1/5 P	23-Apr-04	190	2.7	280	ND	ND	ND	ND	ND	ND	17	ND	ND	20	ND	ND	20	ND	ND	0.92	41	ND	ND	5.9	1.7	ND	3.8	1.3	1.1	5.3	ND	8.5	5.3	ND
1/5 P	26-May-05	150	1.8	190	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	0.7	ND	10	ND	ND	ND	23	ND	ND	3.6	1.1	ND	2.6	0.97	0.88	2.4	0.51	6.9	ND	27
1/5 P	15-May-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	150	ND	ND	ND	ND	21	ND	ND	ND	26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1/5 P	11-May-07	1,500	ND	3,100	ND	ND	ND	ND	ND	ND	6.3	ND	ND	ND	ND	ND	24	ND	ND	ND	18	ND	ND	2.2	ND	3.4	ND	ND	ND	ND	ND	23	ND	72
1/5 P (Dup)	11-May-07	1,500	ND	3,100	ND	ND	ND	ND	ND	ND	5.5	ND	ND	ND	ND	ND	24	ND	ND	ND	16	ND	ND	ND	ND	3.4	ND	ND	ND	ND	ND	ND	ND	73
1/5 P	22-May-08	220	ND	450	ND	ND	ND	ND	ND	ND	17	260	ND	ND	ND	ND	13	ND	ND	ND	45	ND	ND	9.4	ND	ND	ND	ND	ND	ND	ND	6.7	ND	ND
1/5P	8-May-09	360	ND	580	ND	ND	ND	ND	ND	ND	15	350	ND	ND	ND	ND	11	ND	ND	ND	36	ND	ND	5.3	ND	ND	5.9	ND	ND	ND	ND	9.4	ND	38
1/5 P	23-Apr-10	310	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12	ND	ND
1/5 P	11-Apr-11	390	ND	520	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	11	ND	ND	ND	27	ND	ND	6.0	ND	ND	3.8	ND	ND	ND	ND	7.1	ND	30
1/5 P	1-May-12	1,300	ND	1,400	ND	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	4.8	ND	ND	ND	28	ND	ND	6.5	ND	ND	3.5	ND	ND	ND	ND	ND	ND	21
1/5 P	10-Apr-13	71	2.6	64	ND	ND	ND	ND	ND	ND	9.5	ND	ND	ND	ND	ND	6.2	ND	ND	ND	21	ND	ND	5.1	2.5	ND	2.7	ND	ND	1.5	ND	6.2	ND	11
1/5 P	5-May-14	370	2.0	220	ND	ND	ND	ND	ND	ND	9.9	ND	ND	ND	ND	ND	5.6	ND	ND	ND	18	ND	ND	4.4	1.6	ND	4.2	1.4	ND	1.5	ND	8.4	ND	20
1/5 P	8-May-15	740	2.8	370	ND	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	ND	7.0	ND	ND	ND	19	ND	ND	4.6	1.4	ND	4.9	1.4	1.8	1.6	ND	8.2	ND	27
1/5 P	6-May-16	43	3.7	ND	ND	ND	ND	ND	ND	ND	13	ND	ND	ND	ND	ND	7.3	ND	ND	ND	28	ND	ND	5.0	1.8	ND	3.5	1.4	1.3	3.1	ND	4.7	ND	ND
1/5 P (Dup)	6-May-16	41	3.0	ND	ND	ND	ND	ND	ND	ND	9.7	ND	ND	ND	ND	ND	7.0	ND	ND	ND	21	ND	ND	3.5	1.4	ND	2.0	1.7	ND	2.5	ND	4.3	ND	ND
1/5 P	18-Apr-17	36	3.3	17	ND	ND	ND	ND	ND	ND	13	ND	ND	ND	ND	ND	7.4	ND	ND	ND	26	ND	ND	4.9	18	ND	3.5	2.8	1.2	3.3	ND	5.9	ND	6.2
1/5 P	12-Sep-17	52	3.1	13	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	9.3	ND	ND	ND	26	ND	ND	3.8	1.4	ND	3.0	1.7	1.2	2.3	ND	6.3	ND	7.7
1/5 P	9-Nov-17	220	2.4	160	ND	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	ND	5.6	ND	ND	ND	28	ND	ND	6.0	2.0	ND	3.2	ND	ND	1.3	ND	4.0	ND	8.9
4/5 S	30-Dec-97	ND	ND	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	17-Jun-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	8-Jan-99	ND	0.4 J	ND	ND	0.5	ND	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2 J	0.6	ND	ND	ND	ND	ND	ND
4/5 S	21-Jun-99	ND	ND	ND	8.1	ND	ND	0.64	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S (Dup)	21-Jun-99	ND	ND	ND	10	ND	ND	0.63	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	6-Oct-99	ND	ND	ND	ND	ND	ND	0.77	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	15-Dec-99	ND	ND	ND	0.57	ND	ND	0.55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	26-May-00	ND	ND	ND	0.81	ND	ND	0.69	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.53	ND	ND	ND	ND	ND	ND
4/5 S	8-Nov-00	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	26-Apr-01	ND	ND	ND	ND	ND	ND	0.75	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.7	ND	ND	ND	ND	ND	ND
4/5 S	15-Apr-02	ND	0.58	ND	ND	ND	ND	0.59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.73	ND	ND	ND	ND	ND	ND
4/5 S	15-May-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.79	ND	ND	ND	ND	ND	ND
4/5 S	23-Apr-04	ND	0.74	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.74	ND	ND	ND	ND	ND	ND
4/5 S	26-May-05	ND	0.85	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.67	ND	ND	ND	1.3	ND	ND
4/5 S	15-May-06	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	11-May-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	22-May-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	8-May-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	23-Apr-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S (Dup)	23-Apr-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	11-Apr-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	1-May-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	11-Apr-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	5-May-14	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	8-May-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	6-May-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	18-Apr-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	12-Sep-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4/5 S	9-Nov-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 7-2
VOCs Detected in Landfill Module Leachate and LDS Sump Liquid Samples (µg/L)
Riverbend Landfill

Sample Location	Sample Date	Acetone	Benzene	2-Butanone (MEK)	Carbon Disulfide	Chloroethane	Dibromochloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	Ethylbenzene	2-Hexanone	Methylene Chloride	Methyl Isobutyl Ketone	Styrene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl chloride	Total Xylenes	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	cis-1,2-Dichloroethene	Isopropylbenzene	4-Isopropyltoluene	n-Propylbenzene	Naphthalene	p-Cymene	4-Methyl-2-pentanone
6 P	30-Dec-97	900	ND	1,600	ND	ND	ND	ND	ND	ND	ND	340	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6 P	17-Jun-98	9,100 D,E	5.7 D	22,000 D,E	ND	4.8 D	ND	15 D	ND	ND	10 D	62 D	77 D	140 D	ND	ND	620 D,E	ND	2.6 D	ND	36 D	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8 D	ND
6 P	8-Jan-99	3,800	2.2	8,800	1.4	0.5	ND	3.8	0.4 J	ND	8.8	650	4.0	ND	1.3	0.3 J	86	ND	0.8	0.9	24.3	ND	ND	2 J	0.8 J	ND	ND	1.6	3.0 J	ND	0.3 J	2.0 J	ND	ND
6 P	22-Jun-99	20	3.1	ND	ND	ND	ND	4.7	ND	ND	17	ND	8.3	ND	ND	ND	62	ND	ND	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6 P	6-Oct-99	620 D	ND	ND	ND	ND	ND	4.0 D	ND	ND	5 D	ND	9.6 D	ND	ND	ND	ND	ND	ND	ND	51 D	ND	ND	ND	2.8 D	ND	3.8 D	ND	ND	ND	ND	ND	2.9 D	ND
6 P	15-Dec-99	590	2.3	1,500	ND	ND	ND	ND	ND	ND	24	ND	ND	ND	ND	ND	17	ND	ND	ND	37	ND	ND	6.4	3.4	ND	2.4	ND	ND	ND	ND	ND	3.7	ND
6 P (Dup)	15-Dec-99	580	2.14	1,500	ND	ND	ND	ND	ND	ND	22	ND	ND	ND	ND	ND	17	ND	ND	ND	36	ND	ND	6.0	2.8	ND	2.4	ND	ND	ND	ND	ND	3.3	ND
6 P	26-May-00	41	ND	ND	ND	ND	ND	ND	ND	ND	17	ND	3.6	ND	ND	ND	ND	ND	ND	ND	43	ND	ND	6.4	2.3	ND	3.2	ND	3.4	ND	ND	4.4	7.1	ND
6/7 P	8-Nov-00	ND	4.4	ND	ND	ND	ND	ND	ND	ND	24	ND	4.8	ND	ND	ND	12	ND	ND	ND	ND	ND	ND	6.5	ND	ND	ND	ND	4.2	ND	ND	4.2	5.6	ND
6/7 P	26-Apr-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	ND	23	ND	ND	ND	29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 P	15-Apr-02	2,200	ND	3,700	ND	ND	ND	ND	ND	ND	22	ND	12	78	ND	ND	35	ND	ND	ND	56	ND	ND	5.8	ND	ND	ND	ND	ND	ND	ND	7.5	ND	ND
6/7 P	15-May-03	15	2.7	ND	ND	ND	ND	ND	ND	ND	20	ND	ND	ND	ND	ND	12	ND	ND	ND	53	ND	ND	7.4	2.4	ND	2.7	1.5	1.7	4.8	ND	7.7	ND	ND
6/7 P	22-Apr-04	88	2.8	22	ND	ND	ND	ND	ND	ND	16	ND	5.4	ND	ND	ND	4.9	ND	ND	ND	37	ND	ND	6.8	2.1	ND	2.7	ND	ND	2.2	ND	6.7	2.2	ND
6/7 P	26-May-05	11,000	ND	15,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 P	12-May-06	2,800	ND	2,500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 P (Dup)	12-May-06	2,300	ND	2,200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 P	11-May-07	13,000	ND	14,000	ND	ND	ND	ND	ND	ND	ND	ND	78	ND	ND	ND	37	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	300
6/7 P	22-May-08	ND	1.6	ND	ND	ND	ND	ND	ND	ND	5.7	ND	ND	ND	ND	ND	2.1	ND	ND	ND	7.7	ND	ND	3.4	ND	ND	2.0	ND	1.1	ND	ND	4.2	ND	ND
6/7 P	8-May-09	ND	ND	6.1	ND	ND	ND	ND	ND	ND	6.3	180	ND	ND	ND	ND	1.6	ND	ND	ND	7.1	ND	ND	2.3	ND	ND	1.6	ND	1.2	ND	ND	3.6	ND	ND
6/7 P	22-Apr-10	2,200	ND	1,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	57
6/7 P	11-Apr-11	14,000	ND	21,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	180	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,700
6/7 P	1-May-12	5,800	ND	8,600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17	ND	ND	ND	44	ND	ND	36	ND	ND	ND	ND	ND	ND	ND	ND	ND	290
6/7 P	10-Apr-13	34,000	ND	26,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	69	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	690
6/7 P (Dup)	10-Apr-13	34,000	ND	27,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	75	ND	ND	ND	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	720
6/7 P	5-May-14	55	1.8	32	ND	ND	ND	ND	ND	ND	2.7	ND	ND	ND	ND	ND	3.2	ND	ND	ND	8.4	ND	ND	1.5	1.3	ND	1.9	ND	ND	1.4	ND	4.2	ND	ND
6/7 P	8-May-15	2,000	ND	1,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.3	ND	ND	ND	13	ND	ND	3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 P	28-Apr-16	960	1.7	370	ND	ND	ND	ND	ND	ND	6.7	ND	ND	ND	ND	ND	4.4	ND	ND	ND	8.3	ND	ND	2.0	ND	ND	2.4	ND	ND	ND	ND	5.5	ND	17
6/7 P	18-Apr-17	33	1.5	17	ND	ND	ND	ND	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.8	ND	ND
6/7 P	12-Sep-17	310	2.4	150	ND	ND	ND	ND	ND	ND	7.2	ND	ND	ND	ND	ND	2.6	ND	ND	ND	12	ND	ND	3.0	ND	ND	1.9	ND	1.4	ND	ND	11	ND	5.8
6/7 P	9-Nov-17	1,100	1.9	870	ND	ND	ND	ND	ND	ND	3.6	ND	7.6	ND	ND	ND	4.5	ND	ND	ND	4.8	ND	ND	ND	ND	ND	1.7	ND	ND	ND	ND	12	ND	33
6 S	22-Jun-99	8.1	ND	ND	4.1	0.64	ND	0.81	ND	ND	ND	ND	3.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6 S	6-Oct-99	ND	ND	ND	ND	ND	0.75	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6 S (Dup)	6-Oct-99	ND	ND	ND	ND	ND	0.76	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6 S	15-Dec-99	ND	ND	ND	ND	0.5	ND	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	15-Apr-02	10	1.5	ND	ND	ND	ND	0.54	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8	ND	ND	ND	ND	ND	ND	ND	0.62	ND	ND	ND	ND	ND	ND
6/7 S	15-May-03	ND	0.58	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	23-Apr-04	ND	ND	ND	ND	ND	ND	0.51	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	26-May-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	12-May-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	11-May-07	21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	22-May-08	ND	1.2	ND	ND	7.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S (Dup)	22-May-08	ND	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	ND	ND
6/7 S	8-May-09	32	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	28-Apr-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	13-Apr-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	1-May-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	10-Apr-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	5-May-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	8-May-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6/7 S	28-Apr-16	13	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	ND	ND
6/7 S (Dup)	28-Apr-16	14	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	ND	ND
6/7 S	18-Apr-17	15	2.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.9	ND	ND
6/7 S	12-Sep-17	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.1	ND	ND
6/7 S	9-Nov-17	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3	ND	ND
8 P	26-Jun-03	460	ND	1,300	ND	ND	ND	7.3	ND	ND	55	ND	ND	ND	ND	ND	66	ND	ND	5.7	160	ND	ND	27	12	ND	7.6	5.6	ND	20	ND	16	ND	ND
8 P	23-Apr-04	3,600	ND	11,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	340	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 P	27-May-05	220	2.5	300	ND	ND	ND	ND	ND	ND	6.1	ND	ND	ND	ND	ND	3.9	ND	ND	ND	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 P	15-May-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 P	11-May-07	270	ND	200	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	9.0	ND	ND	ND	17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 P	22-May-08	11,000	ND	12,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 P	8-May-09	ND	ND	610	ND	ND	ND	ND	ND	ND	ND	46	ND	ND	ND	ND	9.6	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	47
8 P	22-Apr-10	150	ND	74	ND	ND	ND	ND	ND	ND	4.9	ND	ND	ND	ND	ND	4.5	ND	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 P	11-Apr-11	870	ND	830	ND	ND	ND	ND	ND	ND	6.1	ND	ND	ND	ND	ND	6.4	ND	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 7-2
VOCs Detected in Landfill Module Leachate and LDS Sump Liquid Samples (µg/L)
Riverbend Landfill

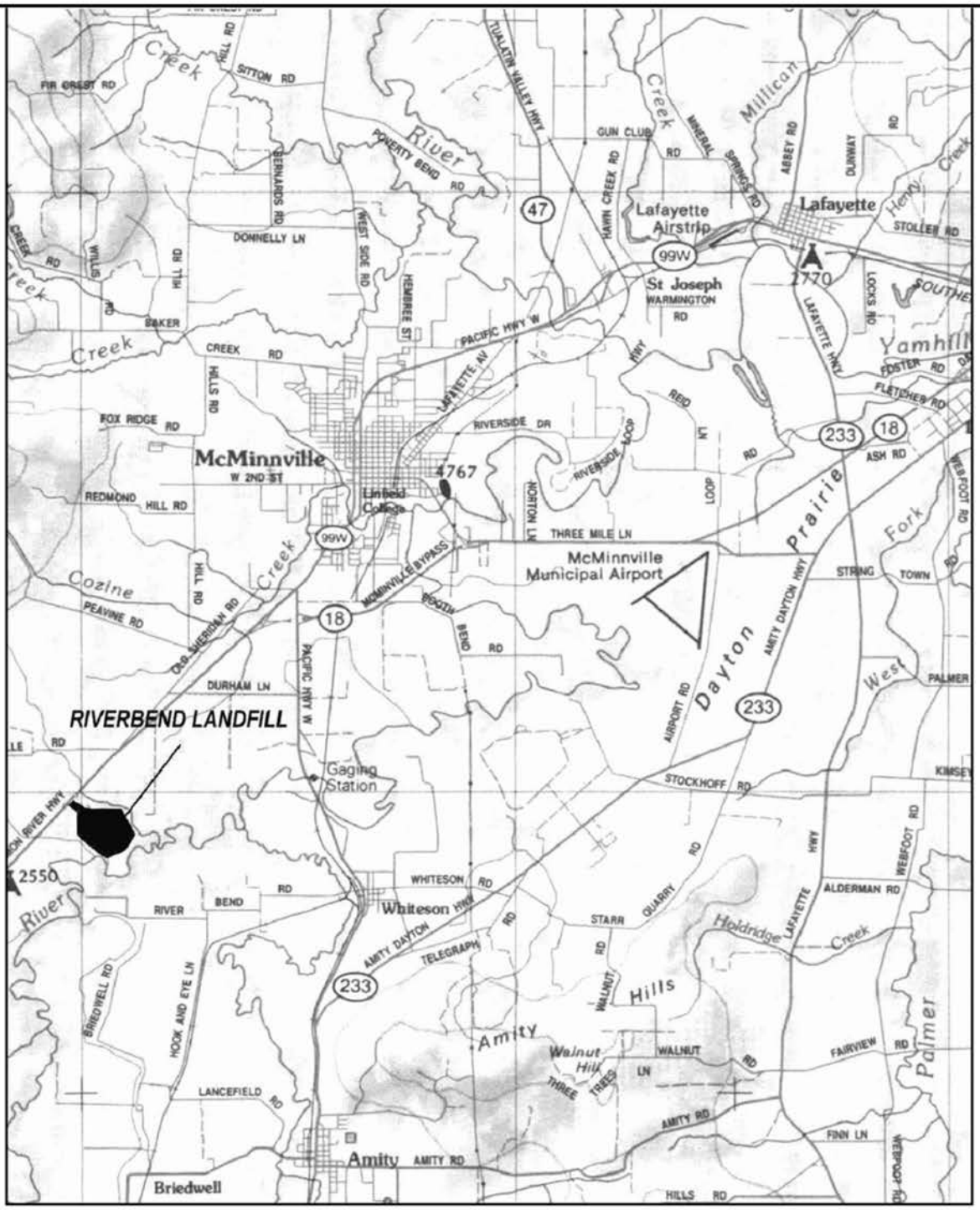
Sample Location	Sample Date	Acetone	Benzene	2-Butanone (MEK)	Carbon Disulfide	Chloroethane	Dibromochloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	Ethylbenzene	2-Hexanone	Methylene Chloride	Methyl Isobutyl Ketone	Styrene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Vinyl chloride	Total Xylenes	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	cis-1,2-Dichloroethene	Isopropylbenzene	4-Isopropyltoluene	n-Propylbenzene	Naphthalene	p-Cymene	4-Methyl-2-pentanone
8 P	1-May-12	**5,100**	ND	**9,700**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**20**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**290**
8 P	10-Apr-13	**3,700**	ND	**2,600**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**19**	ND	ND	ND	**11**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**90**
8 P	5-May-14	**15,000**	ND	**6,700**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**37**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**26**	ND	ND	ND	**160**
8 P	8-May-15	**2,700**	**25**	**1,600**	ND	ND	ND	ND	ND	ND	**10**	ND	ND	ND	**5.0**	ND	**19**	ND	ND	ND	**12**	ND	ND	ND	ND	ND	ND	ND	ND	**4.8**	ND	**29**	ND	**43**
8 P	28-Apr-16	**25,000**	ND	**1,800**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**86**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**470**
8 P	18-Apr-17	**14,000**	ND	**13,000**	ND	ND	ND	ND	ND	ND	**21**	ND	**40**	ND	ND	ND	**64**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**20**	ND	ND	ND	**360**
8 S	26-Jun-03	ND	ND	ND	ND	ND	ND	ND	ND	**0.69**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	23-Apr-04	ND	**1.5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S (Dup)	23-Apr-04	ND	**1.5**	ND	ND	ND	ND	**0.51**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	12-May-06	ND	**1.3**	ND	ND	ND	ND	**0.64**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1,400**	ND	ND	ND	ND	ND	ND	ND	**1.1**	ND	ND	ND	ND	ND	ND
8 S	11-May-07	ND	**1.0**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	22-May-08	ND	**1.0**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	8-May-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S (Dup)	8-May-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	22-Apr-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	11-Apr-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S (Dup)	11-Apr-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	1-May-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	11-Apr-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	5-May-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S (Dup)	5-May-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	8-May-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S (Dup)	8-May-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	28-Apr-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8 S	18-Apr-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9 P	8-May-15	**3,900**	ND	**7,200**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**360**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**140**
9 P	6-May-16	**31**	ND	ND	ND	ND	ND	ND	ND	ND	**3.7**	ND	ND	ND	ND	ND	**1.4**	ND	ND	ND	**11**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9 P	18-Apr-17	**7,600**	ND	**9,300**	ND	ND	ND	ND	ND	ND	ND	ND	**18**	ND	ND	ND	**20**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**33**	ND	ND	ND	**130**
9 S	8-May-15	**13**	ND	ND	ND	ND	ND	**5.6**	**1.3**	ND	ND	ND	ND	ND	ND	ND	**2.6**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9 S	6-May-16	**1,500**	ND	**950**	ND	ND	ND	ND	ND	ND	ND	ND	**230**	ND	ND	ND	**9,500**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9 S	18-Apr-17	**12**	**2.1**	**11**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**8.5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9 S (Dup)	18-Apr-17	**30**	**1.6**	**12**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**5.5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	8-Apr-13	**230**	ND	**110**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	21-Nov-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	5-May-14	**1,100**	ND	**580**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	20-Nov-14	**1,400**	ND	**460**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	11-May-15	**910**	ND	**630**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	11-Nov-15	**850**	ND	**250**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	28-Apr-16	**230**	ND	**180**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.7**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**11**
Leachate Pond	17-Nov-16	**25**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.6**	ND	ND	ND	ND	**1.7**	**1.3**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	18-Apr-17	**2,000**	ND	**950**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond	9-Nov-17	**900**	ND	**470**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**11**
Leachate Pond LDS	11-Apr-13	**230**	ND	**570**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond LDS	21-Nov-13	**12**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**10**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond LDS	5-May-14	**1,000**	ND	**660**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**5.8**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**8.0**
Leachate Pond LDS	20-Nov-14	**110**	**1.2**	**34**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**5.9**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond LDS	11-May-15	**13**	ND	**18**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**4.5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**14**
Leachate Pond LDS	11-Nov-15	ND	**1.3**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3.0**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Leachate Pond LDS	28-Apr-16	**860**	ND	**400**	ND	ND	ND	ND	ND	ND	ND	**31**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**6.5**
Leachate Pond LDS	17-Nov-16	**200**	ND	**150**	ND	ND	ND	ND	ND	ND	**9.1**	ND	ND	ND	ND	ND	**7.4**	ND	ND	ND	**24**	ND	ND	**3.7**	ND	ND	ND	ND	ND	ND	ND	**6.8**	ND	ND
Leachate Pond LDS	18-Apr-17	**1,400**	ND	**790**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**11**
Leachate Pond LDS	9-Nov-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3.9**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE:

Detections are in **bold** type; LDS = secondary leak detection system; NT = not tested; ND = not detected at or above the practical quantitation limit; D = compounds identified in analysis at a secondary dilution factor;

J = indicates an estimate value; E = compounds whose concentrations were above the calibration range of the GC/MS instrument for that analysis; µg/L = micrograms per liter.

FIGURES



Basemap from Oregon Atlas and Gazetteer (DeLorme)

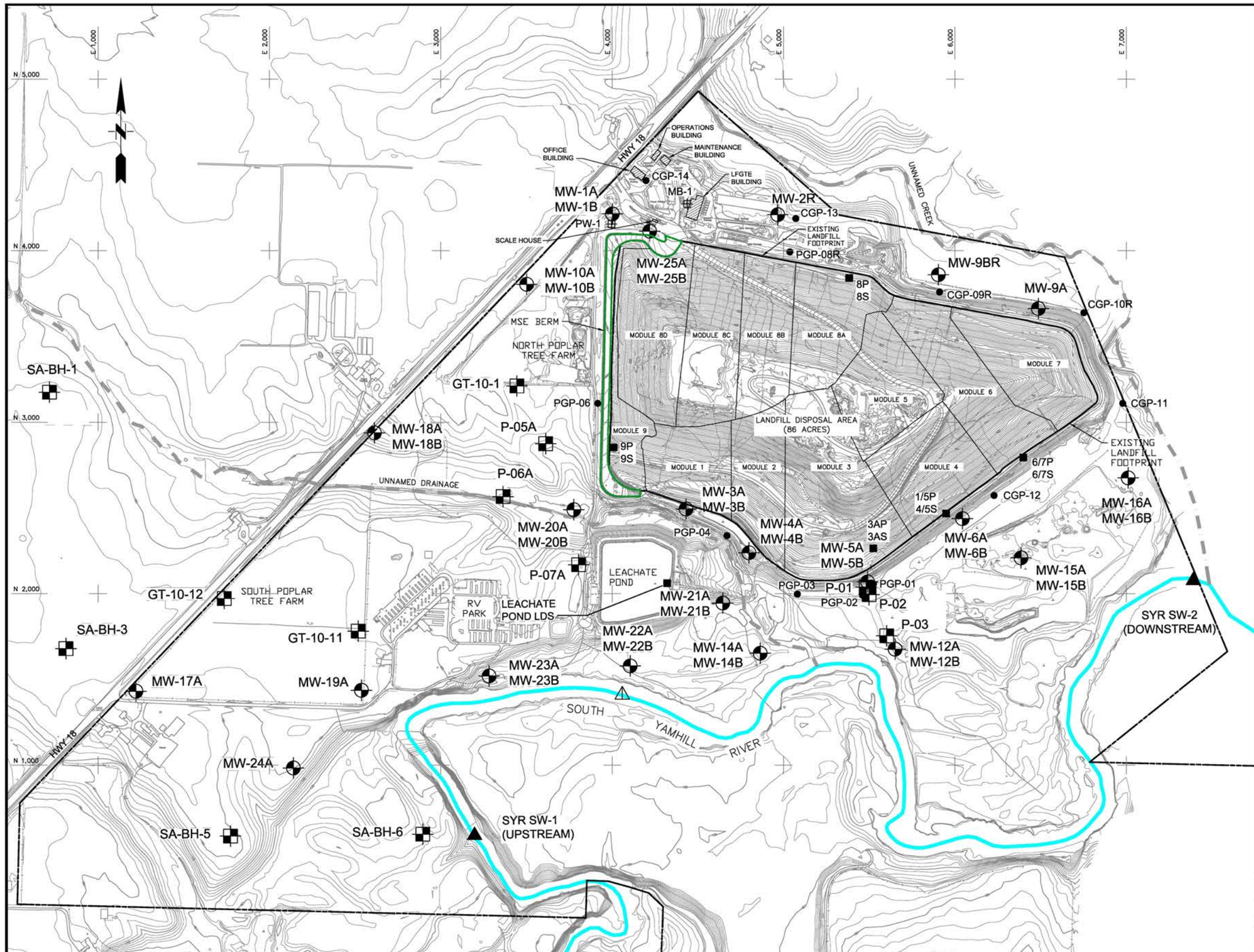
0 1 2
MILES

OREGON

WASTE MANAGEMENT

SCS ENGINEERS
Environmental Consultants and Contractors
15940 S.W. 72nd Avenue
Portland, Oregon 97224
(503) 639-9201 FAX: (503) 684-6948

PROJECT NO.	DES BY	SITE LOCATION MAP	DATE
04208022.18	S.N.		APRIL 2018
SCALE	CHK BY	RIVERBEND LANDFILL	FIGURE
AS SHOWN	D.L.	McMINNVILLE, OREGON	1-1
CAD FILE	APP BY		
FIGURE 1-1	L.C.		



LEGEND:

- Topographic Contours (Surveyed)
- Topographic Contours (USGS)
- Property Boundary
- Flow Line - Yamhill River
- Flow Line - Tributary Stream
- MW-19A — Groundwater Monitoring Well
- P-05A — Piezometer
- PW-1 — On-Site Water Well
- CGP-11 — Compliance Landfill Gas Monitoring Probe
- PGP-06 — Performance Landfill Gas Monitoring Probe
- 6/7P 6/7S — LCRS and LSCS Monitoring Location
- SYR SW-1 — South Yamhill River Sampling Location (Approximate)
- South Yamhill River Gauging Station

SOURCE:

1) Existing contours based on aerial topography provided by Miller Creek Aerial Mapping, date of photograph March 19, 2017. Contours are based on NAVD 88.

2) Horizontal Datum: Assumed
Iron pipe at scale house = N4000.000 E4000.000
Iron pipe at maintenance building = N2825.685 E4000.000

NOTES:

1) Monitoring wells and piezometers with "A" designation are screened in the shallow (Silt-Clay) water-bearing zone, and monitoring wells and piezometers with "B" designation are screened in the deeper (Sand-Gravel) water-bearing zone.

2) Piezometers with "GT" and "SA-BH" designations are screened in the shallow (Silt-Clay) water-bearing zone.

3) Leachate Collection and Removal System (LCRS) monitoring locations are identified by a "P" designation and Leak Detection System (LDS) monitoring locations are identified with a "S" designation.

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0 600 1200
SCALE IN FEET

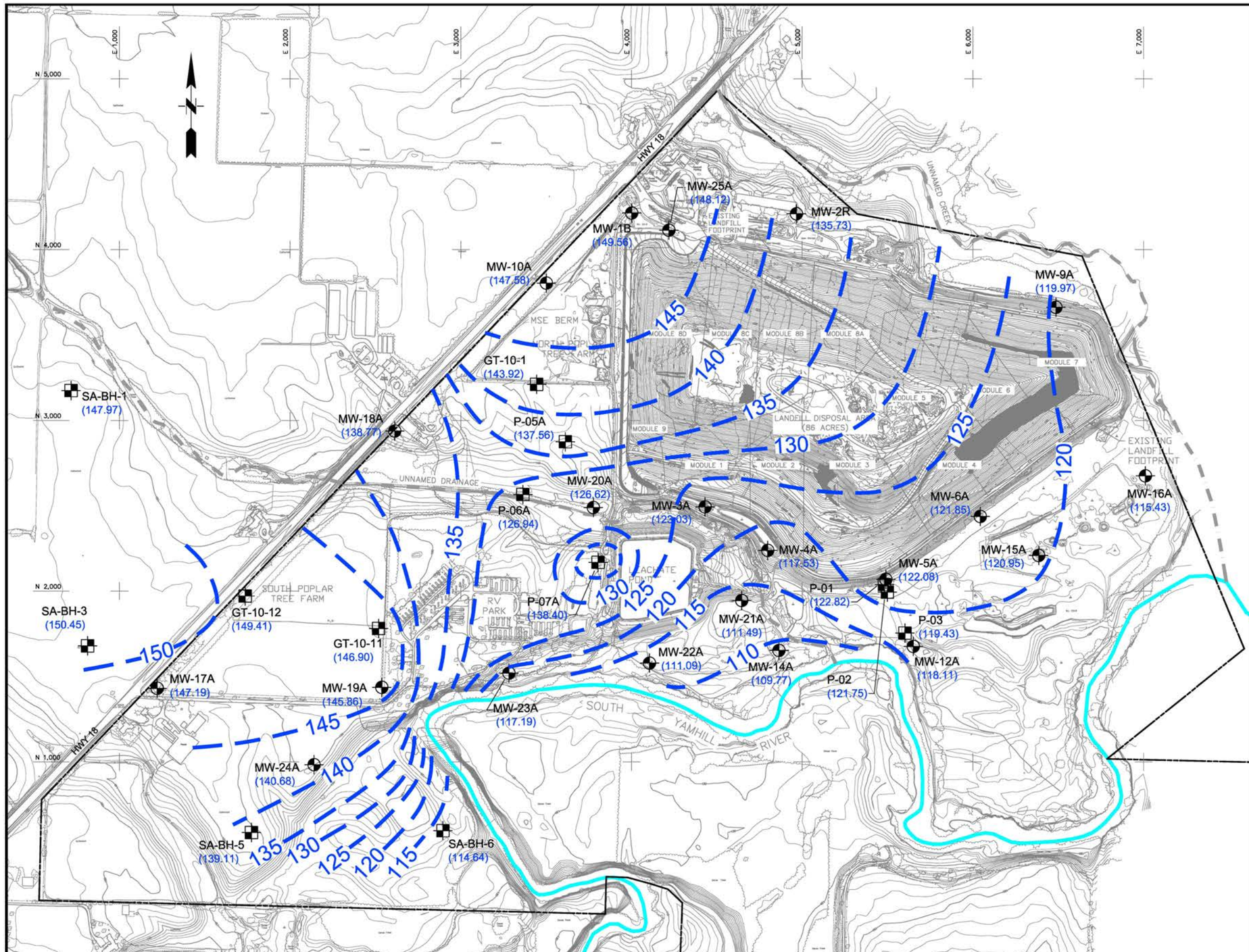
PROJECT NO. 04208022.18	DES BY S.N.
SCALE AS SHOWN	CHK BY D.L.
CAD FILE FIGURE 1-2	APP BY L.C.

SITE PLAN AND MONITORING LOCATIONS

RIVERBEND LANDFILL
McMINNVILLE, OREGON

DATE APRIL 2018

FIGURE 1-2



LEGEND:

- Topographic Contours (Surveyed)
- Topographic Contours (USGS)
- Property Boundary
- Flow Line - Yamhill River
- Flow Line - Tributary Stream
- 110 — Potentiometric Surface Contours for shallow water - bearing zone (Feet MSL) Contour Interval = 5 Feet (Quieried where uncertain)
- MW-19A — Groundwater Monitoring Well
- P-05A — Piezometer
- (119.97) — Groundwater Elevation in Feet Above Mean Sea Level on April 17, 2017

SOURCE:

1) Existing contours based on aerial topography provided by Miller Creek Aerial Mapping, date of photograph March 19, 2017. Contours are based on NAVD 88.

2) Horizontal Datum: Assumed
Iron pipe at scale house = N4000.000 E4000.000
Iron pipe at maintenance building = N2825.685 E4000.000

NOTES:

1) Monitoring wells and piezometers with "A" designation are screened in the shallow (Silt-Clay) water-bearing zone, and monitoring wells and piezometers with "B" designation are screened in the deeper (Sand-Gravel) water-bearing zone.

2) Piezometers with "GT" and "SA-BH" designations are screened in the shallow (Silt-Clay) water-bearing zone.

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WM WASTE MANAGEMENT

0 600 1200
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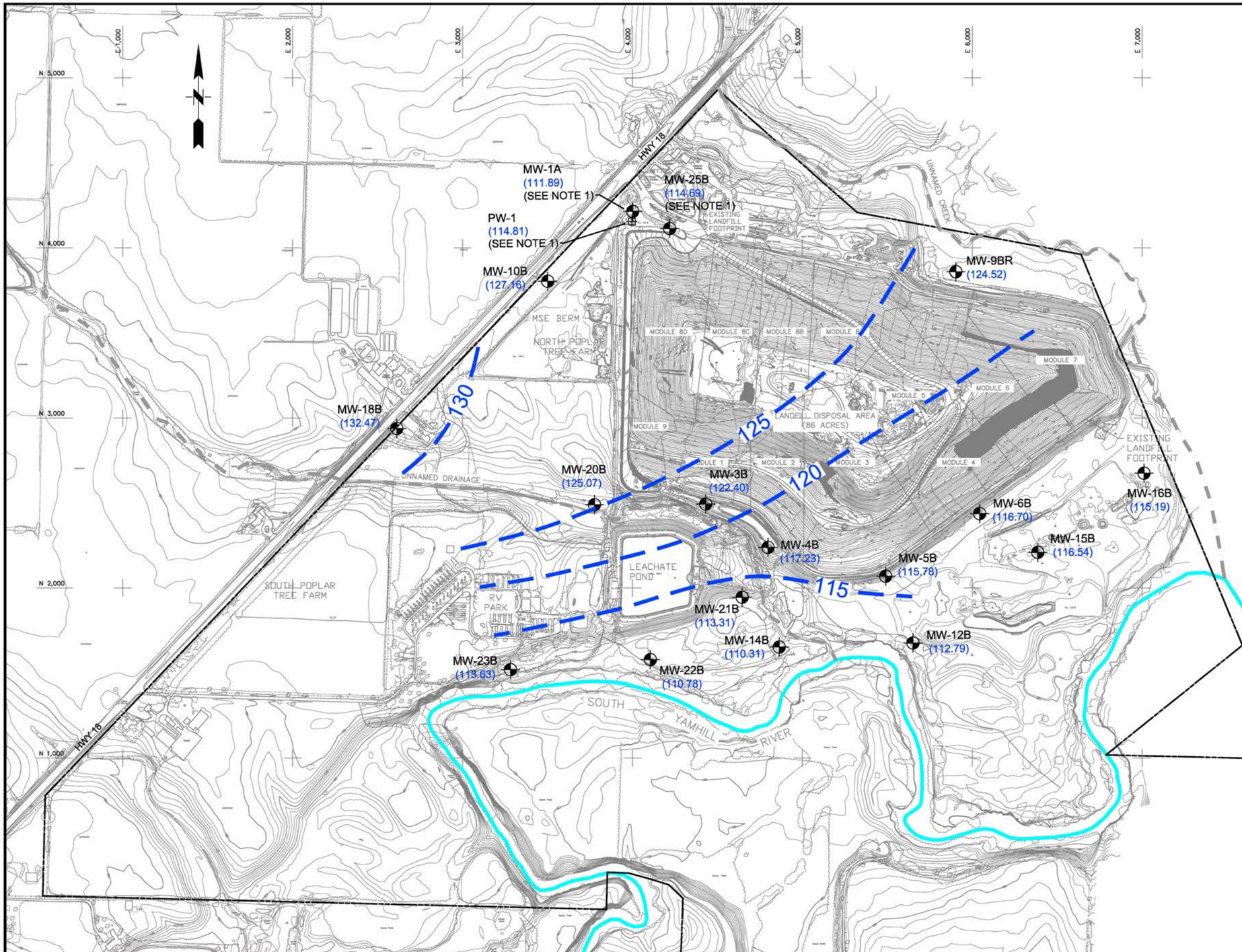
SCALE AS SHOWN	CHK BY D.L.
CAD FILE FIGURE 6-1	APP BY L.C.

SHALLOW WATER - BEARING ZONE
POTENTIOMETRIC SURFACE CONTOURS
(APRIL 17, 2017)

RIVERBEND LANDFILL
McMINNVILLE, OREGON

DATE APRIL 2018

FIGURE 6-1



LEGEND:

- Topographic Contours (Surveyed)
- Topographic Contours (USGS)
- Property Boundary
- Flow Line - Yamhill River
- Flow Line - Tributary Stream
- 120 — Potentiometric Surface Contours for deep water - bearing zone (Feet MSL) Contour Interval = 5 Feet
- MW-18B — Groundwater Monitoring Well
- PW-1 — On-Site Water Well
- (124.52) — Groundwater Elevation in Feet Above Mean Sea Level on April 17, 2017

SOURCE:

1) Existing contours based on aerial topography provided by Miller Creek Aerial Mapping, date of photograph March 19, 2017. Contours are based on NAVD 88.

2) Horizontal Datum: Assumed
Iron pipe at scale house = N4000.000 E4000.000
Iron pipe at maintenance building = N2825.685 E4000.000

NOTES:

1) Water level in well is depressed due to periodic pumping of the site production well (PW-1). These wells were not used in the interpretation of potentiometric contours.

2) Monitoring wells and piezometers with "A" designation are screened in the shallow (Silt-Clay) water-bearing zone, and monitoring wells and piezometers with "B" designation are screened in the deeper (Sand-Gravel) water-bearing zone.

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WASTE MANAGEMENT

0 600 1200
SCALE IN FEET

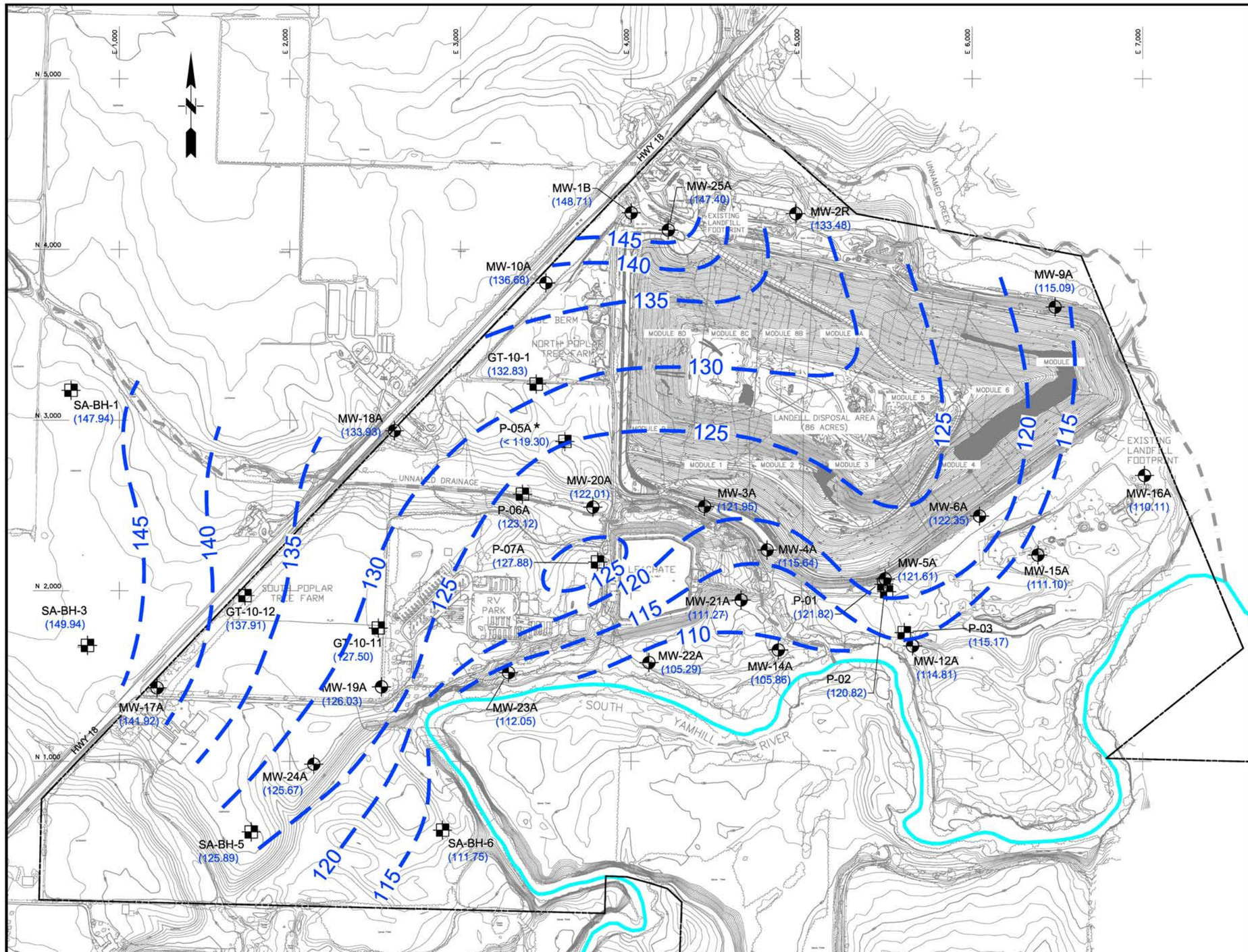
PROJECT NO. 04208022.18	DES BY S.N.
SCALE AS SHOWN	CHK BY D.L.
CAD FILE FIGURE 6-2	APP BY L.C.

DEEP WATER - BEARING ZONE
POTENTIOMETRIC SURFACE CONTOURS
(APRIL 17, 2017)

RIVERBEND LANDFILL
McMINNVILLE, OREGON

DATE APRIL 2018

FIGURE 6-2



LEGEND:

- Topographic Contours (Surveyed)
- Topographic Contours (USGS)
- Property Boundary
- Flow Line - Yamhill River
- Flow Line - Tributary Stream
- 120 — Potentiometric Surface Contours for shallow water - bearing zone (Feet MSL) Contour Interval = 5 Feet (Quieried where uncertain)
- MW-19A — Groundwater Monitoring Well
- P-06A — Piezometer
- (123.12) — Groundwater Elevation in Feet Above Mean Sea Level on November 7, 2017
- * — P-05A is Dry. Bottom of Screen at 119.30 (AMSL)

SOURCE:

1) Existing contours based on aerial topography provided by Miller Creek Aerial Mapping, date of photograph March 19, 2017. Contours are based on NAVD 88.

2) Horizontal Datum: Assumed
Iron pipe at scale house = N4000.000 E4000.000
Iron pipe at maintenance building = N2825.685 E4000.000

NOTES:

1) Monitoring wells and piezometers with "A" designation are screened in the shallow (Silt-Clay) water-bearing zone, and monitoring wells and piezometers with "B" designation are screened in the deeper (Sand-Gravel) water-bearing zone.

2) Piezometers with "GT" and "SA-BH" designations are screened in the shallow (Silt-Clay) water-bearing zone.

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WASTE MANAGEMENT

0 600 1200
SCALE IN FEET

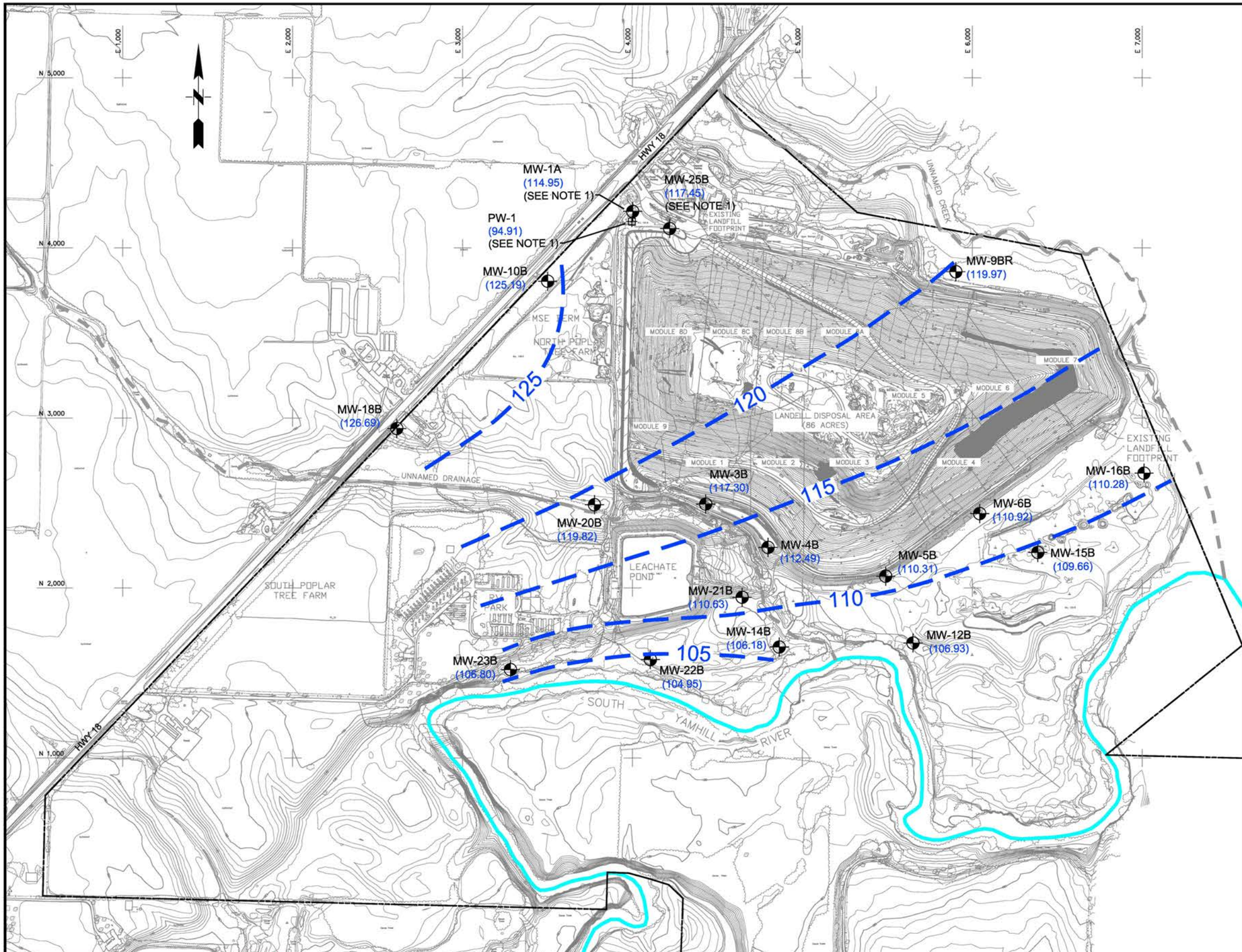
PROJECT NO.	DES BY
04208022.18	S.N.
SCALE	CHK BY
AS SHOWN	J.D.
CAD FILE	APP BY
FIGURE 6-3	D.L.

SHALLOW WATER - BEARING ZONE
POTENTIOMETRIC SURFACE CONTOURS
(NOVEMBER 7, 2017)

RIVERBEND LANDFILL
McMINNVILLE, OREGON

DATE: APRIL 2018

FIGURE: 6-3



LEGEND:

- Topographic Contours (Surveyed)
- Topographic Contours (USGS)
- Property Boundary
- Flow Line - Yamhill River
- Flow Line - Tributary Stream
- 120 — Potentiometric Surface Contours for deep water - bearing zone (Feet MSL) Contour Interval = 5 Feet
- MW-18B — Groundwater Monitoring Well
- PW-1 — On-Site Water Well
- (126.69) — Groundwater Elevation in Feet Above Mean Sea Level on November 7, 2017

SOURCE:

1) Existing contours based on aerial topography provided by Miller Creek Aerial Mapping, date of photograph March 19, 2017. Contours are based on NAVD 88.

2) Horizontal Datum: Assumed
Iron pipe at scale house = N4000.000 E4000.000
Iron pipe at maintenance building = N2825.685 E4000.000

NOTES:

1) Water level in well is depressed due to periodic pumping of the site production well (PW-1). These wells were not used in the interpretation of potentiometric contours.

2) Monitoring wells and piezometers with "A" designation are screened in the shallow (Silt-Clay) water-bearing zone, and monitoring wells and piezometers with "B" designation are screened in the deeper (Sand-Gravel) water-bearing zone.

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0 600 1200
SCALE IN FEET

PROJECT NO. 04208022.18	DES BY S.N.
SCALE AS SHOWN	CHK BY J.D.
CAD FILE FIGURE 6-4	APP BY D.L.

DEEP WATER - BEARING ZONE
POTENTIOMETRIC SURFACE CONTOURS
(NOVEMBER 7, 2017)

RIVERBEND LANDFILL
McMINNVILLE, OREGON

DATE APRIL 2018

FIGURE 6-4

Figure 6-5
Volatile Organic Compounds Detected in MW-5A Groundwater Samples
Riverbend Landfill

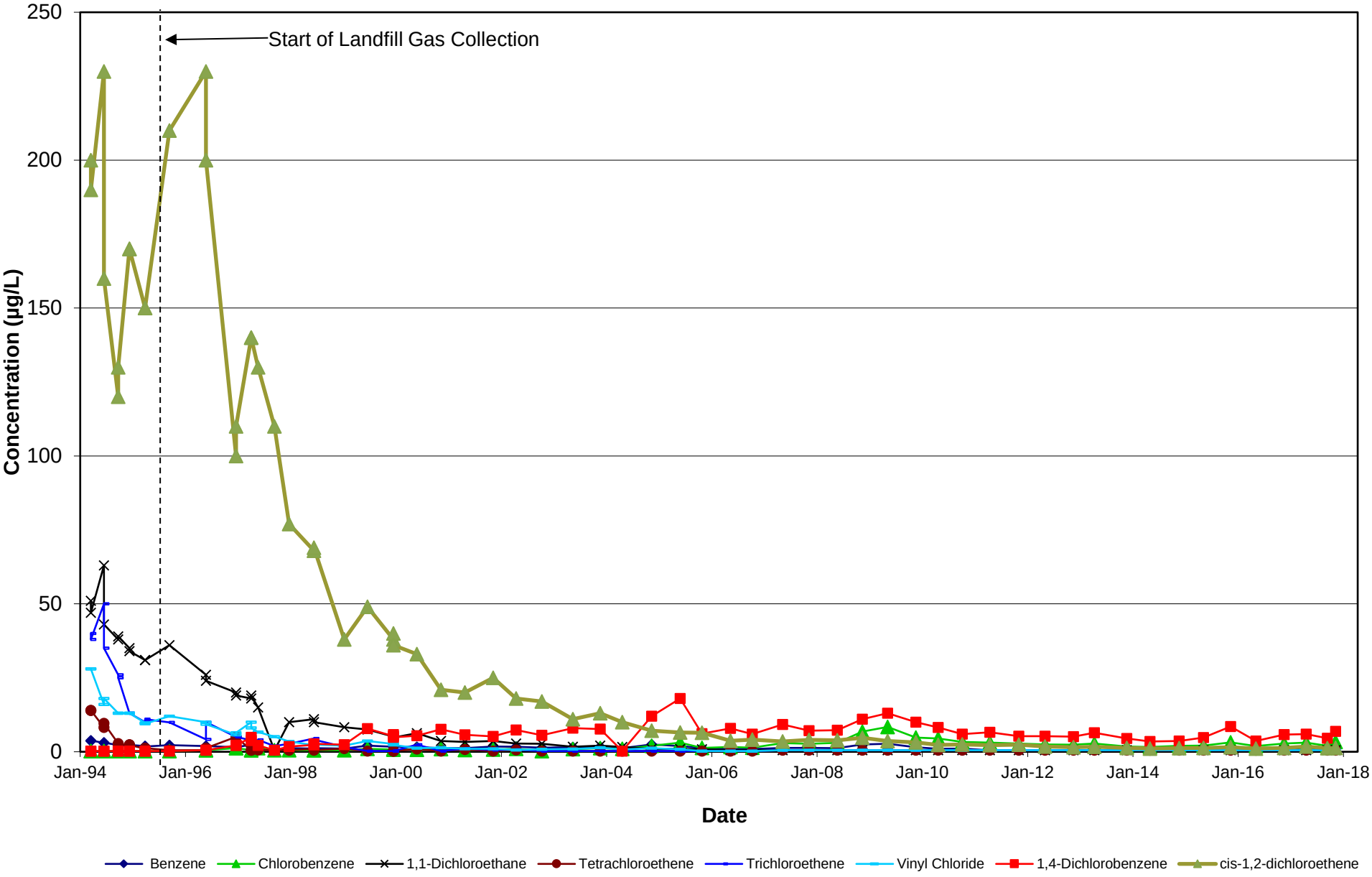
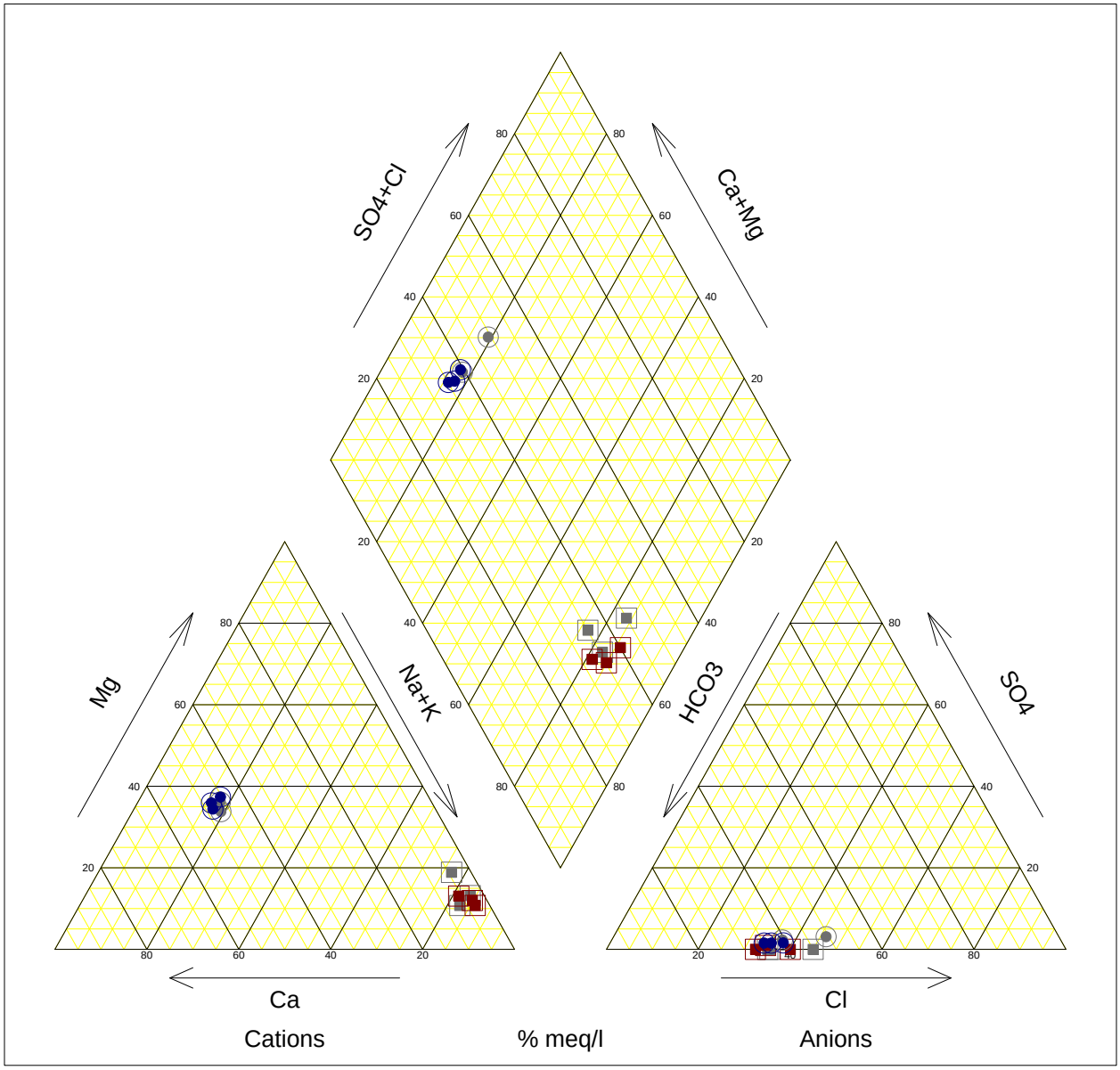


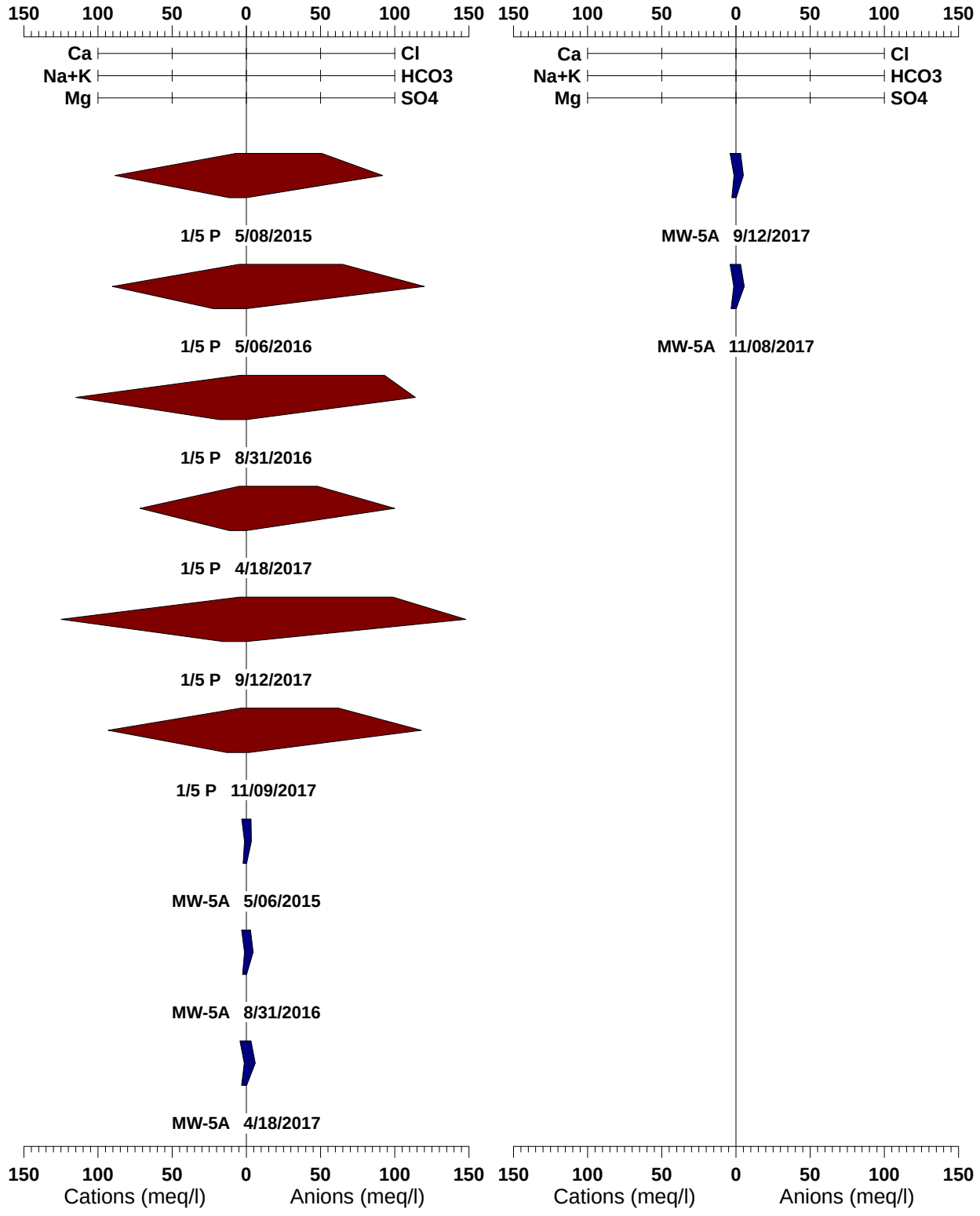
Figure 6-6: MW-5A Groundwater and Sump 1/5 P Leachate



1/5 P	5/08/2015	MW-5A	4/18/2017
1/5 P	5/06/2016	MW-5A	9/12/2017
1/5 P	8/31/2016	MW-5A	11/08/2017
1/5 P	4/18/2017		
1/5 P	9/12/2017		
1/5 P	11/09/2017		
MW-5A	5/06/2015		
MW-5A	8/31/2016		

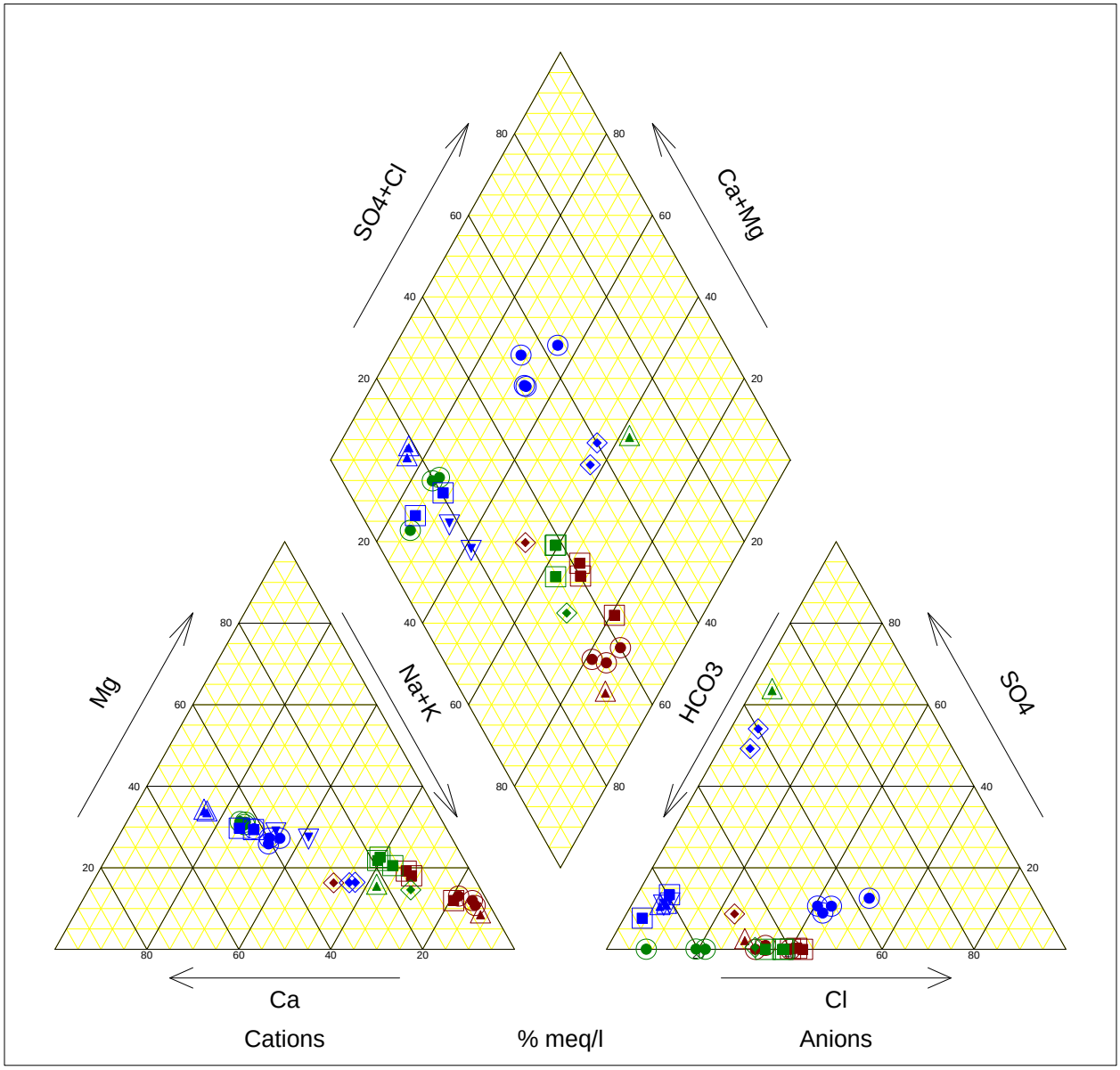
Prepared by: SCS Engineers

Figure 6-7: MW-5A Groundwater and Sump 1/5 P Leachate



Prepared by: SCS Engineers

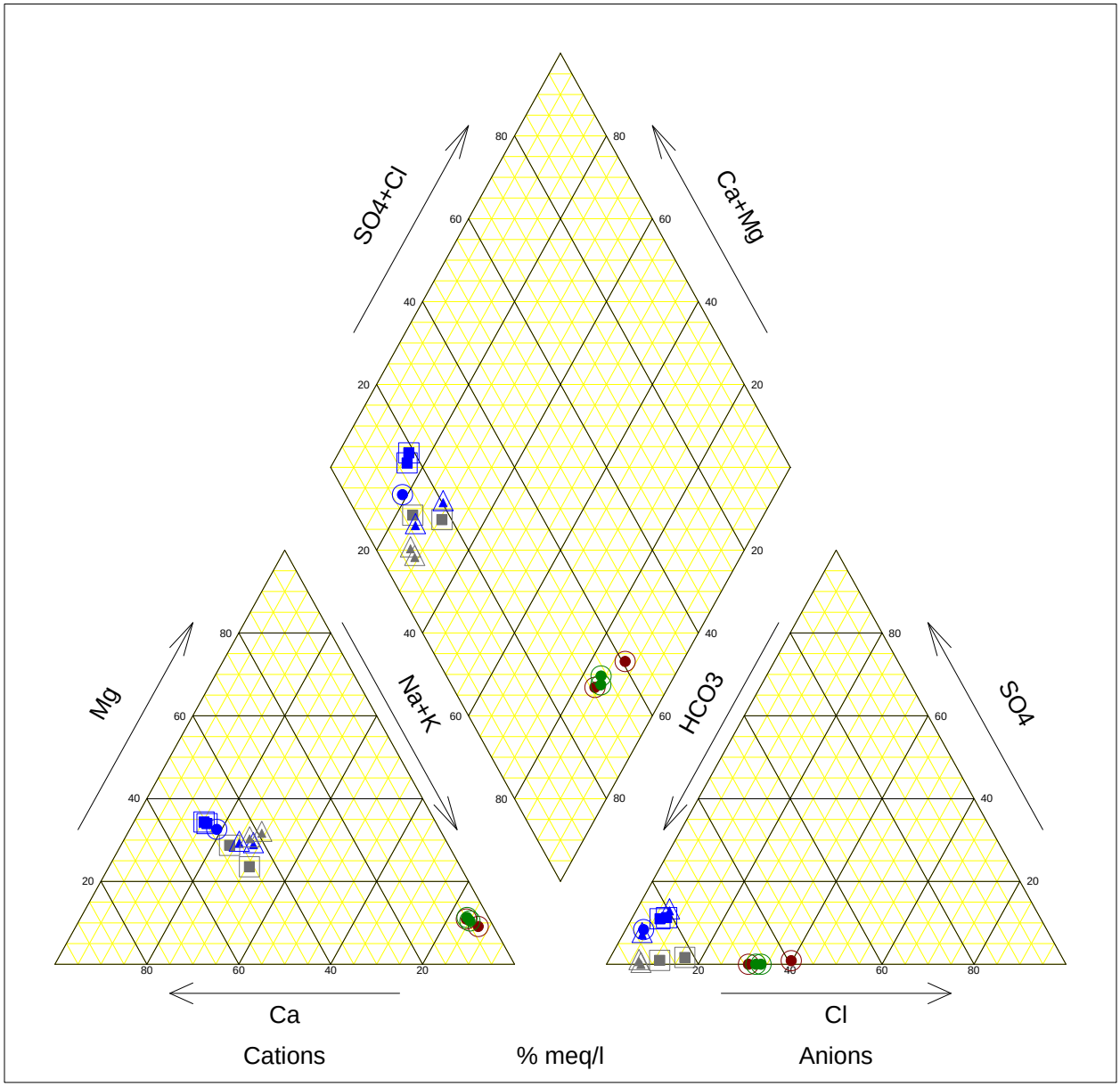
Figure 7-1: 2017 Shallow Groundwater and Sump Samples



1/5 P	4/18/2017	8P	4/18/2017	MW-16A	4/19/2017
1/5 P	9/12/2017	8S	4/18/2017	MW-16A	11/07/2017 - 11/21/2017
1/5 P	11/09/2017	9P	4/18/2017	MW-21A	4/20/2017
4/5 S	4/18/2017	9S	4/18/2017	MW-21A	11/08/2017
4/5 S	9/12/2017	MW-12A	4/19/2017		
4/5 S	11/09/2017	MW-12A	7/14/2017		
6/7 P	4/18/2017	MW-12A	9/12/2017		
6/7 P	9/12/2017	MW-12A	11/09/2017		
6/7 P	11/09/2017	MW-14A	4/19/2017		
6/7 S	4/18/2017	MW-14A	11/08/2017		
6/7 S	9/12/2017	MW-15A	4/19/2017		
6/7 S	11/09/2017	MW-15A	11/08/2017		

Prepared by: SCS Engineers

Figure 7-2: 2017 Leachate Pond, LDS Liquid, and Nearby Groundwater Samples



LEACHATE POND	4/18/2017	MW-21A	4/20/2017
LEACHATE POND	11/09/2017	MW-21A	11/08/2017
LPOND LDS	4/18/2017	MW-21B	4/20/2017
LPOND LDS	11/09/2017	MW-21B	11/08/2017
MW-14A	4/19/2017	MW-22A	4/18/2017
MW-14A	11/08/2017		
MW-14B	4/19/2017		
MW-14B	11/08/2017		

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