

Second Quarter 2019 Monitoring Report

LRI Landfill

Graham, Washington

Pierce County Recycling, Composting
& Disposal, LLC dba LRI
17925 Meridian Street East
Puyallup, Washington 98375



SCS ENGINEERS

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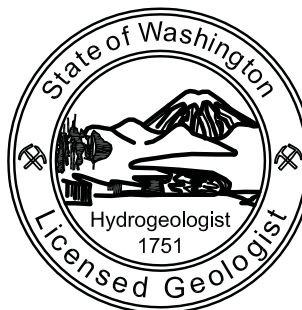
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This Quarterly Monitoring Report for the LRI Landfill located in Graham, Washington, was prepared by Sam Graber and Kevin Lakey of SCS Engineers.

September 18, 2019



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GROUNDWATER MONITORING

Second Quarter 2019 groundwater samples were collected from June 17 through June 19, 2019. Water level elevations were measured on June 18, 2019. Nine monitoring wells (MW-1A, MW-2A, MW-3, MW-4, MW-5A, MW-6, MW-7, MW-9, and MW-10) were sampled this monitoring period. Field quality control samples consisted of one field blank and one duplicate sample collected at MW-5A. Sampling procedures followed the LRI Landfill Groundwater Monitoring Plan (GWMP), dated March 10, 2014.

Groundwater samples were obtained using low-flow purging and sampling techniques with dedicated pumps at all monitoring wells with the exception of MW-4, where a non-dedicated QED Sample Pro pump was deployed. Samples for laboratory analyses were submitted to TestAmerica, Inc. of Denver, Colorado for the parameters listed in Appendix I and II of WAC 173-351-990. The groundwater sampling locations are shown on Figure 1.

A groundwater surface elevation map for the Second Quarter monitoring event is included as Figure 1 in Attachment A. The average groundwater gradients and flow directions calculated for the quarter remain similar to those previously reported at the facility, with a flow rate of about 45 feet per year towards the northwest for horizontal groundwater movement within the uppermost aquifer (assuming a horizontal hydraulic conductivity of 1×10^{-3} centimeters per second and an effective porosity of 30 percent).

Field measurements and analytical results for groundwater, leak detection/collection system (LDCS), and quality control samples are summarized on the following tables included in Attachment B: Groundwater Level Elevations, Field Parameters, Inorganic Parameters, Appendix I Metals, Appendix II Metals, Volatile Organic Compounds, Cation-Anion Balance, and Duplicate Sample Results.

Copies of the Field Sampling Data Sheets are included in Attachment C. Statistical calculations, including summary tables for indicator parameters, are included in Attachment D. Trilinear (Piper) plots of groundwater and LDCS sample results are included in Attachment E. Data validation results are summarized in Attachment F. Copies of the laboratory reports were submitted to the TPCHD under separate cover.

A nonparametric inter-well prediction limit approach was used to evaluate the water quality results for Appendix I parameters listed in WAC 173-351-990 (15 total metals and nitrate). Prediction limits were generated using background data for nitrate and eight rounds of quarterly sampling conducted in 2014 and 2015 for the fifteen total metals. Using this procedure, the highest concentration of each parameter in the data set was selected as the prediction limit for that parameter. In addition, the prediction limit data set includes ongoing water quality results from background (upgradient) wells MW-9 and MW-10. Appendix I total metal and nitrate concentrations measured at the downgradient monitoring wells were less than or equal to prediction limit values at all of the wells monitored this quarter.

Groundwater time-trend plots for inorganic parameters and metals are included in Attachment G. The following four plots are provided for each monitoring well:

- Plot 1 — ammonia, nitrate, chloride, TOC
- Plot 2 — alkalinity, sulfate, TDS
- Plot 3 — calcium, magnesium, sodium, potassium
- Plot 4 — iron, manganese, zinc, arsenic

Time trend plots show that concentrations of metals and inorganic parameters remained generally consistent with previously measured values during the Second Quarter. The total dissolved solids (TDS) concentration at MW-3 that was previously elevated during the First Quarter monitoring event, decreased to a level consistent with historic trends (220 mg/L).

Reported detections of inorganic parameters and metals measured at downgradient monitoring wells were less than or equal to the groundwater quality criteria listed in WAC 173-200-040, with the exceptions shown in Table 1. The highest concentrations of chloride and nitrate in the uppermost aquifer continue to be observed in background well MW-10.

Table 1. Groundwater Results Greater Than WAC 173-200-040 Criteria

Parameter	Groundwater Quality Criteria	MW-1A	MW-2A	MW-3	MW-4	MW-5A	MW-6	MW-7
Arsenic, Total	0.00005	**	**	**	0.0091	0.0055	0.0070	0.0052
Iron, Dissolved	0.30	1.6	0.67	*	*	*	*	*
Manganese, Dissolved	0.05	0.27	0.29	0.31	0.24	0.21	0.20	0.25
Notes: Concentrations listed as mg/L = milligrams per liter ** = Not detected above the method reporting limit (MRL), but the MRL exceeded WAC 173-200-040 GW Quality Criteria * = Reported value was less than WAC 173-200-040 Groundwater Quality Criteria								

The values listed in Table 1 are typical of previous results (see time-trend plots in Appendix G), are interpreted to be within natural background variation, and in the case of total arsenic, are less than or equal to the background level used to establish the prediction limit (prediction limits are not applicable for dissolved iron and manganese). The method reporting limit (MRL) for arsenic is 0.005 milligrams per liter (mg/L), which is greater than the WAC 173-200-040 criteria of 0.00005 mg/L. Therefore, arsenic results reported as non-detect are considered to be greater than the WAC 173-200-040 criterion.

The measured value for pH at background well MW-9 (6.42 SU) was below the WAC 173-200-040 criteria of 6.5 during the Second Quarter monitoring event. Since MW-9 is a background (upgradient) monitoring well, the low pH value is interpreted to be representative of natural groundwater quality.

Low-level detections of ammonia (<0.25 mg/L) were reported at all downgradient monitoring wells during this monitoring event. Similar low-level ammonia detections have been reported during the previous several quarters, including at background well MW-10 during the Second Quarter 2018

monitoring event. Therefore, the low-level ammonia concentrations appear to be due to site-wide aquifer chemistry.

The cation-anion balance evaluates the difference in the sum of cations and anions (in milliequivalents per liter [meq/L]) within a water sample to determine if it is electroneutral (balanced cation and anion charges). Consistent with WAC 173-350-430(5), a threshold of ten percent difference is used if the total cation-anion sum is less than 5.0 meq/L, and a threshold of five percent difference is used if the total cation-anion sum is greater than or equal to 5.0 meq/L. Cation-anion balance evaluations were below the appropriate threshold for all of the monitoring wells during this monitoring event.

Graphical plots of the monitoring well water quality results are presented on trilinear (piper) diagrams in Attachment E. These plots demonstrate the inherent water quality differences between groundwater from the monitoring wells, shallow groundwater from the LDCS, and leachate (collected annually in December).

Trichloroethene (TCE) was reported in the sample from MW-4 at a concentration of 0.94 µg/L during the Second Quarter monitoring event. However, TCE was also detected in the Field Blank quality control sample at a concentration of 0.50 µg/L. The field blank sample is collected by pouring lab grade deionized water (provided by TestAmerica) over a water level meter and into the sample containers. Since TCE was detected in the field blank, the concentration reported in MW-4 is likely the result of a laboratory artifact. No other volatile organic compounds (VOCs) were detected in groundwater samples collected from monitoring wells this quarter.

LEAK DETECTION/COLLECTION SYSTEM (LDCS) MONITORING

LDCS Daily Monitoring. Daily monitoring of the LDCS sumps for volume of water pumped, liquid level, and specific conductance (conductivity) was performed by using a programmable logic controller (PLC) and through direct measurements by LRI site personnel. Rainfall data were recorded manually using an on-site rain gauge. The combined field and PLC data, as well as time series plots of the data, are included in Attachment H.

Conductivity probes at LDCS-2B and LDCS-6 were recalibrated by LRI staff on May 23, 2019. Following recalibration, recorded conductivity values more closely reflected readings taken in the field. In early June, conductivity values at LDCS-4B displayed an increase, which occurred following a three-day rain event. Since then, conductivity values have decreased to levels more consistent with historic trends. In May, conductivity values at LDCS-5 displayed fluctuations, followed by readings at the upper range limit of the conductivity probe of 996 µS/cm. The conductivity probe at LDCS-5 was re-calibrated on June 7, 2019 to expand the range of recorded values. See below for additional discussion regarding water quality at LDCS-5.

Conductivity data from the remaining LDCS sumps trended within typical historical levels during the Second Quarter of 2019.

LDCS Quarterly Monitoring. LDCS samples were collected from the leak detection sumps with disposable bailers at LDCS-1, LDCS-2A, and LDCS-2B, and with dedicated QED Sleeper Pumps at LDCS-3A, LDCS-4A, LDCS-4B, LDCS-5, and LDCS-6. Samples for laboratory testing were submitted to TestAmerica of Denver, Colorado. Field and laboratory data results are included on the groundwater summary tables in Attachment B.

LDCS time trend plots for inorganic parameters and dissolved metals are included in Attachment G. The following four plots are provided for each leak detection sump:

- Plot 1 — ammonia, nitrate, chloride, TOC
- Plot 2 — alkalinity, sulfate, TDS
- Plot 3 — calcium, magnesium, sodium, potassium
- Plot 4 — iron, manganese, zinc, arsenic

The sample collected from LDCS-2B displayed an elevated concentration of dissolved iron during the Second Quarter monitoring event (1.2 mg/L). However, all leachate indicator parameters were non-detect or remained low. Therefore, the elevated iron concentration does not appear to be the result of leachate.

The sample collected from LDCS-4B displayed an elevated concentration of iron (4.0 mg/L) and slight increases in ammonia (1.0 mg/L), chloride (32 mg/L), and total organic carbon (9.9 mg/L). The primary leachate indicator parameters acetone and 2-butanone were non-detect. However, as a precautionary measure, groundwater from LDCS-4B was directed to the leachate collection system, beginning on July 26, and is not being discharged through the concrete channel. LRI plans to clean the concrete vault as well as the riser pipe and sump using a vactor truck prior to the Third Quarter monitoring event.

The sample collected from LDCS-5 displayed elevated concentrations of secondary leachate indicator parameters ammonia (13.0 mg/L) and chloride (70 mg/L), as well as alkalinity, iron, manganese, sodium, potassium, TDS, and TOC (see summary tables in Attachment B and time trend plots in Attachment G). Although the primary leachate indicator parameters acetone and 2-butanone were not detected, elevated concentrations of the inorganic parameters and metals listed above are indicative of a potential leachate leak. Therefore, LDCS-5 was re-sampled on July 12 and again on August 23, 2019, and an investigation of the leachate forcemain was begun. The results of the July sample were similar to the results of the June sample (secondary leachate indicator parameters were elevated and primary leachate indicator parameters were not detected; see attached summary tables). Results for the August sample are not yet available.

To date, the leachate forcemain has been exposed at four locations. Liquids, with a conductivity range from 920 $\mu\text{S}/\text{cm}$ to 4,400 $\mu\text{S}/\text{cm}$, were observed near the concrete vaults located just south of the leachate riser pipes. Therefore, exposure of the leachate force main in this area is planned. Groundwater withdrawn from LDCS-5 continues to be directed to the leachate collection system, as it has been since May, 2016, and is not being discharged through the concrete channel.

No VOC detections were reported present in the LDCS samples this quarter.

Graphical plots of the LDCS water quality results are presented on trilinear (piper) diagrams in Attachment E. These plots demonstrate the inherent water quality differences between groundwater from the monitoring wells, shallow groundwater from the LDCS, and leachate (collected annually in December).

SURFACE WATER MONITORING

Surface water monitoring was performed consistent with NPDES Construction Stormwater General Permit WAR 002603C and NPDES Industrial Stormwater General Permit WAR 002557. A surface

water sample was collected on April 10, 2019 consistent with NPDES Industrial Stormwater General Permit WAR-002557. Surface water Discharge Monitoring Reports (DMR's) were submitted to Ecology on a monthly (Construction Permit) and quarterly (Industrial Permit) basis. Copies of the Second Quarter DMR's are included in Attachment I. No benchmark values or effluent limits were exceeded during the second quarter.

LEACHATE MONITORING

A leachate sample was collected from Cell 4B during Second Quarter monitoring event. The analytical results from this sample were consistent with previous leachate sampling at the LRI landfill. A full round of leachate sampling will take place during the annual monitoring event in December.

Leachate volumes were monitored using the automated PLC system and through direct measurements by LRI site personnel. Collected leachate was truck-hauled to the pretreatment facility at the Hidden Valley Landfill where it was discharged to the Pierce County sewer system in accordance with Pierce County Utilities Department Industrial Discharge Permit Number PC03096, and to the City of Tacoma and City of Salem Wastewater Treatment Plants for proper disposal. A summary of year to date leachate volume data based on volumes truck-hauled off site is provided on Table 2.

Table 2. 2019 Leachate Volume Data

Month	Leachate Trucked Offsite for Proper Disposal (gallons)	Monthly Rainfall (inches)
January	2,352,863	2.89
February	2,293,109	3.44
March	2,366,050	1.78
April	2,321,189	1.37
May	2,152,277	1.05
June	2,185,958	1.15
Totals	13,671,446	11.68
Notes: Leachate was trucked off-site for proper disposal. Leachate volumes were determined by trucking records kept on a daily basis.		

LANDFILL GAS MONITORING

Monthly monitoring of the landfill gas performance probes was conducted on April 25, May 29, and June 12 using a Landtec GEM2000 portable gas monitor. Methane measurements were less than the lower explosive limit (LEL) of five percent by volume during the Second Quarter except at performance probes GP-2, GP-10, GP-10P, and GP-12 (see Table 3). Previous barhole monitoring surveys have shown that similar methane levels at these probes does not result in the migration of landfill gas to the property line.

Indoor air was tested for the presence of methane on June 12. The office, maintenance building, scale house, and work shed located next to the stormwater treatment ponds were tested with a portable flame ionization detector (MicroFID). No detectible methane was recorded.

Field records for gas probe and indoor air monitoring are included in Attachment J.

Table 3. 2019 Landfill Gas Probe Monitoring Summary (Percent Methane)

Monitoring Date	GP-1	GP-2	GP-3	GP-4	GP-9	GP-10	GP-10P	GP-11	GP-12	GP-13	GP-14	GP-15
January 18	6.6	18.2	0.0	0.0	0.0	0.1	27.1	0.0	23.1	1.2	0.0	0.0
February 20	6.1	16.9	0.0	0.0	0.0	19.8	14.8	0.3	23.8	1.1	0.0	0.0
March 26	1.8	17.0	0.0	0.0	0.0	1.9	19.6	0.0	26.0	1.3	0.0	0.0
April 25	1.7	16.1	0.0	0.0	0.0	16.1	20.4	0.0	28.6	1.5	0.0	0.0
May 29	1.5	15.9	0.0	0.0	0.0	13.7	23.2	0.0	29.9	0.4	0.0	0.0
June 12	2.4	16.0	0.0	0.0	0.0	23.5	15.4	0.0	29.4	0.0	0.0	0.0
Notes: All values are reported as percent methane by volume. Methane measurements at or above the lower explosive limit of 5.0% by volume are shown in bold .												

LANDFILL GAS EXTRACTION WELL CONSTRUCTION

No new landfill gas extraction wells were installed during the second quarter.

GROUNDWATER MONITORING WELL CONSTRUCTION AND MAINTENANCE

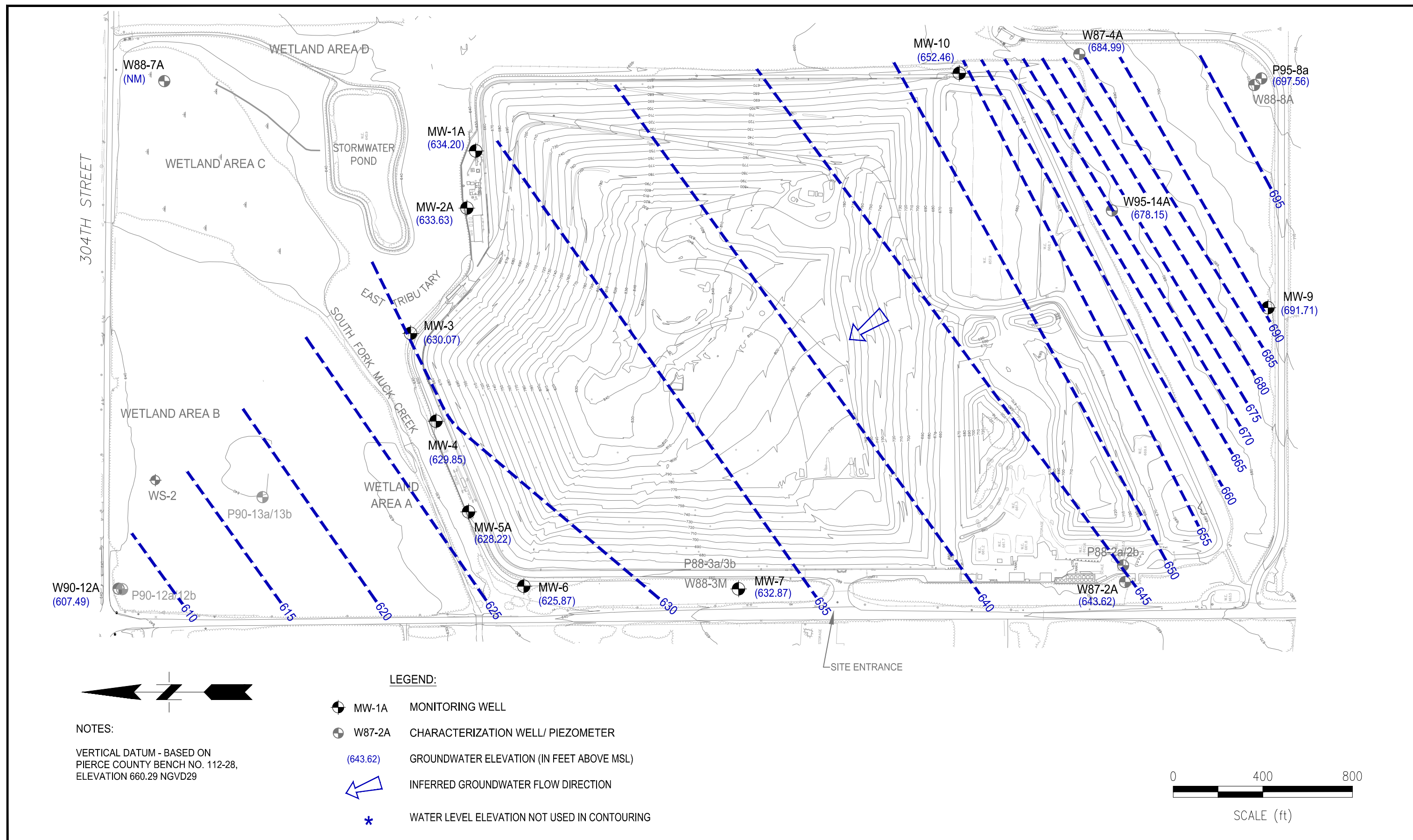
No well construction or significant well maintenance activities were performed this quarter.



Appendix A

Groundwater Flow Map





SCS ENGINEERS Environmental Consultants and Contractors 2405 140th Avenue NE, Suite 107 Bellevue, Washington 98005 (425) 746-4600 FAX: (425) 746-6747			PROJECT NO.	04219001.02	DES BY	SG	POTENTIOMETRIC SURFACE CONTOUR MAP JUNE 18, 2019 LRI LANDFILL 30919 MERIDIAN STREET E. GRAHAM, WASHINGTON	DATE	AUGUST 2019
			SCALE	AS SHOWN	CHK BY	KGL		FIGURE	1
			CAD FILE	FIGURE 1	APP BY	KGL			



Appendix B

Groundwater Data Summary Tables



Table 1. Groundwater Level Elevations
June 18, 2019
LRI Landfill, Pierce County, Washington

Location	Well Casing Elevation (ft)	Depth to Water (ft)	Water Level Elevation (ft, NGVD29)
Wells			
W87-2A	664.01	20.39	643.62
W87-4A	693.29	8.30	684.99
W88-3M	658.11	13.34	644.77
W88-7A	632.51	NM	--
W88-8M	721.05	40.42	680.63
W90-12A	640.84	33.35	607.49
W95-14A	680.49	2.34	678.15
MW-1A	652.57	18.37	634.20
MW-2A	651.93	18.30	633.63
MW-3	637.41	7.34	630.07
MW-4	652.37	22.52	629.85
MW-5A	655.55	27.33	628.22
MW-6	635.71	9.84	625.87
MW-7	656.03	23.16	632.87
MW-9	701.77	10.06	691.71
MW-10	673.87	21.41	652.46
Piezometers			
P13-14A	665.96	22.04	643.92
P88-2A	663.96	NM	--
P88-2B	663.48	NM	--
P88-3A	656.20	16.03	640.17
P88-3B	655.98	18.01	637.97
P95-8A	722.07	24.51	697.56
P90-12A	640.79	4.23	636.56
P90-12B	640.73	5.75	634.98
P90-13A	645.19	NM	--
P90-13B	643.63	NM	--
GP-1P ^a	652.00	17.10	634.90
GP-2P ^a	658.61	16.35	642.26
GP-3P ^a	658.51	11.47	647.04
GP-4P ^a	662.01	9.76	652.25
GP-9P ^a	674.03	12.35	661.68
South Creek			
SWSC-1	632.68	2.34	630.34
SWSC-2	629.98	6.35	623.63
Leak Detection System			
LDCS-1 ^b	657.26	26.70	630.56
LDCS-2A ^b	659.24	29.31	629.93
LDCS-2B ^b	661.70	26.61	635.09

Notes:

NM= not measured

-- = not applicable

Measurements taken on 6/18/2019 unless otherwise noted

a = Measurement taken on 6/12/2019

b = Measurement taken on 6/17/2019

Table 2. Field Parameters
Second Quarter 2019
LRI Landfill, Pierce County, Washington

Location	Sample Number	Sample Date	Sampling Method	pH	Conductivity	Temperature
Units				(SU)	(μS/cm)	(°C)
WAC 173-200 Criteria				6.5-8.5	700 ^b	—
Monitoring Wells						
MW-1A	304-061819-13	6/18/2019	DP	6.63	173	13.4
MW-2A	304-061919-18	6/19/2019	DP	6.69	243	12.9
MW-3	304-061719-01	6/17/2019	DP	6.65	344	10.2
MW-4	304-061819-14	6/18/2019	SP	7.49	297	13.3
MW-5A	304-061719-05	6/17/2019	DP	7.20	359	12.0
MW-6	304-061719-03	6/17/2019	DP	7.12	298	10.4
MW-7	304-061719-09	6/17/2019	DP	7.22	379	10.3
MW-9	304-061919-19	6/19/2019	DP	6.42	137	10.5
MW-10	304-061719-11	6/17/2019	DP	6.98	258	10.8
Leak Detection System						
LDCS-1	304-061719-08	6/17/2019	DB	6.35	425	24.5
LDCS-2A	304-061719-06	6/17/2019	DB	7.20	776	23.3
LDCS-2B	304-061719-04	6/17/2019	DB	7.08	693	21.6
LDCS-3A	304-061719-02	6/17/2019	DP	6.45	806	21.8
LDCS-4A	304-061719-10	6/17/2019	DP	6.36	938	25.2
LDCS-4B	304-061719-12	6/17/2019	DP	6.47	1,095	25.5
LDCS-5	304-061819-17	6/18/2019	DP	6.84	1,329	26.3
LDCS-5 (Resample)	304-071219-01	7/12/2019	DP	6.68	1,389	28.3
LDCS-6	304-061919-20	6/19/2019	DP	6.98	1,037	20.7
Leachate Collection System						
Leachate, Cell 4B	304-061819-15	6/18/2019	GB	8.04	30,050	23.0

Notes:

WAC 173-200 GW Quality Criteria Exceedances are shown in **bold**.

b = Secondary Drinking Water Standard

DB = disposable bailer

DP = dedicated pump

GB = grab sample

SP = submersible pump

μS/cm = microsiemens per centimeter

°C = degrees celcius

**Table 3. Inorganic Parameters
Second Quarter 2019
LRI Landfill, Pierce County, Washington**

Parameter	Alkalinity, Total	Ammonia	Chloride	Nitrate	Sulfate	Total Dissolved Solids	Total Organic Carbon	Total Suspended Solids
MRL	10	0.1-22	0.2-120	0.5-0.84	0.2-2.5	10-470	1-7.8	4.0
WAC 173-200 Criteria	—	—	250	10	250	500	—	—
Prediction Limit	—	—	—	6.4	—	—	—	—
Monitoring Wells								
MW-1A	92	0.12	2.0	*	3.0	160 B	*	*
MW-2A	120	0.10	3.0	*	5.2	170	*	11
MW-3	140	0.15	3.7	*	29	220	*	*
MW-4	150	0.18	3.0	*	9.6	210 B	*	*
MW-5A	170	0.17	3.1	*	14	220	*	*
MW-6	140	0.14	5.4	*	6.9	190	*	*
MW-7	200	0.24	3.2	*	3.2	220	*	*
MW-9	68	*	1.6	*	1.8	140	*	*
MW-10	100	*	8.0	4.7	7.1	200	*	*
Leak Detection System								
LDCS-1	200	0.12	4.4	*	6.1	260	2.5	—
LDCS-2A	410	*	4.0	*	21	470	2.5	—
LDCS-2B	310	*	4.0	*	58	430	2.4	—
LDCS-3A	350	*	4.7	*	75	490	1.6	—
LDCS-4A	380	0.15	20	*	56	520	5.0	—
LDCS-4B	470	1.0	32	*	60	630	9.9	—
LDCS-5	640	13.0	70	*	19	780	28	—
LDCS-5 (Resample)	510	16.0	48	*	20	610	16	—
LDCS-6	440	*	8.8	*	160	710	3.7	—
Leachate Collection System								
Leachate, Cell 4B	14000 H B	1,700	3,700	4.9	5.4	18,000	1800 H	—

Notes:

All sample units are milligrams per liter (mg/L)

Groundwater (monitoring well) concentrations greater than prediction limits or WAC 173-200 criteria are shown in **bold**

Analyses performed by TestAmerica of Denver, Colorado

Method Reporting Limit (MRL) is typical and may be elevated for some samples

* indicates the sample result was not reported at or above the MRL

— = not applicable or not performed

B = Compound found in the blank and the sample

H = Sample was prepped or analyzed beyond the specified holding time

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value

Table 4. WAC 173-351 Appendix I Metals
Second Quarter 2019
LRI Landfill, Pierce County, Washington

Parameter	Antimony-D	Antimony-T	Arsenic-D	Arsenic-T	Barium-D	Barium-T	Beryllium-D	Beryllium-T	Cadmium-D	Cadmium-T	Chromium-D	Chromium-T	Cobalt-D	Cobalt-T	Copper-D	Copper-T	Lead-D	Lead-T	Nickel-D	Nickel-T	Selenium-D	Selenium-T	Silver-D	Silver-T	Thallium-D	Thallium-T	Vanadium-D	Vanadium-T	Zinc-D	Zinc-T	
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
MRL	0.05	0.05	0.005	0.005	0.005	0.005	0.001	0.001	0.001	0.001	0.005	0.005	0.001	0.001	0.01	0.01	0.002	0.002	0.02	0.02	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	
WAC 173-200 Criteria	—	—	—	0.00005	—	1.0	—	—	—	0.01	—	0.05	—	—	—	1.0	—	0.05	—	—	—	0.01	—	0.05	—	—	—	—	—	5.0	
Prediction Limit	—	0.05	—	0.011	—	0.091	—	0.005	—	0.005	—	0.011	—	0.01	—	0.063	—	0.042	—	0.020	—	0.005	—	0.01	—	0.005	—	0.016	—	0.290	
Monitoring Wells																															
MW-1A	—	*	—	*	—	0.021	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	
MW-2A	—	*	—	*	—	0.013	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	
MW-3	—	*	—	*	—	0.012	—	*	—	*	—	0.012	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	
MW-4	—	*	—	0.0091	—	0.016	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	0.026	
MW-5A	—	*	—	0.0055	—	0.012	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	
MW-6	—	*	—	0.0070	—	0.011	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	
MW-7	—	*	—	0.0052	—	0.015	—	*	—	*	—	0.015	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	
(BG) MW-9	—	*	—	*	—	0.0051	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	0.013	—	*	
(BG) MW-10	—	*	—	*	—	0.015	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	
Leak Detection System																															
LDCS-1	*	—	0.0094	—	0.024	—	—	—	—	—	*	—	*	—	*	—	*	—	*	—	—	—	—	—	—	—	—	*	—	*	—
LDCS-2A	*	—	0.0072	—	0.017	—	—	—	—	—	*	—	*	—	*	—	*	—	*	—	—	—	—	—	—	—	—	*	—	*	—
LDCS-2B	*	—	*	—	0.015	—	—	—	—	—	*	—	*	—	*	—	*	—	*	—	—	—	—	—	—	—	—	*	—	*	—
LDCS-3A	*	—	*	—	0.019	—	—	—	—	—	*	—	*	—	*	—	*	—	*	—	—	—	—	—	—	—	—	*	—	*	—
LDCS-4A	*	—	0.016	—	0.045	—	—	—	—	—	*	—	0.0050	—	*	—	*	—	*	—	—	—	—	—	—	—	*	—	*	—	
LDCS-4B	*	—	0.034	—	0.059	—	—	—	—	—	*	—	0.0015	—	*	—	*	—	*	—	—	—	—	—	—	—	*	—	*	—	
LDCS-5	*	—	0.014	—	0.120	—	*	—	*	—	*	—	0.0018	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	
LDCS-5 (Resample)	*	—	0.015	—	0.110	—	*	—	*	—	*	—	0.0014	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	
LDCS-6	*	—	*	—	0.032	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	0.016	—	
Leachate Collection System																															
Leachate, Cell 4B	—	*	—	0.11	—	1.3	—	*	—	*	—	0.58	—	0.038	—	0.074	—	0.019	—	0.62	—	0.012	—	*	—	*	—	0.13	—	0.14	

Notes:
All sample units are milligrams per liter (mg/L).
WAC 173-200-040 Table 1 Groundwater Quality Criteria are for total metals.
Groundwater (monitoring well) concentrations greater than prediction limits or WAC 173-200 criteria are shown in **bold**.
Parameter concentrations for monitoring wells are total (T) metals.
Parameter concentrations for LDCS sumps are dissolved (D) metals.
Analyses performed by TestAmerica of Denver, Colorado.
Method Reporting Limit (MRL) is typical and may be elevated for some samples.
* indicates result was not reported at or above the MRL
— = not applicable or not performed
BG = Background
J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

**Table 5. WAC 173-351 Appendix II Metals (Dissolved)
Second Quarter 2019
LRI Landfill, Pierce County, Washington**

Parameter	Calcium	Iron	Magnesium	Manganese	Potassium	Sodium
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MRL	0.20	0.10	0.10	0.005	2.0	1.0
WAC 173-200 Criteria	—	0.30	—	0.050	—	—
Monitoring Wells						
MW-1A	14	1.6	8.8	0.27	3.6	11
MW-2A	18	0.67	10	0.29	2.8	14
MW-3	35	0.11	15	0.31	3.7	13
MW-4	29	*	16	0.24	5.4	12
MW-5A	28	0.14	11	0.21	4.2	31
MW-6	31	*	14	0.20	4.7	9.9
MW-7	33	0.19	22	0.25	5.4	13
(BG) MW-9	9.5	*	6.5	*	*	7.1
(BG) MW-10	24	*	10	*	2.1	13
Leak Detection System						
LDCS-1	42	0.35	17	1.6	5.3	18
LDCS-2A	88	*	33	0.031	9.3	29
LDCS-2B	87	1.2	30	0.25	6.7	19
LDCS-3A	90	*	40	0.63	6.2	21
LDCS-4A	86	2.5	46	1.9	6.6	23
LDCS-4B	110	4.0	55	2.0	9.4	40
LDCS-5	100	0.81	57	2.3	16	90
LDCS-5 (Resample)	80	1.4	44	1.7	17	73
LDCS-6	110	*	58	1.2	4.4	34
Leachate Collection System ^						
Leachate, Cell 4B	41	6.5	58	0.23	1,200	5,100

Notes:

All sample units are milligrams per liter (mg/L).

WAC 173-200-040 Table 1 Groundwater Quality Criteria are for total metals.

Groundwater (monitoring well) concentrations greater than WAC 173-200 criteria are shown in **bold**.

Analyses performed by TestAmerica of Denver, Colorado.

Method Reporting Limit (MRL) is typical and may be elevated for some samples.

^ Leachate reported concentraions are total metals.

* indicates result was not reported at or above the MRL.

— = not applicable or not performed

BG = Background

Table 6. Volatile Organic Compounds (µg/L)
Second Quarter 2019
LRI Landfill, Pierce County, Washington

Parameter	1,4-Dichlorobenzene	2-Butanone (MEK)	2-Hexanone	4-Methyl-2-pentanone (MIBK)	Acetone	Benzene	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene	Ethylbenzene	Methylene Chloride	m-Xylene & p-Xylene	o-Xylene	Styrene	Toluene	Trichloroethene
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MRL	0.5	6.0	5.0	5.0	10.0	0.5	0.5	0.5	0.5	1.0	2.0	0.5	0.5	0.5	0.5	0.5
WAC 173-200 Criteria	4.0	—	—	—	—	1.0	—	7.0	—	—	5.0	—	—	—	—	3.0
Monitoring Wells																
MW-1A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MW-2A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MW-3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MW-4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0.94
MW-5A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MW-6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MW-7	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
(BG) MW-9	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
(BG) MW-10	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Leak Detection System																
LDCS-1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LDCS-2A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LDCS-2B	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LDCS-3A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LDCS-4A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LDCS-4B	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LDCS-5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LDCS-5 (Resample)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LDCS-6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Leachate Collection System																
Leachate, Cell 4B	8.8	660	380	14	910	37	1.4	*	3	33	*	52	27	2.6	59	5.1
Quality Control Sample																
Field Blank	*	*	*	*	*	*	*	0.63	*	*	11.0	*	*	*	*	0.5

Notes:
Analyses performed by TestAmerica of Denver, Colorado.
* = not reported at or above the MRL
— = not applicable or not performed
BG = Background

Table 7. Cation-Anion Balance
Second Quarter 2019
LRI Landfill, Pierce County, Washington

Cations	mg/L					meq/L					% of Total			
	Ca	Mg	K	Na	Total	Ca	Mg	K	Na	Total	Na+K	Ca	Mg	
MW-1A	14	8.8	3.6	11	37.4	0.70	0.72	0.08	0.48	1.98	28	35	37	
MW-2A	18	10.0	2.8	14	44.8	0.90	0.82	0.06	0.61	2.39	28	38	34	
MW-3	35	15	3.7	13	66.7	1.75	1.23	0.08	0.57	3.63	18	48	34	
MW-4	29	16	5.4	12	62.4	1.45	1.32	0.12	0.52	3.41	19	42	39	
MW-5A	28	11	4.2	31	74.2	1.40	0.91	0.09	1.35	3.75	39	37	24	
MW-6	31	14	4.7	9.9	59.6	1.55	1.15	0.11	0.43	3.24	17	48	36	
MW-7	33	22	5.4	13	73.4	1.65	1.81	0.12	0.57	4.14	17	40	44	
MW-9	9.5	6.5	2.0	7.1	25.1	0.47	0.53	0.05	0.31	1.36	26	35	39	
MW-10	24	10	2.1	13	49.1	1.20	0.82	0.05	0.57	2.63	23	45	31	
LDCS-1	42	17	5.3	18	82.3	2.10	1.40	0.12	0.78	4.40	21	48	32	
LDCS-2A	88	33	9.3	29	159.3	4.39	2.72	0.21	1.26	8.58	17	51	32	
LDCS-2B	87	30	6.7	19	142.7	4.34	2.47	0.15	0.83	7.79	13	56	32	
LDCS-3A	90	40	6.2	21	157.2	4.49	3.29	0.14	0.91	8.84	12	51	37	
LDCS-4A	86	46	6.6	23	161.6	4.29	3.79	0.15	1.00	9.23	12	47	41	
LDCS-4B	110	55	9.4	40	214.4	5.49	4.53	0.21	1.74	11.97	16	46	38	
LDCS-5	100	57	16	90	263.0	4.99	4.69	0.36	3.92	13.96	31	36	34	
LDCS-5 (Resample)	80	44	17	73	214.0	3.99	3.62	0.38	3.18	11.17	32	36	32	
LDCS-6	110	58	4.4	34	206.4	5.49	4.77	0.10	1.48	11.84	13	46	40	
Leachate, Cell 4B	41	58	1200	5100	6399	2.05	4.77	27.10	221.85	255.77	97	1	2	

Anions	mg/L				meq/L				% of Total				Total Ions (meq/L)	Cation - Anion Balance	Applicable Ratio (%)	Ratio Exceedance
	Alk	Cl	NO ₃	SO ₄	Total	Alk	Cl	NO ₃	SO ₄	Total	Cl	Alk				
MW-1A	110.4	2.0	0.5	3.0	115.9	1.81	0.06	0.008	0.06	1.94	3	93	3.92	1.2	10	O
MW-2A	144	3.0	0.5	5.2	152.7	2.36	0.08	0.008	0.11	2.56	3	92	4.96	3.4	10	O
MW-3	168	3.7	0.5	29	201.2	2.76	0.10	0.008	0.60	3.47	3	79	7.10	2.2	5	O
MW-4	180	3.0	0.5	9.6	193.1	2.95	0.08	0.008	0.20	3.24	3	91	6.65	2.5	5	O
MW-5A	204	3.1	0.5	14	221.6	3.35	0.09	0.008	0.29	3.73	2	90	7.48	0.2	5	O
MW-6	168	5.4	0.5	6.9	180.8	2.76	0.15	0.008	0.14	3.06	5	90	6.29	2.8	5	O
MW-7	240	3.2	0.5	3.2	246.9	3.94	0.09	0.008	0.07	4.10	2	96	8.25	0.5	5	O
MW-9	81.6	1.6	0.5	1.8	85.5	1.34	0.05	0.008	0.04	1.43	3	94	2.79	2.4	10	O
MW-10	120	8.0	4.7	7.1	139.8	1.97	0.23	0.076	0.15	2.42	9	81	5.05	4.3	5	O
LDCS-1	240	4.4	0.5	6.1	251	3.94	0.12	0.008	0.13	4.20	3	94	8.59	2.4	5	O
LDCS-2A	492	4.0	0.5	21	517.5	8.07	0.11	0.008	0.44	8.63	1	94	17.21	0.3	5	O
LDCS-2B	372	4.0	0.5	58	434.5	6.10	0.11	0.008	1.21	7.43	2	82	15.22	2.4	5	O
LDCS-3A	420	4.7	0.5	75	500.2	6.89	0.13	0.008	1.56	8.59	2	80	17.43	1.4	5	O
LDCS-4A	456	20	0.5	56	532.5	7.48	0.56	0.008	1.16	9.22	6	81	18.44	0.1	5	O
LDCS-4B	564	32	0.5	60	656.5	9.25	0.90	0.008	1.25	11.41	8	81	23.38	2.4	5	O
LDCS-5	768	70	0.5	19	857.5	12.60	1.97	0.008	0.40	14.97	13	84	28.93	3.5	5	O
LDCS-5 (Resample)	612	48	0.5	20	681	10.04	1.35	0.008	0.42	11.81	11	85	22.99	2.8	5	O
LDCS-6	528	8.8	0.5	160	697	8.66	0.25	0.008	3.33	12.24	2	71	24.08	1.7	5	O
Leachate, Cell 4B	16800	3700	4.9	5.4	20510	275.52	104.34	0.079	0.11	380.05	27	72	635.82	19.5	5	Exceeds

Notes:

mg/L = milligrams per liter

meq/L = milliequivalents per liter

Total alkalinity concentration, reported as calcium carbonate (CaCO₃), is converted to the bicarbonate (HCO₃⁻) ion by multiplying by a factor of 1.2.

— = not applicable or not performed

The MRL was used for analytes that were non-detect

A 10% difference threshold is used if the total cation-anion sums are < 5.0 meq/liter.

A 5% difference threshold is used if the total cation-anion sums are > or = to 5.0 meq/liter.

Table 8. Duplicate Sample Results
Second Quarter 2019 Monitoring Report
LRI Landfill, Pierce County, Washington

Parameter	MRL	MW-5A	MW-5A (Duplicate)	RPD (%)
Volatile Organic Compounds (µg/L)				
No Detections	-	-	-	-
Inorganic Parameters (mg/L)				
Alkalinity, Bicarbonate (as CaCO ₃)	10	170	170	0.0
Ammonia	0.1	0.17	0.17	0.0
Chloride	0.2	3.1	3.1	0.0
Sulfate	0.2	14	14	0.0
Total Dissolved Solids	10	220	230	4.4
Dissolved Metals (mg/L)				
Calcium	0.2	28	28	0.0
Iron	0.1	0.14	0.11	24.0
Magnesium	0.1	11	11	0.0
Manganese	0.005	0.21	0.2	4.9
Potassium	2.0	4.2	4.3	2.4
Sodium	1.0	31	31	0.0
Total Metals (mg/L)				
Arsenic	0.005	0.0055	0.0052	5.6
Barium	0.005	0.012	0.012	0.0

Notes:

Analyses performed by TestAmerica of Denver, Colorado.

VOCs not listed were not present at concentrations exceeding the Method Reporting Limit (MRL).

RPD = relative percent difference.

µg/L = micrograms per liter.

mg/L = milligrams per liter.

* = the sample results were not reported at or above the MRL

The MRL was used to calculate the RPD for analytes where one sample was non-detect.



Appendix C

Field Sampling Documentation



June 20, 2019
File No. 04219001.02

Subject: **Second Quarter 2019 Groundwater Monitoring Event**
LRI Landfill, Pierce County, Washington

NOTES/SAMPLE DECODING:

Event Dates: June 17-19 & July 12, 2019

Field Staff: Sam Graber and Travis Berndahl

- Dedicated pumps were used for purging and sampling wells MW-1A, MW-2A, MW-3, MW-5A, MW-6, MW-7, MW-9, MW-10, and leak detection/collection system points LDCS-3A, LDCS-4A, LDCS-4B, LDCS-5, and LDCS-6.
- Disposable bailers were used to sample leak detection/collection system points LDCS-1, LDCS-2A, and LDCS-2B.
- A non-dedicated Sample Pro pump was used for purging and sampling well MW-4.
- LDCS-5 was resampled on 7/12/19.
- The ORP meter for samples "-02", "-.04", "-06", "-08", "-10", "-12", and "-14" was not functioning properly; therefore that data is omitted from the reports.
- A round of water level measurements was completed on June 18, 2019.
- Multiparameter field meters were calibrated daily, prior to sampling.
- Source water for the field blank was lab-grade deionized water (VOC-free) provided by TestAmerica in Tacoma, Washington.

Sample Number	Well Number
304-061719-01	MW-3
304-061719-02	LDCS-3
304-061719-03	MW-6
304-061719-04	LDCS-2B
304-061719-05	MW-5A
304-061719-06	LDCS-2A
304-061719-07	MW-5A (Duplicate)
304-061719-08	LDCS-1
304-061719-09	MW-7
304-061719-10	LDCS-4A
304-061719-11	MW-10
304-061719-12	LDCS-4B
304-061819-13	MW-1
304-061819-14	MW-4
304-061819-15	Leachate Cell 4B
304-061819-16	Field Blank
304-061819-17	LDCS-5
304-061919-18	MW-2
304-061919-19	MW-9

304-061919-20	LDCS-6
304-071219-01	LDCS-5 (Resample)

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04219001.02

Site: LRI 304th

Well ID: MW-3

Sample ID: 304-061719-01

Date: 6/17/19

Weather: Cloudy

Filtered? ☒ N

Locked? ☒ Y

Water in Protector? ☒ Y

Sample Containers: 1000 ml Poly 500 ml Poly 500 ml HNO3 x2 500 ml H2SO4 x2 125 ml NaOH

Sampling Method: Dedicated

Meter: MP-20

DTW: 7.36

TOS: /

Intake: /

BOS: /

Total Depth: /

Damage? ☒ Y

125 ml Poly 250 ml Poly 40 ml VOA x3 x6 1000 ml Amber

1.75" QED SamplePro Bail

1 ft water = 0.62L

One Well Volume (liters)

Total Volume Bailed (liters)

Peristaltic

Grab

Other

1L = 0.26 gallons

CONTROL SETTINGS:

Refill 9

Discharge 6

Pressure 35

Flow 300 mL/min

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
958		10.41	385	5.47	5.39	299.1		
1003		10.15	343	0.46	6.28	287.9		
1006		10.15	343	0.47	6.39	285.5		
1007		10.15	343	0.36	6.49	280.0		
1012		10.15	344	0.33	6.56	272.6		
1015		10.15	344	0.31	6.62	261.5		
1018		10.15	344	0.31	6.65	253.8	0.20	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER: Travis Berndahl

Printed Name

Signature

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04219001:02
 Site: LRI 304th
 Well ID: LDCS-3
 Sample ID: 304-0617 19-02
 Date: 6/17/19
 Weather: cloudy
 Filtered? ☒ Y ☐ N
 Locked? ☒ Y ☐ N
 Sample Containers: 1000 ml Poly 500 ml HNO3 x2 125 ml NaOH 500 ml H2SO4 x2 500 ml Poly 500 ml H2SO4 x2 125 ml NaOH
 Water in Protector? ☒ Y ☐ N
 Water in Protector? ☒ Y ☐ N
 1000 ml Poly 500 ml Poly 500 ml H2SO4 x2 500 ml H2SO4 x2 125 ml NaOH 500 ml Poly 500 ml H2SO4 x2 125 ml NaOH
 DTW TOS Intake BOS
 Meter: MP-20
 CONTROL SETTINGS: 1.75" QED SamplePro Bail 1 ft water = 0.62L One Well Volume (liters) Other: Flow
 Refill 11.5 Discharge 3.5 Pressure 40 Flow 250 ml/min
 Total Depth 250 ml Poly 40 ml VOA x3 x6 1000 ml Amber
 Damage? ☒ Y ☐ N
 Peristaltic Grab Other

Notes / Observations (color, odor, anomalies, etc):
 LDCS level = 12.5 when pump turned on. water to surface right away.

TIME	DTW	Temp.	Sp Cond.	DO	pH	Eh	Turbidity	Q/Vol.
1005		17.8	757	3.65	7.55	-443.8*		
1010		19.1	765	3.06	7.04	-445.0		
1013		20.8	805	2.94	6.44	-449.0		
1016		21.4	807	1.75	6.45	-450.2		
1019		21.7	807	1.32	6.45	-450.2		
1022		21.9	807	1.11	6.45	-450.3		
1025		21.8	806	1.00	6.45	-450.3	0.71	815

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

Sam Gabor

SAMPLER:

Printed Name

Signature

[Signature]

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04219001.02
 Site: LRI 304th
 Well ID: MW-6
 Sample ID: 304-0617-19-03
 Date: 6/17/19
 Weather: Cloudy

Filtered? ☒ N
 Sample Containers: 1000 ml Poly
 500 ml HNO3 x2
 125 ml NaOH

Locked? ☒ Y
 Water in Protector? ☒ Y
 500 ml Poly
 500 ml H2SO4 x2
 125 ml NaOH

Sampling Method: DTW
 Meter: MP-20
 (YS)

CONTROL SETTINGS:
 Refill: 10
 Discharge: 5
 Pressure: 30
 Flow: 300 ml/min

1.75" QED SamplePro
 Bail: 1 ft water = 0.62L
 One Well Volume (liters):
 Total Volume Bailed (liters):

Peristaltic
 Grab
 Other

1L = 0.26 gallons

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1100		10.46	306	3.06	6.84	210.8		
1105		10.32	297	0.43	6.75	210.7		
1108		10.31	297	0.37	6.98	205.3		
1111		10.32	298	0.33	7.02	204.0		
1114		10.32	297	0.33	7.07	202.1		
1117		10.33	297	0.28	7.10	200.3		
1120		10.35	298	0.27	7.12	198.7	0.0	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER: Travis Berndahl

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Groundwater Sampling Data Sheet

Project #:	04219001.02				
Site	LRI 304th				
Well ID:	V065-2B				
Sample ID:	304-061719-04				
Date:	6/17/19				
Weather:	cloudy				

	Sampling Method :		Dedicated	1.75" QED SamplePro (Bail)	Peristaltic	Grab	Other
	DTW <u>26.61</u> TOS Intake BOS Total Depth	Meter: MP-20 (YSI)	CONTROL SETTINGS: Refill _____ One Well Volume _____ Discharge _____ (liters) Pressure _____ Total Volume Bailed _____ Flow _____ (liters)				

1L = 0.26 gallons

Filtered? ☒ Y ☐ N	Locked? ☐ Y ☒ N	Water in Protector? ☐ Y ☒ N	Damage? ☐ Y ☒ N	Notes / Observations (color, odor, anomalies, etc):
Sample Containers:	1000 ml Poly	500 ml Poly	250 ml Poly	125 ml Poly
	500 ml HNO3	500 ml H2SO4	40 ml VOA	1000 ml Amber
	125 ml NaOH			

TIME	DTW	Temp.	Sp.Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1130		21.6	693	6.90	7.08	-448.2	53.5	733

particulates in sample.

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER: Sam Baber
Printed Name

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Groundwater Sampling Data Sheet

Project #: 04219001.02
 Site: LRI 304th
 Well ID: MW-5A
 Sample ID: 304-061719-05
 Date: 6/17/19
 Weather: Cloudy

Sampling Method: DTW
 Meter: MP-20
 CONTROL SETTINGS: 27.25
 Refill: 9
 Discharge: 6
 Pressure: 40
 Flow: 300 ml/min

1.75" QED SamplePro
 Bail: 1 ft water = 0.62L
 One Well Volume (liters):
 Total Volume Bailed (liters):

Peristaltic
 Grab
 Other

1L = 0.26 gallons
 Other: Flow Setting:

Filtered? ☒ Y ☐ N
 Sample Containers: 1000 ml Poly 500 ml Poly 500 ml HNO3 x2 500 ml H2SO4 x2 125 ml NaOH
 Water in Protector? ☒ Y ☐ N
 Damage? ☒ Y ☐ N
 125 ml Poly 250 ml Poly 40 ml VOA x3 x6 1000 ml Amber

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q/Vol.
1205		12.67	371	7.30	7.17	197.4		
1210		12.06	362	0.37	7.10	177.1		
1213		12.04	356	0.33	7.13	113.1		
1216		12.06	357	0.38	7.15	84.4		
1219		12.03	358	0.35	7.18	43.7		
1222		12.04	359	0.35	7.19	20.0		
1225		12.03	359	0.39	7.20	9.9	0.83	

Notes / Observations (color, odor, anomalies, etc):

Dup taken @ 1230
 304-061719-07

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

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Groundwater Sampling Data Sheet

spec panel

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

Sam Barber

Printed Name _____

Signature: _____

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Groundwater Sampling Data Sheet

Project #: 04219001.02

Site: LRI 304th

Well ID: MW-7

Sample ID: 304-0617 19-09

Date: 6/17/19

Weather: Cloudy

Filtered? ☒ N

Locked? ☒ Y

Water in Protector? ☒ Y

Sample Containers: 1000 ml Poly 500 ml Poly 500 ml HNO3 x2 500 ml H2SO4 x2 125 ml NaOH

Sampling Method: Dedicated

Meter: MP-20

CONTROL SETTINGS: Refill 10 Discharge 5 Pressure 40 Flow 300 ml/min

1.75" QED SamplePro Bail

1 ft water = 0.62L

One Well Volume (liters)

Total Volume Bailed (liters)

Peristaltic Grab

1L = 0.26 gallons

Other

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1322		10.42	385	1.04	7.42	180.1		
1327		10.39	379	0.56	7.11	60.8		
1330		10.31	376	1.07	7.16	25.5		
1333		10.33	377	1.08	7.18	5.9		
1336		10.33	378	1.07	7.19	-3.7		
1339		10.31	379	0.92	7.21	-11.2		
1342		10.31	379	0.82	7.22	-18.9	0.0	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

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Groundwater Sampling Data Sheet

Project #: 04219001.02

Site: LRI 304th

Well ID: LDCS-4A

Sample ID: 304-061719-10

Date: 6/17/19

Weather: Cloudy

Filtered? ☒ Y ☐ N

Locked? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml HNO3 x2 125 ml NaOH

Water in Protector? ☒ Y ☐ N

500 ml H2SO4 x2

125 ml NaOH

Sampling Method: DTW TOS Intake BOS Total Depth

Meter: MP-20

CONTROL SETTINGS: Refill 11.5 Discharge 3.5 Pressure 3.5 Flow 250 mL/min

Dedicated: 1.75" QED SamplePro Bail

Peristaltic Grab Other

1L = 0.26 gallons

One Well Volume (liters)

Total Volume Bailed (liters)

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1335		20.2	792	5.54	6.50	-451.2*		
1340		23.1	908	1.59	6.34	-452.9*		
1343		23.9	942	1.11	6.35			
1346		24.4	954	0.83	6.36			
1349		24.6	953	0.62	6.37			
1352		24.8	951	0.53	6.37			
1355		25.2	938	0.46	6.36			

Stabilization Parameters: pH/DO ± 0.2, SpC ± 10%, Temp ± 0.5°C, Turb. ± 10% or ≤ 5

SAMPLER:

Sam Bisher

Printed Name

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@ 1520

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Groundwater Sampling Data Sheet

Project #: 04219001.02
 Site: LRI 304th
 Well ID: MW-10
 Sample ID: 304-061719-11
 Date: 6/17/19
 Weather: Sunny
 Filtered? ☒ N
 Locked? ☒ Y
 Sample Containers: 1000 ml Poly 500 ml HNO3 x2 500 ml H2SO4 x2 125 ml NaOH
 Water in Protector? ☒ Y
 500 ml Poly 40 ml VOA x3 x6 125 ml Poly 1000 ml Amber
 Sampling Method: Meter: MP-20 (YSI)
 DTW 21.41
 TOS
 Intake
 BOS
 Total Depth
 Damage? ☒ Y
 CONTROL SETTINGS: 1.75" QED SamplePro Bail 1 ft water = 0.62L 1L = 0.26 gallons
 One Well Volume (liters) 9
 Discharge 6
 Pressure 35
 Flow 300 mL/min
 Total Volume Bailed (liters)
 Other:
 Flow
 Setting:

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp	Sp Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1425		11.43	271	6.48	7.67	175.2		
1430		10.87	273	3.21	6.80	187.3		
1433		10.86	272	2.90	6.80	189.6		
1436		10.89	270	2.43	6.85	188.0		
1439		10.75	270	2.09	6.82	186.1		
1442		10.73	267	1.92	6.91	185.2		
1445		10.76	258	1.78	6.98	184.1	0.21	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

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Groundwater Sampling Data Sheet

Project #:	04219001.02				
Site	LRI 304th				
Well ID:	L005-4B				
Sample ID:	304-0617 19-12				
Date:	6/17/19				
Weather:	sunny				
					
Sampling Method :					
DTW	_____				
TOS	_____				
Intake	_____				
BOS	_____				
Total Depth	_____				
Meter:	MP-20				
	XSI				
CONTROL SETTINGS:					
Refill	11.5				
Discharge	3.5				
Pressure	40				
Flow	250 mL/min				
Dedicated	1.75" QED SamplePro	Bail	Peristaltic	Grab	Other
		1 ft water = 0.62L	1L = 0.26 gallons		
		One Well Volume (liters)		Other :	
		Total Volume Bailed (liters)		Flow Setting :	

Filtered? ☒ Y ☐ N	Locked? ☐ Y ☒ N	Water in Protector? ☐ Y ☒ N	Damage? ☐ Y ☒ N
Sample Containers:			
	1000 ml Poly	500 ml Poly	250 ml Poly
	500 ml HNO3	x2	40 ml VOA
	125 ml NaOH	x2	x3
			1000 ml Amber

TIME	DTW	Temp.	Sp Cond.	DO	pH	Ek	Turbidity	Q/Vel.
1422		Turned pump on.						
1423		Water to surface						
1428		20.8	969	3.80	6.36	-453.8		
1433		22.4	985	1.01	6.40	-454.8		
1436		23.7	1026	0.71	6.43	-454.8		
1439		24.9	1090	0.58	6.47	-454.8		
1442		25.4	1095	0.48	6.48	-454.8		
1445		25.5	1095	0.44	6.47	-454.8	2.22	1040

Notes / Observations (color, odor, anomalies, etc):

6DCRS level = 3 when pump was turned on.

foods and vegetables

25.73 C°
1010 spc
4.47 D.O
~~6.93~~ 6.93 pH
7 = 6 ORP

WDCRS level = 1.0

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

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Groundwater Sampling Data Sheet

Project #: 04219001.02
 Site: LRI 304th
 Well ID: MW-1
 Sample ID: 304-0618-13
 Date: 6/18/19
 Weather: Cloudy

Sampling Method: DTW
 Meter: MP-20
 YSI

CONTROL SETTINGS:
 Refill: 8
 Discharge: 7
 Pressure: 25
 Flow: 300 ml/min

1.75" QED SamplePro
 Bail: 1 ft water = 0.62L
 One Well Volume (liters):
 Total Volume Bailed (liters):

Peristaltic
 Grab
 Other

1L = 0.26 gallons

Filtered? ☒ N
 Sample Containers:
 1000 ml Poly
 500 ml HNO3 x2
 125 ml NaOH

Water in Protector? ☒ Y
 500 ml Poly
 500 ml H2SO4 x2
 125 ml Poly

Damage? ☒ Y
 125 ml Poly
 1000 ml Amber

TIME	DTW	Temp.	Sp Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1102		15.69	187	8.32	5.61	301.9		
1107		13.54	99	1.49	5.85	302.0		
1110		13.47	123	1.24	5.98	298.6		
1113		13.44	145	1.11	6.09	292.0		
1116		13.44	155	0.96	6.33	234.2		
1119		13.42	167	0.84	6.51	140.5		
1122		13.40	173	0.75	6.63	86.0	0.0	

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER: Travis Berndahl

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Groundwater Sampling Data Sheet

Project #: 04219001.02
 Site: LRI 304th
 Well ID: 400-4
 Sample ID: 304-0618 19-14
 Date: 6/18/19
 Weather: cloudy
 Filtered? ☒ N
 Locked? ☒ N
 Sample Containers: 1000 ml Poly 500 ml HNO3 x2 500 ml H2SO4 x2 125 ml NaOH
 Water in Protector? ☒ N
 500 ml Poly 250 ml Poly 40 ml VOA x3 x6 1000 ml Amber 125 ml NaOH
 Sampling Method: DTW
 Meter: MP-20
 CONTROL SETTINGS: Refill Discharge Pressure Flow
 175" QED SamplePro Bail
 1 ft water = 0.62L
 One Well Volume (liters)
 Total Volume Bailed (liters)
 Peristaltic Grab
 Other
 1L = 0.26 gallons

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1145		18.3	299	8.30	6.71	-461.0	*73.7	
1207		18.3	297	0.86	7.41	-462.2	11.5	
1222		18.3	297	0.62	7.45	-463.3	6.31	
1227		18.4	297	0.56	7.46	-463.3*		
1230		18.3	297	0.54	7.47	↓		
1233		18.3	297	0.53	7.47	-463.8*		
1236		18.3	297	0.51	7.48	↓		
1239		18.3	297	0.49	7.48	↓		
1242		18.3	297	0.48	7.49	↓	5.79	

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2, SpC ± 10%, Temp ± 0.5°C, Turb. ± 10% or ≤ 5

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 Printed Name

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Groundwater Sampling Data Sheet

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb $\pm 10\%$ or ≤ 5

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Groundwater Sampling Data Sheet

Project #:	04219001.02	
Site	LRI 304th	
Well ID:	Field blank	
Sample ID:	304-0613 19-16	
Date:	6/18/19	
Weather:	cloudy	
Filtered?	Y (N)	
Sample Containers:	1000 ml Poly 500 ml HNO3 x2 500 ml H2SO4 x2 125 ml NaOH	



Sampling Method :		Dedicated	1.75" QED SamplePro	Bail	Peristaltic	Grab	Other
DTW	Meter:						
TOS	MP-20						
Intake	YSI						
BOS							
Total Depth							

CONTROL SETTINGS:	
Refill	One Well Volume (liters)
Discharge	
Pressure	
Flow	

Notes / Observations (color, odor, anomalies, etc):	

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1215		22.99	4	5.99	7.17	145.8	0.72	

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Printed Name

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Groundwater Sampling Data Sheet

Project #: 04219001.02 Site: L21 South

Well ID: LDGS-5 Sample ID: 304-061319-17

Date: 6/13/19 Weather: cloudy

Filtered? ☒ Y ☐ N Locked? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml Poly 500 ml HNO3 x2 125 ml NaOH

Water in Protector? ☒ Y ☐ N 250 ml Poly 40 ml VOA x3 x6 125 ml Poly 1000 ml Amber

Sampling Method: Dedicated Meter: MP-20 YSI

CONTROL SETTINGS: Refill 11.5 Discharge 3.5 Pressure 40 Flow 100 mL/min

1.75" QED SamplePro Bail 1 ft water = 0.62L One Well Volume (liters) Total Volume Bailed (liters)

Peristaltic Grab Other

Notes / Observations (color, odor, anomalies, etc):

LDGS level at 6.7 when pump turned on. Water right away.

* Discontinuity from YSI

Grab sample from pump Spigot 6/19/19 @ 1315

20.16 °C
132.8 °F
1.15 D.O.
6.45 pH
12.7 ORP

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1344	Turned pump on							
1345	24.51	776	1.98	6.57	200.7			
1350	26.61	824	0.77	6.59	18.1			
1353	26.82	837	0.52	6.57	-12.5			
1356	26.98	831	0.43	6.55	-22.4			
1359	26.84	849	0.37	6.33	-33.3			
1402	26.80	865	0.35	6.57	-40.7			
1405	26.66	1109	0.32	6.71	-46.9			
1408	26.52	1307	0.28	6.82	-45.5			
1411	26.44	1328	0.26	6.83	-41.2			
1414	26.28	1332	0.25	6.83	-36.9			
1417	26.28	1329	0.25	6.84	-34.5	7.19	98.9 *	

Stabilization Parameters: pH/DO ± 0.2, SpC ± 10%, Temp ± 0.5°C, Turb. ± 10% or ≤ 5

SAMPLER:

Sam Graber

Printed Name

Signature

[Signature]

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Groundwater Sampling Data Sheet

Project #: 04219001.02

Site: CRS 304th

Well ID: NW-2

Sample ID: 304-061919-18

Date: 6/19/19

Weather: cloudy

Filtered? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml Poly 500 ml HNO3 500 ml H2SO4 125 ml NaOH

Locked? ☒ Y ☐ N

Water in Protector? ☒ Y ☐ N

250 ml Poly 40 ml VOA 125 ml Poly 1000 ml Amber

Sampling Method: DTW TOS Intake BOS Total Depth

Meter: MP-20 YSI

CONTROL SETTINGS: 1.75" QED SamplePro 1L = 0.26 gallons

Peristaltic Grab Other

One Well Volume (liters) 30 300 mL/min

Total Volume Bailed (liters) 30

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
920		13.44	245	2.30	5.51	273.4		
925		13.42	245	1.10	5.97	245.3		
928		13.09	246	0.48	6.29	156.9		
931		13.03	246	0.42	6.45	110.6		
934		13.00	246	0.36	6.58	52.8		
937		12.97	245	0.32	6.65	26.5		
940		12.94	243	0.31	6.69	5.3	0.82	

Notes / Observations (color, odor, anomalies, etc):

* Ono collected after pump run for 5 minutes

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Jim Graber

Printed Name

Signature

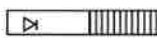
[Signature]

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Groundwater Sampling Data Sheet

Project #:	0220888888 D4219001.02	
Site	CSWF (Island Co.) LPI 304th	
Well ID:	4W-9	
Sample ID:	0448 304-061919-19	
Date:	4/19/2019	
Weather:	cloudy	
Filtered?	Y N	
Sample Containers:	1000 ml Poly 500 ml HNO3 125 ml NaOH	

	10.08 DTW TOS Intake BOS Total Depth	Sampling Method : Meter: MP-20 YS	Dedicated CONTROL SETTINGS: Refill Discharge Pressure Flow	1.75" QED SamplePro Bail 1 L = 0.26 gallons One Well Volume (liters) Total Volume Bailed (liters)	Peristaltic Grab Other : Flow Setting :	Other
---	---	--	---	---	--	-------

Water in Protector? Y N 500 ml Poly 500 ml H2SO4 125 ml NaOH	Damage? Y N 125 ml Poly 1000 ml Amber	Notes / Observations (color, odor, anomalies, etc): Crack in air connection piece.
---	---	---

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1030		10.36	139	5.22	6.52	232.1		
1035		10.34	136	4.19	6.40	225.1		
1050		10.32	136	4.05	6.44	223.6		
1101		10.30	136	3.96	6.49	221.3		
1104		10.29	136	3.38	6.51	220.4		
1107		10.54	136	3.80	6.53	217.7		
1110		10.49	137	3.84	6.42	215.3	1.89	

Notes / Observations (color, odor, anomalies, etc):

Watch in air connection piece.

1/2 piece diameter of
screw 0.716 inch
(on top)

Female screw under cap $1/2$ inch O.D.

used tape on outside of pipe
to try and fix

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb $\pm 10\%$ or ≤ 5

SAMPLER:

Printed Name _____

Signature _____

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Groundwater Sampling Data Sheet

Project #: 0420700011 04219001.02

Site: Island ~~SEA~~ ~~Landfill~~ LRI 301th

Well ID: LDCS-6

Sample ID: 304-061919-20

Date: 10/12/2018 6/19/19

Weather: cloudy

Filtered? ☒ N

Sample Containers: 1000 ml Poly 500 ml HNO3 x2 500 ml NaOH

Locked? ☒ N

Water in Protector? ☒ Y

Water in Poly 500 ml Poly 250 ml Poly 125 ml Poly 1000 ml Amber

DTW TOS Intake BOS Total Depth

Damage? ☒ Y

125 ml NaOH

CONTROL SETTINGS: Refill 16.5 Discharge 3.5 Pressure 40 Flow 100 mL/min

1.75" QED SamplePro Bail 1 ft water = 0.62L One Well Volume (liters) Total Volume Bailed (liters)

Dedicated Meter: MP-20 (YSI)

1L = 0.24 gallons

TIME	DTW	Temp.	Sp.Cond.	DO	pH	Eh	Turbidity	SPC
1225		19.38	1024	6.71	7.43	225.2		
1230		19.72	1034	5.27	7.63	228.3		
1239		19.73	1036	5.06	7.64	270.9		
1236		19.73	1036	4.96	7.66	232.4		
1251		20.03	1039	2.92	6.98	243.4		
1254		20.13	1038	2.77	6.96	243.9		
1257		20.27	1038	2.66	6.98	243.7		
1300		20.70	1037	2.52	6.98	242.7	6.31	1243

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Sam Gruber

Printed Name

Signature

[Signature]

Notes / Observations (color, odor, anomalies, etc):

LDCRS level at 20.0, water right away.

Readings taken from pump spigot. @ 1310

22.22 C°
110.9 SPC
1.73 DO
6.31 PH
217.4 ORP

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: D4219001.02

Site: LRIS 301th

Well ID: LDLRS-5

Sample ID: 301-07219-01

Date: 7/12/19

Weather: cloudy

Filtered? ☒ N

Locked? ☒ N

Water in Protector? ☒ N

Sample Containers:

1000 ml Poly	500 ml Poly	500 ml H2SO4	x2	125 ml NaOH

Sampling Method: DTW

Meter: MP-20

CONTROL SETTINGS:

Refill	11.5
Discharge	3.5
Pressure	4.0
Flow	75 mL/min

1.75" QED SamplePro

Bail

1 ft water = 0.62L

One Well Volume (liters)

Total Volume Bailed (liters)

Peristaltic

Grab

Other

Notes / Observations (color, odor, anomalies, etc):

sample appearance - off white.

No odor

LDLRS had ~~to~~ upon turning pump on 6.5.

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1020		Started						
1045		25.75	1422	1.95	6.63	-28.7		
1048		25.98	1437	1.03	6.71	-68.9		
1051		25.98	1431	0.69	6.70	-68.7		
1054		25.83	1423	0.53	6.69	-69.6		
1057		25.95	1433	0.43	6.63	-72.9		
1100		26.02	1437	0.36	6.67	-74.0		
1103		26.16	1438	0.23	6.63	-80.7		
1106		28.27	1389	0.26	6.63	-84.3	1.45	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Sam Gaber

Printed Name

Signature

[Signature]

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	6/17/19				
Time	045				
Weather (sky or precip, temp)	025645+				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	100% or ~8.5 1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1351	3.93			
Post Cal Reading	1413	4.01	7.00	0.50 0.95, 4, 10, 30, 0.11	
Descrrepancy	No				
Calib. Successful?	Yes				
Calibration by	SJB				
Instrument Type, ID	MP20	/	YSI 550 (Turbid)	MicoTPW / HACH2000	
Calibration Location	304m				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	6/17/19				
Time	845				
Weather (sky or precip, temp)	overcast				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	100% or ~8.5 1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1444	3.86			
Post Cal Reading	1413	4.00	7.00	8.5 177, 98.7, 20.1, 0.2	
Discrepancy	No				
Calib. Successful?	yes				
Calibration by	SFB				
Instrument Type, ID	MP20 / YSI 556		MicoTPW / HACH2000		
Calibration Location	304th				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	6/18/14				
Time	1007				
Weather (sky or precip, temp)	Cloudy				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1536	4.16	7.17	98.1%	
Post Cal Reading	1413	4.01	7.00	100% 782, 99.3, 20.8, 0.21	
Discrepancy	No				
Calib. Successful?	Yes				
Calibration by	TAB				
Instrument Type, ID	MP20 / SI 556	fent 41			MicoTPW / HACH2000
Calibration Location	304th				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	6/18/19				
Time	1007				
Weather (sky or precip, temp)	cloudy				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	100% or ~8.5 1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1475	4.06	6.92	8.89	
Post Cal Reading	1413	4.01	7.00	8.50 1100, 12.03, 0.0	
Discrepancy	NO				
Calib. Successful?	Yes				
Calibration by	TAB				
Instrument Type, ID	MP20 / YSI 556		MicoTPW / HACH2000		
Calibration Location	304th				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Date	6/19/19	Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Time	900						
Weather (sky or precip, temp)	cloudy						
Type of Calibration	Standard	Standard	Standard	Standard	Standard	Standard	
Standard Value	1413	4.00	7.00	100% or ~8.5	1000, 10, 0.2 800, 100, 20, <0.1		
Pre-Cal Reading	1350	4.44	6.70	9.01			
Post Cal Reading	1413	4.00	7.00	9.50	760, 99.1, 21.6, 0.44		
Discrepancy	No						
Calib. Successful?	Yes						
Calibration by	SLB						
Instrument Type, ID	MP20 / YSI 556	MicoTPW / HACH2000					
Calibration Location	LPF 704th						

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	7/12/19				
Time	1015				
Weather (sky or precip, temp)	cloudy				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	100% or ~8.5 1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	14130	4.03	7.00		
Post Cal Reading	1413	4.01	7.00	800, 100, 20, 0.1	
Discrepancy	No				
Calib. Successful?	yes				
Calibration by	Seb				
Instrument Type, ID	MP20 / YSI 556		MicoTPW / HACH2000		
Calibration Location	LRI 304th				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)



Appendix D

Statistical Calculations



Groundwater Prediction Limits (mg/L)
Appendix I Parameters, Second Quarter 2019
LRI Landfill, Pierce County, Washington

	MRL (typical)	Prediction Limit	MW-1/ MW-1A	MW-2/ MW-2A	MW-3	MW-4	MW-5/ MW-5A	MW-6	MW-7	MW-9	MW-10
Antimony	0.050	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L
Arsenic	0.005	0.011	0.005 L	0.005 L	0.005 L	0.011	0.008	0.008	0.006	0.005 L	0.005 L
Barium	0.005	0.091	0.030	0.018	0.015	0.091	0.036	0.014	0.016	0.0057	0.016
Beryllium	0.005	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.001 L	0.005 L	0.001 L	0.005 L
Cadmium	0.005	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L
Chromium	0.005	0.011	0.005 L	0.005 L	0.005 L	0.011	0.005	0.005 L	0.005 L	0.005 L	0.005 L
Cobalt	0.010	0.010 L	0.010 L	0.010 L	0.010 L	0.004	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L
Copper	0.010	0.063	0.010 L	0.010 L	0.010 L	0.063	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L
Lead	0.002	0.042	0.002 L	0.002 L	0.002 L	0.042	0.002 L	0.002 L	0.002 L	0.002 L	0.002 L
Nickel	0.020	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L
Selenium	0.005	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L
Silver	0.010	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L
Thallium	0.005	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L
Vanadium	0.010	0.016	0.010 L	0.010 L	0.010 L	0.014	0.010 L	0.010 L	0.010 L	0.016	0.010 L
Zinc	0.01	0.290	0.032	0.010 L	0.010 L	0.290	0.010	0.010 L	0.010 L	0.043	0.011
Nitrate as Nitrogen	0.50	6.40	0.500 L	0.500 L	0.500 L	0.500 L	0.500 L	0.500 L	0.500 L	0.500 L	6.40

Notes:

Prediction Limits are shown in bold.

Prediction Limits for metals are for total metals.

L = not reported at or above the MRL (Method Reporting Limit).

mg/L = milligrams per liter.

Statistical Summary of Total Metals Groundwater Data
Appendix I Parameters, Second Quarter 2019
LRI Landfill, Pierce County, Washington

Location ID	Antimony (Sb)		Arsenic (As)		Barium (Ba)		Beryllium (Be)		Cadmium (Cd)		Chromium (Cr)		Cobalt (Co)		Copper (Cu)		Lead (Pb)		Nickel (Ni)		Selenium (Se)		Silver (Ag)		Thallium (Tl)		Vanadium (V)		Zinc (Zn)		Nitrate (NO ₃)			
Monitoring Date	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.		
MW-1																																		
3/24/2014	0.002	L 0.001	0.005	L 0.0025	0.022	0.022	0.001	L 0.0005	0.005	L 0.0025	0.002	L 0.001	0.01	L 0.005	0.002	L 0.001	0.001	L 0.0005	0.002	L 0.001	0.005	L 0.0025	0.01	L 0.005	0.001	L 0.0005	0.01	L 0.005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25
6/24/2014	0.002	L 0.001	0.005	L 0.0025	0.02	0.02	0.001	L 0.0005	0.005	L 0.0025	0.002	L 0.001	0.01	L 0.005	0.002	L 0.001	0.001	L 0.0005	0.002	L 0.001	0.005	L 0.0025	0.01	L 0.005	0.001	L 0.0005	0.01	L 0.005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25
9/17/2014	0.05	L 0.025	0.005	L 0.0025	0.024	0.024	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.01	L 0.005	0.005	L 0.0025	0.01	L 0.005	0.02	0.02	0.5	L 0.25		
12/16/2014	0.05	L 0.025	0.005	L 0.0025	0.03	0.03	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.032	0.032	0.5	L 0.25		
3/23/2015	0.05	L 0.025	0.005	L 0.0025	0.02	0.02	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
6/8/2015	0.05	L 0.025	0.005	L 0.0025	0.022	0.022	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
9/16/2015	0.05	L 0.025	0.005	L 0.0025	0.021	0.021	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
12/14/2015	0.05	L 0.025	0.005	L 0.0025	0.024	0.024	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
Number Analyzed	8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		8			
Number Detected	0		0		8		0		0		0		0		0		0		0		0		0		0		0		2		0			
Minimum Concentration		0.001		0.0025		0.02		0.0005		0.0005		0.001		0.0005		0.001		0.0005		0.001		0.0025		0.0025		0.0005		0.0025		0.005		0.25		
Maximum Concentration		0.025		0.0025		0.03		0.0025		0.0025		0.0025		0.005		0.005		0.001		0.01		0.0025		0.005		0.0025		0.005		0.032		0.25		
Average Concentration		NC		NC		0.02288		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
Variance		NC		NC		1.1E-05		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
Standard Deviation		NC		NC		0.0033		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
oefficient of Variation (%)		NC		NC		14.2974		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
Standard Error		NC		NC		0.00116		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
MW-2																																		
3/24/2014	0.002	L 0.001	0.005	L 0.0025	0.014	0.014	0.001	L 0.0005	0.005	L 0.0025	0.002	L 0.001	0.01	L 0.005	0.002	L 0.001	0.001	L 0.0005	0.002	L 0.001	0.005	L 0.0025	0.01	L 0.005	0.001	L 0.0005	0.01	L 0.005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25
6/26/2014	0.002	L 0.001	0.005	L 0.0025	0.015	0.015	0.001	L 0.0005	0.005	L 0.0025	0.002	L 0.001	0.01	L 0.005	0.002	L 0.001	0.001	L 0.0005	0.002	L 0.001	0.005	L 0.0025	0.01	L 0.005	0.001	L 0.0005	0.01	L 0.005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25
9/16/2014	0.05	L 0.025	0.005	L 0.0025	0.018	0.018	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.01	L 0.005	0.005	L 0.0025	0.01	L 0.005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25
12/16/2014	0.05	L 0.025	0.005	L 0.0025	0.014	0.014	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
3/23/2015	0.05	L 0.025	0.005	L 0.0025	0.012	0.012	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
6/8/2015	0.05	L 0.025	0.005	L 0.0025	0.013	0.013	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
9/16/2015	0.05	L 0.025	0.005	L 0.0025	0.013	0.013	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
12/14/2015	0.05	L 0.025	0.005	L 0.0025	0.014	0.014	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
Number Analyzed	8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		8			
Number Detected	0		0		8		0		0		0		0		0		0		0		0		0		0		0		0		0			
Minimum Concentration		0.001		0.0025		0.012		0.0005		0.0005		0.001		0.0005		0.001		0.0005		0.001		0.0025		0.0025		0.0005		0.0025		0.005		0.25		
Maximum Concentration		0.025		0.0025		0.018		0.0025		0.0025		0.0025		0.005		0.005		0.001		0.01		0.0025		0.005		0.0025		0.005		0.005		0.25		
Average Concentration		NC		NC		0.01413		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC				

Statistical Summary of Total Metals Groundwater Data
Appendix I Parameters, Second Quarter 2019
LRI Landfill, Pierce County, Washington

Location ID	Antimony (Sb)			Arsenic (As)		Barium (Ba)		Beryllium (Be)		Cadmium (Cd)		Chromium (Cr)		Cobalt (Co)		Copper (Cu)		Lead (Pb)		Nickel (Ni)		Selenium (Se)		Silver (Ag)		Thallium (Tl)		Vanadium (V)		Zinc (Zn)		Nitrate (NO ₃)										
Monitoring Date	Result	Conc.		Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.									
MW-4																																										
3/24/2014	0.002	L	0.001	0.0074	0.0074	0.012	0.012	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.5	L	0.25					
6/25/2014	0.002	L	0.001	0.0086	0.0086	0.012	0.012	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.5	L	0.25					
9/17/2014	0.05	L	0.025	0.0099	0.0099	0.013	0.013	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25					
12/16/2014	0.05	L	0.025	0.0076	0.0076	0.011	0.011	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25		
3/24/2015	0.05	L	0.025	0.0079	0.0079	0.013	0.013	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25		
6/9/2015	0.05	L	0.025	0.0094	0.0094	0.013	0.013	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25		
9/18/2015	0.05	L	0.025	0.0094	0.0094	0.017	0.017	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.5	L	0.25			
12/15/2015	0.05	L	0.025	0.011	0.011	0.091	0.091	0.001	L	0.0005	0.001	L	0.0005	0.011	0.011	0.0039	0.0039	0.063	0.063	0.042	0.042	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.29	0.29	0.5	L	0.25		
Number Analyzed	8			8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		
Number Detected	0			8		8		0		0		0		1		1		1		1		0		0		0		0		1		2		0		0		0		0		
Minimum Concentration		0.001			0.0074		0.011		0.0005		0.0005		0.001		0.0005		0.001		0.0005		0.001		0.0025		0.0025		0.0005		0.0025		0.005		0.25		0.25		0.25		0.25			
Maximum Concentration		0.025			0.011		0.091		0.0025		0.0025		0.011		0.005		0.063		0.042		0.01		0.0025		0.005		0.0025		0.014		0.29		0.25		0.25		0.25		0.25			
Average Concentration		NC			0.0089		0.02275		NC		NC		NC		NC		NC		NC		NC		0.0025		0.005		0.0025		0.014		NC		NC		NC		NC		NC		NC	
Variance		NC			1.6E-06		0.00076		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
Standard Deviation		NC			0.00125		0.02763		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
oefficient of Variation (%)		NC			14.0465		121.469		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
Standard Error		NC			0.00044		0.00977		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC	
MW-5																																										
3/24/2014	0.002	L	0.001	0.0072	0.0072	0.032	0.032	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.5	L	0.25					
6/25/2014	0.002	L	0.001	0.0067	0.0067	0.033	0.033	0.001	L	0.0005	0.005	L	0.0025	0.0036	0.0036	0.0061	0.0061	0.001	L	0.0005	0.0043	0.0043	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.5	L	0.25					
9/16/2014	0.05	L	0.025	0.0059	0.0059	0.036	0.036	0.005	L	0.0025	0.005	L	0.0025	0.0051	0.0051	0.01	L	0.005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
12/16/2014	0.05	L	0.025	0.0055	0.0055	0.022	0.022	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25		
3/23/2015	0.05	L	0.025	0.008	0.008	0.03	0.03	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25		
6/8/2015	0.05	L	0.025	0.0075	0.0075	0.02	0.02	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25		
9/18/2015	0.05	L	0.025	0.005	L	0.0025	0.014	0.014	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L																							

**Statistical Summary of Total Metals Groundwater Data
Appendix I Parameters, Second Quarter 2019
LRI Landfill, Pierce County, Washington**

Location ID	Antimony (Sb)			Arsenic (As)			Barium (Ba)			Beryllium (Be)			Cadmium (Cd)			Chromium (Cr)			Cobalt (Co)			Copper (Cu)			Lead (Pb)			Nickel (Ni)			Selenium (Se)			Silver (Ag)			Thallium (Tl)			Vanadium (V)			Zinc (Zn)			Nitrate (NO ₃)				
Monitoring Date	Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.									
MW-9	3/25/2014	0.002	L	0.001	0.005	L	0.0025	0.0047	0.0047	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.016	0.016	0.01	0.01	0.5	L	0.25				
	6/24/2014	0.002	L	0.001	0.005	L	0.0025	0.0045	0.0045	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.016	0.016	0.01	L	0.005	0.5	L	0.25			
	9/18/2014	0.002	L	0.001	0.005	L	0.0025	0.0057	0.0057	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.014	0.014	0.014	0.014	0.5	L	0.25				
	12/17/2014	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25		
	3/24/2015	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.013	0.013	0.01	L	0.005	0.5	L	0.25		
	6/9/2015	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25		
	9/18/2015	0.05	L	0.025	0.005	L	0.0025	0.005	0.005	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25			
	12/16/2015	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.042	0.042	0.5	L	0.25			
	3/22/2016	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.028	0.028	0.5	L	0.25			
	6/8/2016	0.05	L	0.025	0.005	L	0.0025	0.005	0.005	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.023	0.023	0.5	L	0.25				
	9/16/2016	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.015	0.015	0.043	0.043	0.5	L	0.25			
	12/6/2016	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25		
	3/29/2017	0.05	L	0.025	0.005	L	0.0025	0.0056	0.0056	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25			
	6/22/2017	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25		
	9/26/2017	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.012	0.012	0.01	L	0.005	0.5	L	0.25		
	12/13/2017	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.013	0.013	0.01	L	0.005	0.5	L	0.25		
	3/21/2018	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.016	0.016	0.01	L	0.005	0.5	L	0.25		
	6/19/2018	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.013	0.013	0.01	L	0.005	0.5	L	0.25		
	9/19/2018	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.013	0.013	0.01	L	0.005	0.5	L	0.25		
	12/4/2018	0.05	L	0.025	0.005	L	0.0025	0.0051	0.0051	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25
	3/11/2019	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25		
	6/19/2019	0.05	L	0.025	0.005	L	0.0025	0.0051	0.0051	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.013	0.013	0.01	L	0.005	0.5	L	0.25
Number Analyzed	22				22			22				22			22			22			22			22			22			22			22			22			22			22			22					
Number Detected	0				0			8				0			0			0			0			0			0			0			0			0			22			6			0					
Minimum Concentration		0.001				0.0025			0.0025		0.0005			0.0005			0.0005		0.0005		0.001			0.0005			0.0005		0.001			0.0025		0.0025		0.0005			0.012		0.005			0.25						
Maximum Concentration		0.025				0.0025			0.0057		0.0005			0.0025		0.0025	0.0005		0.005		0.005		0.005		0.001		0.0025		0.01			0.0025		0.005		0.0005			0.016		0.043			0.25						
Average Concentration		NC				NC			NC		NC			NC		NC	NC		NC		NC		NC		NC		NC		NC			NC		NC		NC			NC			NC			NC					
Variance		NC				NC			NC		NC			NC		NC	NC		NC		NC		NC		NC		NC		NC			NC		NC		NC			1E-06		NC			NC						
Standard Deviation		NC				NC			NC		NC			NC		NC	NC		NC		NC		NC		NC		NC		NC			NC		NC		NC			NC			NC			NC					
oefficient of Variation (%)		NC				NC			NC		NC			NC		NC	NC		NC		NC		NC		NC		NC		NC			NC		NC		NC			7.31095		NC			NC						
Standard Error		NC				NC			NC		NC			NC		NC	NC		NC		NC		NC		NC		NC		NC			NC		NC		NC			0.00022		NC			NC						
MW-10	3/25/2014	0.002	L	0.001	0.005	L	0.0025	0.014	0.014	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.01	L	0.005	6.4	6.4			
	6/25/2014																																																	

Notes: Metals results are for total metals.
mg/L = milligrams per liter.
L = not reported at or above the MRL (Method Reporting Limit).
One-half the MRL value used for statistical calculations when concentrations not reported at or above the MRL
NC = not calculated due to insufficient number of reported detections.

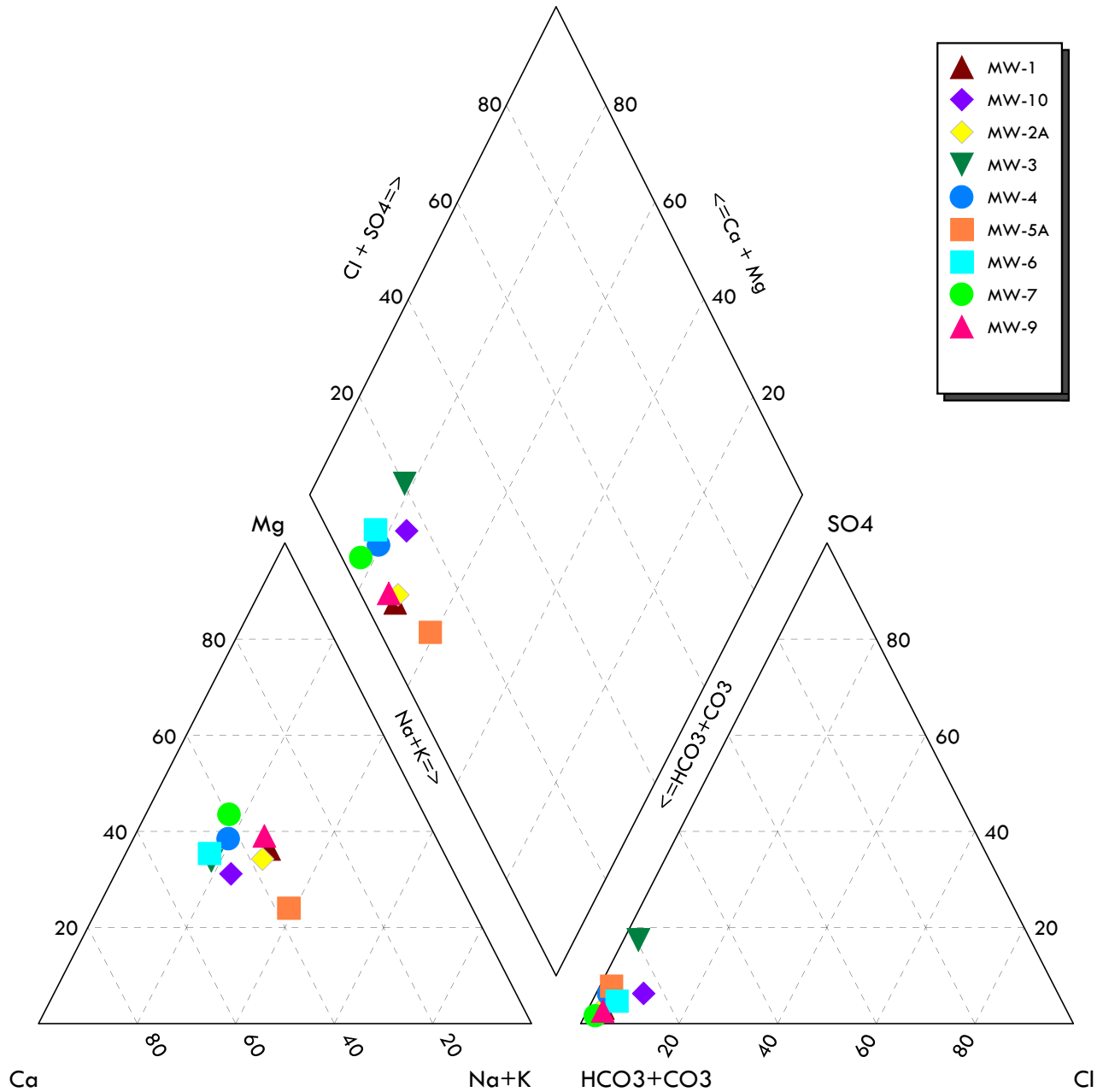


Appendix E

Trilinear Diagrams



Second Quarter 2019, Groundwater Monitoring Wells



DESCRIPTION: LRI LF 2Q19 Groundwater Piper Diagram

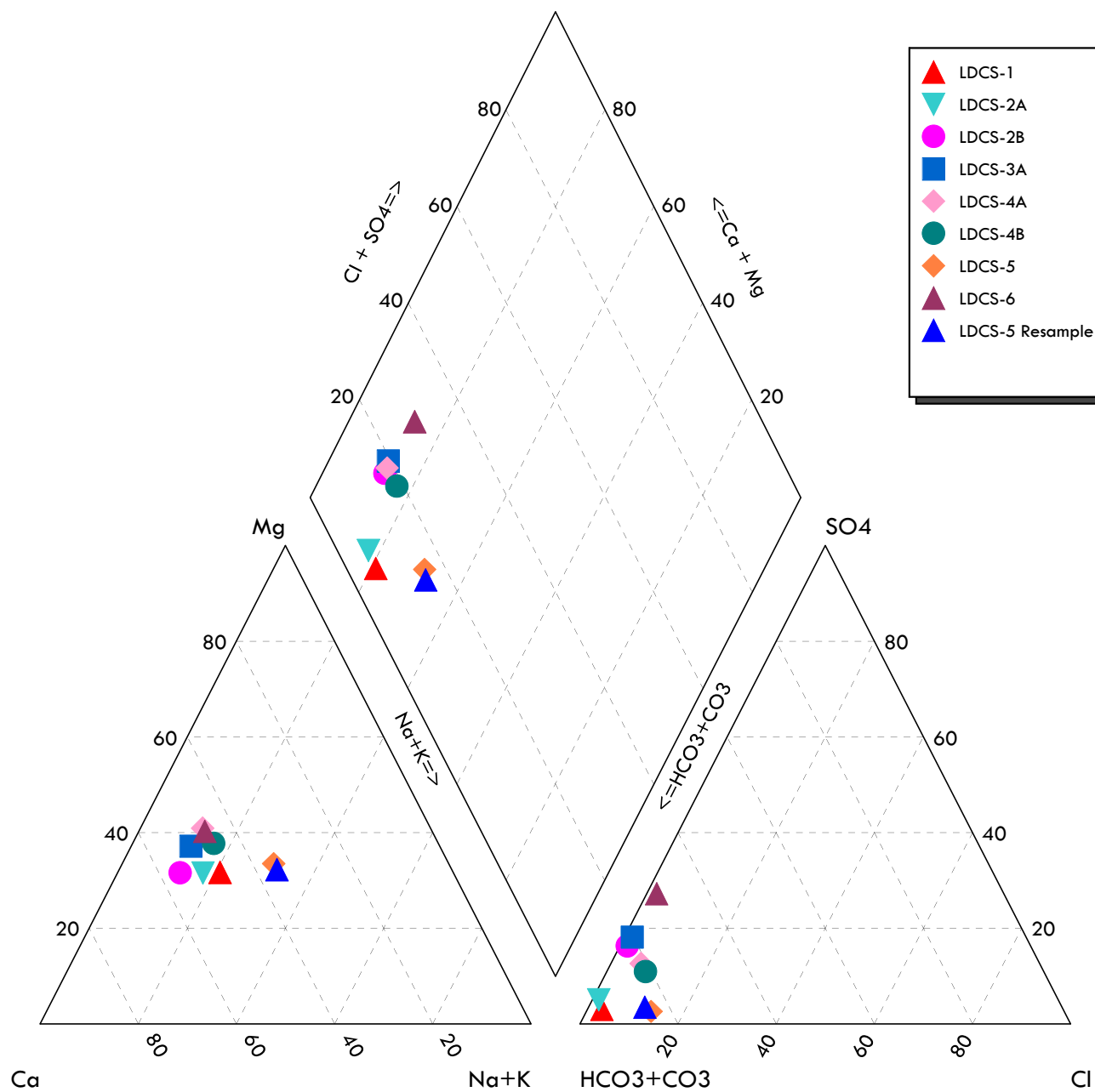
PROJECT: LRI Landfill

PROJECT NO: 04219001.02

CLIENT: LRI, Inc.

DATE: August 2019

Second Quarter 2019, Leak Detection Collection Recovery System



DESCRIPTION: LRI LF 2Q19 LDCRS Piper Diagram

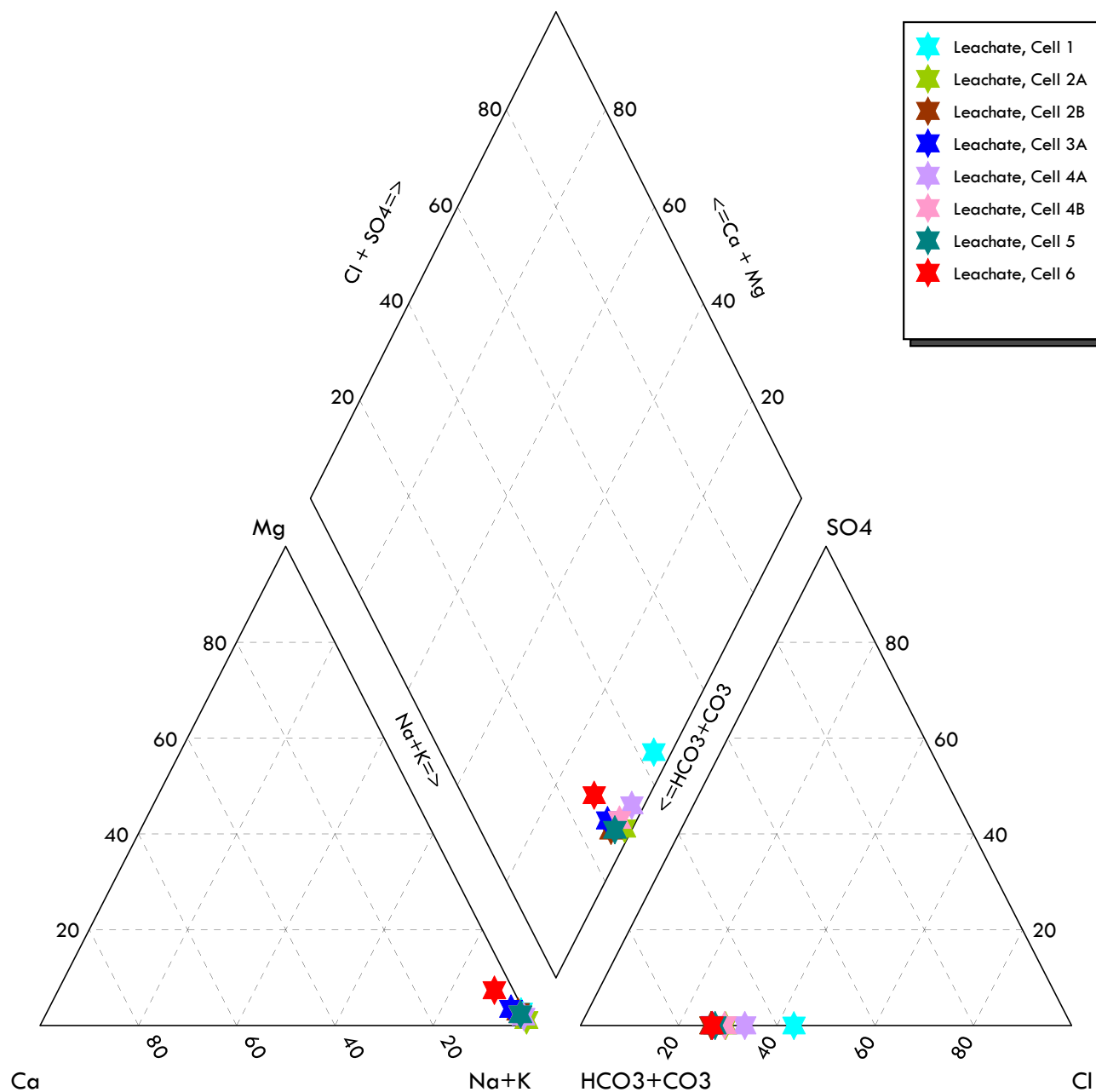
PROJECT: LRI Landfill

PROJECT NO: 04219001.02

CLIENT: LRI, Inc.

DATE: August 2019

LRI Landfill Fourth Quarter 2018, Leachate



DESCRIPTION: LRILF Leachate 4Q18 Piper Plot

PROJECT: LRI Landfill

PROJECT NO: 04219001.02

CLIENT: LRI, Inc.

DATE: March 2019



Appendix F

Analytical Data Validation Report



SECOND QTR. 2019 DATA VALIDATION REPORT – LRI LANDFILL

Project Details

Project No.	04219001.02	Site Name	LRI 304 th Street LF
Data Validator	Sam Graber	Data Level	Level 2
Date	8/14/2019	DV Tier	Tier 1
QA Document	LRI Landfill Groundwater Monitoring Plan, March 10, 2014		

Sample Login Summary

Sample Group	Sample Login Comments	Analytical Lab (Primary)
280-125287-1	No comments.	TestAmerica, Denver, CO
280-125289-1	Container in sample “-07” mislabeled. TA fixed on 6/19/19. No other comments.	TestAmerica, Denver, CO
280-125338-1	Due to a QC failure during TDS analysis, sample “-16” was reanalyzed outside holding time.	TestAmerica, Denver, CO
280-125340-1	No comments.	TestAmerica, Denver, CO
280-125342-1	Alkalinity and TOC reanalysis of sample “-15” performed outside holding time. Data is qualified.	TestAmerica, Denver, CO
280-125359-1	No comments.	TestAmerica, Denver, CO
280-125360-1	No comments.	TestAmerica, Denver, CO
280-126217-1	N comments.	TestAmerica, Denver, CO

Analytical Summary

Sample Group	Analyses					
	TDS/Alk/NO3	Metals	NH4/TOC	VOCs	Anions	TSS
280-125287-1	X	X ¹	X	X	X	--
280-125289-1	X	X ²	X	X	X	X
280-125338-1	X	X ²	X	X	X	X
280-125340-1	X	X ¹	X	X	X	--
280-125342-1	X	X ³	X	X	X	--
280-125359-1	X	X ¹	X	X	X	--
280-125360-1	X	X ²	X	X	X	X
280-126217-1	X	X ¹	X	X	X	--

Notes:

1. Dissolved metals analysis performed (field filtered)
2. Dissolved and Total metals analysis performed



3. Total Metals analysis performed

Laboratory Quality Assurance Samples

Lab QA Samples	Results	Comments
Method Blank	Acceptable.	Analyte(s) were detected in method blank at concentration above the method detection limit but below the reporting limit. Data have been qualified and reported (280-125338-1, 280-125342-1)
LCS/LCSD	Acceptable.	See case narrative (280-125287-1, 280-126217-1).
MS/MSD	Acceptable.	Some matrix interference and results that were below or above control limits. No corrective action necessary. See case narrative for more details (280-125287-1, 280-125289-1, 280-125338-1, 280-125340-1, 280-125342-1, 280-125359-1, 280-126217-1)
Duplicates	Acceptable.	See case narrative (280-125360-1, 280-125289-1, 280-125338-1).
Organics		See case narrative (280-125342-1).
General Comments	Acceptable.	See case narratives.
Metals	Acceptable.	See case narrative (280-125289-1)

Field Quality Assurance Samples

Field QA Samples	Sample Group	Analytes	Notes
QC-FB	280-125338-1	Chloroform (0.63 ug/L) Methylene chloride (11 ug/L) Trichloroethene (0.5 ug/L)	
QC-TB	280-125287-1	None.	
QC-TB	280-125289-1	None.	
QC-TB	280-125338-1	None.	
QC-TB	280-125340-1	None.	
QC-TB	280-125359-1	None.	
QC-TB	280-125360-1	None.	
QC-TB	280-126217-1	None.	

Lab Quality Flags

Flag	Sample Groups	Comments
B	280-125338-1, 280-125342-1	Compound was found in the blank and sample.
E		Result exceeded calibration range.
F1	280-125287-1, 280-125289-1, 280-125340-1,	MS and/or MSD recovery exceeds the control limits.

	280-125342-1, 280-125359-1, 280-126217-1	
F2	280-125289-1	MS/MSD RPD exceeds control limits.
F3		Duplicate RPD exceeds the control limit.
F5	280-125289-1, 280-125338-1	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times the RL. Data considered valid because the absolute difference is less than the RL.
H	280-125338-1, 280-125342-1	Sample was prepped or analyzed beyond specified holding time.
J	280-125287-1, 280-125289-1, 280-125338-1, 280-125340-1, 280-125342-1, 280-125359-1, 280-126217-1	Result is <RL, >MDL and concentration is approximate value.
X		Surrogate is outside control limits.
4	280-125287-1, 280-125289-1, 280-125338-1, 280-125340-1, 280-125342-1, 280-125359-1, 280-126217-1	MD, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration. Therefore, the control limits are not applicable.
^	280-125289-1, 280-125342-1	ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: instrument related QC is outside acceptance limits.
*	280-125287-1, 280-126217-1	LCS or LCSD is outside acceptance limits.

Duplicate Evaluation

Analyte	Units	MW-5A (304-061719-05)	MW-5A DUP (304-061719-07)	RPD (%)
Alkalinity, Total	mg/L	170	170	0
Ammonia	mg/L	0.17	0.17	0
Chloride	mg/L	3.1	3.1	0
Sulfate	mg/L	14	14	0
Total Dissolved Solids	mg/L	220	230	4.4
Calcium, Dissolved	mg/L	28	28	0
Iron, Dissolved	mg/L	0.14	0.11	24
Magnesium, Dissolved	mg/L	11	11	0
Manganese, Dissolved	mg/L	0.21	0.2	4.9
Potassium, Dissolved	mg/L	4.2	4.3	2.4
Sodium, Dissolved	mg/L	31	31	0
Arsenic, Total	mg/L	0.0055	0.0052	5.6
Barium, Total	mg/L	0.012	0.012	0

Analyte	Units	MW-5A (304-061719-05)	MW-5A DUP (304-061719-07)	RPD (%)
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U = Non-detection. Reporting limit (RL) used for calculation of RPD.

Additional Data Flags

Flag	Description
U	Not detected above the method reporting limit.

Qualified Data and Usability

Lab qualifiers are noted. All data, as qualified, are acceptable for use.



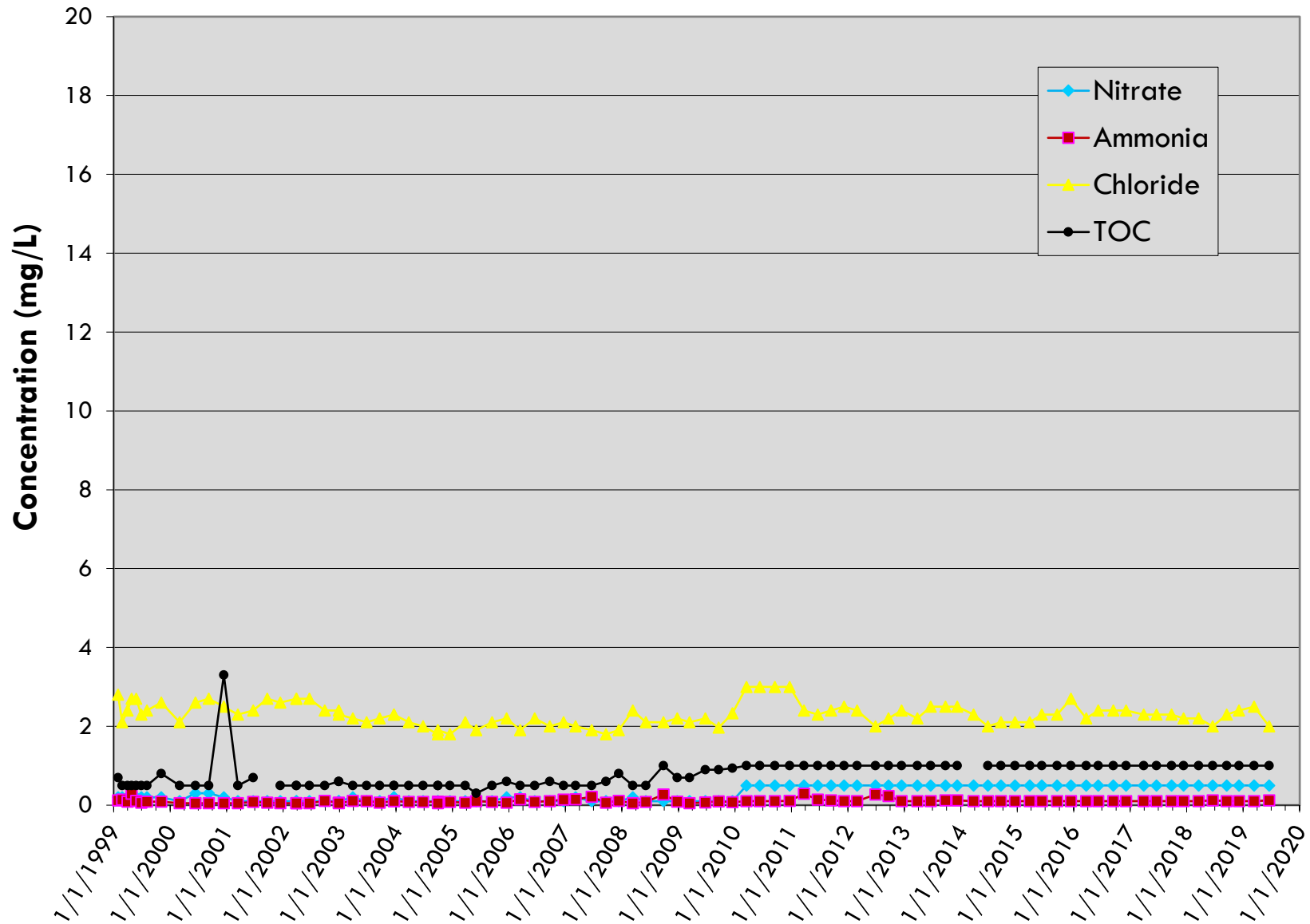
Appendix G

Groundwater and LDCS Time Trend Plots



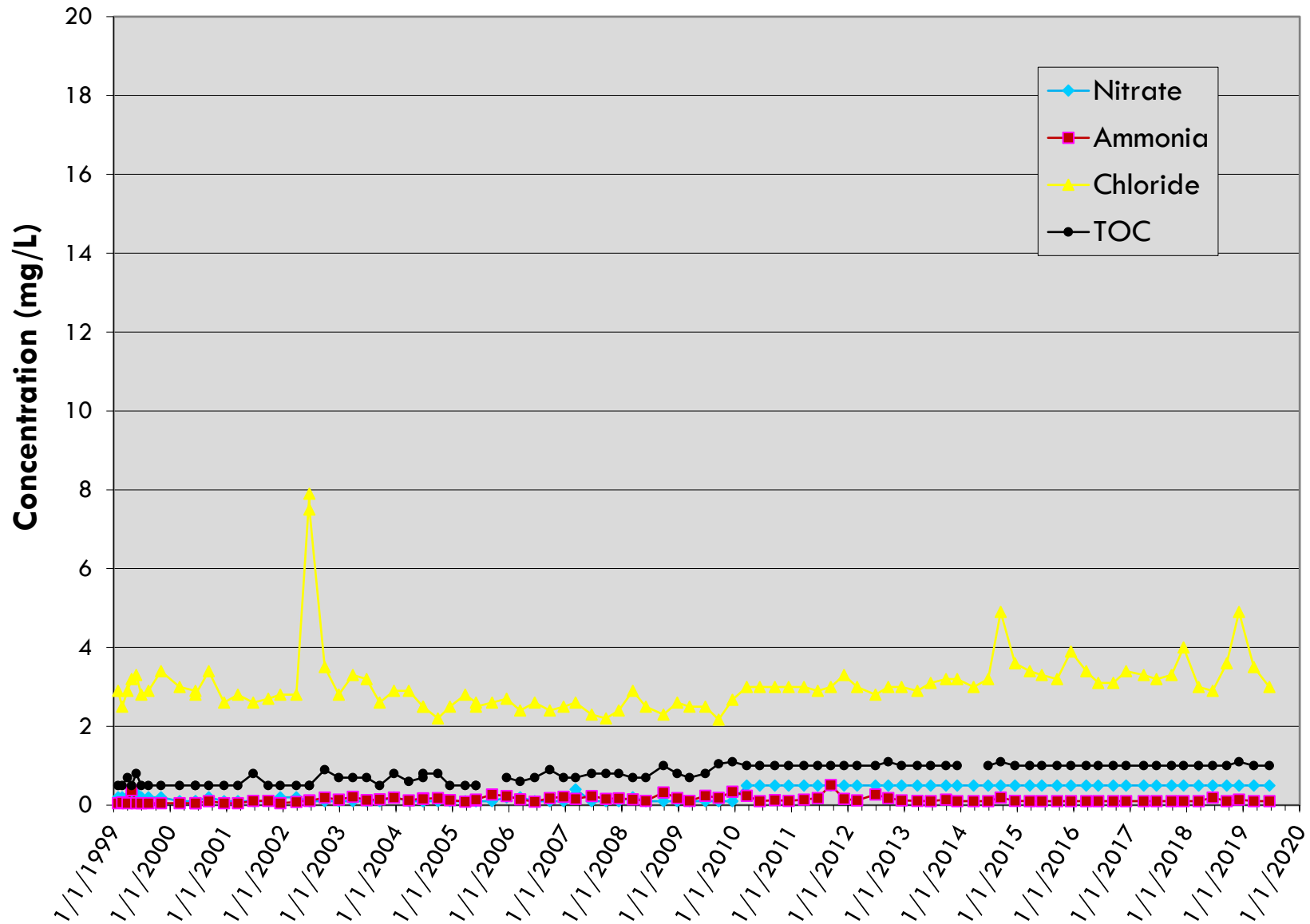
MW-1A

LRI Landfill, Pierce County, Washington



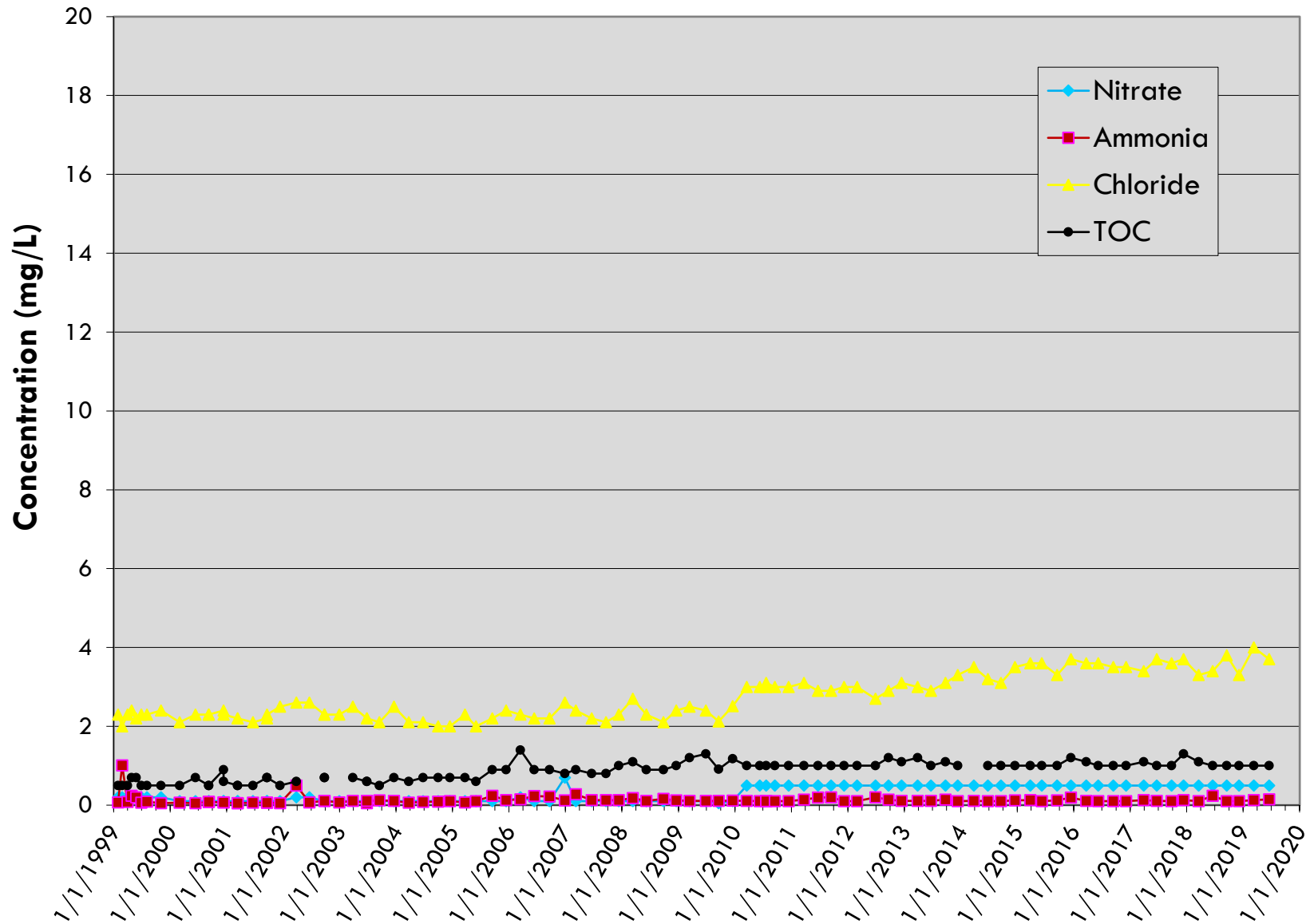
MW-2A

LRI Landfill, Pierce County, Washington



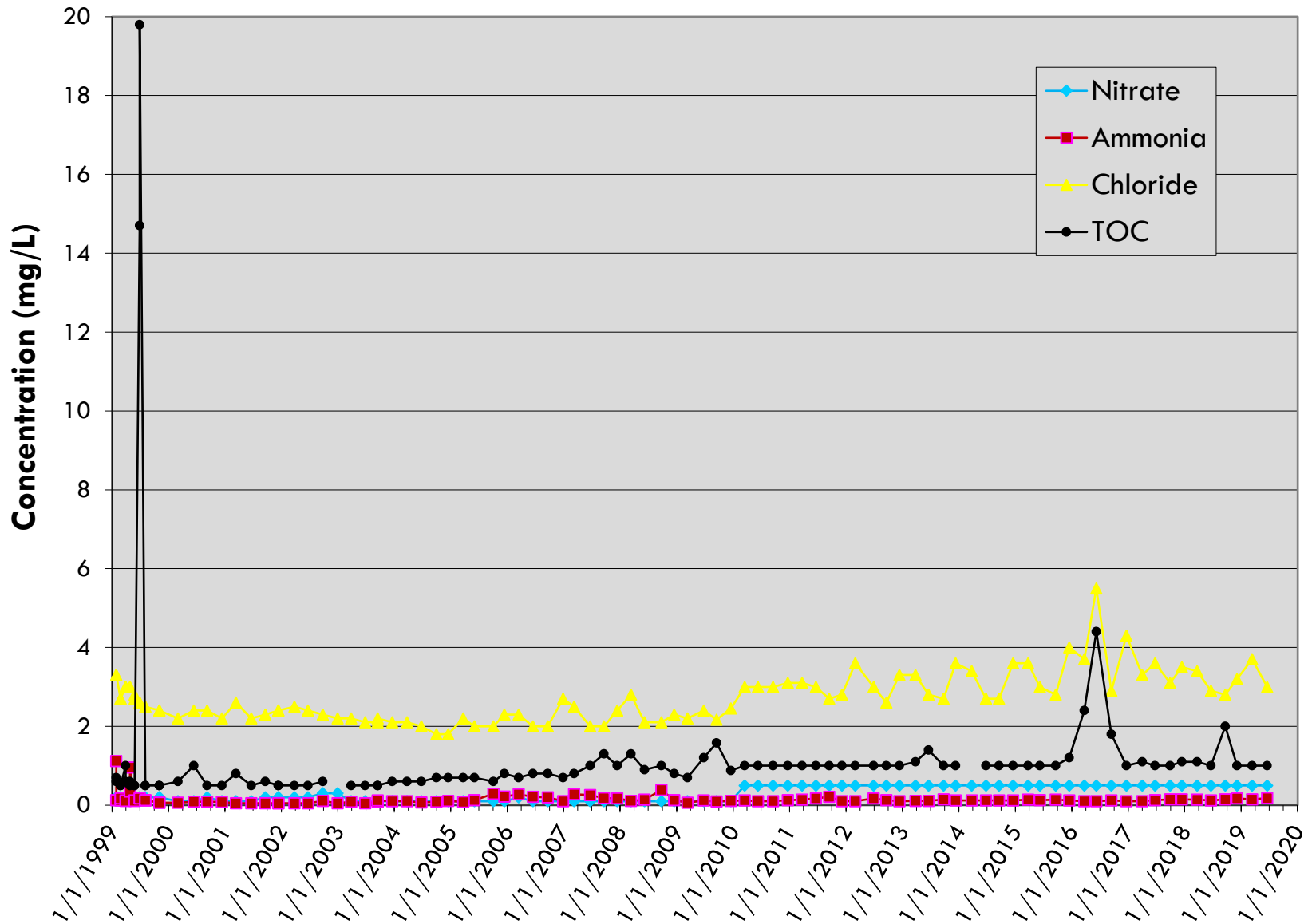
MW-3

LRI Landfill, Pierce County, Washington



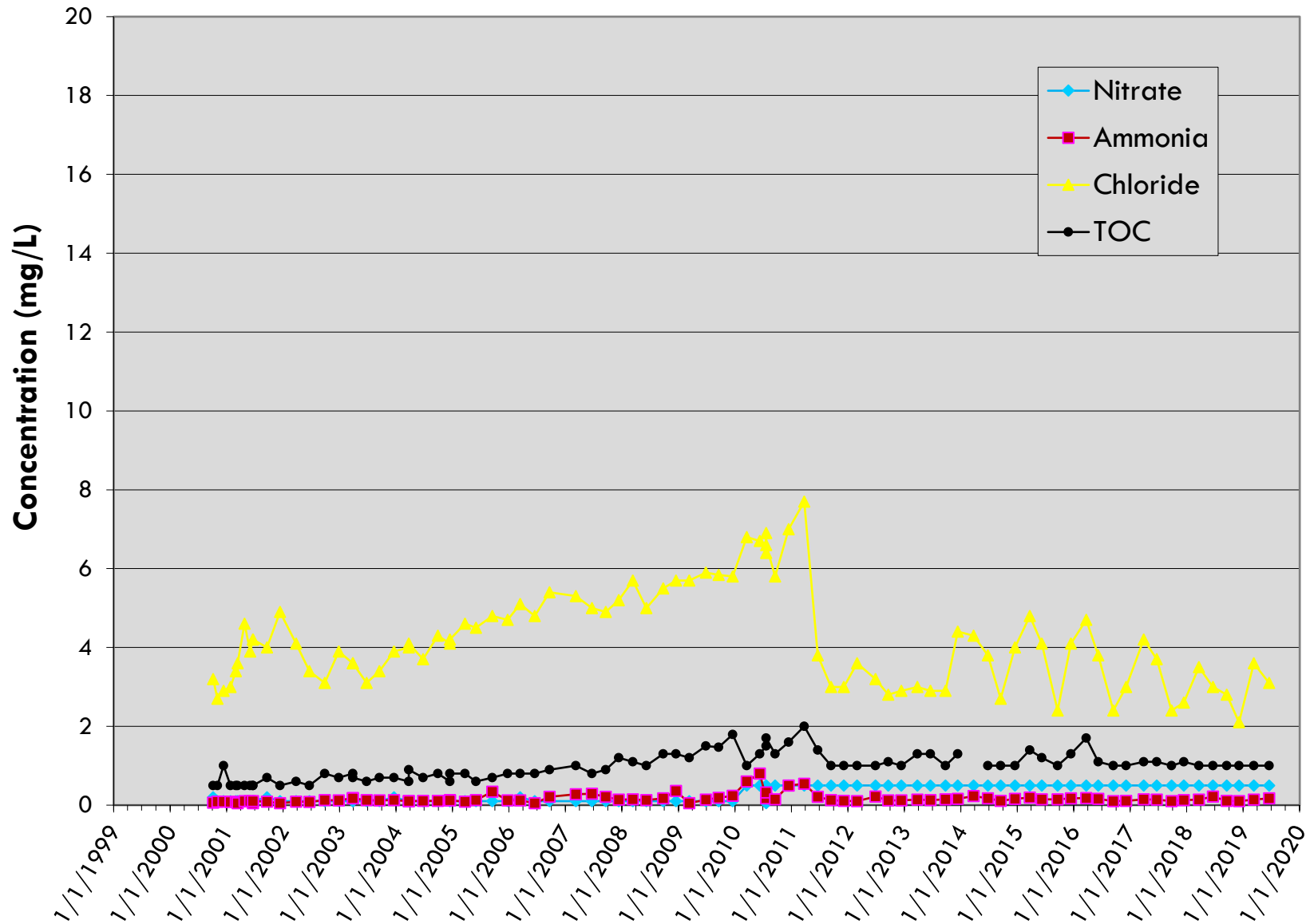
MW-4

LRI Landfill, Pierce County, Washington



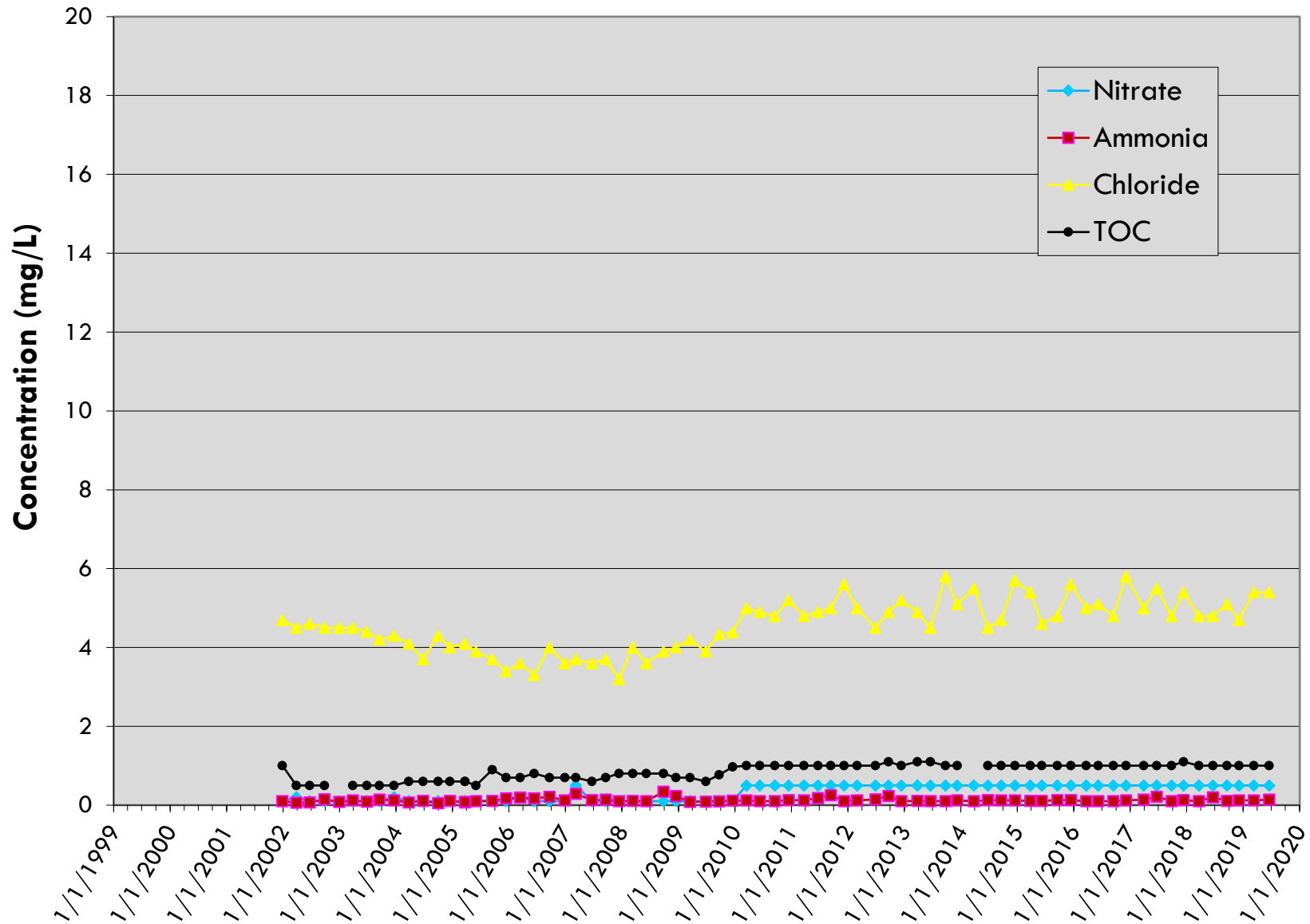
MW-5A

LRI Landfill, Pierce County, Washington



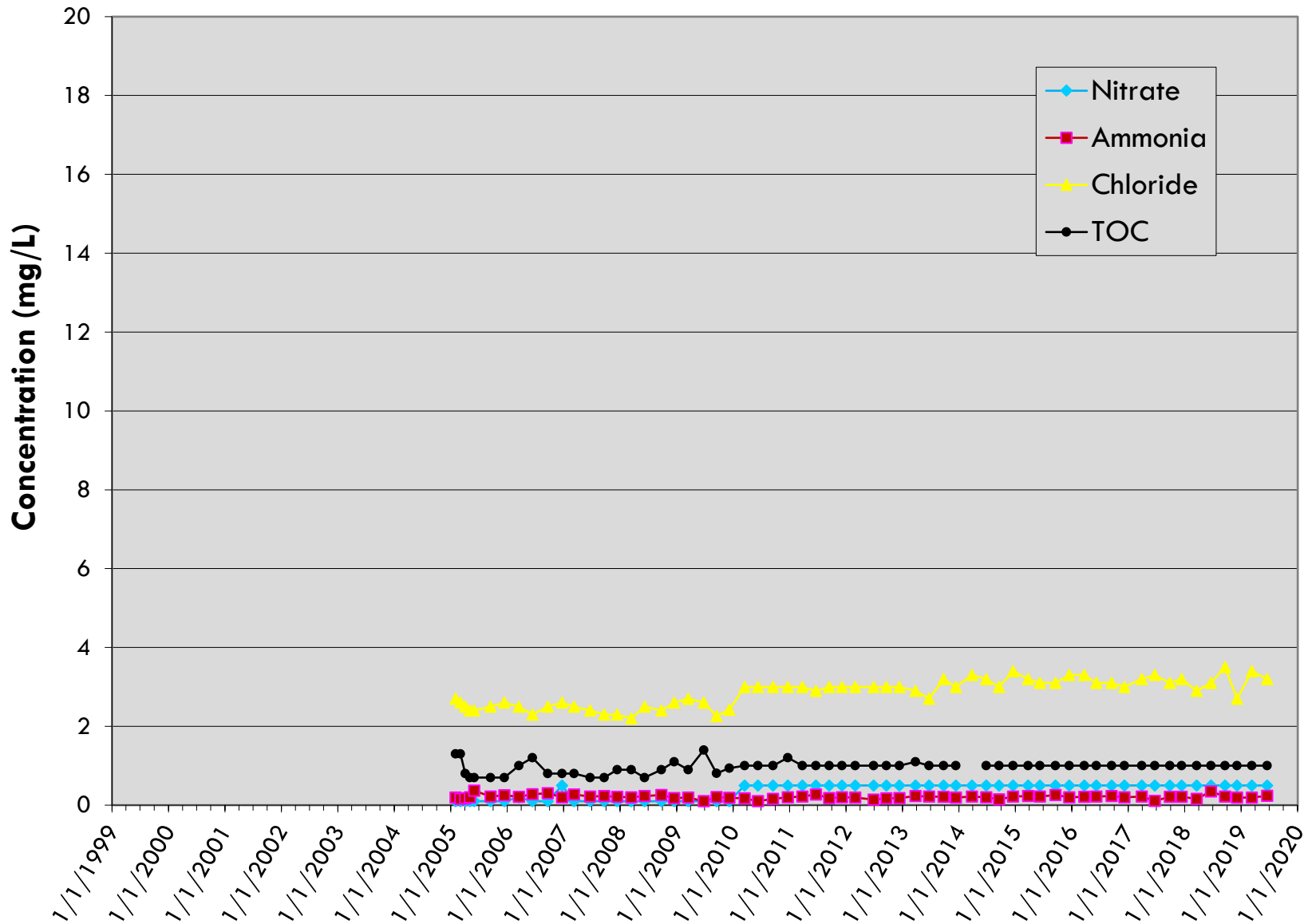
MW-6

LRI Landfill, Pierce County, Washington

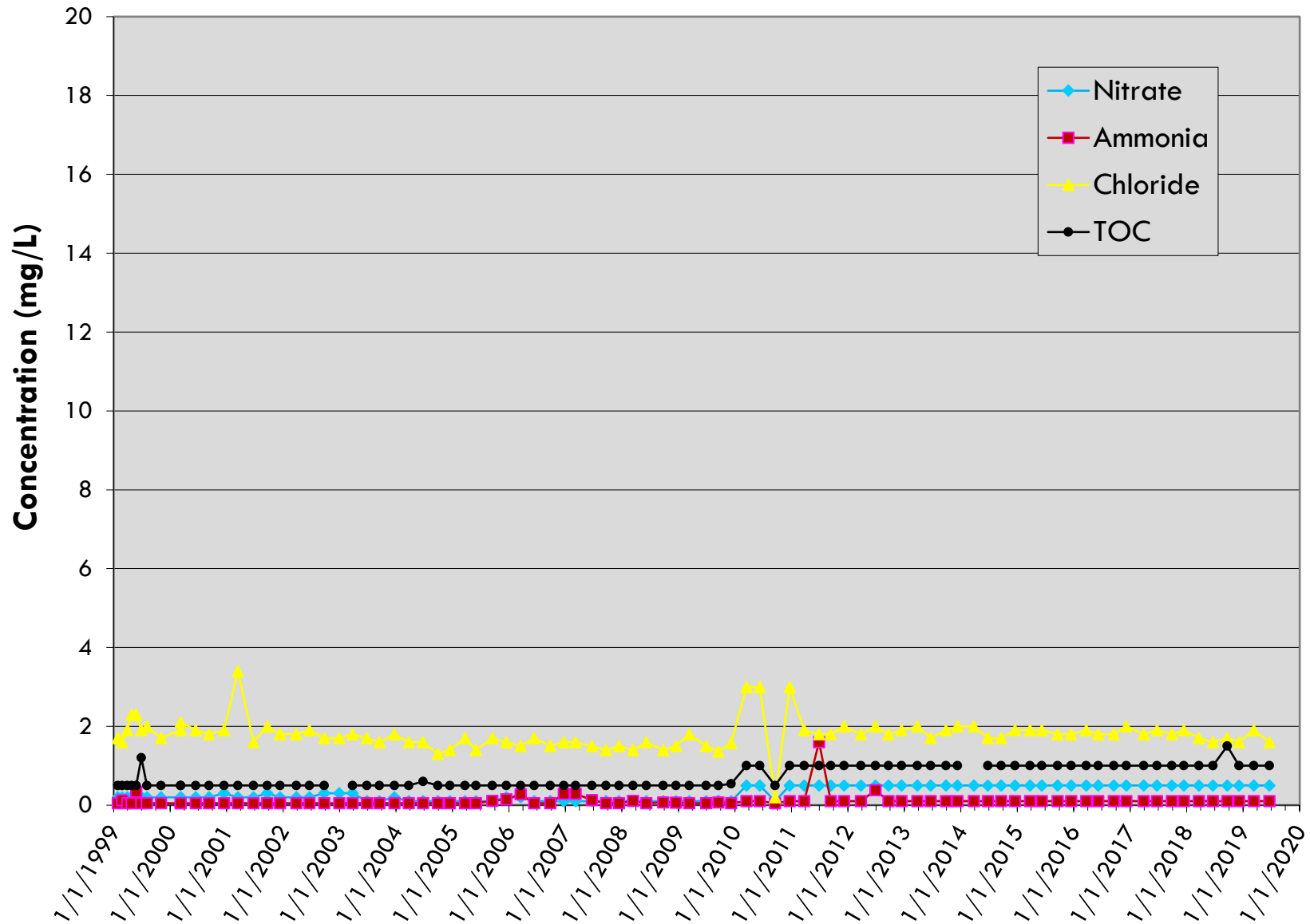


MW-7

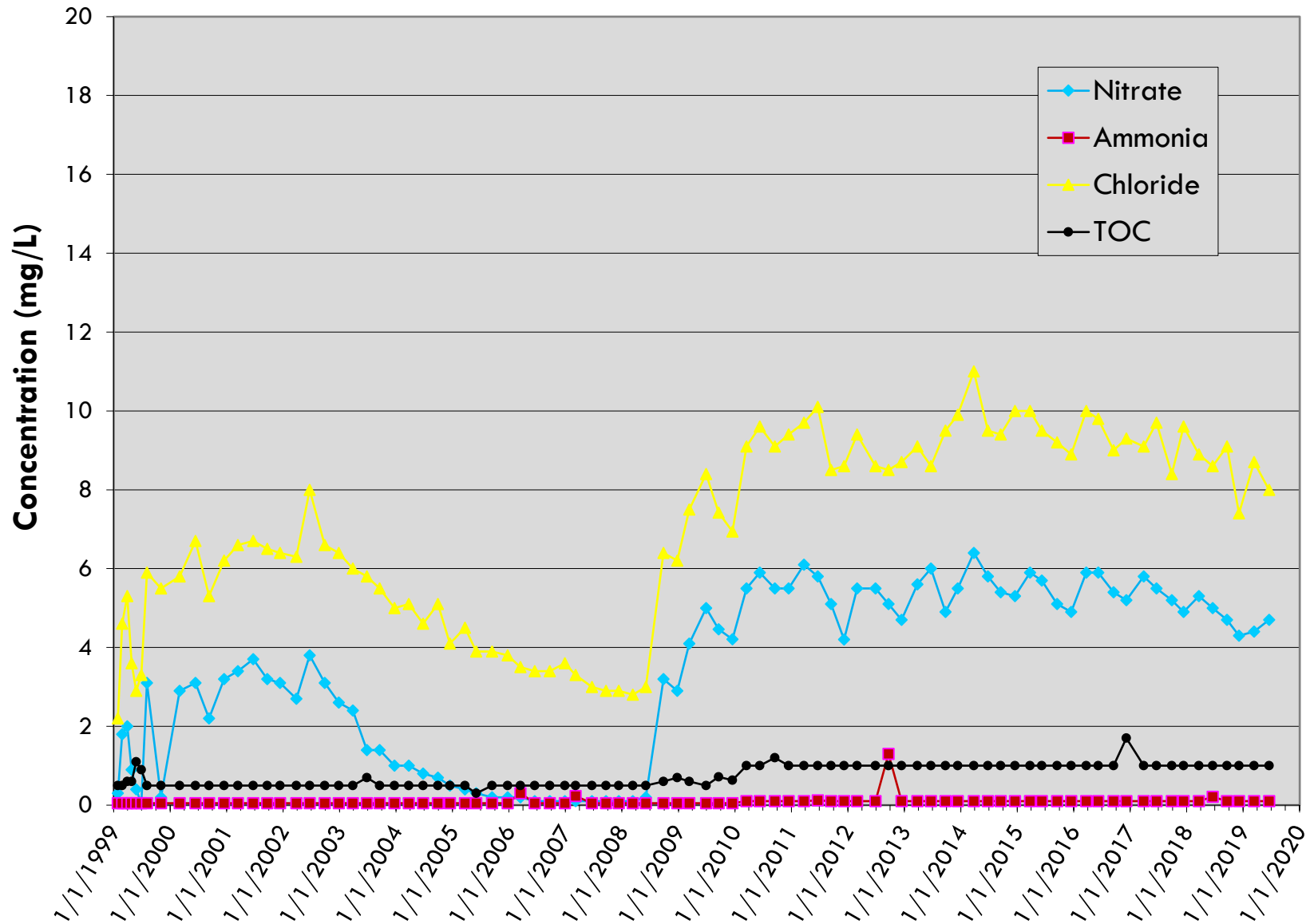
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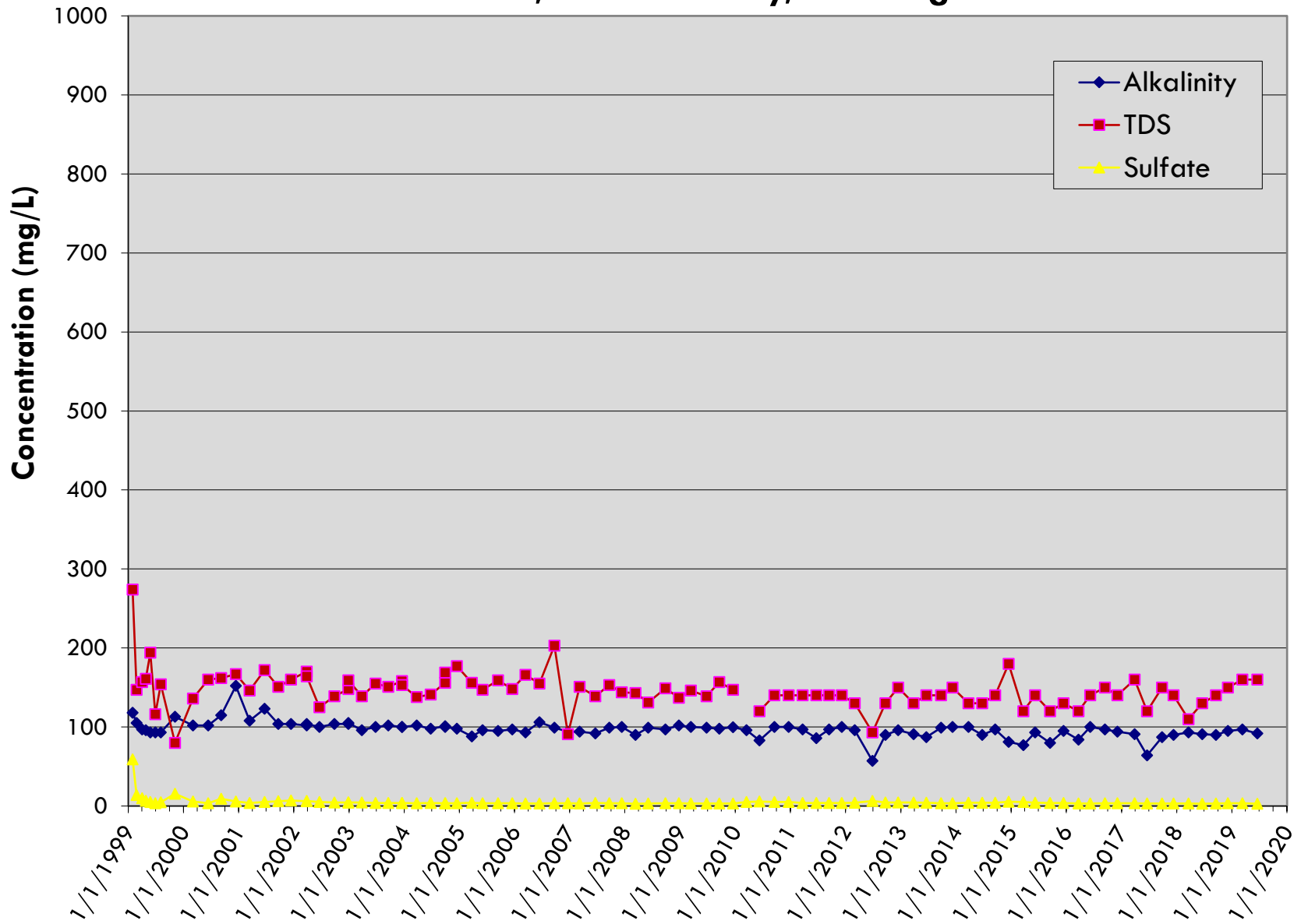
MW-9 (Background) LRI Landfill, Pierce County, Washington



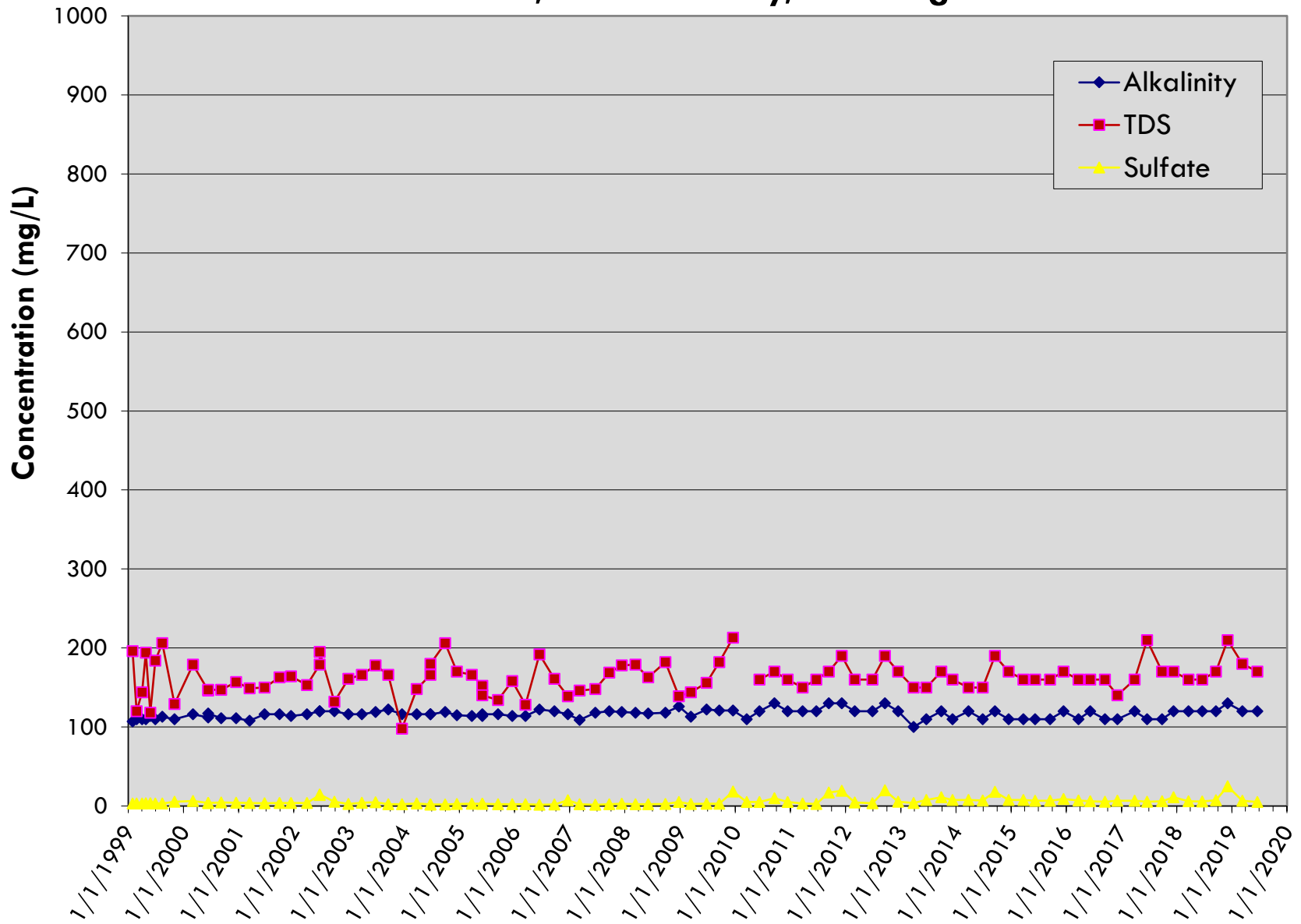
MW-10 (Background) LRI Landfill, Pierce County, Washington



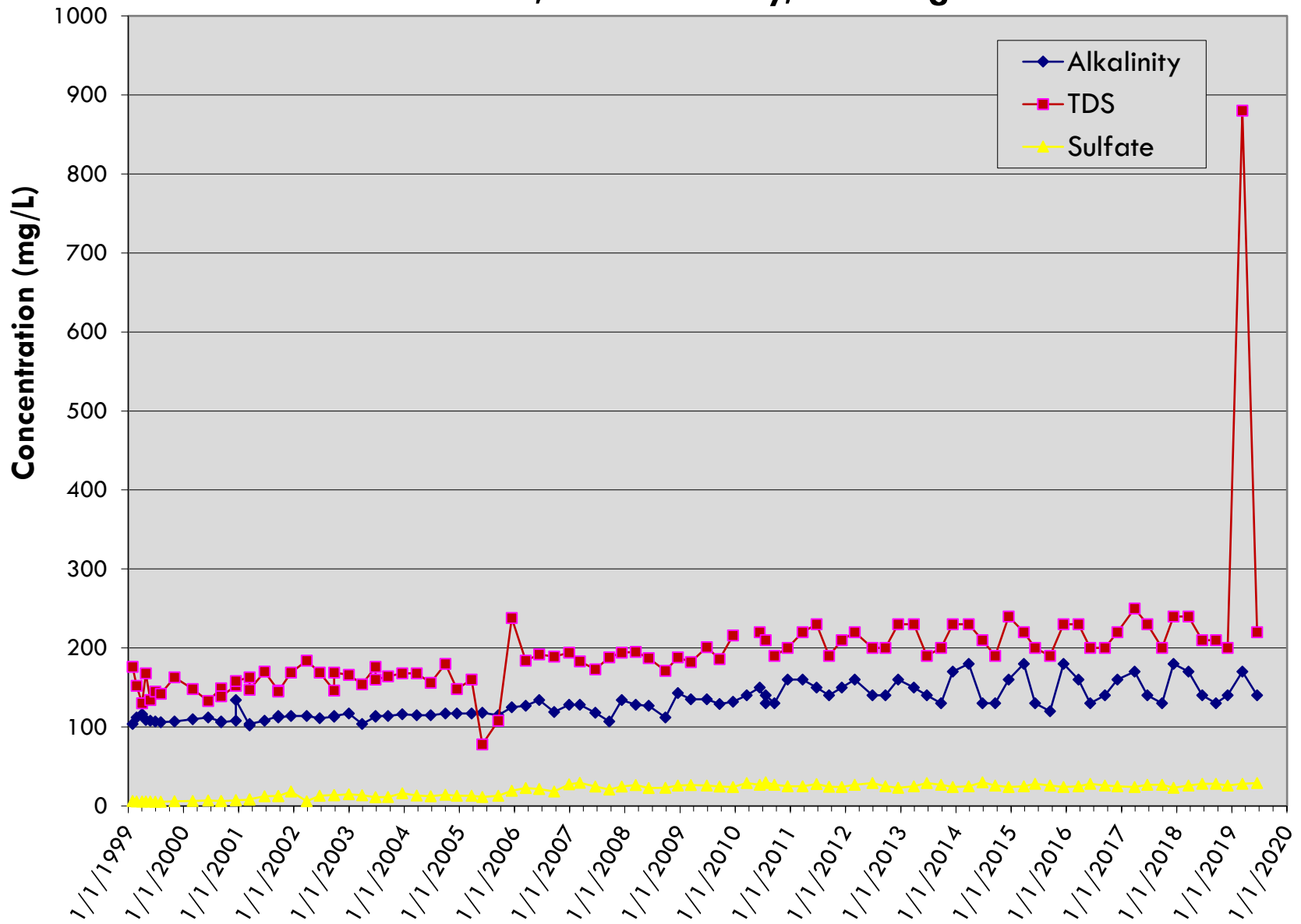
MW-1A
LRI Landfill, Pierce County, Washington



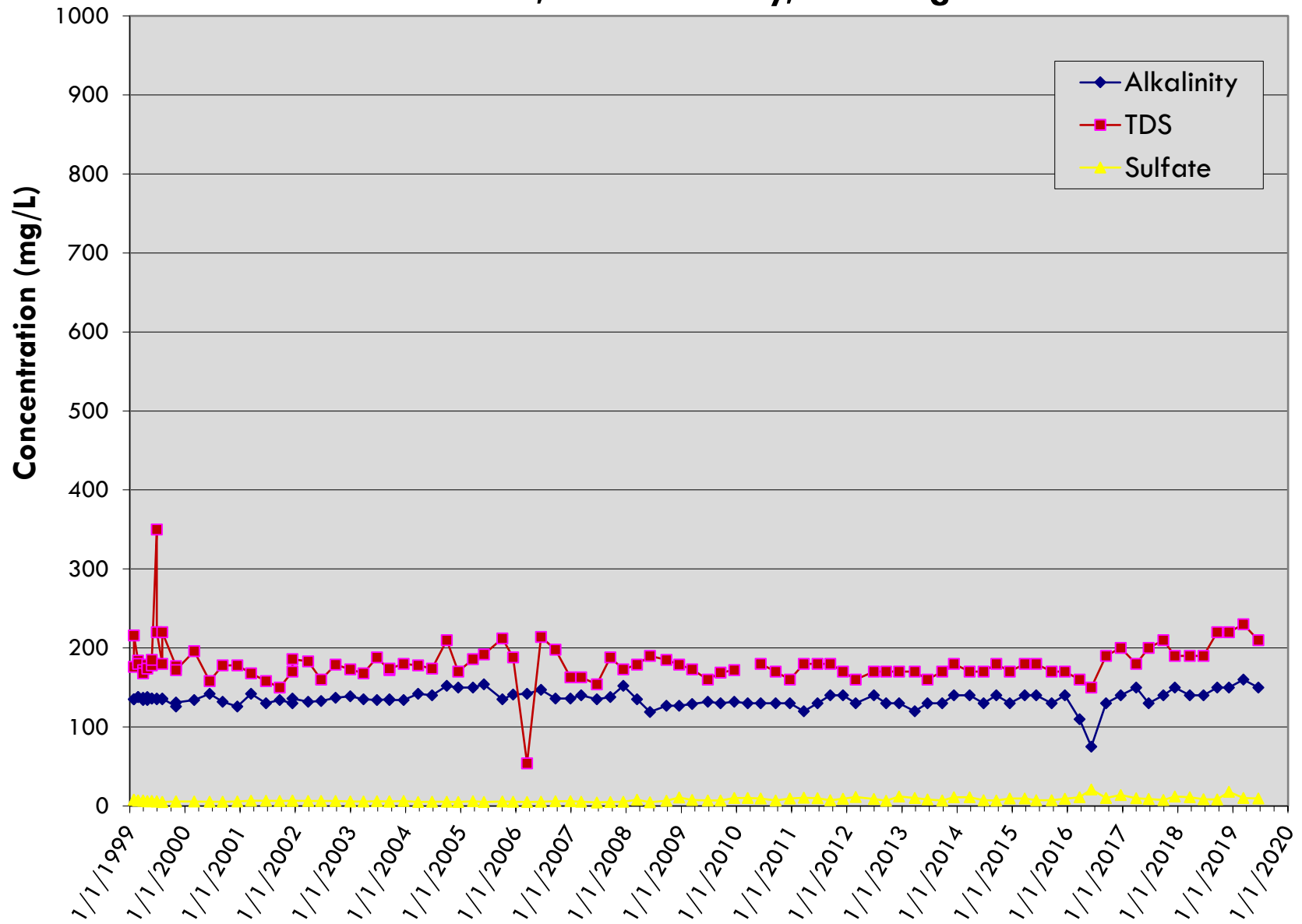
MW-2A
LRI Landfill, Pierce County, Washington



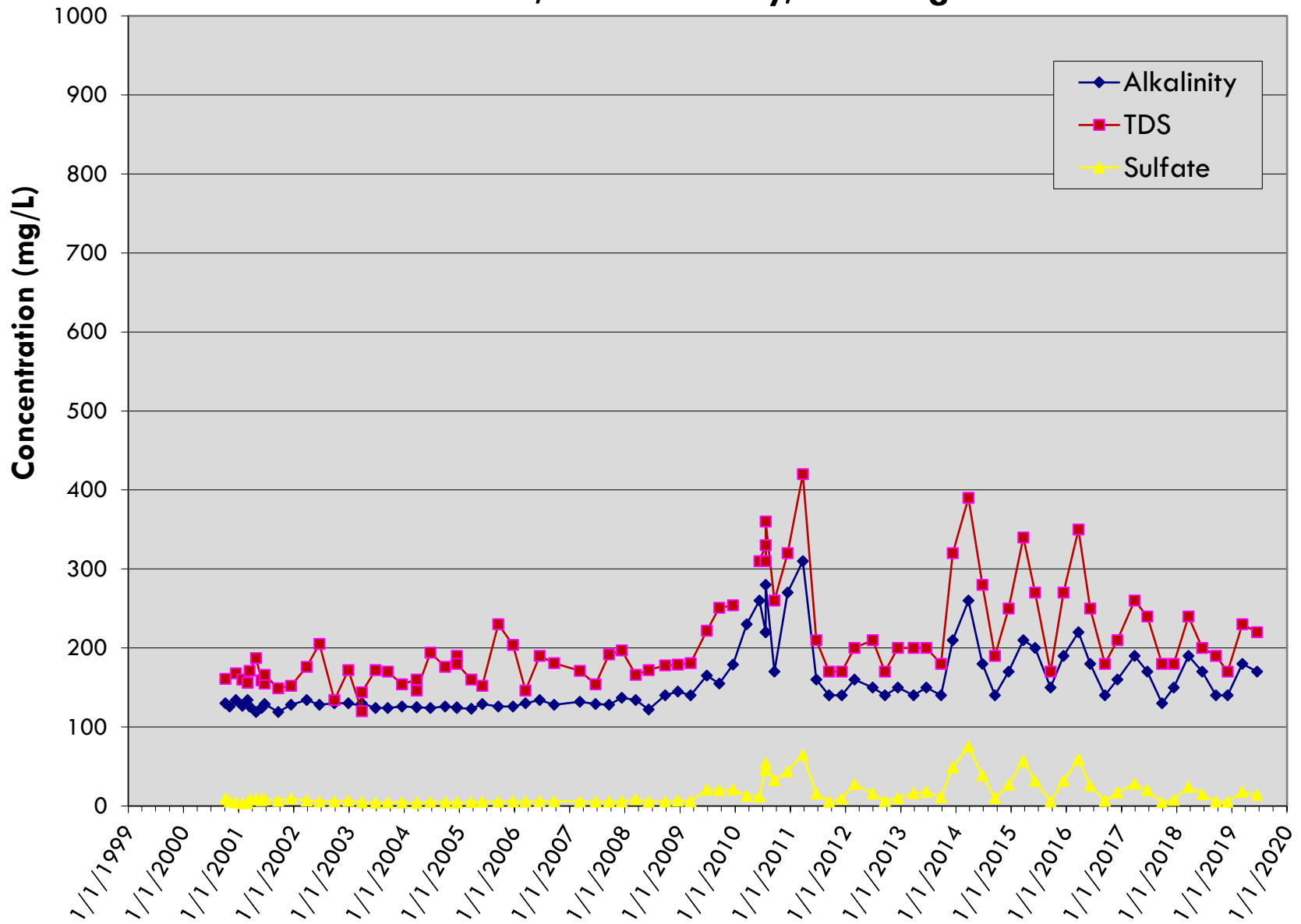
MW-3
LRI Landfill, Pierce County, Washington



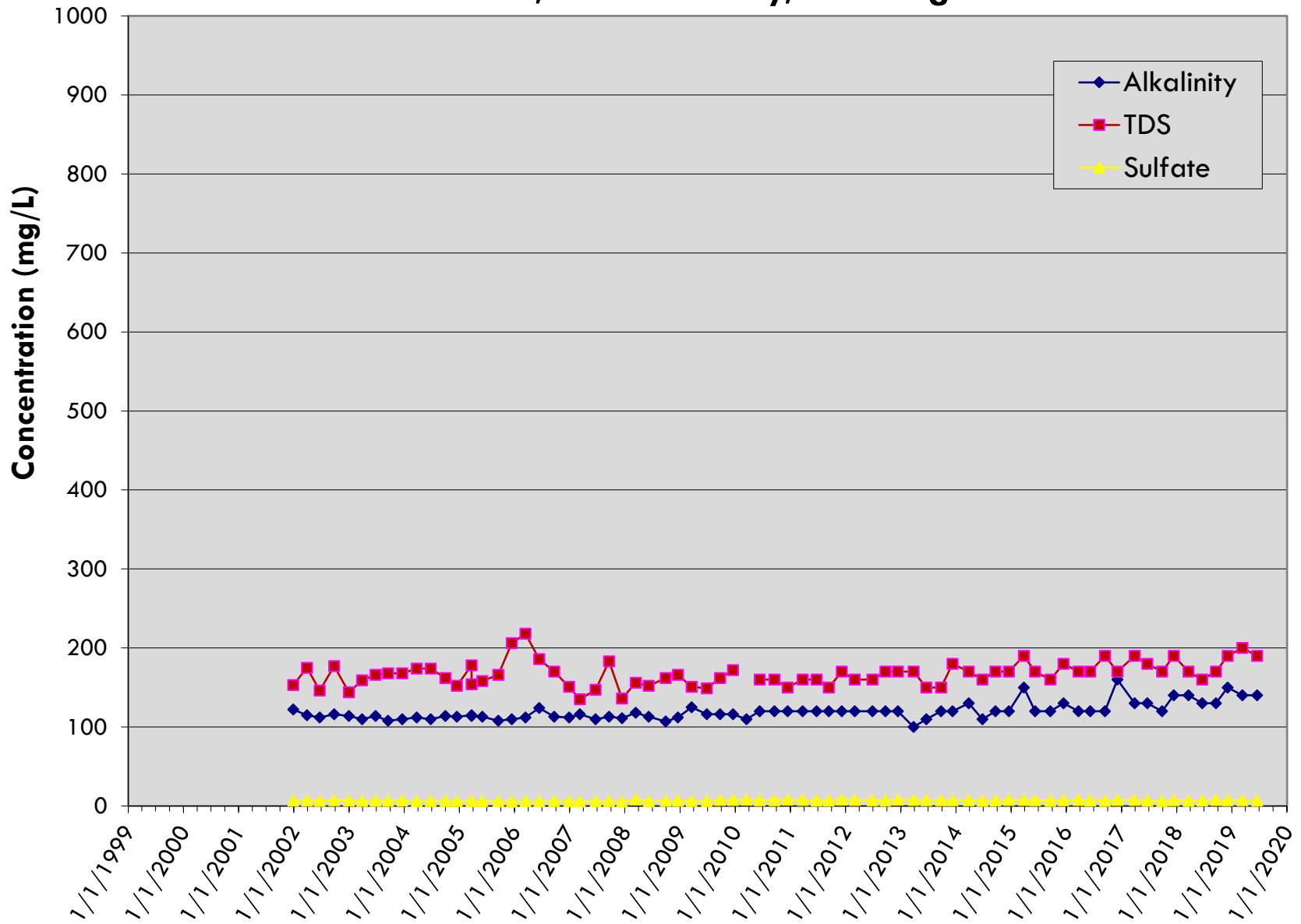
MW-4
LRI Landfill, Pierce County, Washington



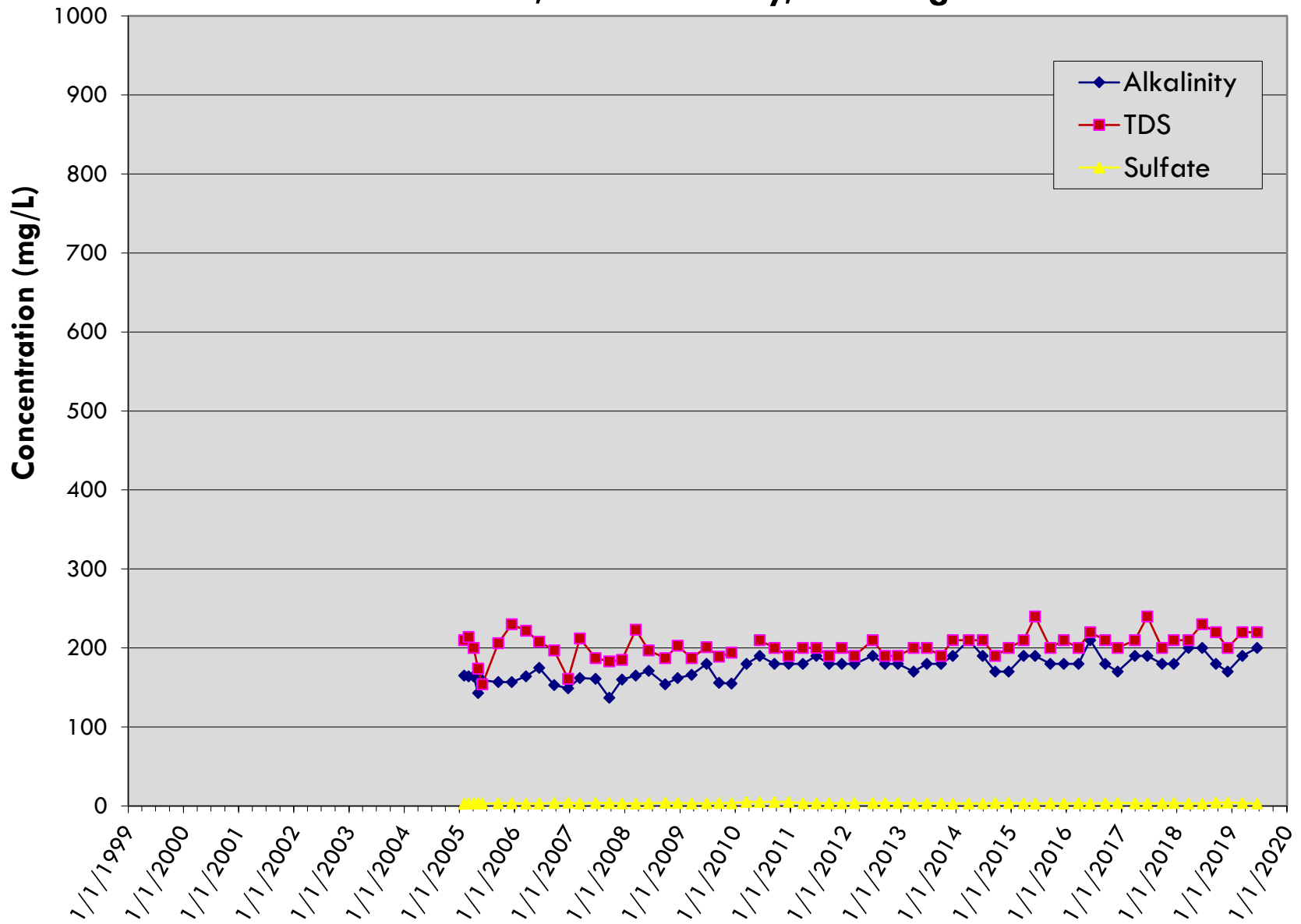
MW-5A
LRI Landfill, Pierce County, Washington



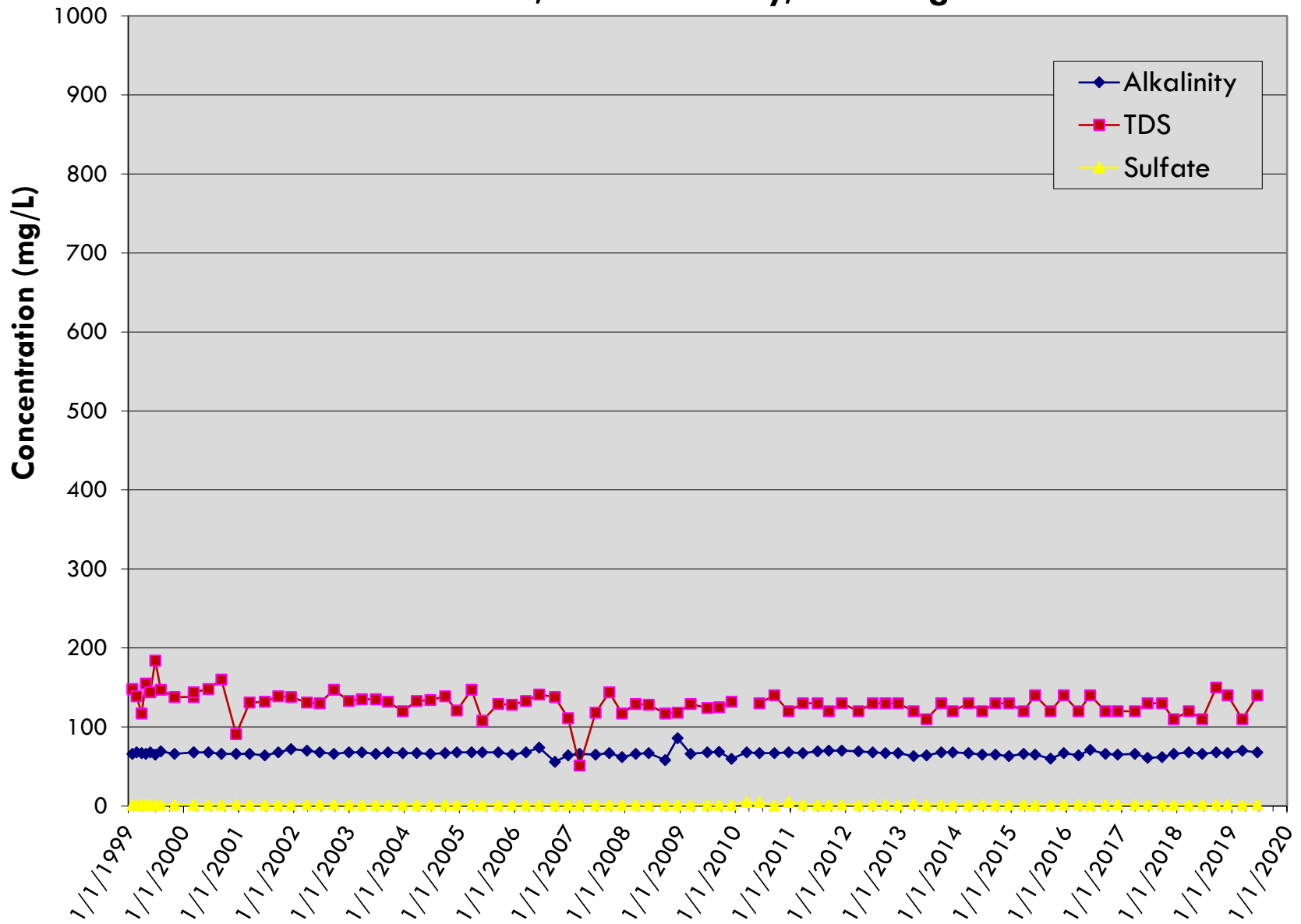
MW-6
LRI Landfill, Pierce County, Washington



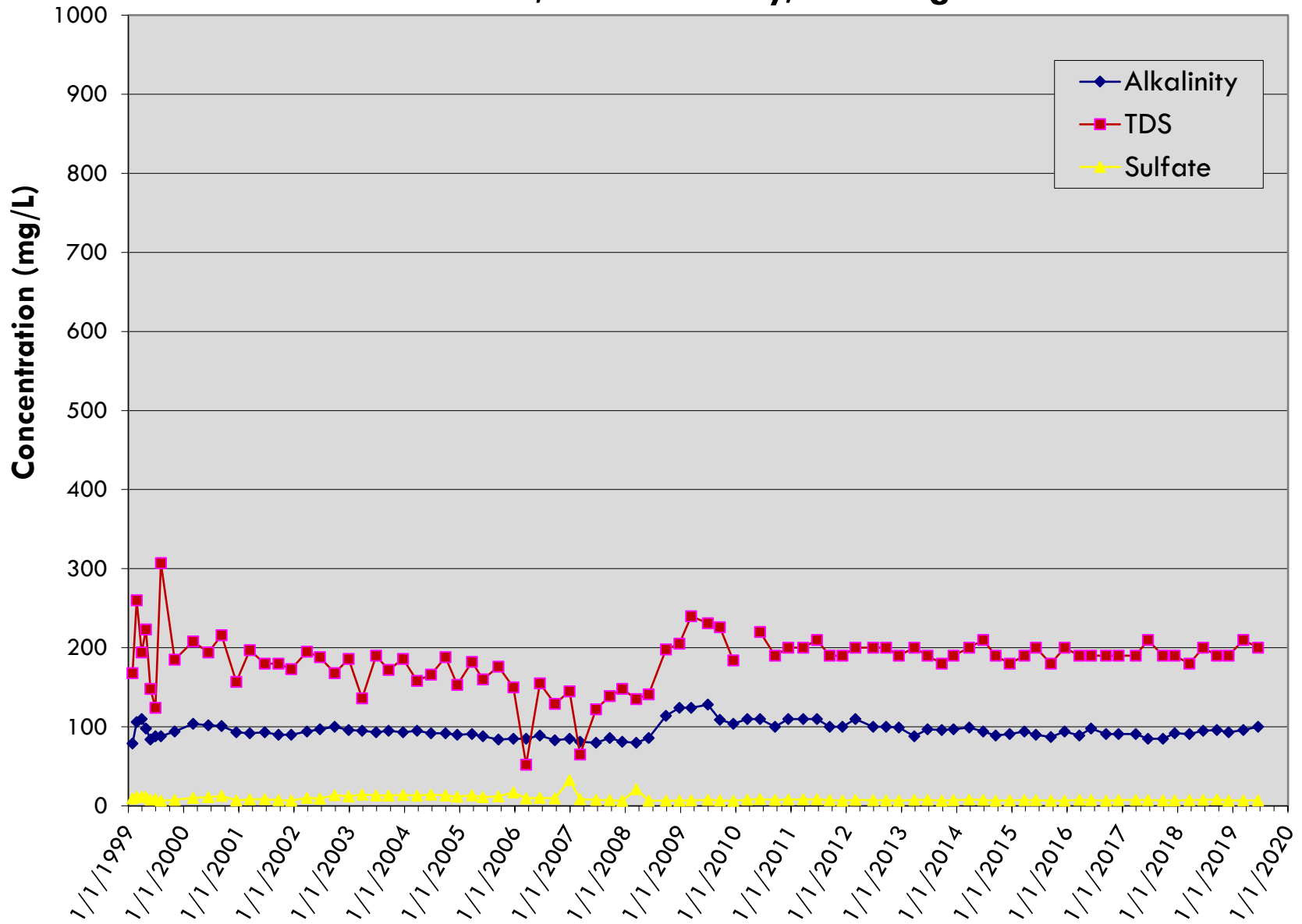
MW-7
LRI Landfill, Pierce County, Washington



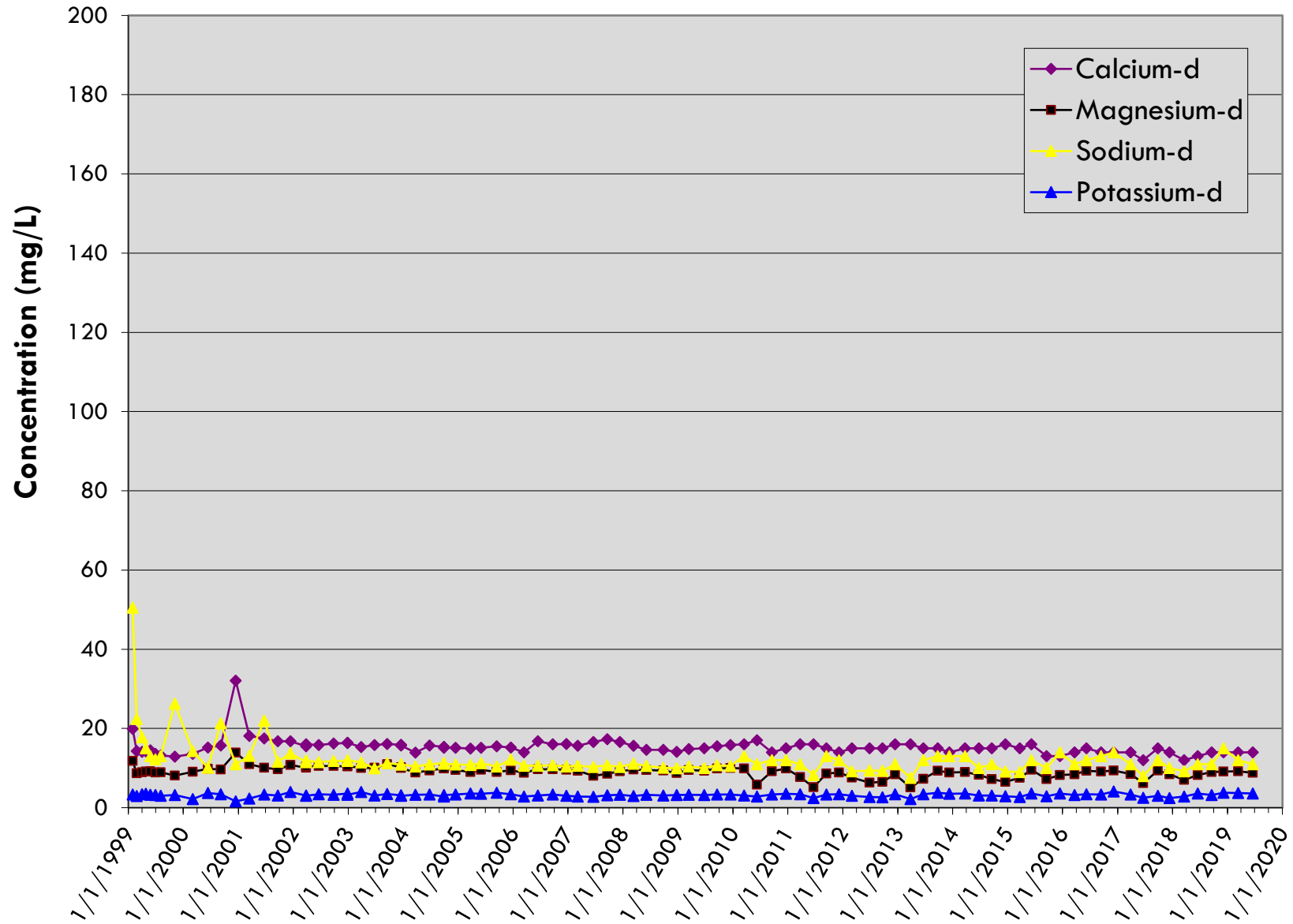
MW-9 (Background)
LRI Landfill, Pierce County, Washington



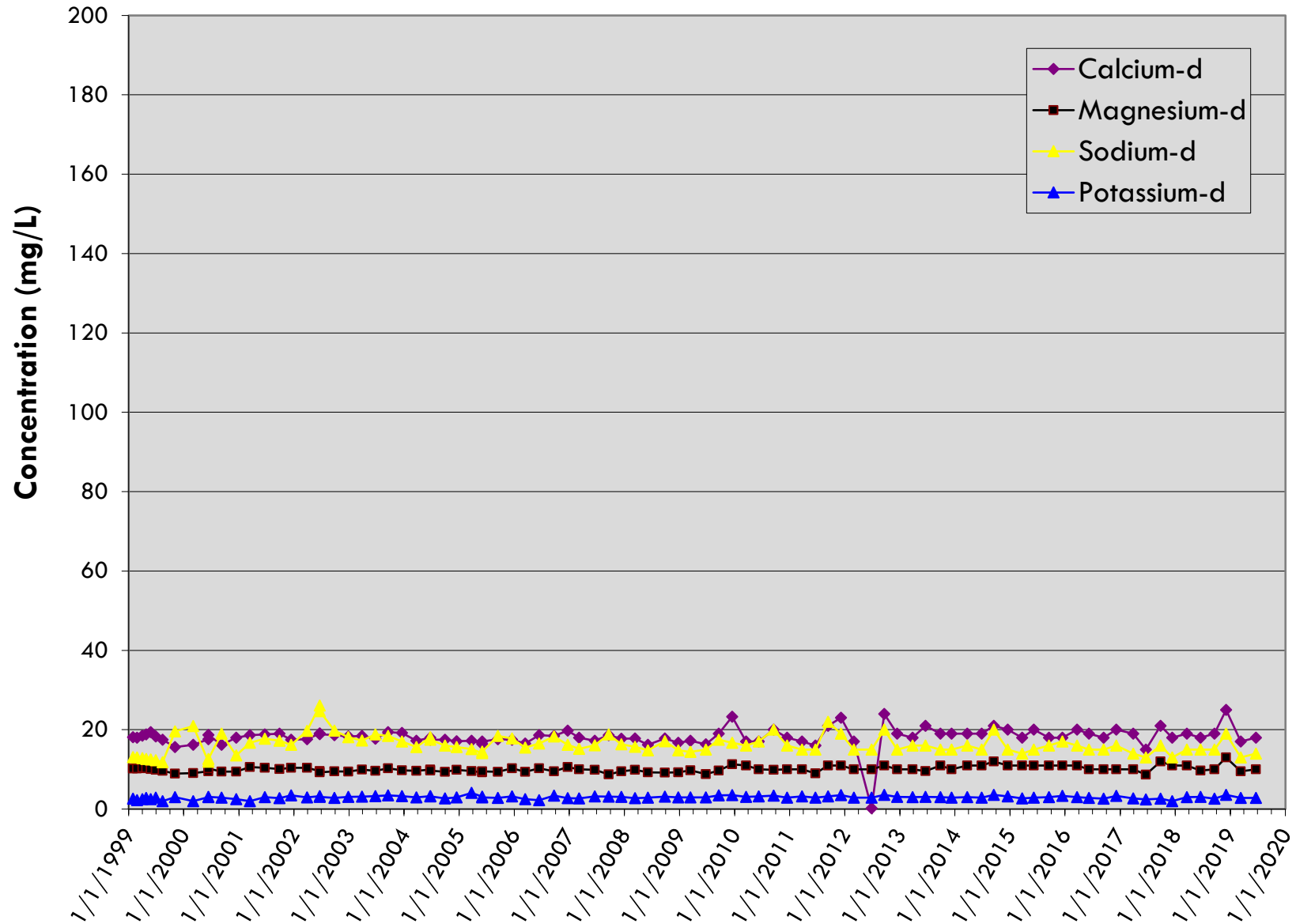
MW-10 (Background)
LRI Landfill, Pierce County, Washington



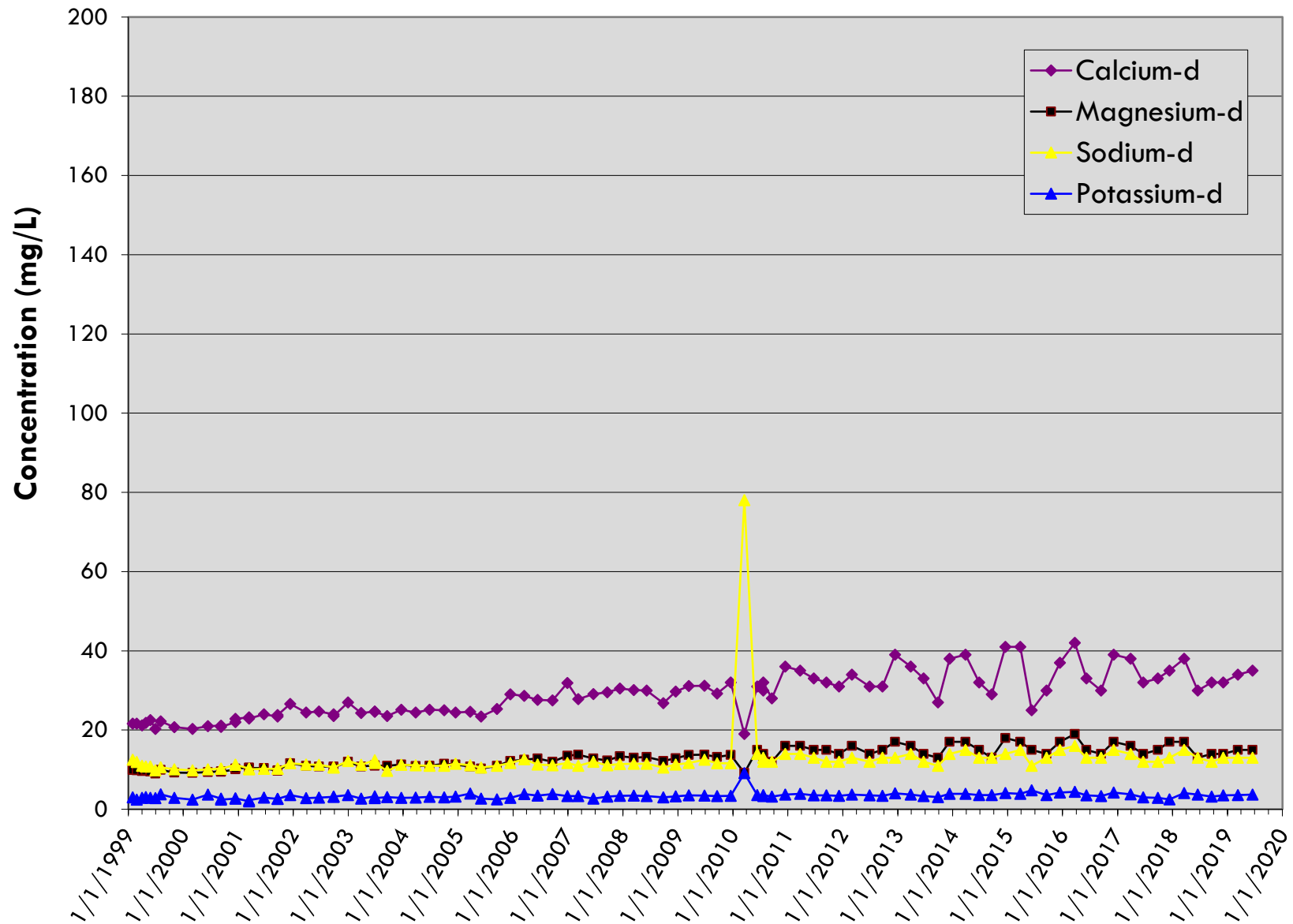
MW-1A
LRI Landfill, Pierce County, Washington



MW-2A
LRI Landfill, Pierce County, Washington

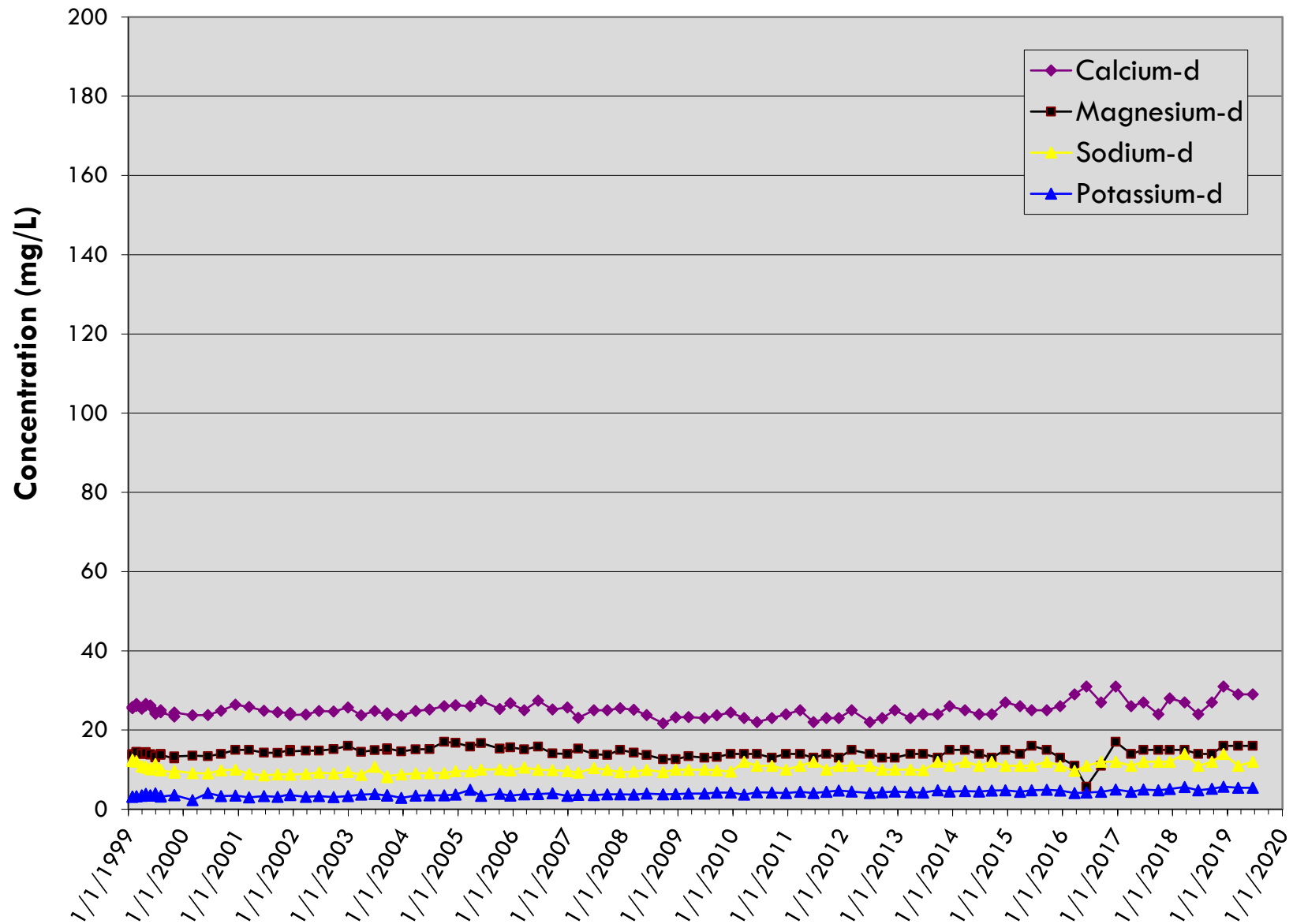


MW-3
LRI Landfill, Pierce County, Washington



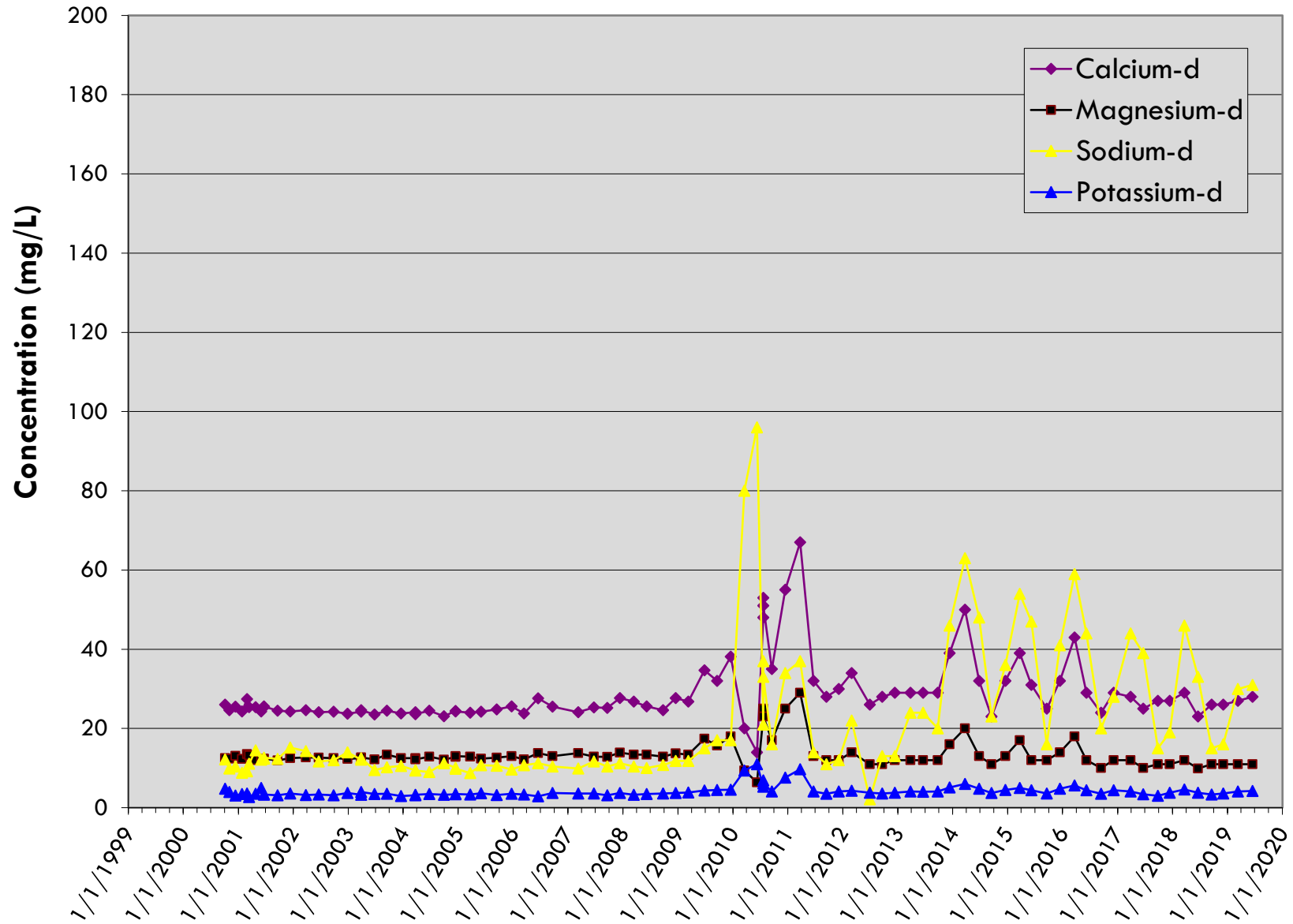
MW-4

LRI Landfill, Pierce County, Washington



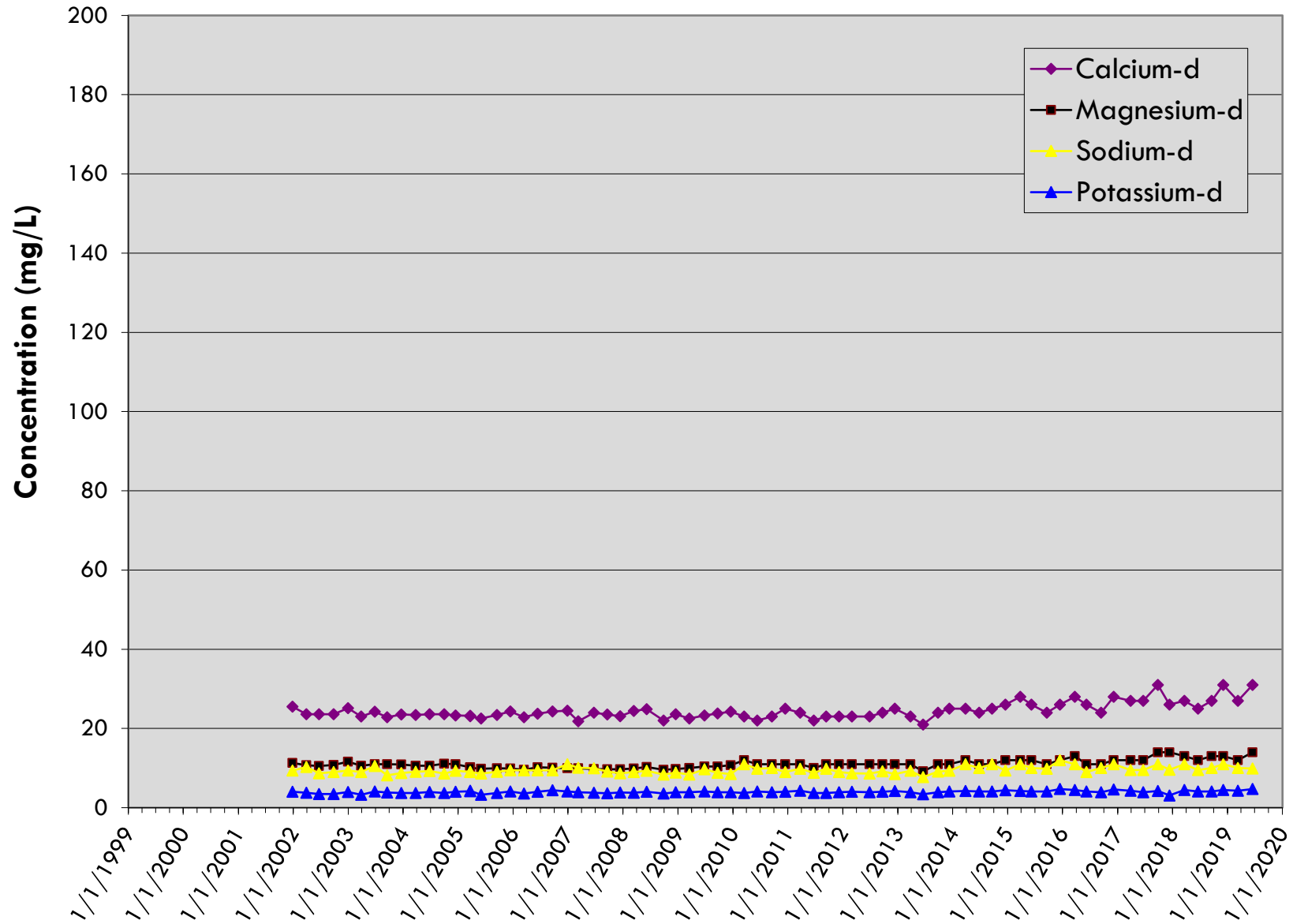
MW-5A

LRI Landfill, Pierce County, Washington

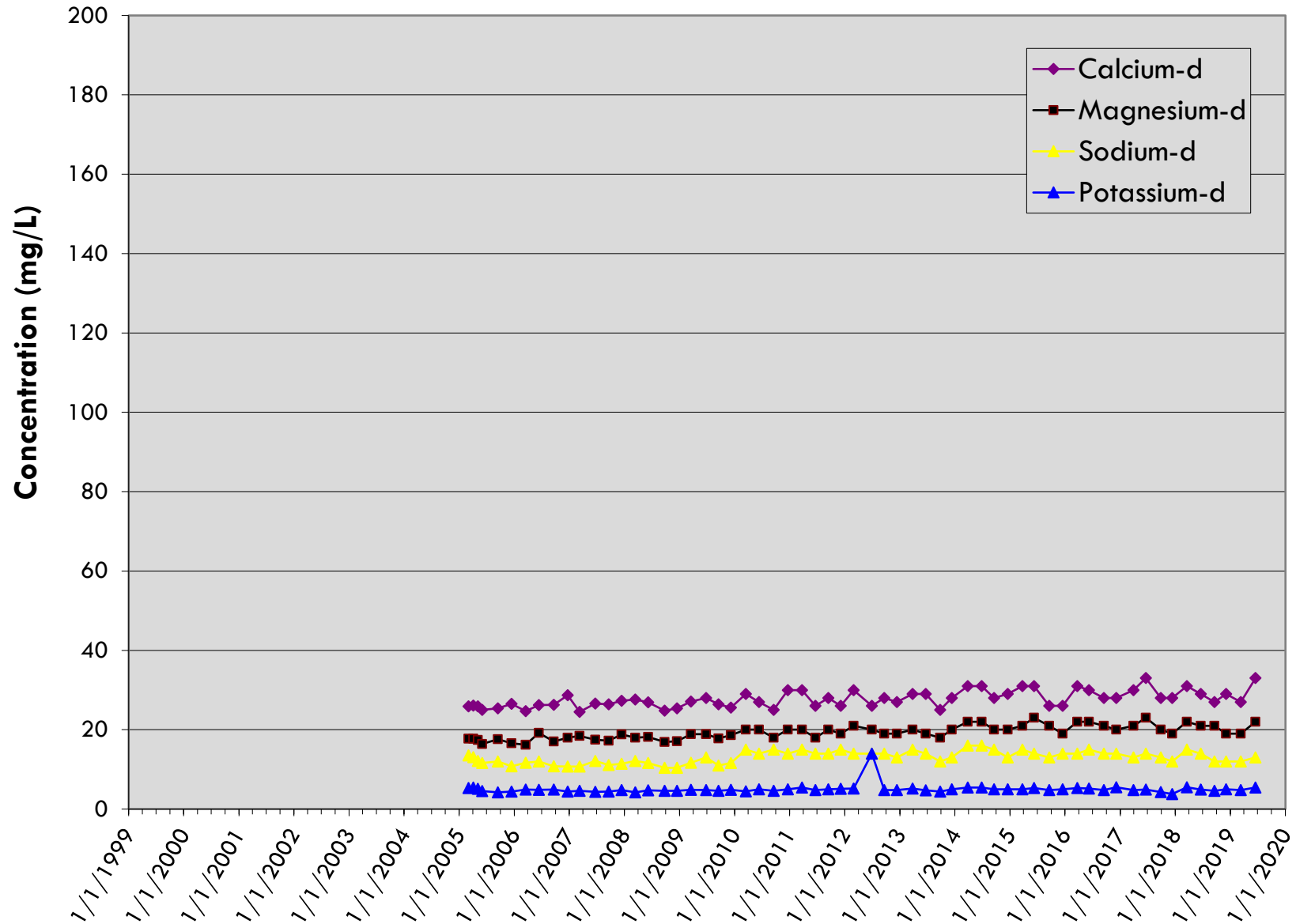


MW-6

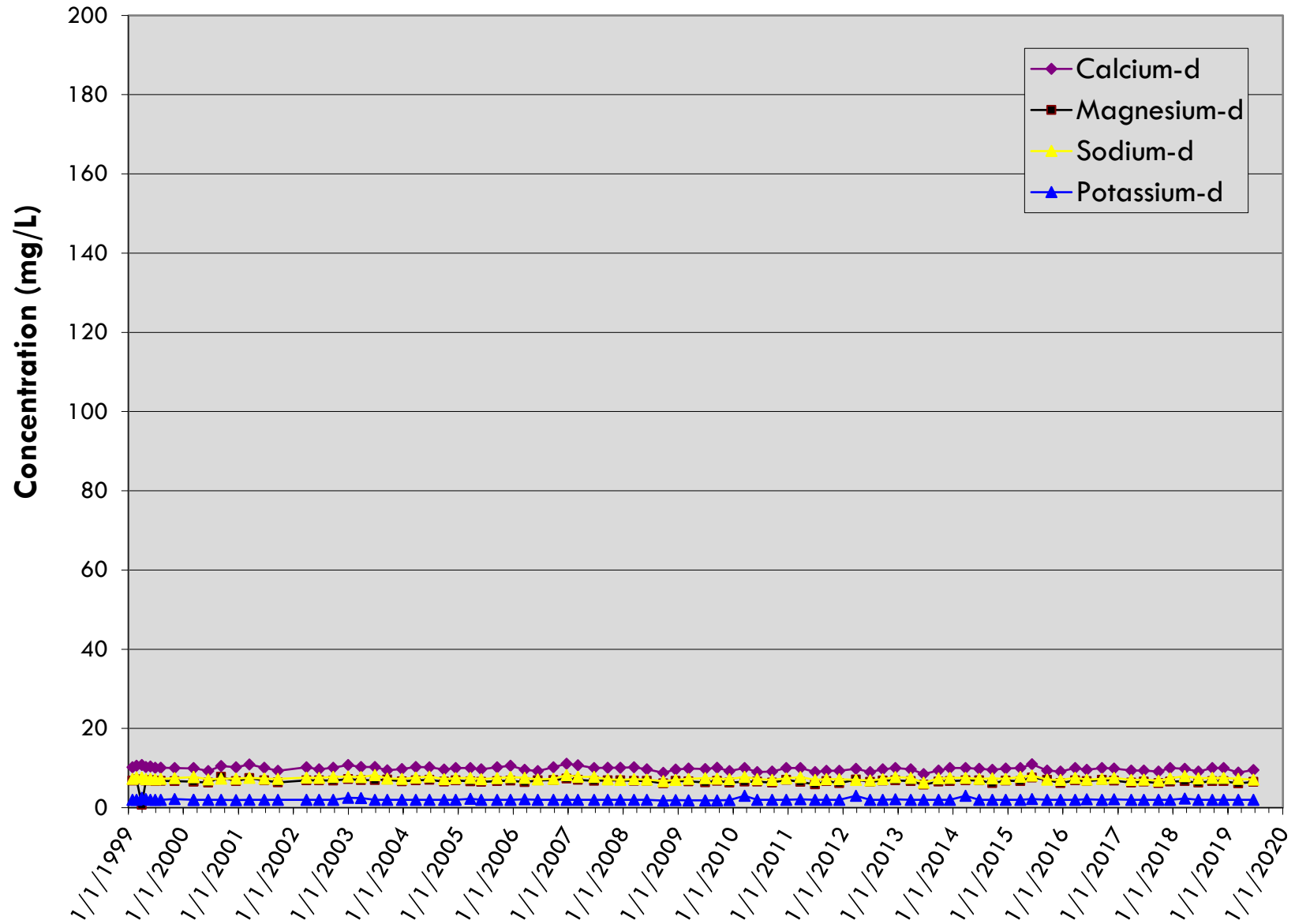
LRI Landfill, Pierce County, Washington



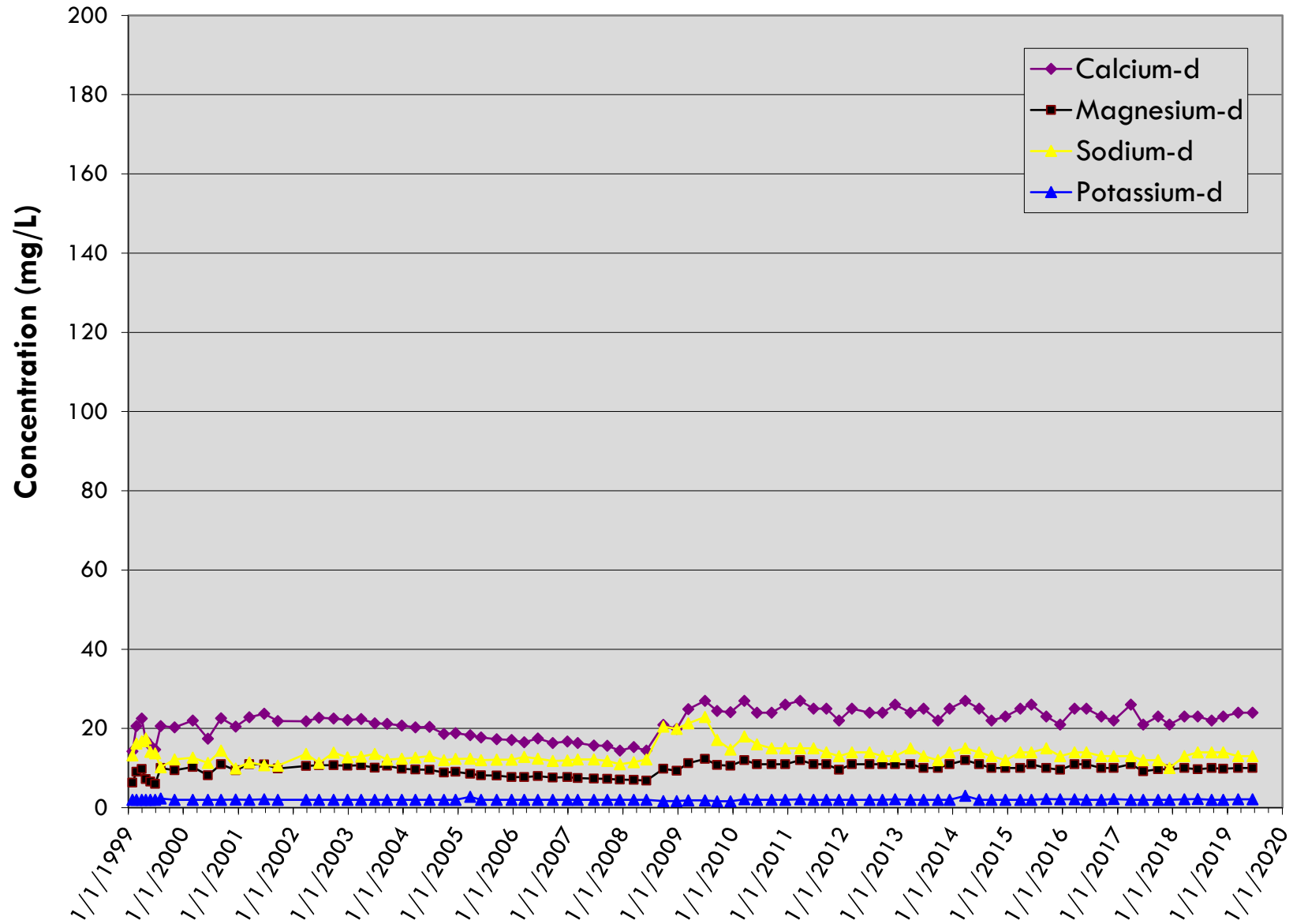
MW-7
LRI Landfill, Pierce County, Washington



MW-9 (Background)
LRI Landfill, Pierce County, Washington

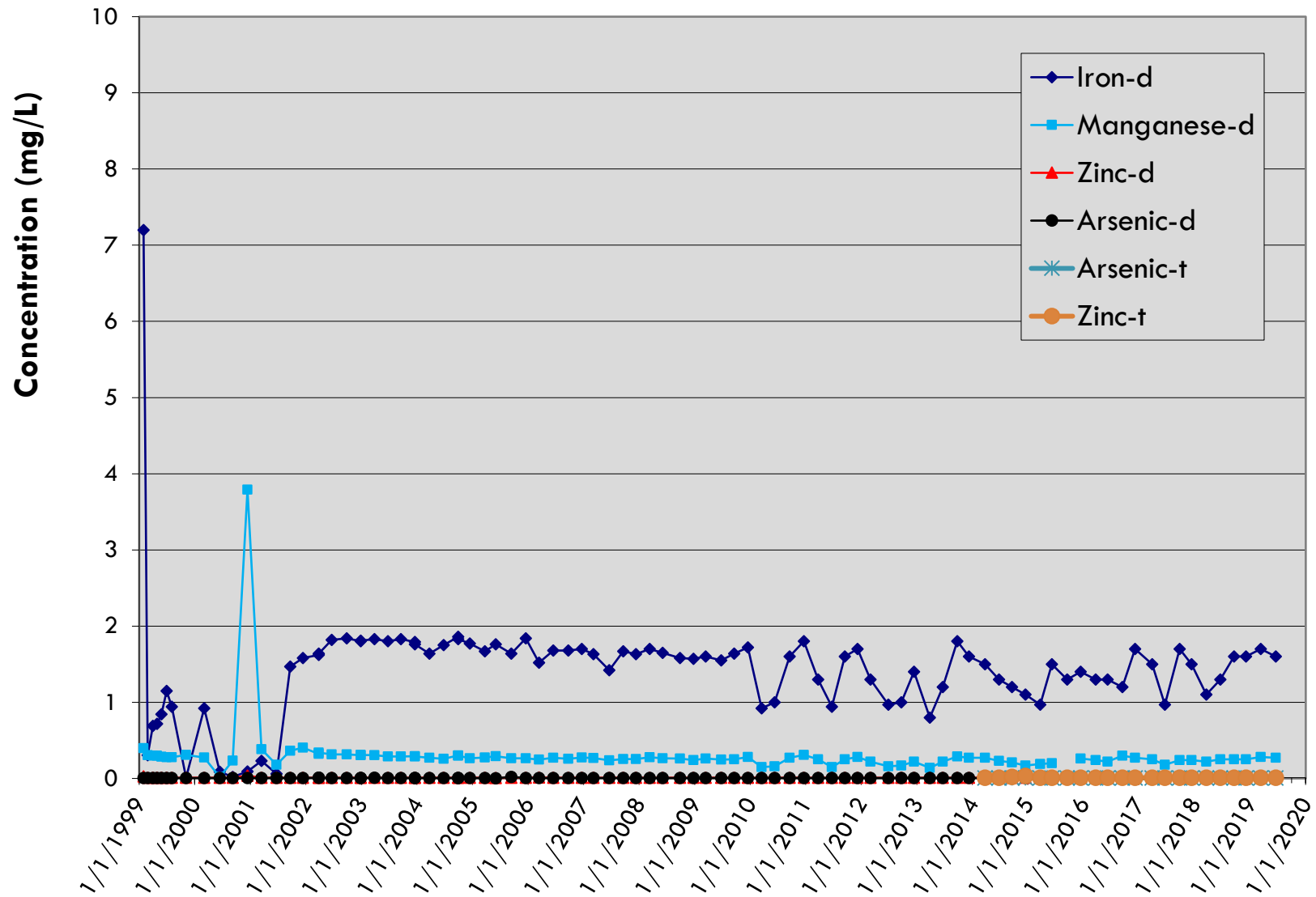


MW-10 (Background) LRI Landfill, Pierce County, Washington



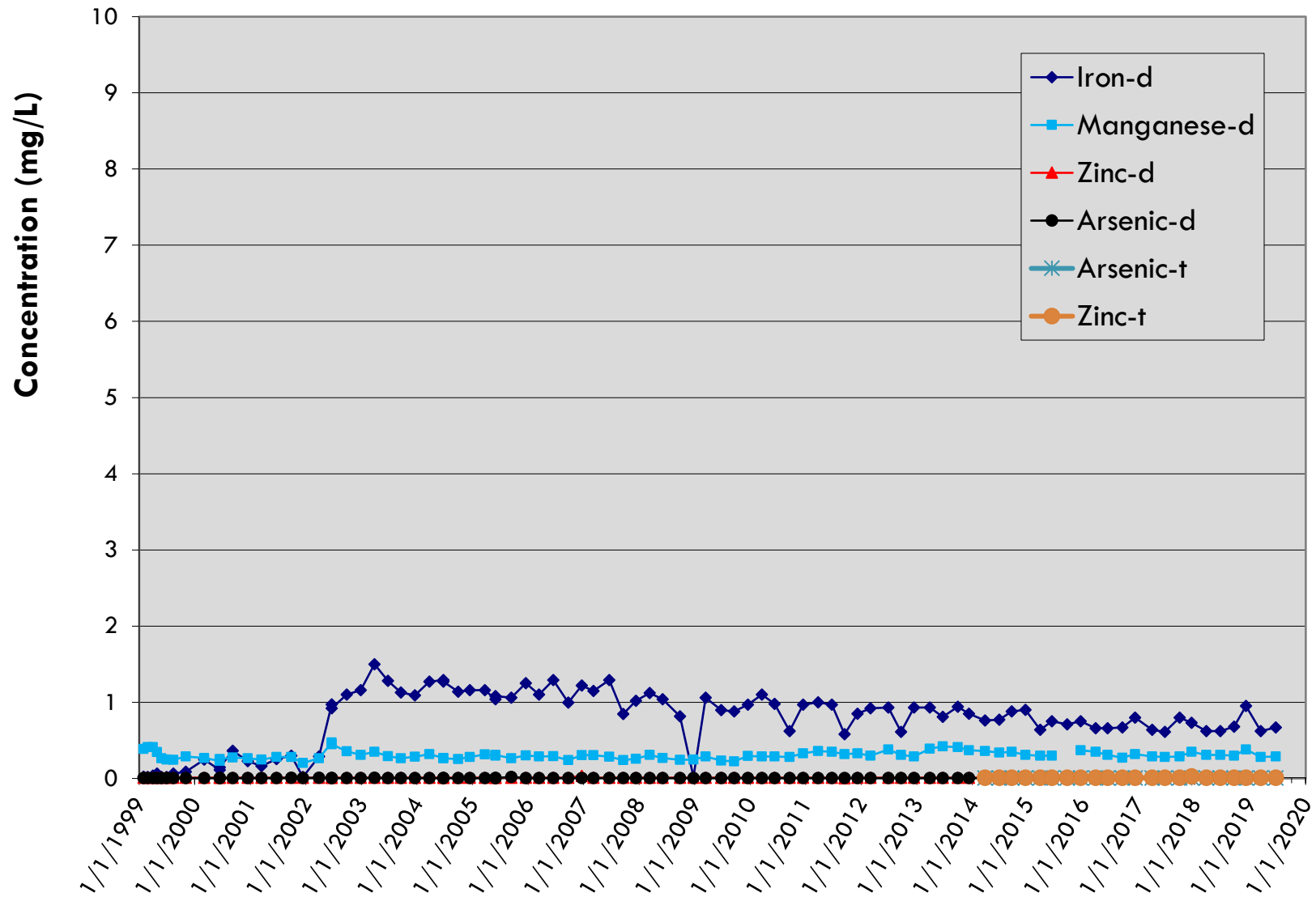
MW-1A

LRI Landfill, Pierce County, Washington



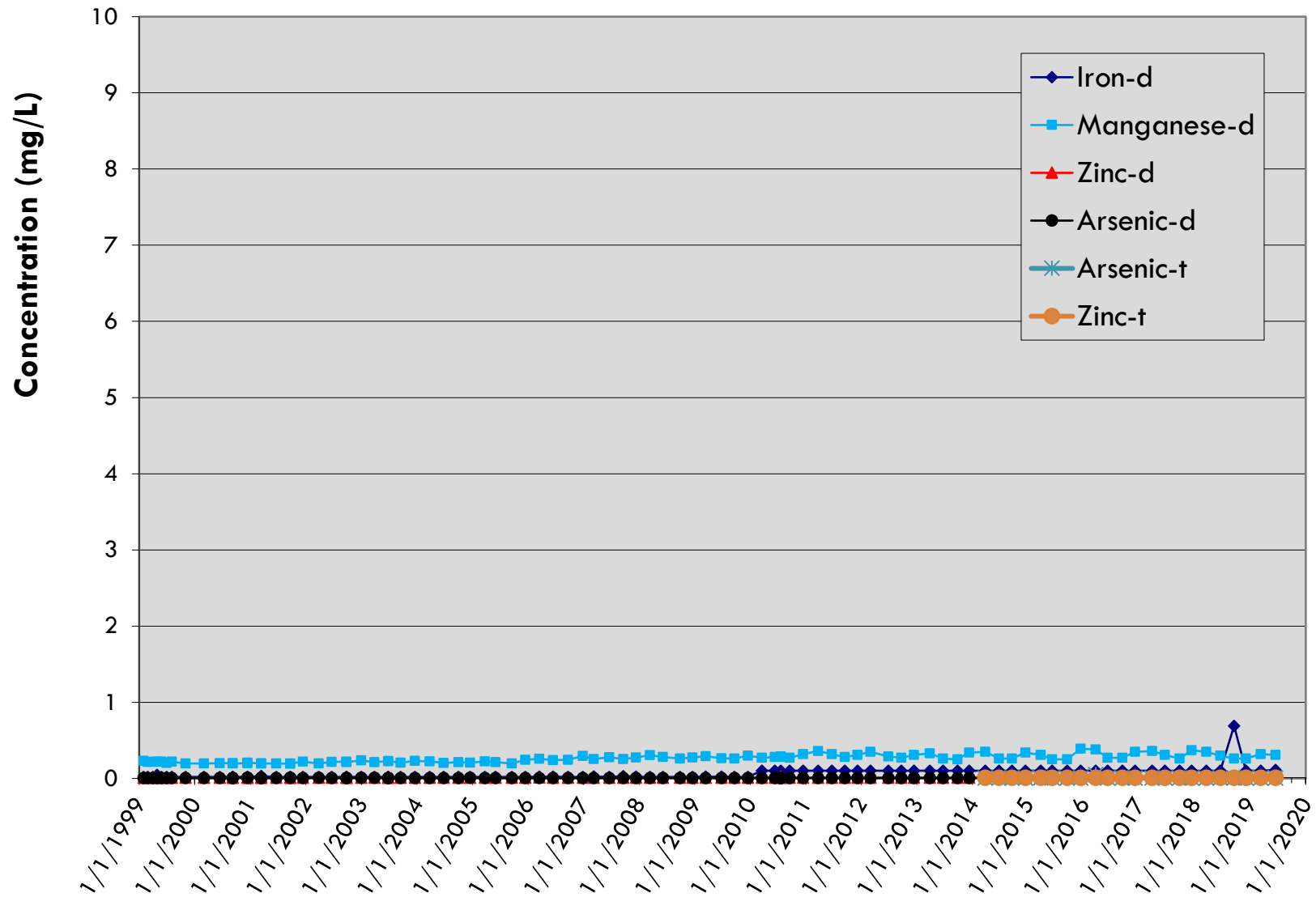
MW-2A

LRI Landfill, Pierce County, Washington



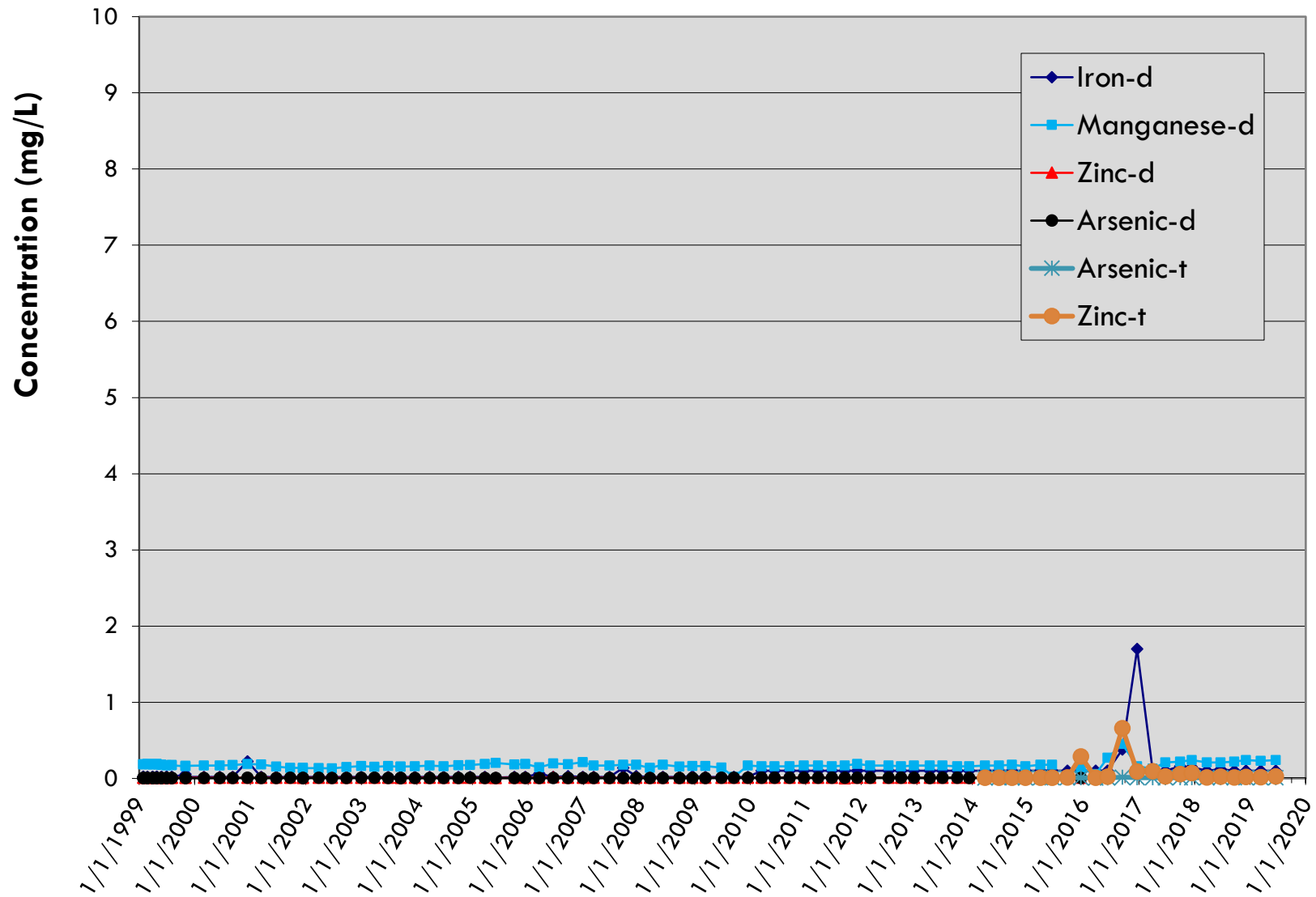
MW-3

LRI Landfill, Pierce County, Washington

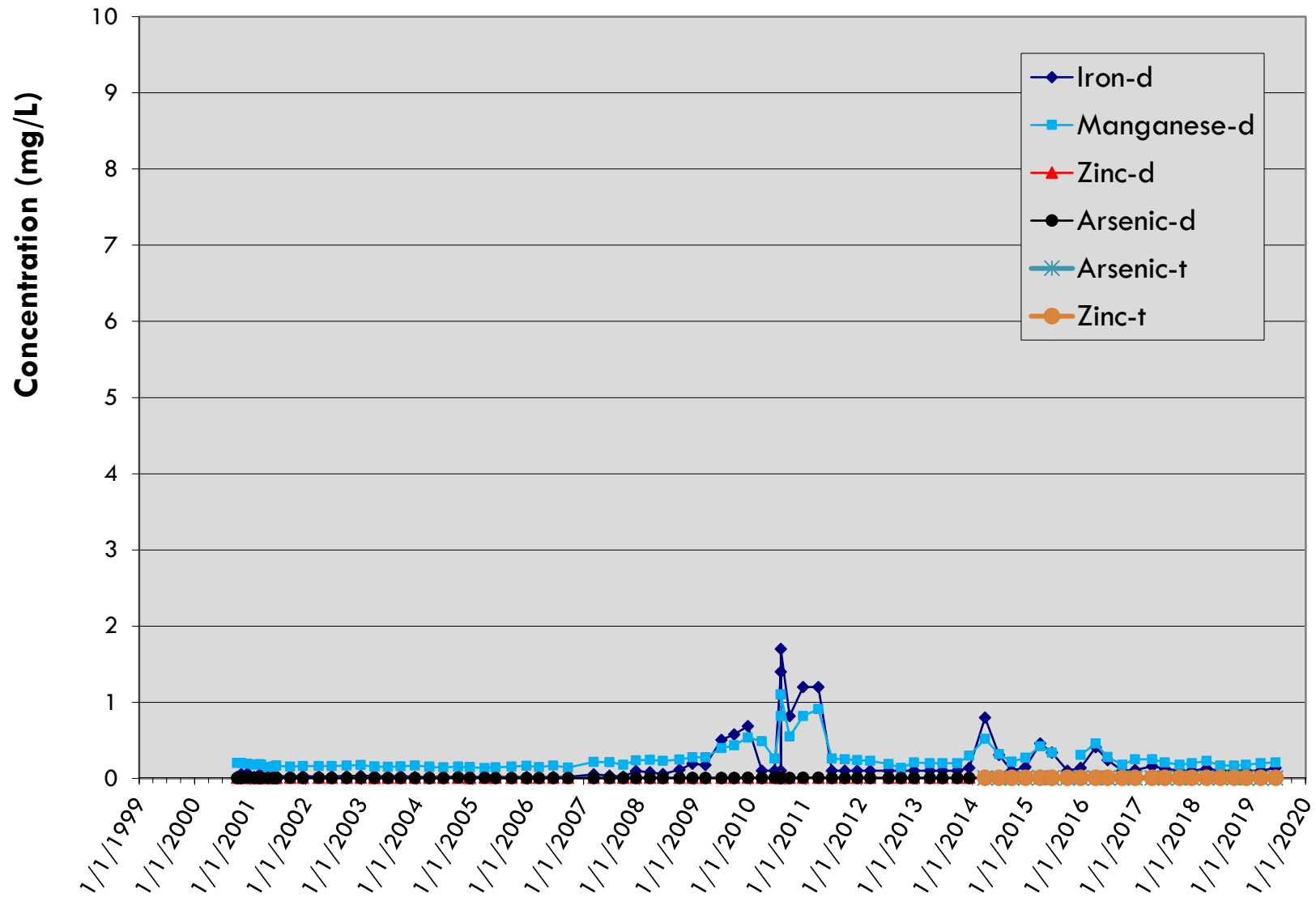


MW-4

LRI Landfill, Pierce County, Washington

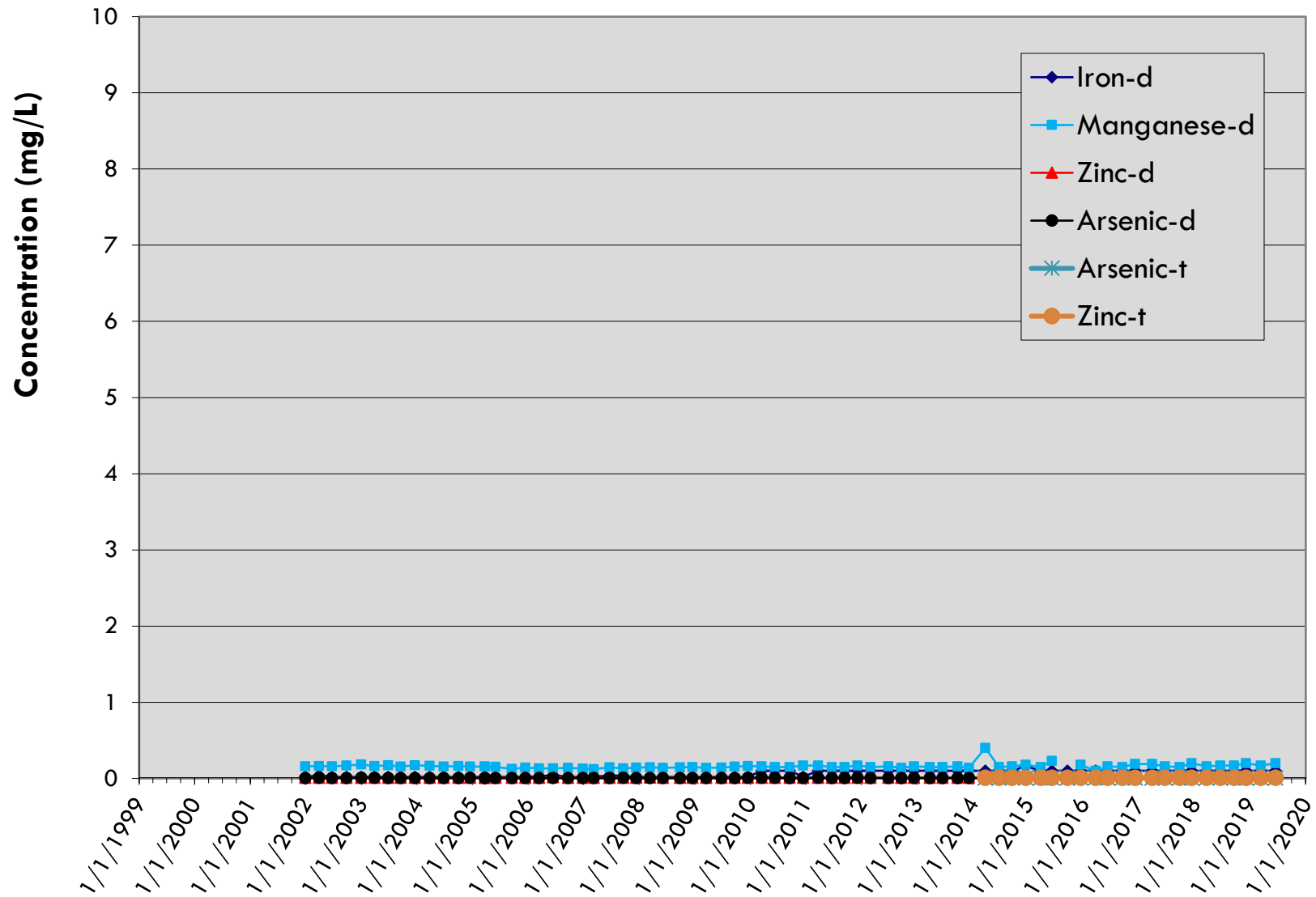


MW-5A
LRI Landfill, Pierce County, Washington

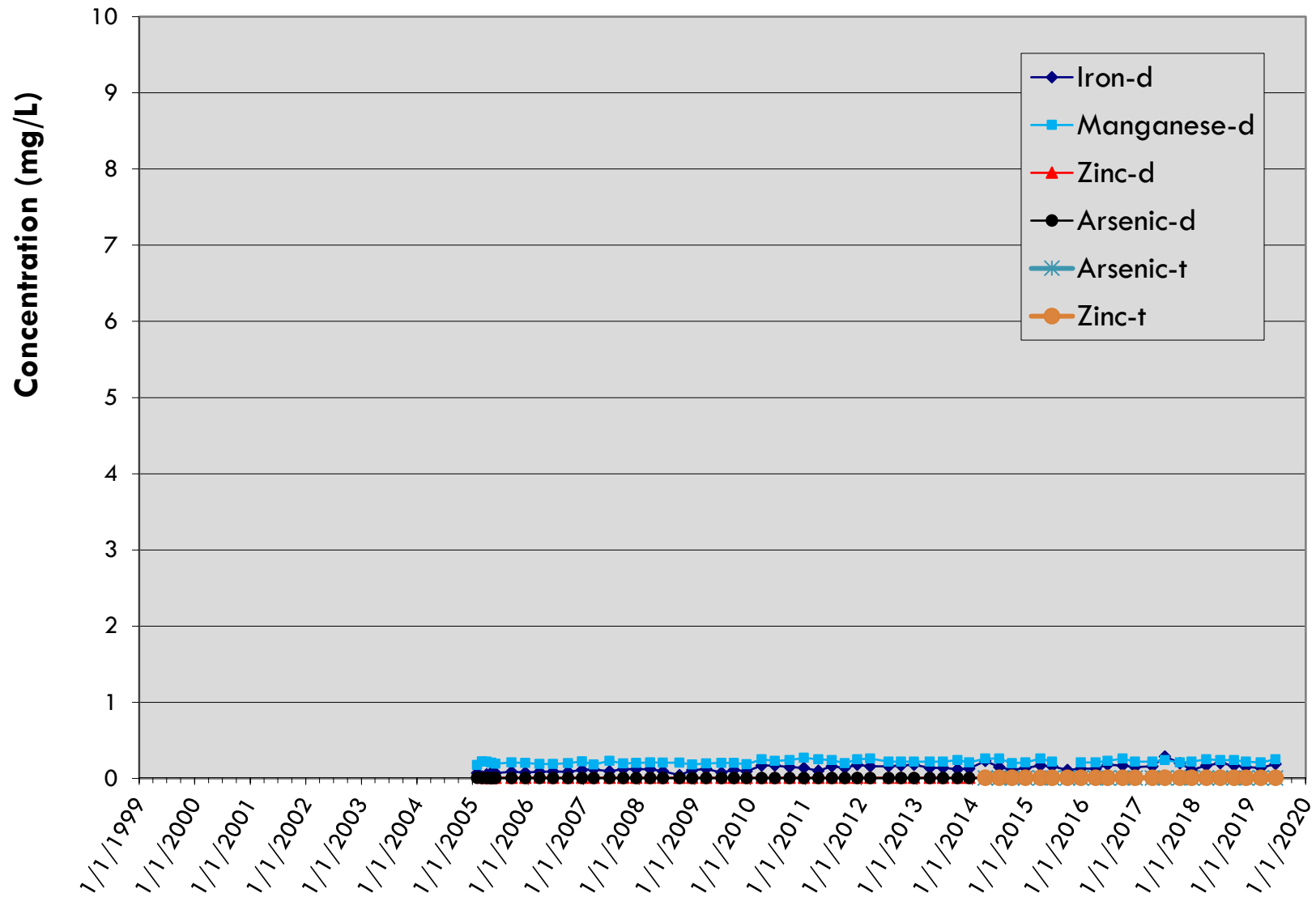


MW-6

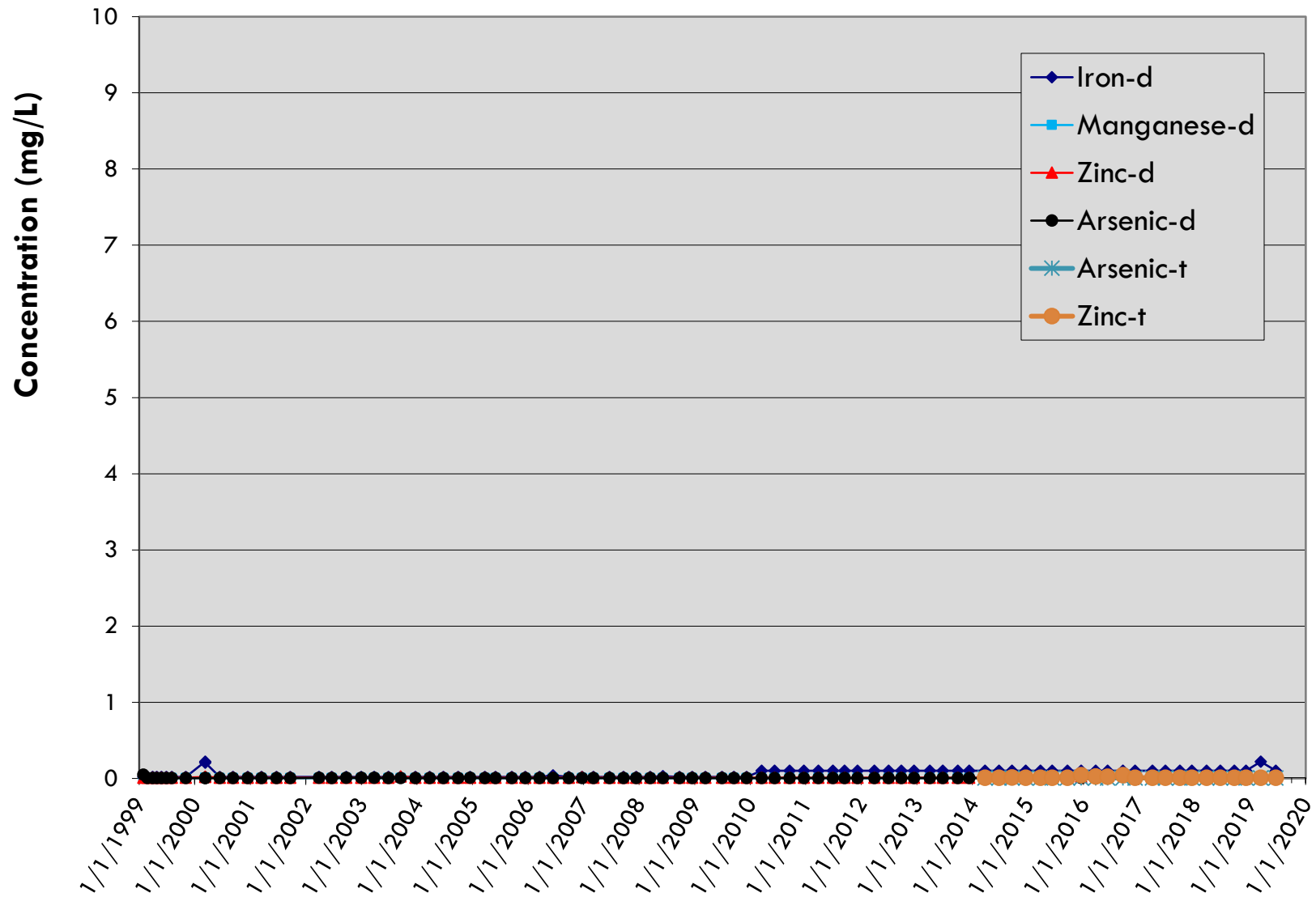
LRI Landfill, Pierce County, Washington



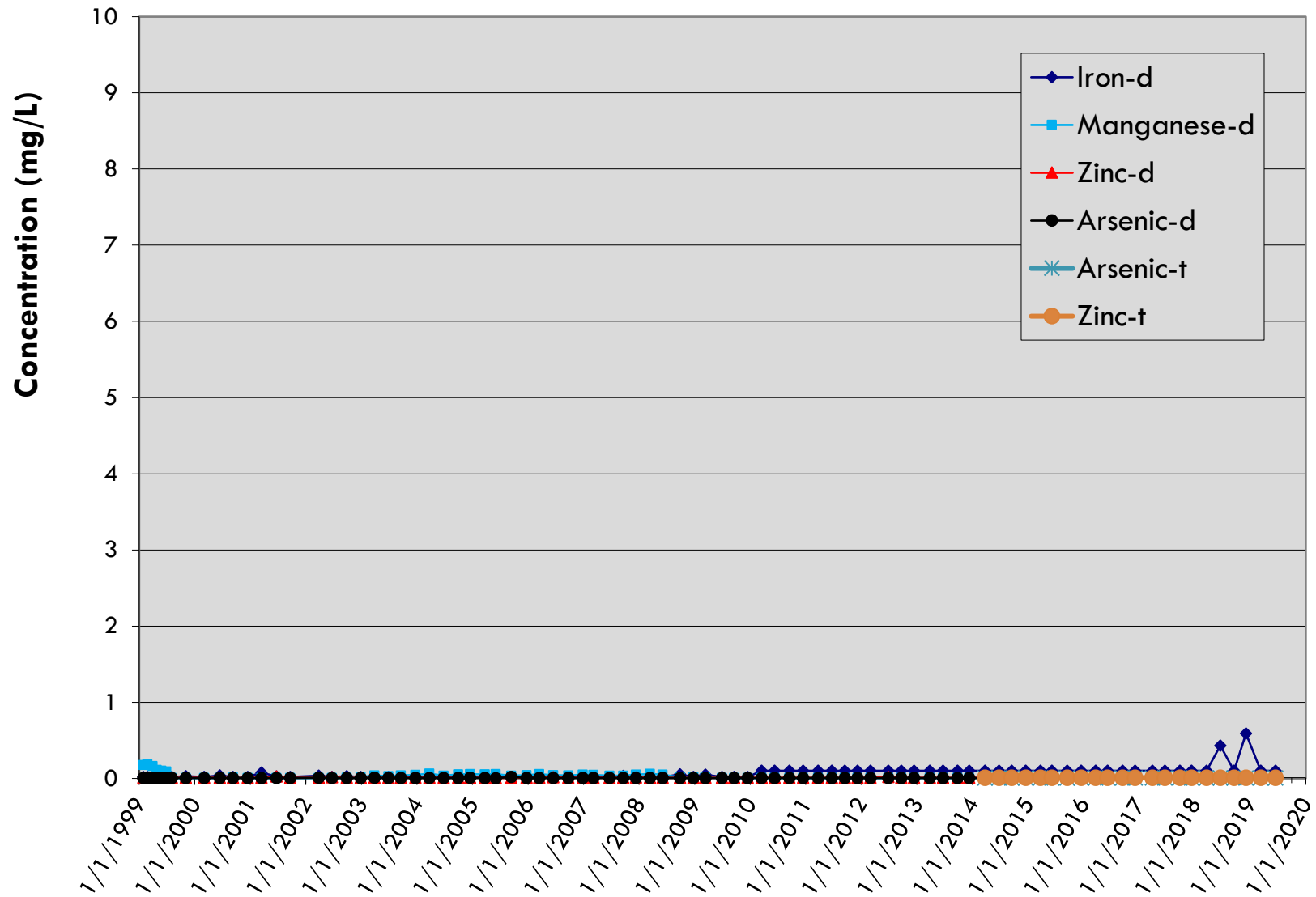
MW-7
LRI Landfill, Pierce County, Washington



MW-9 (Background) LRI Landfill, Pierce County, Washington

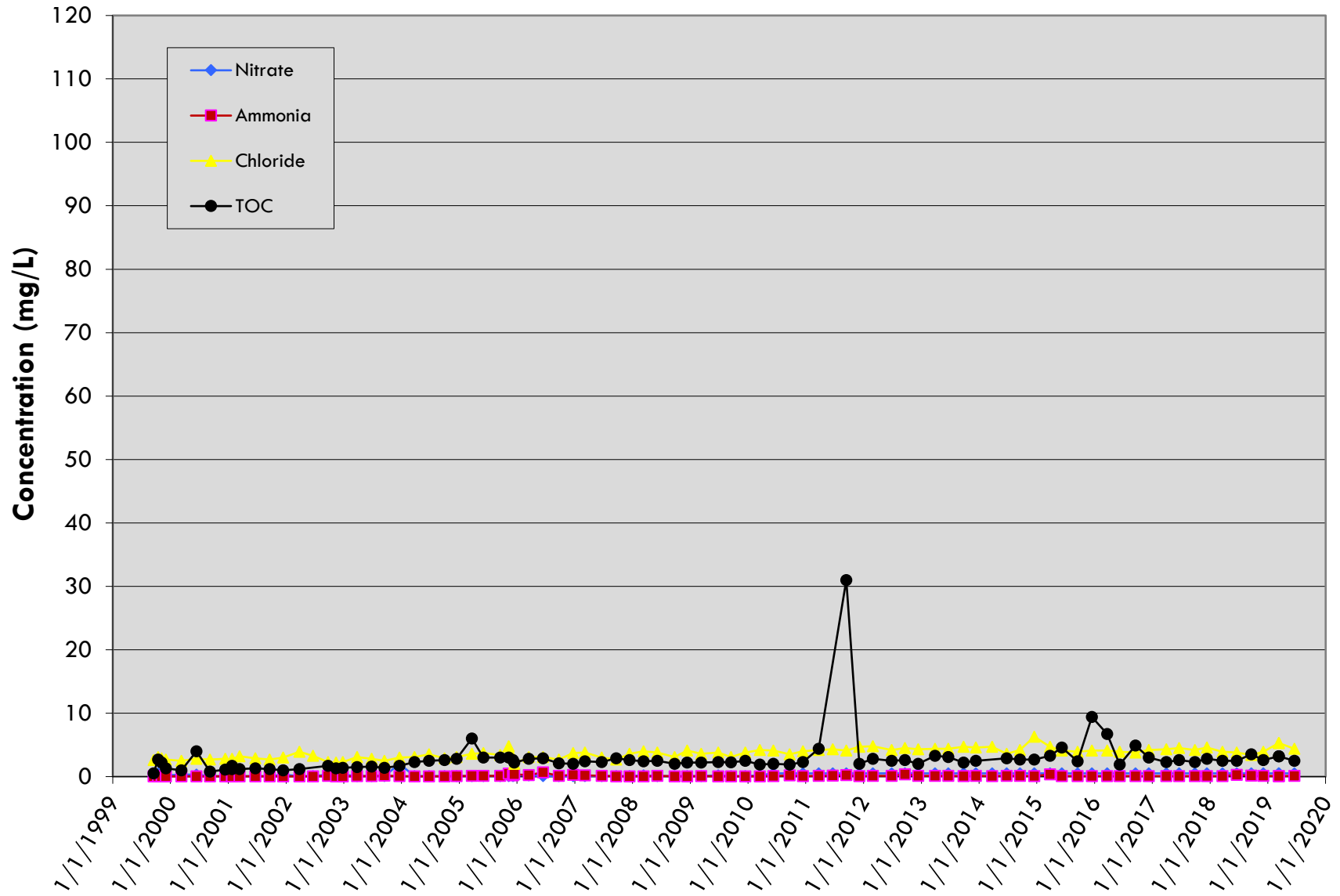


MW-10 (Background) LRI Landfill, Pierce County, Washington



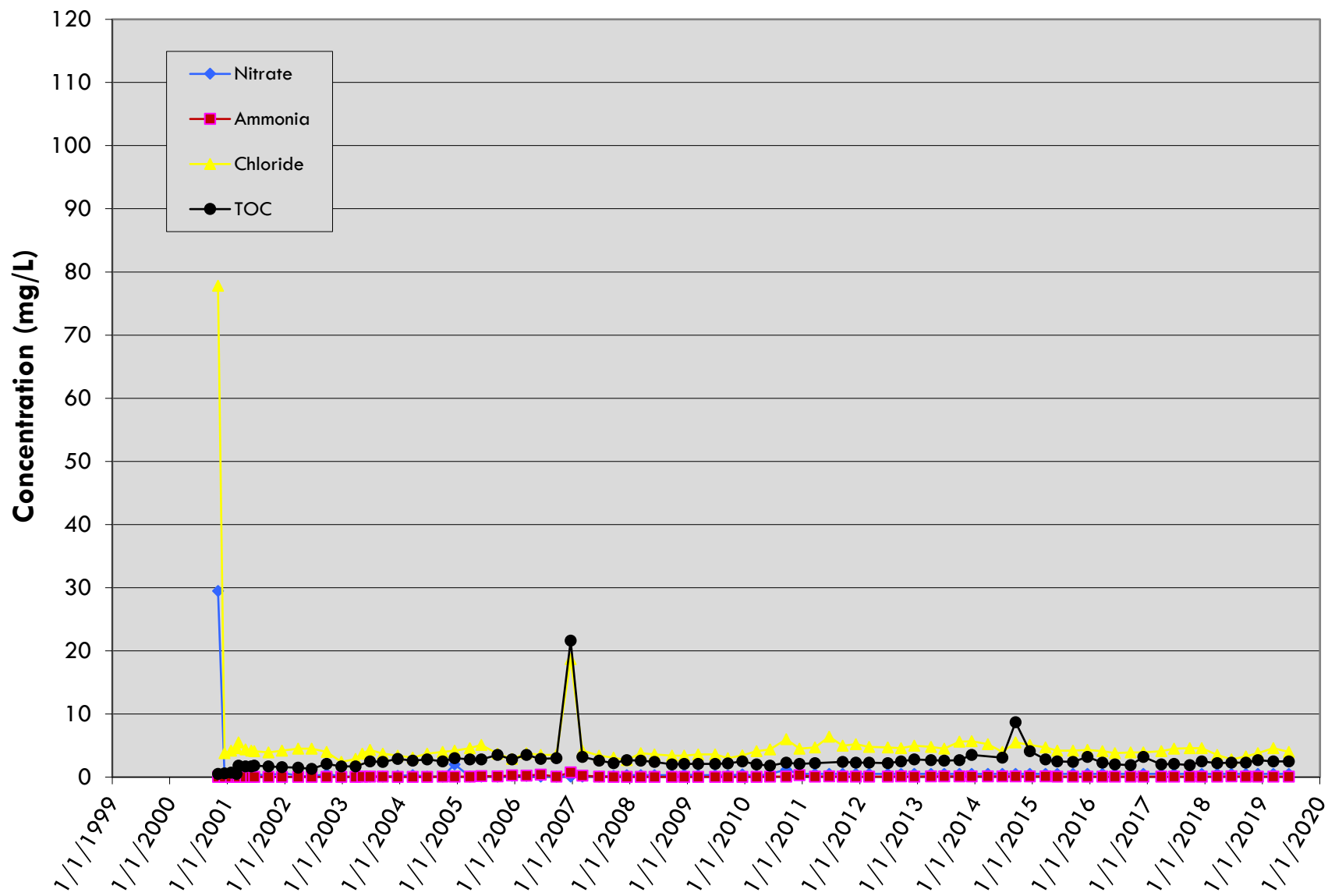
LDCS-1

LRI Landfill, Pierce County, Washington



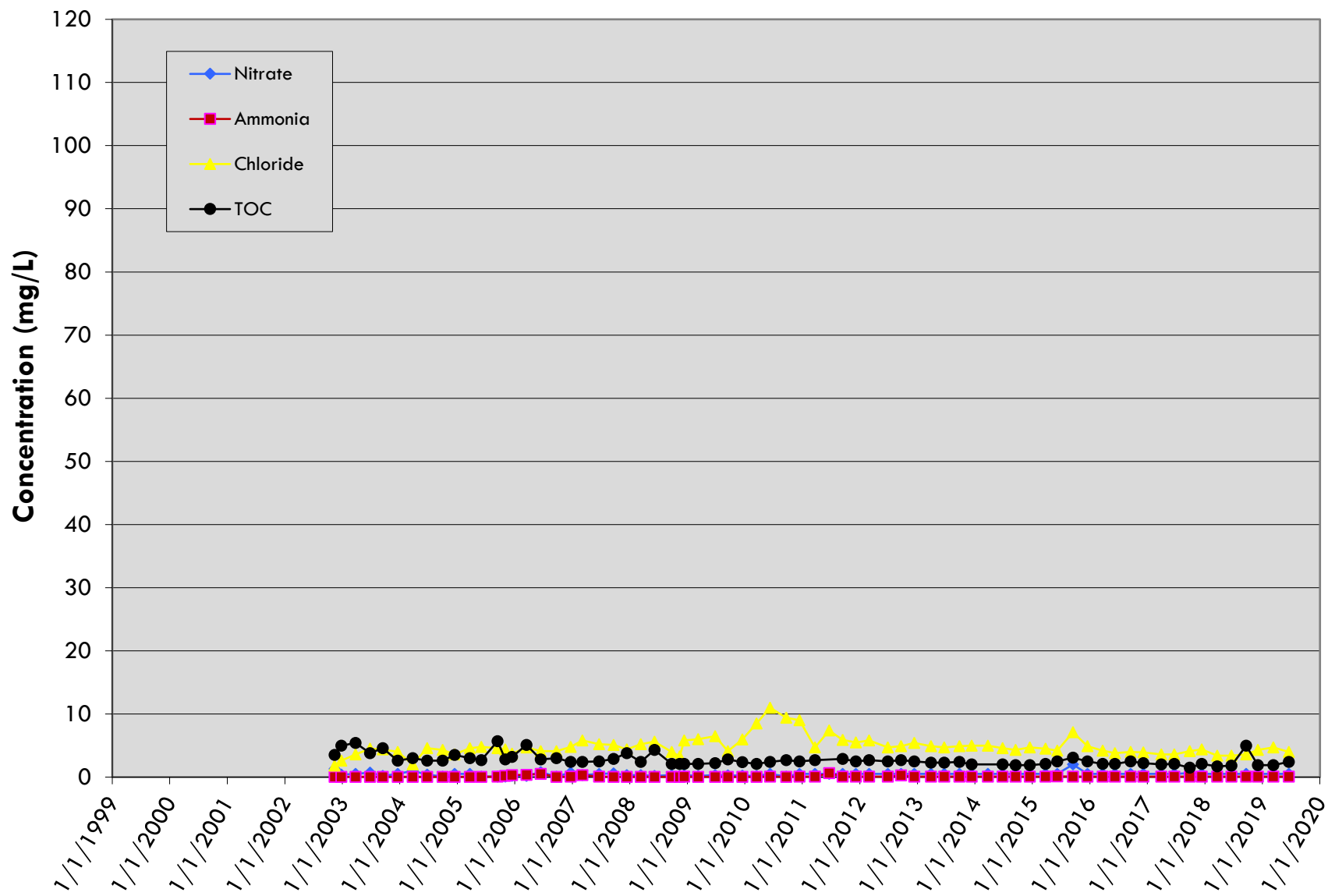
LDCS-2A

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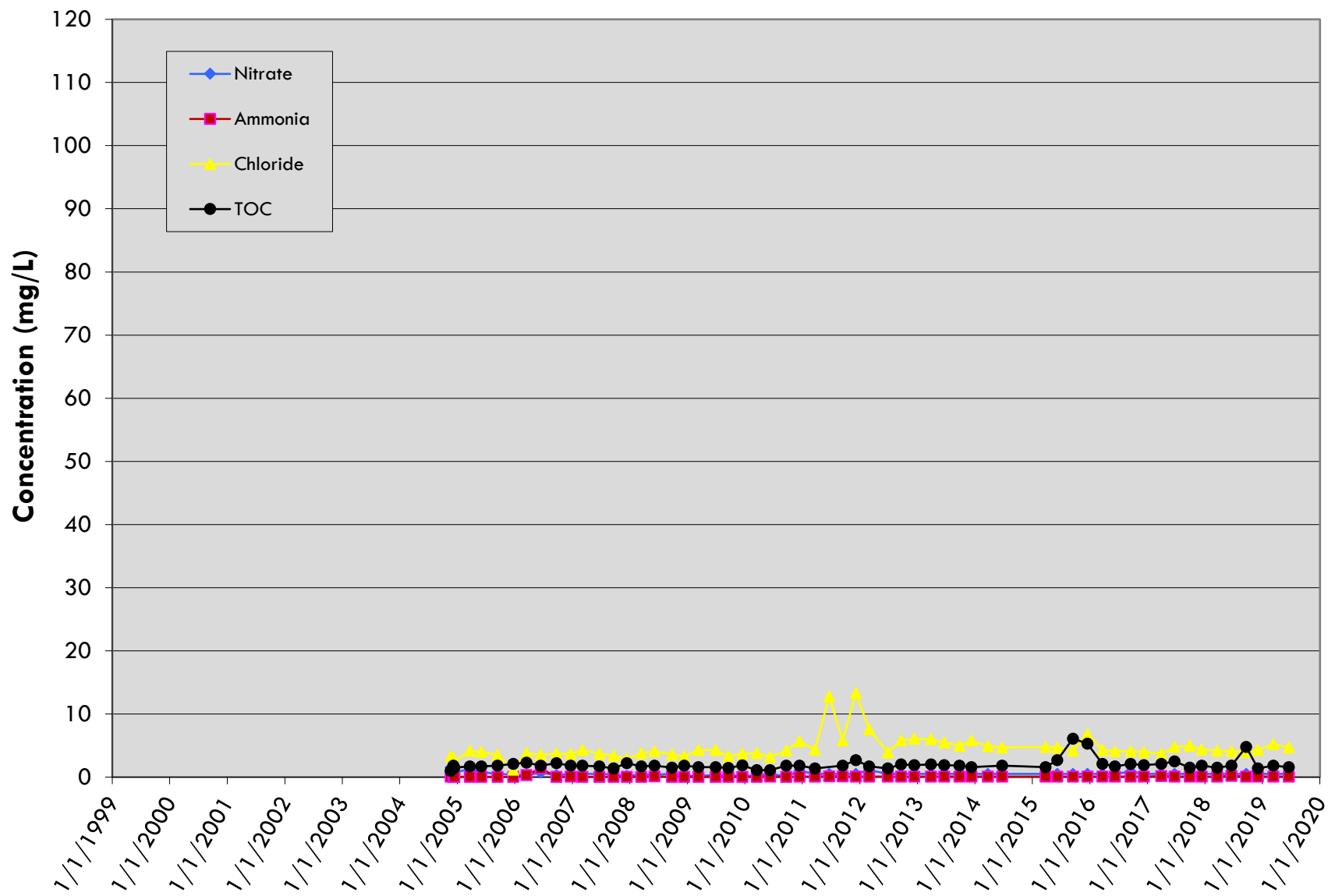
LDCS-2B

LRI Landfill, Pierce County, Washington



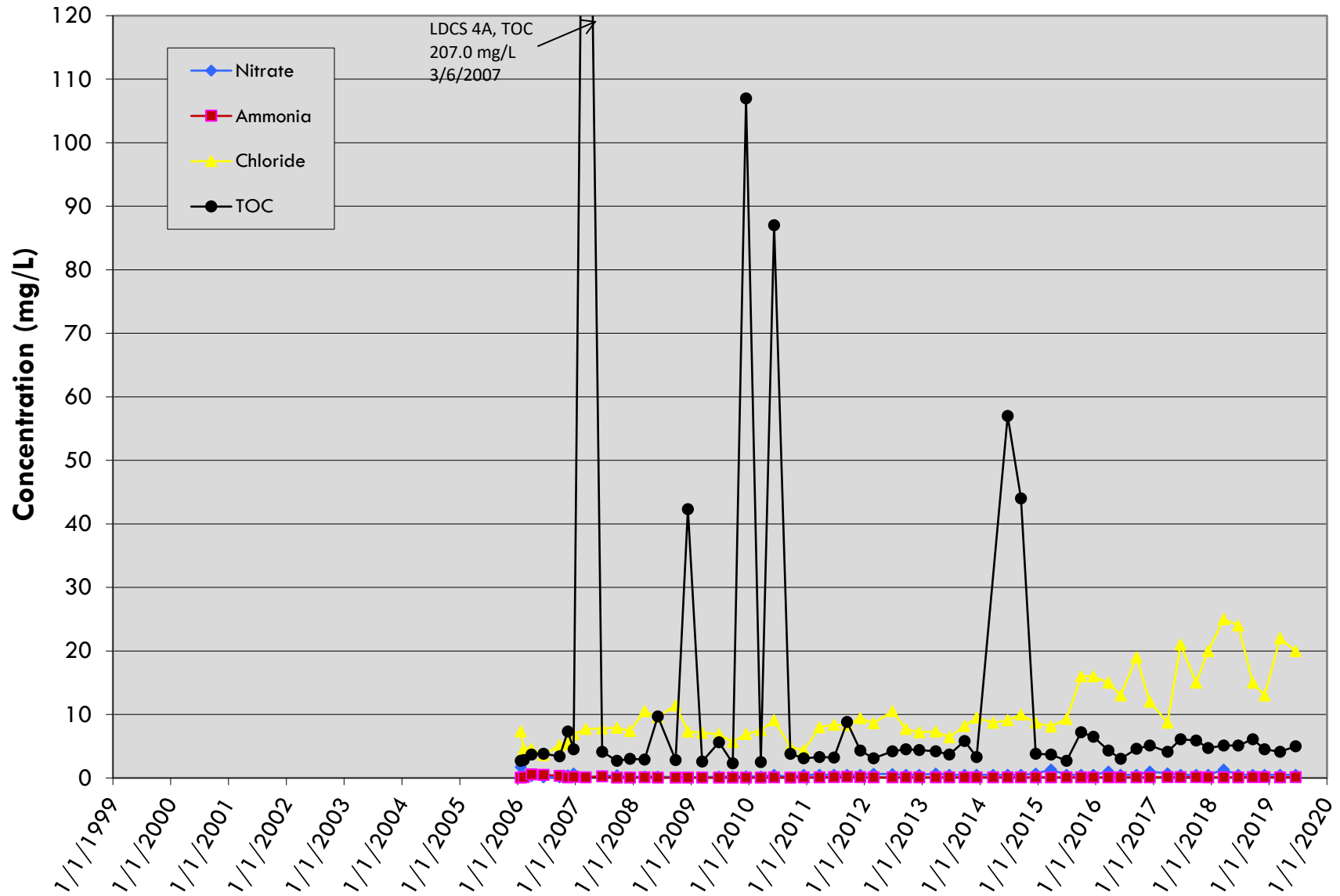
LDCS-3A

LRI Landfill, Pierce County, Washington



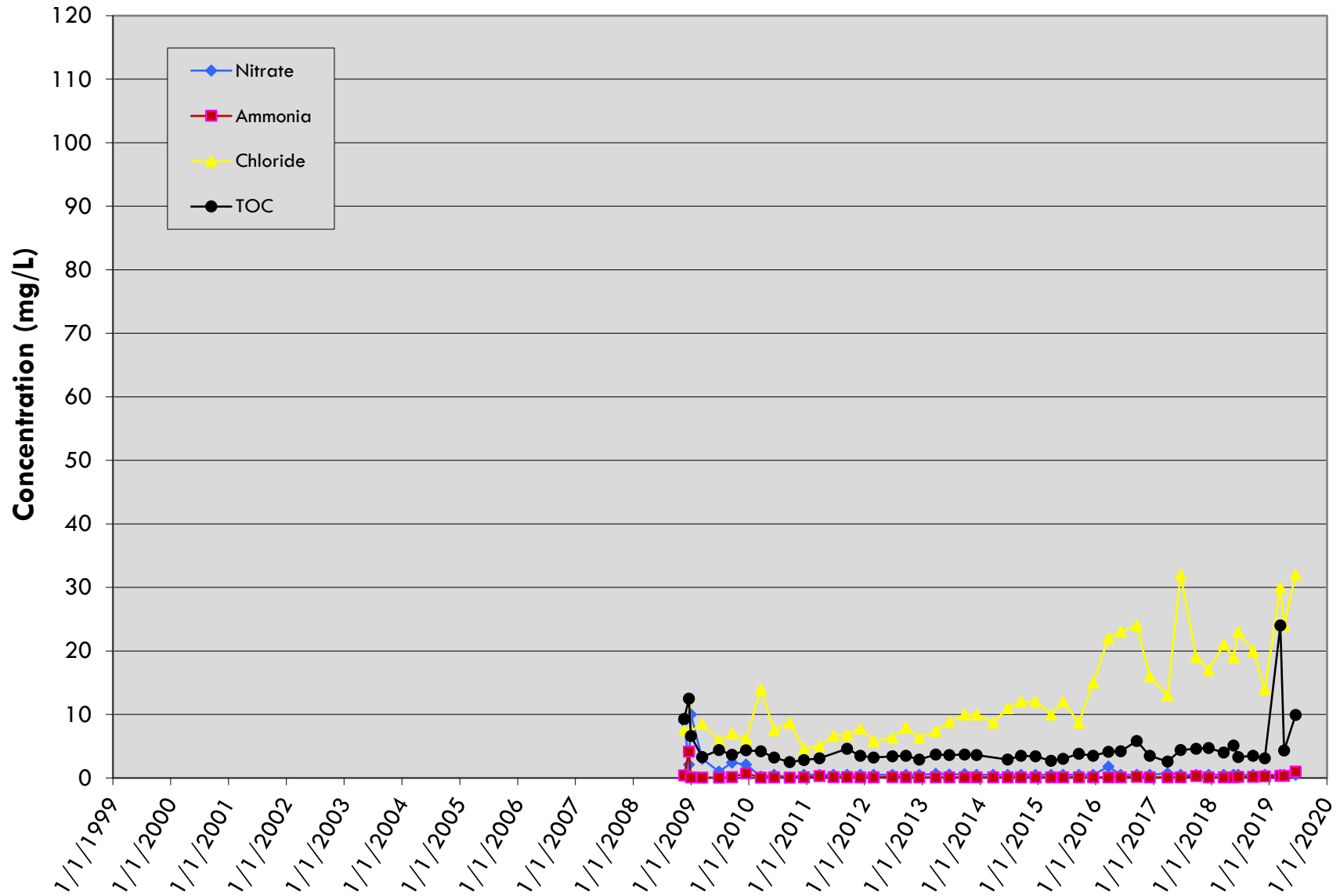
LDCS-4A

LRI Landfill, Pierce County, Washington



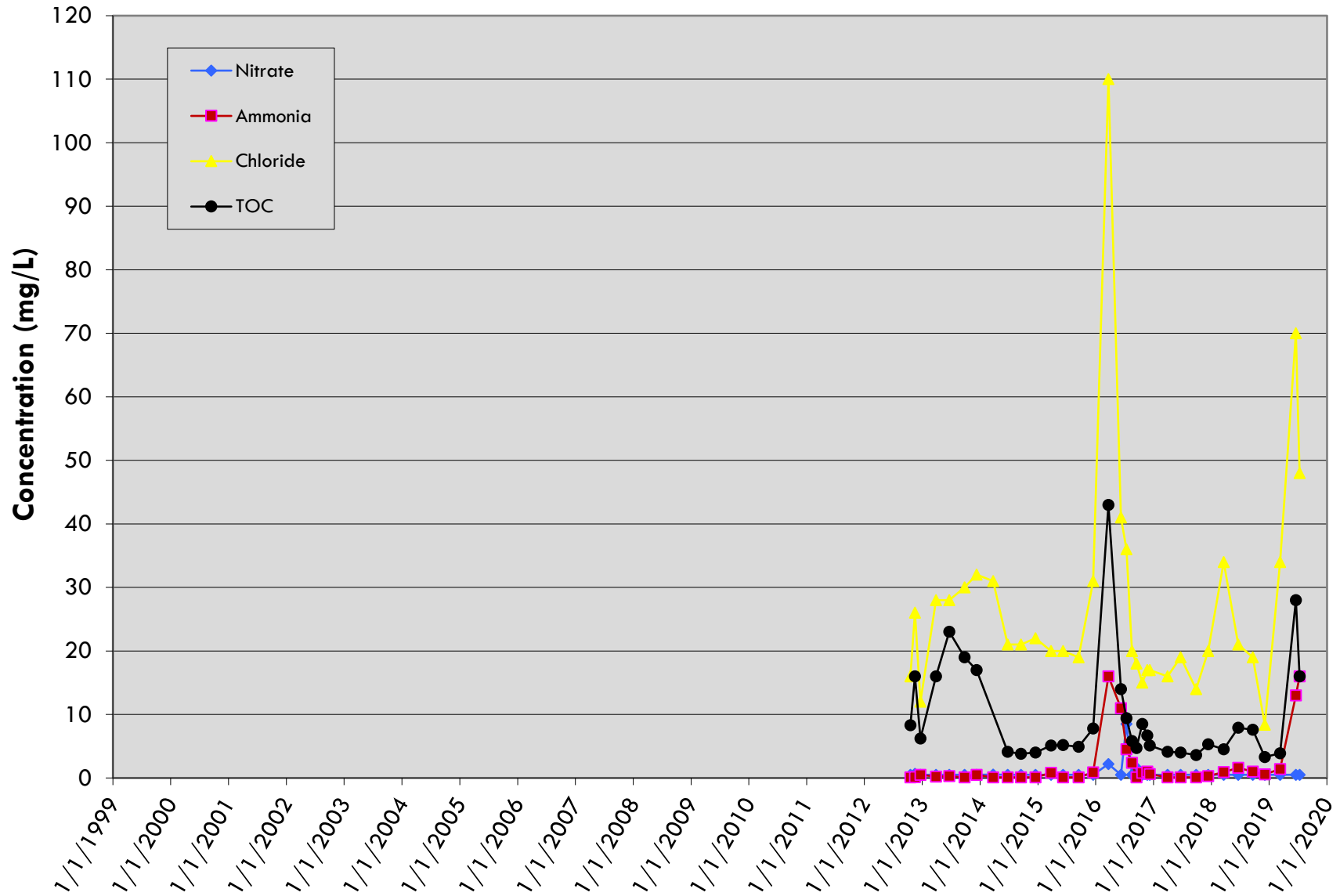
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LRI Landfill, Pierce County, Washington



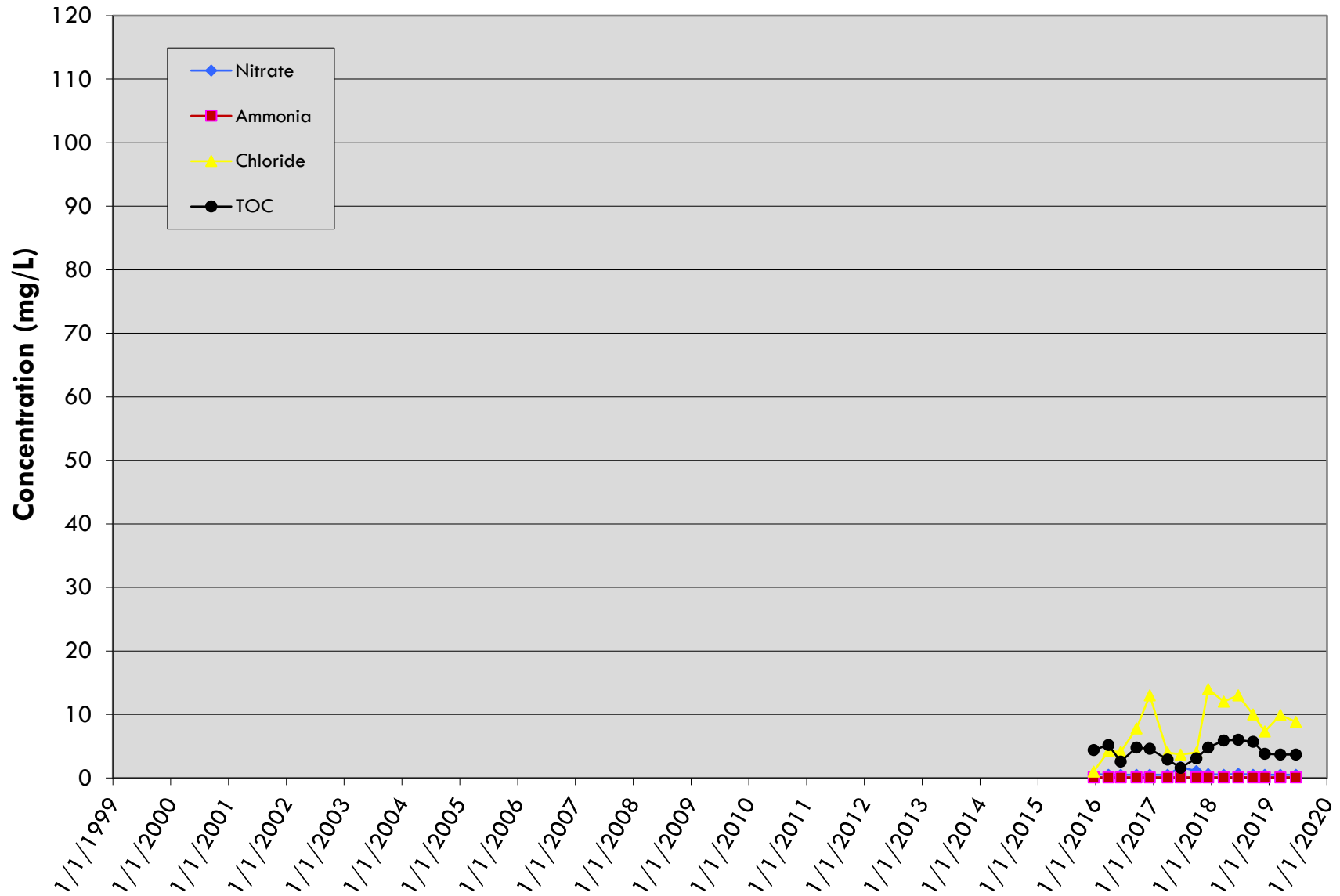
LDCS-5

LRI Landfill, Pierce County, Washington



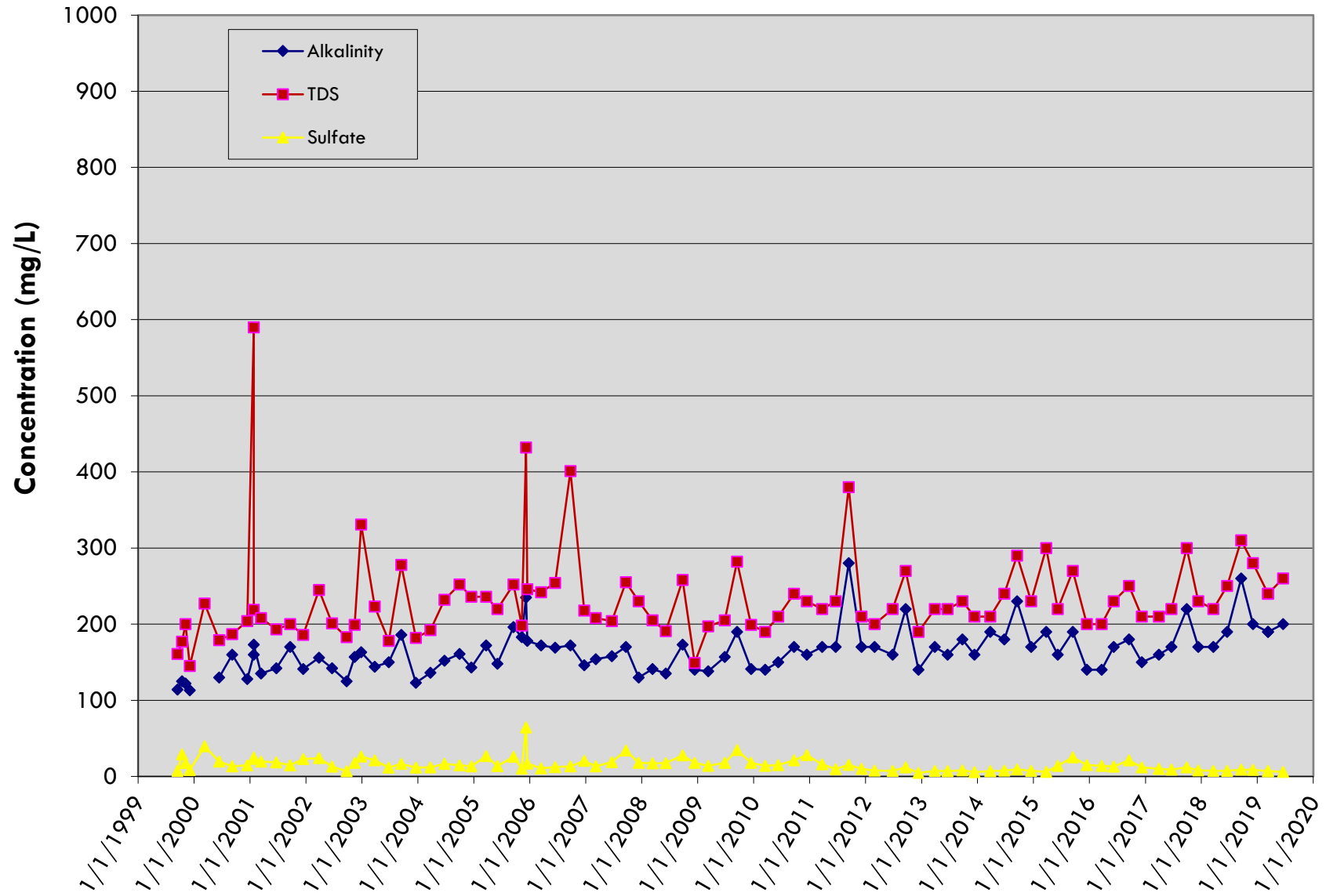
LDCS-6A

LRI Landfill, Pierce County, Washington



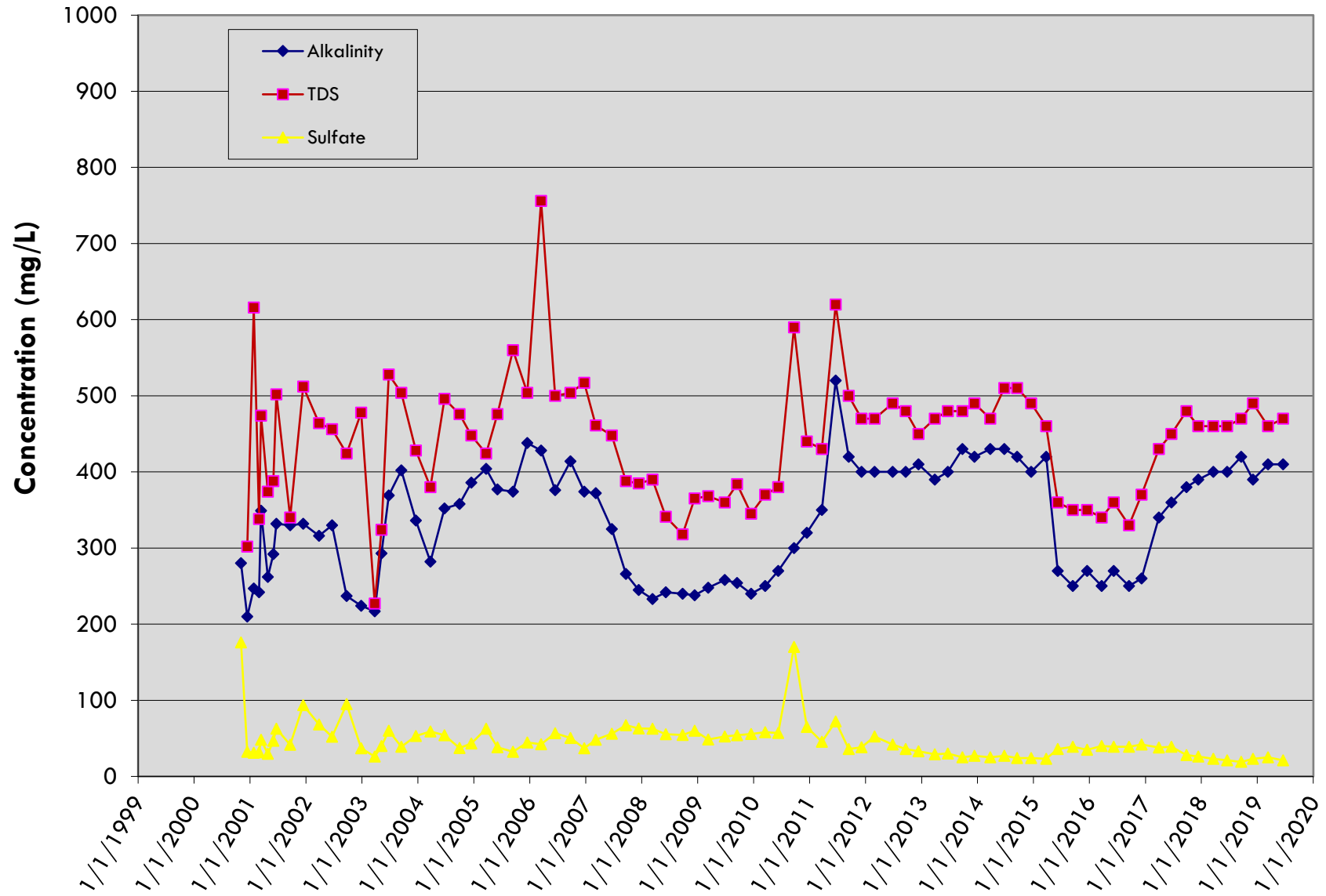
LDCS-1

LRI Landfill, Pierce County, Washington



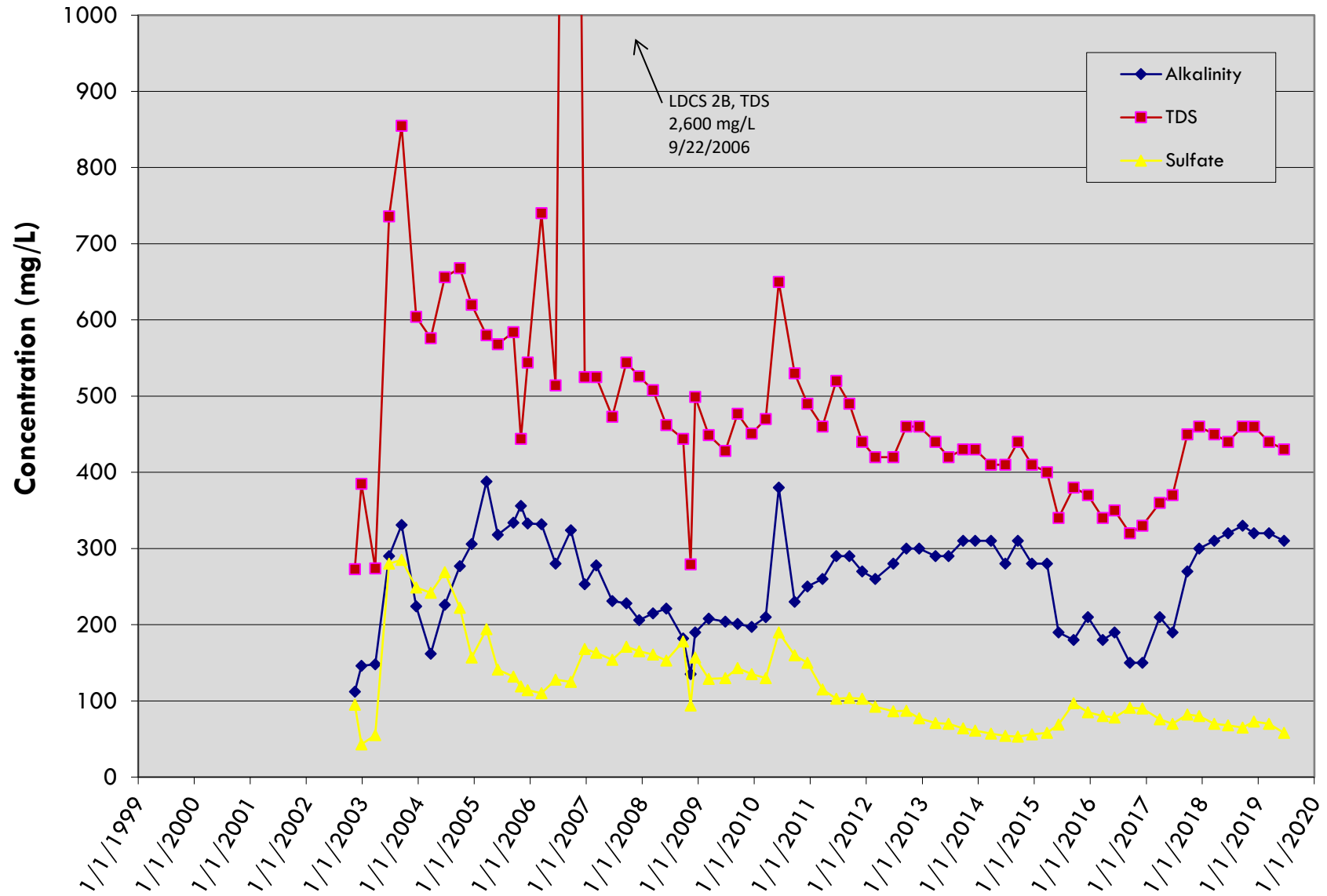
LDCS-2A

LRI Landfill, Pierce County, Washington



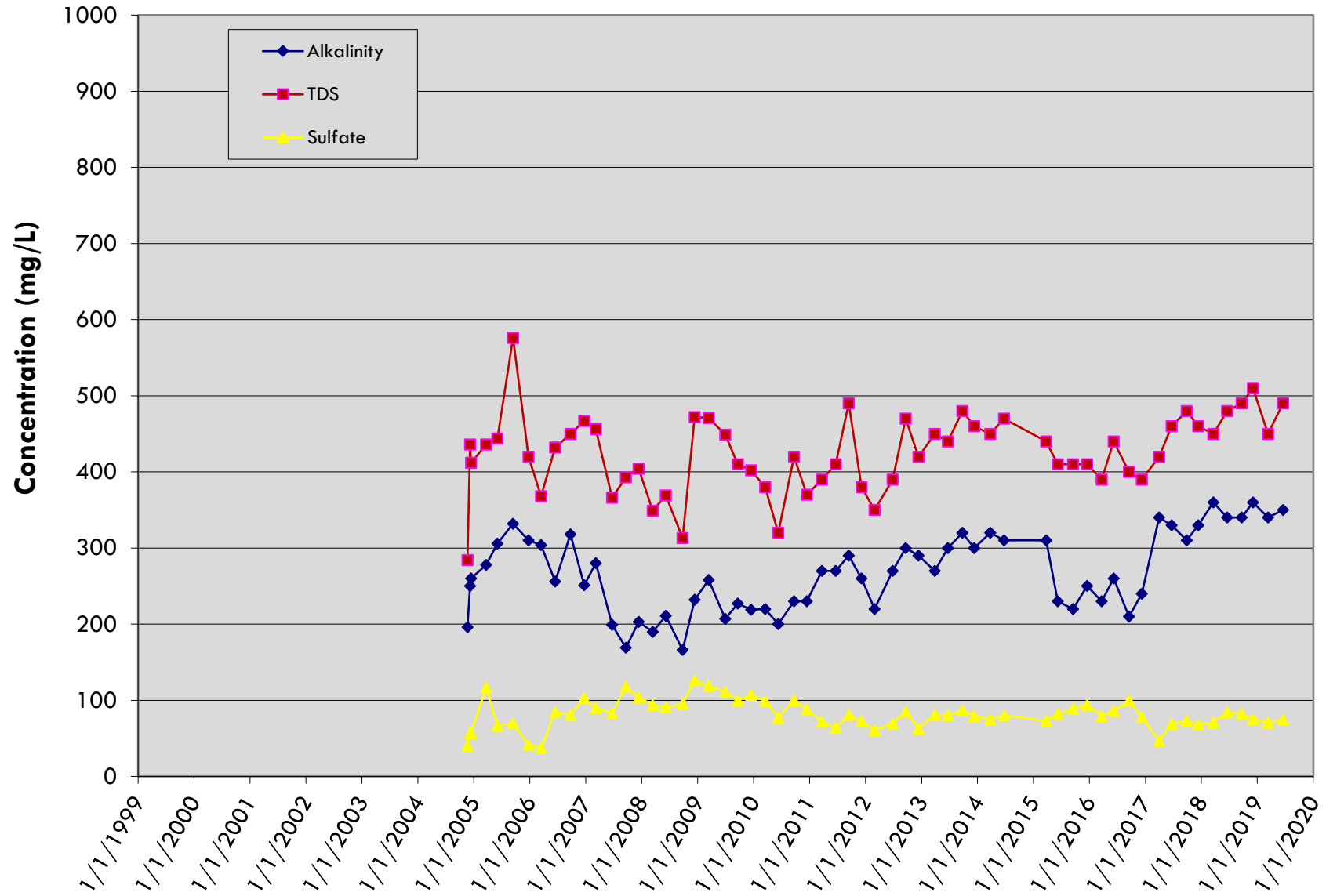
LDCS-2B

LRI Landfill, Pierce County, Washington



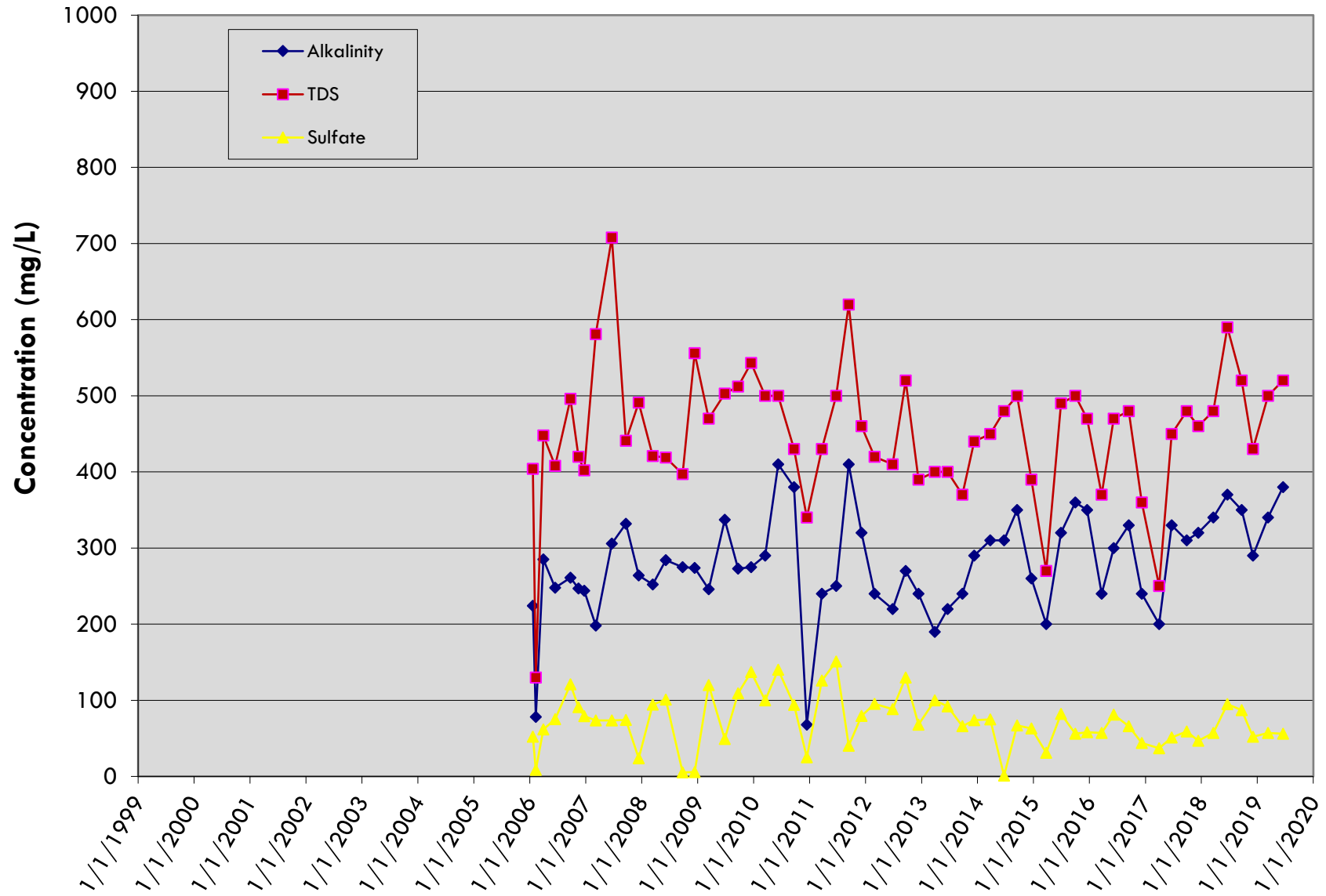
LDCS-3A

LRI Landfill, Pierce County, Washington



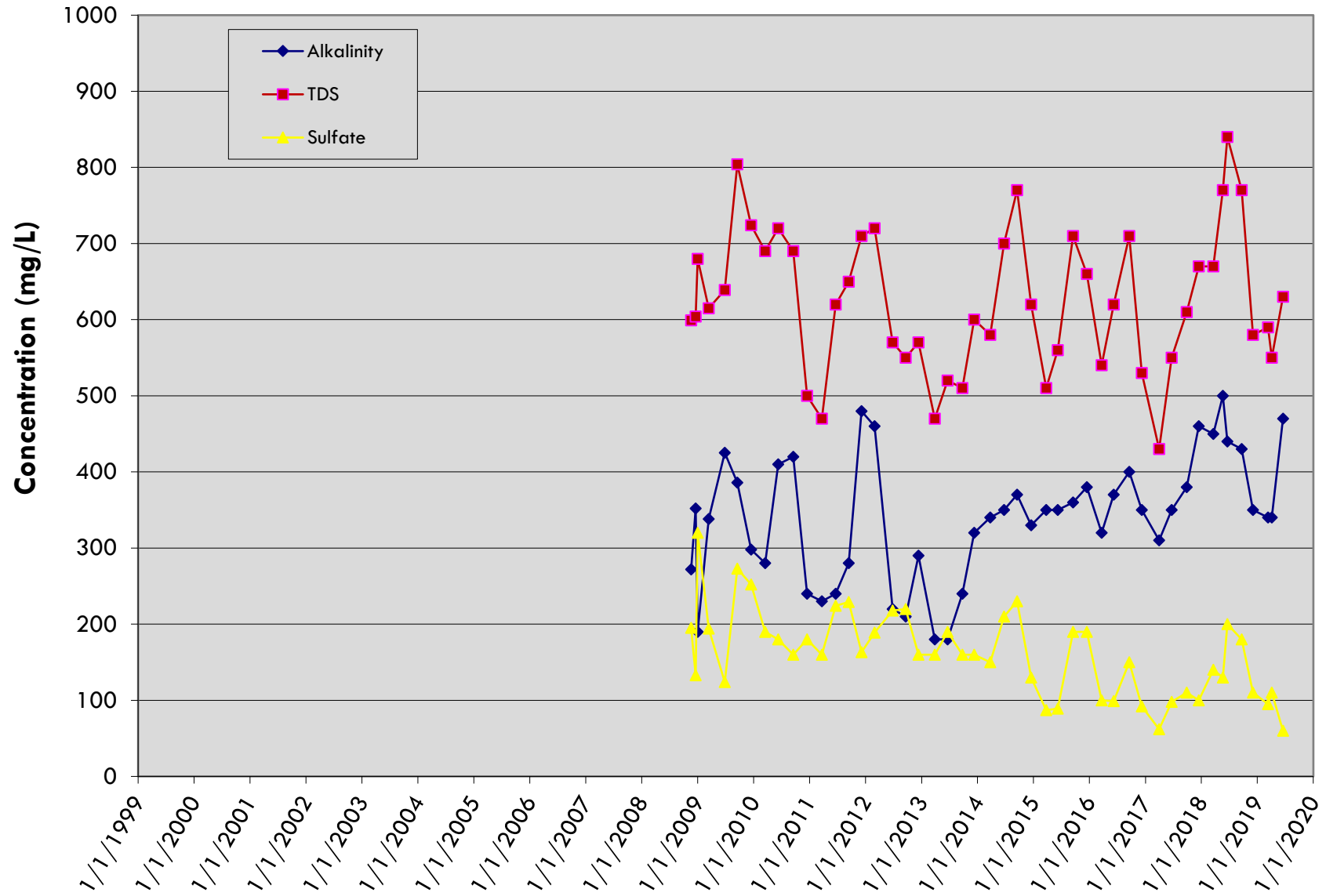
LDCS-4A

LRI Landfill, Pierce County, Washington



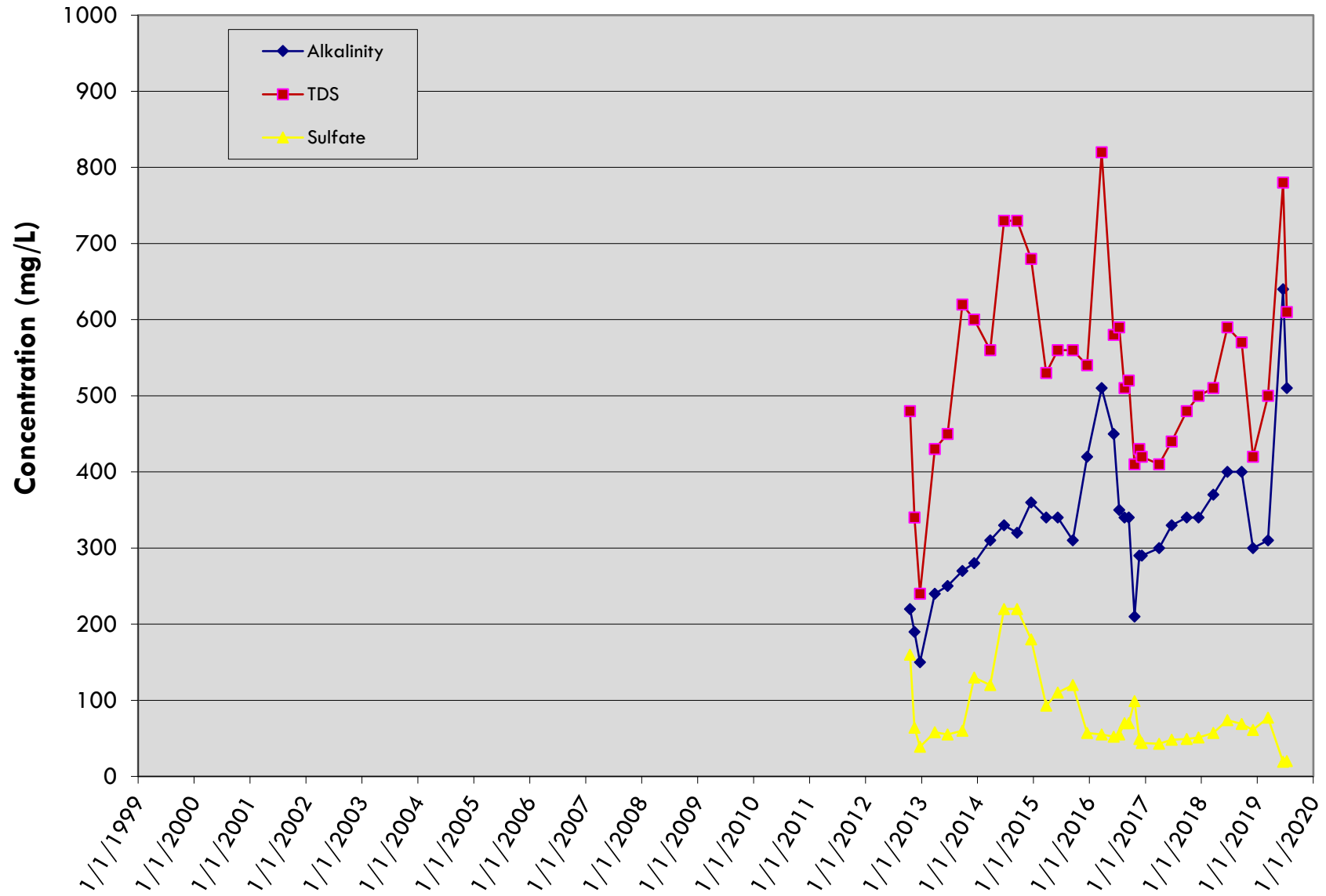
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LRI Landfill, Pierce County, Washington



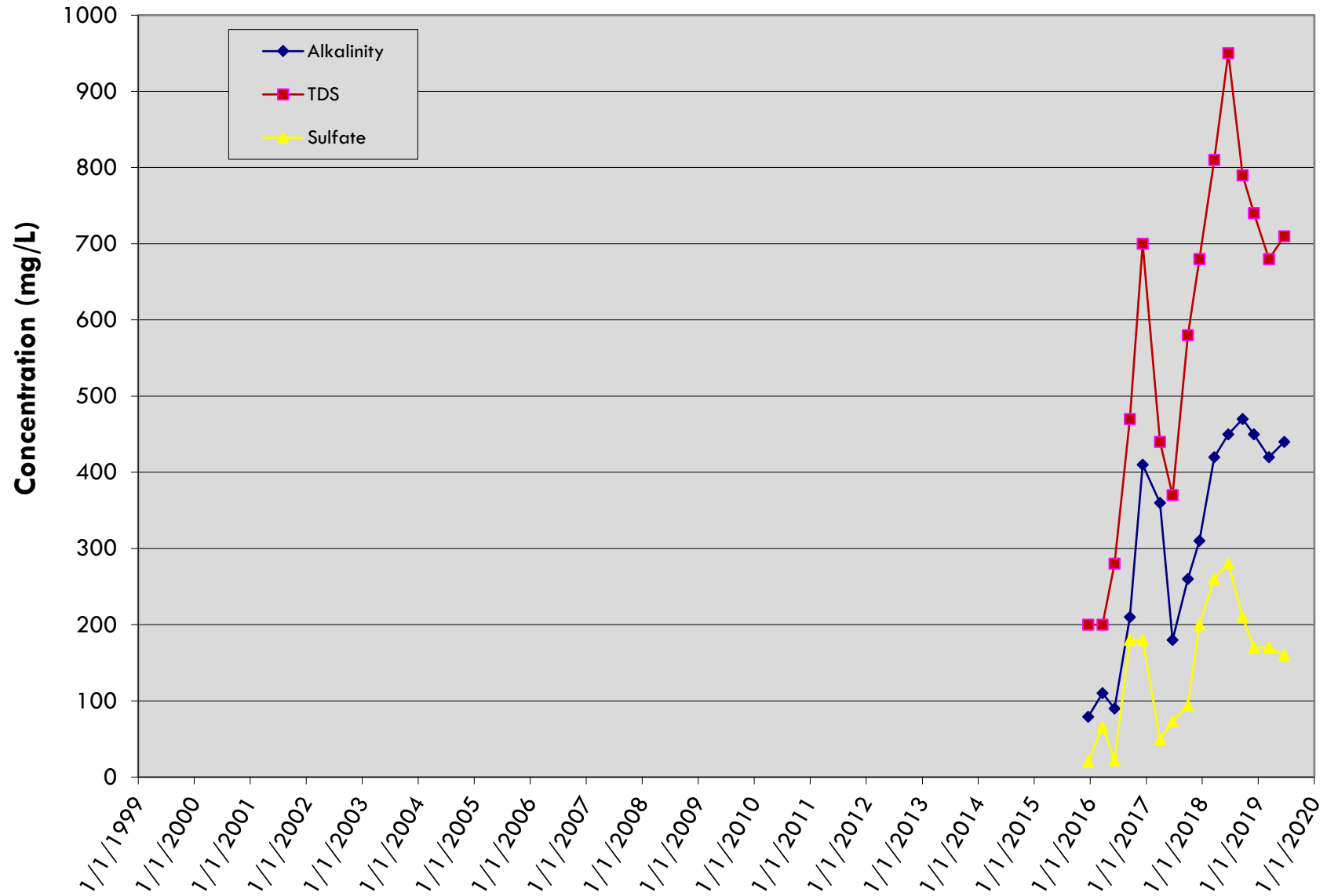
LDCS-5

LRI Landfill, Pierce County, Washington



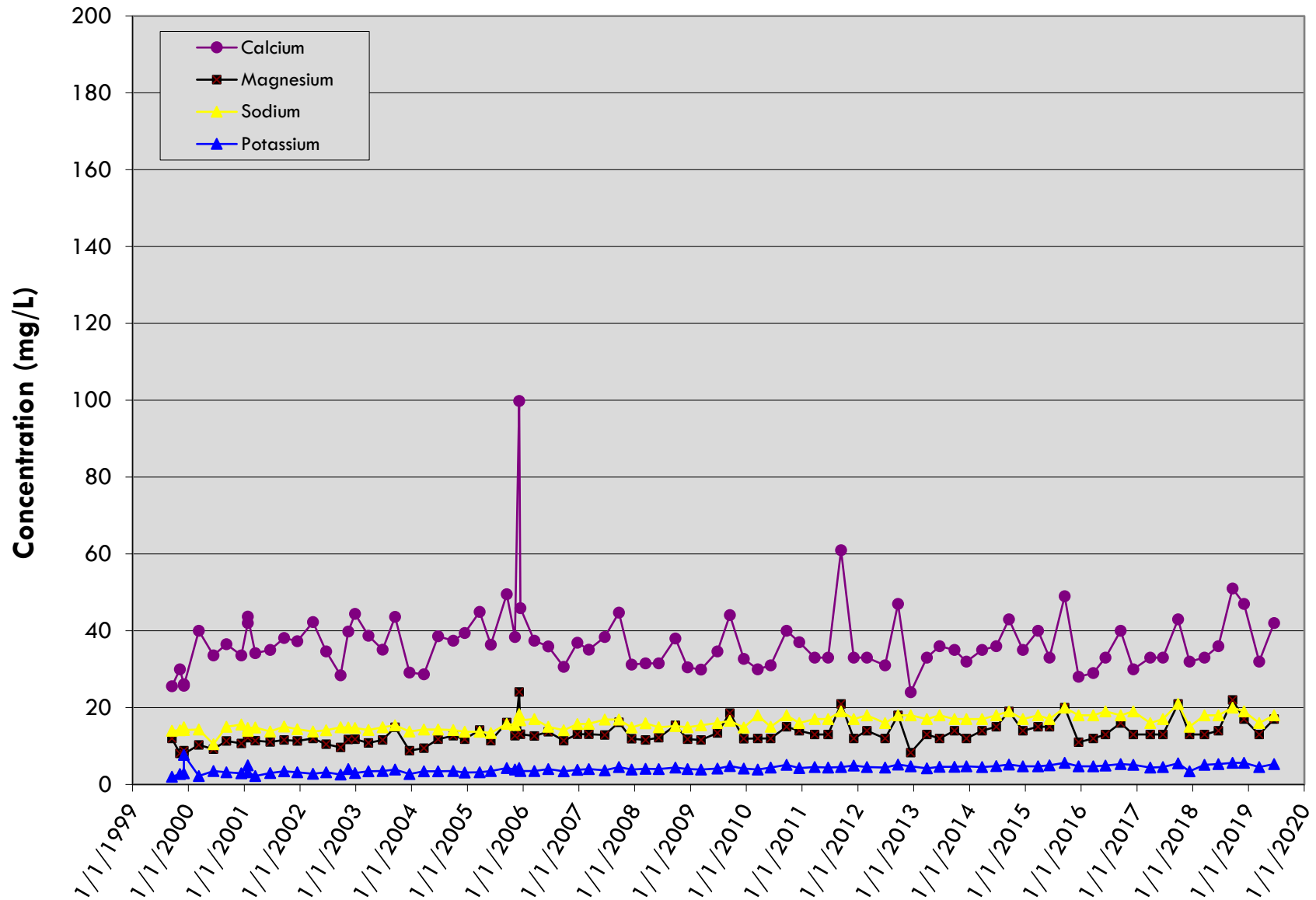
LDCS-6A

LRI Landfill, Pierce County, Washington



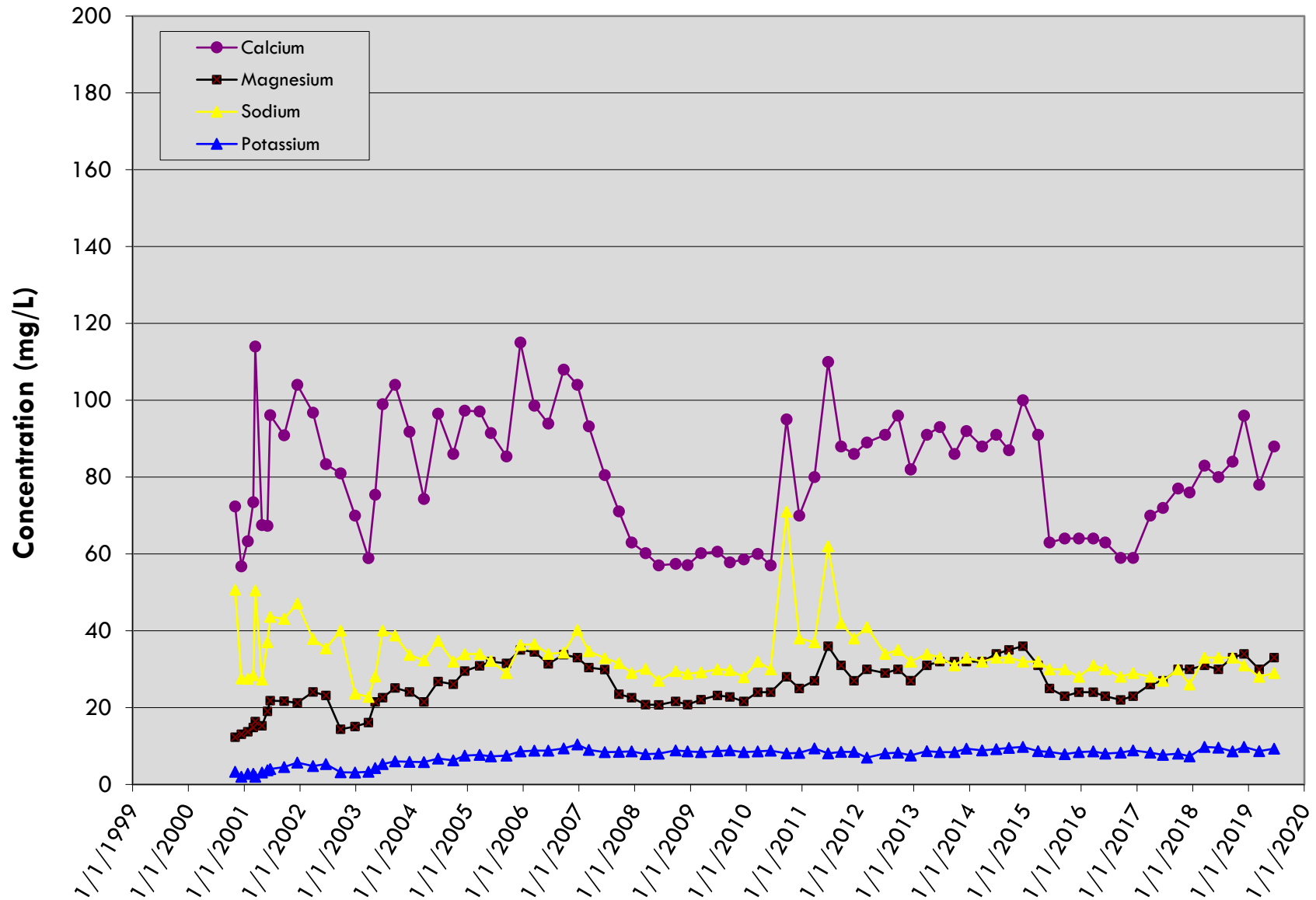
LDCS-1

LRI Landfill, Pierce County, Washington



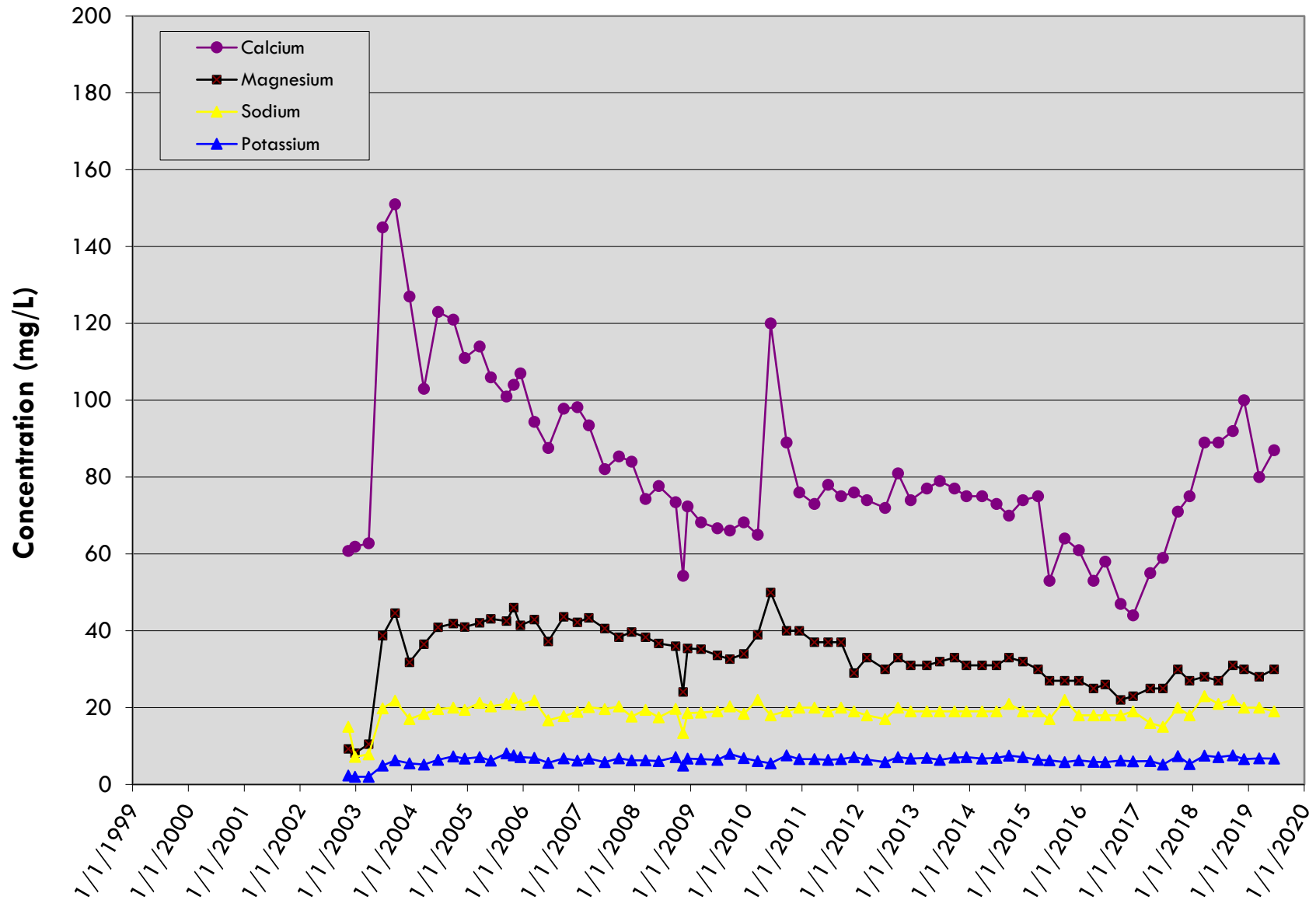
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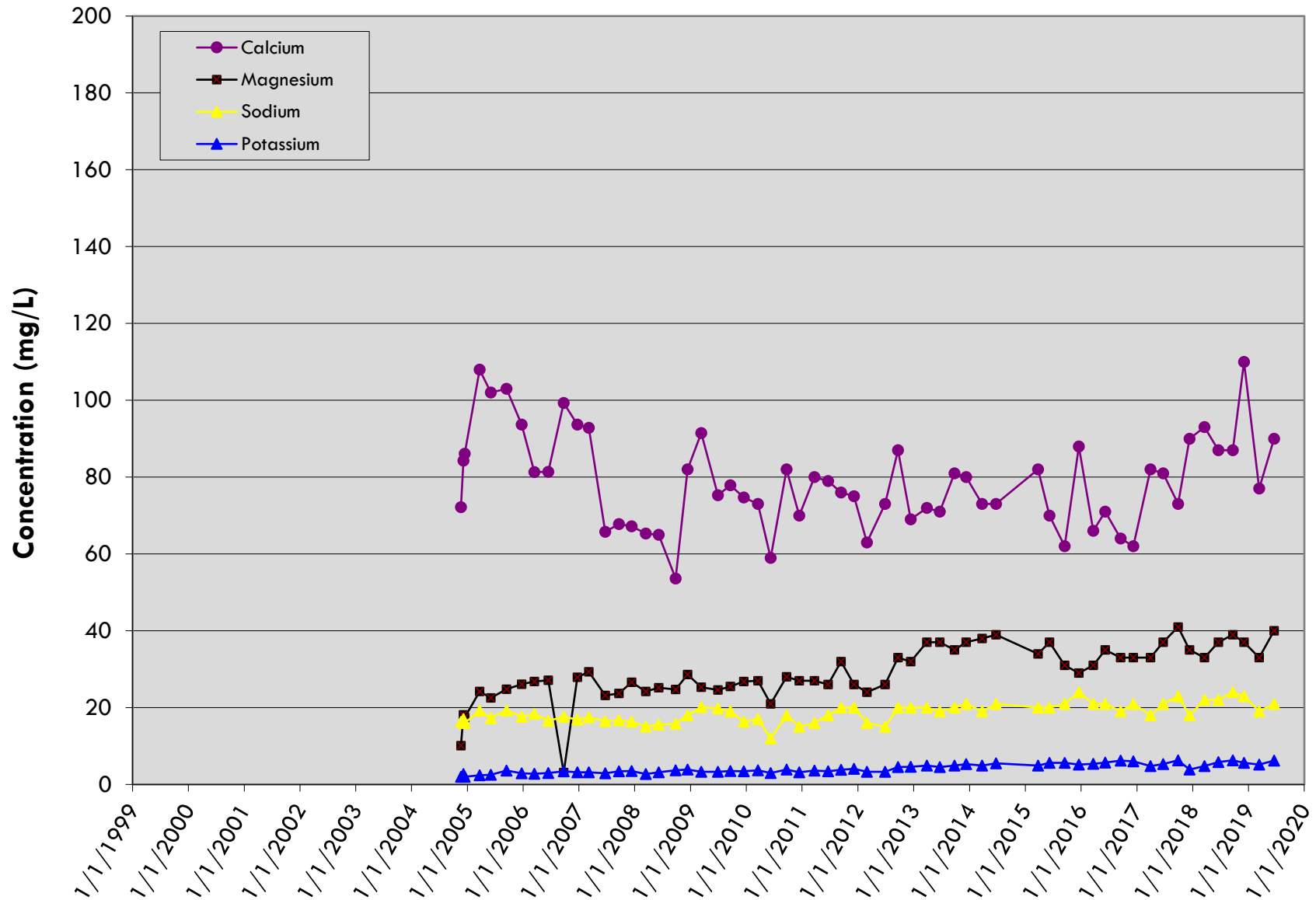
LDCS-2B

LRI Landfill, Pierce County, Washington



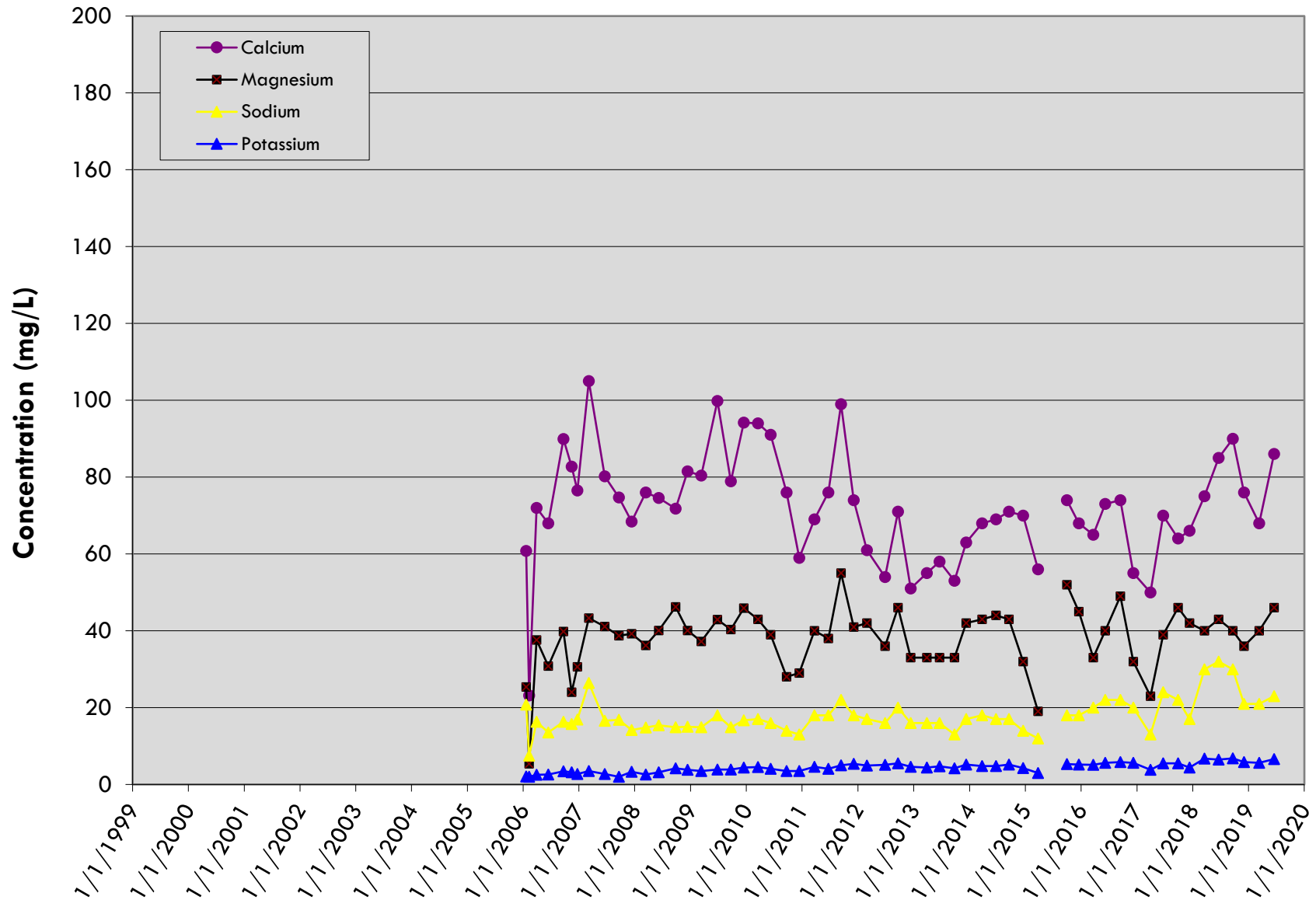
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LRI Landfill, Pierce County, Washington



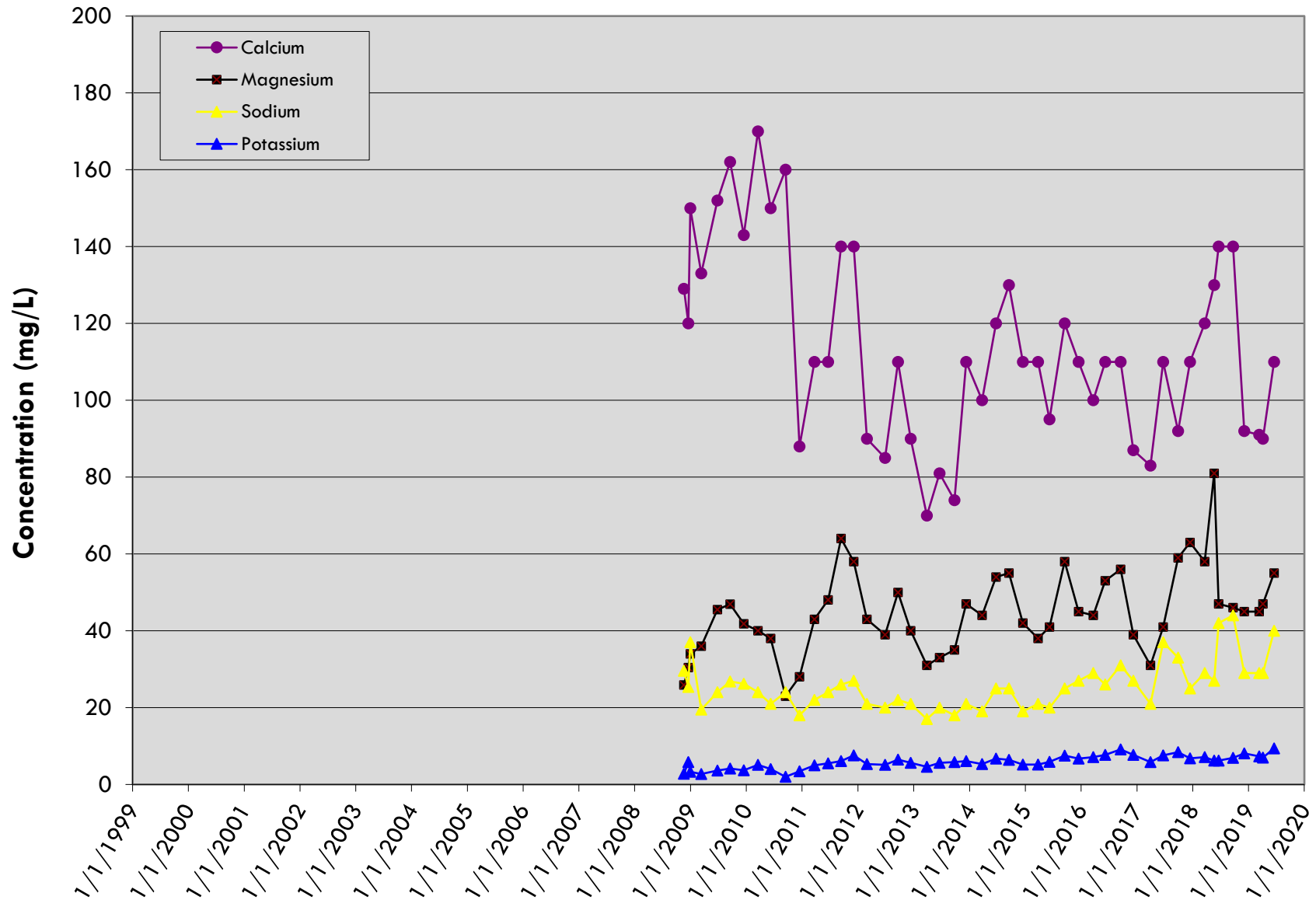
LDCS-4A

LRI Landfill, Pierce County, Washington



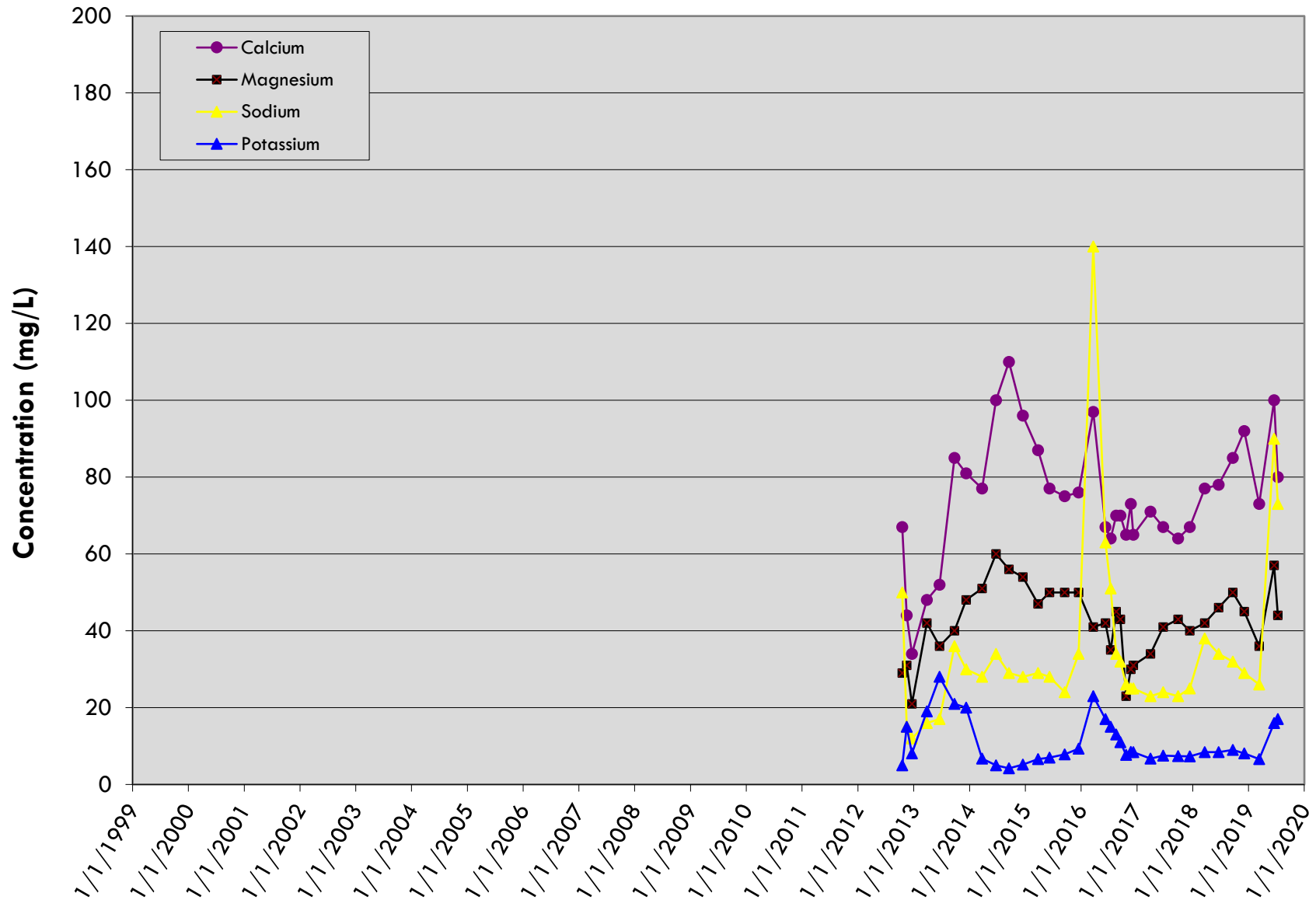
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LRI Landfill, Pierce County, Washington



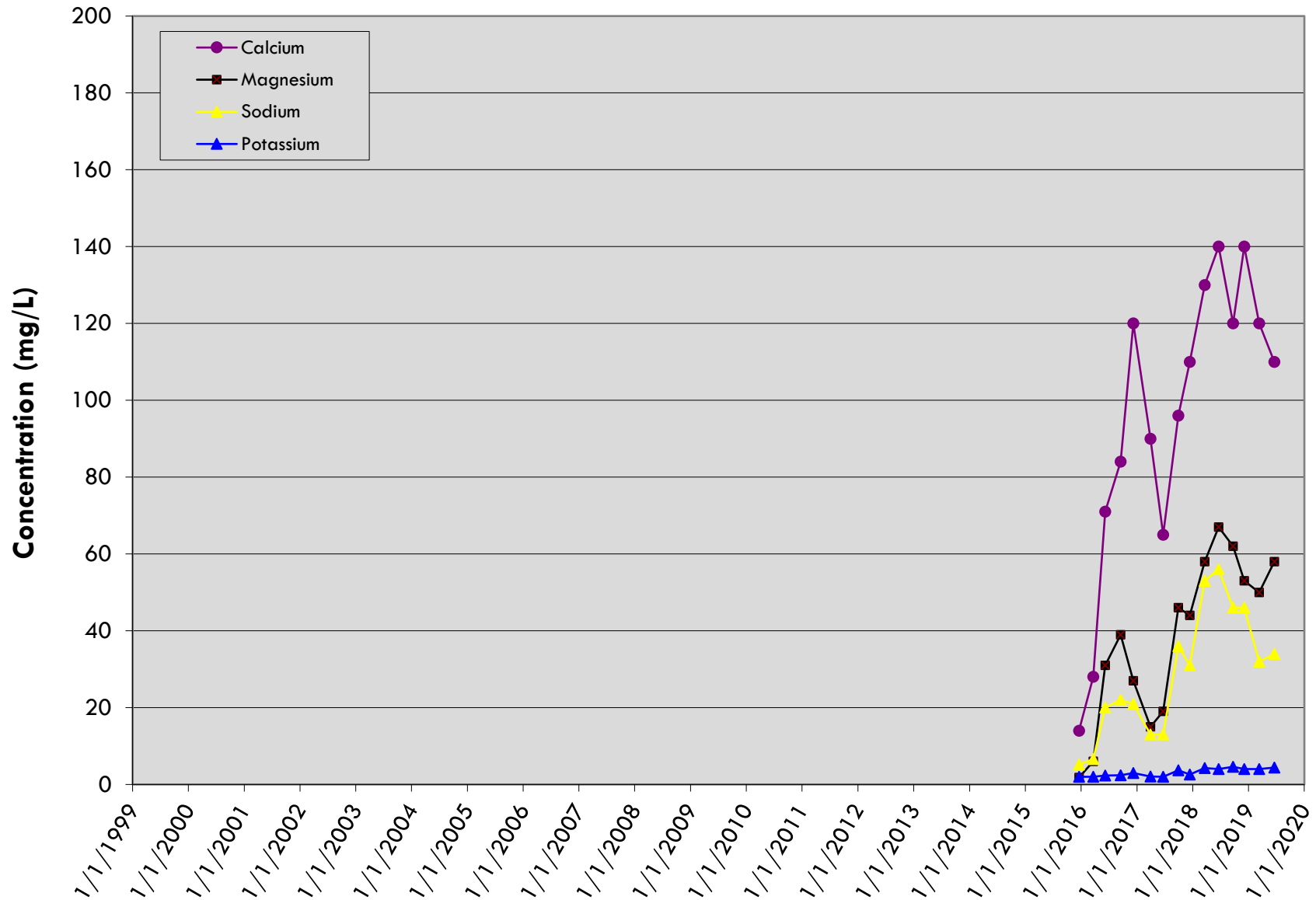
LDCS-5

LRI Landfill, Pierce County, Washington



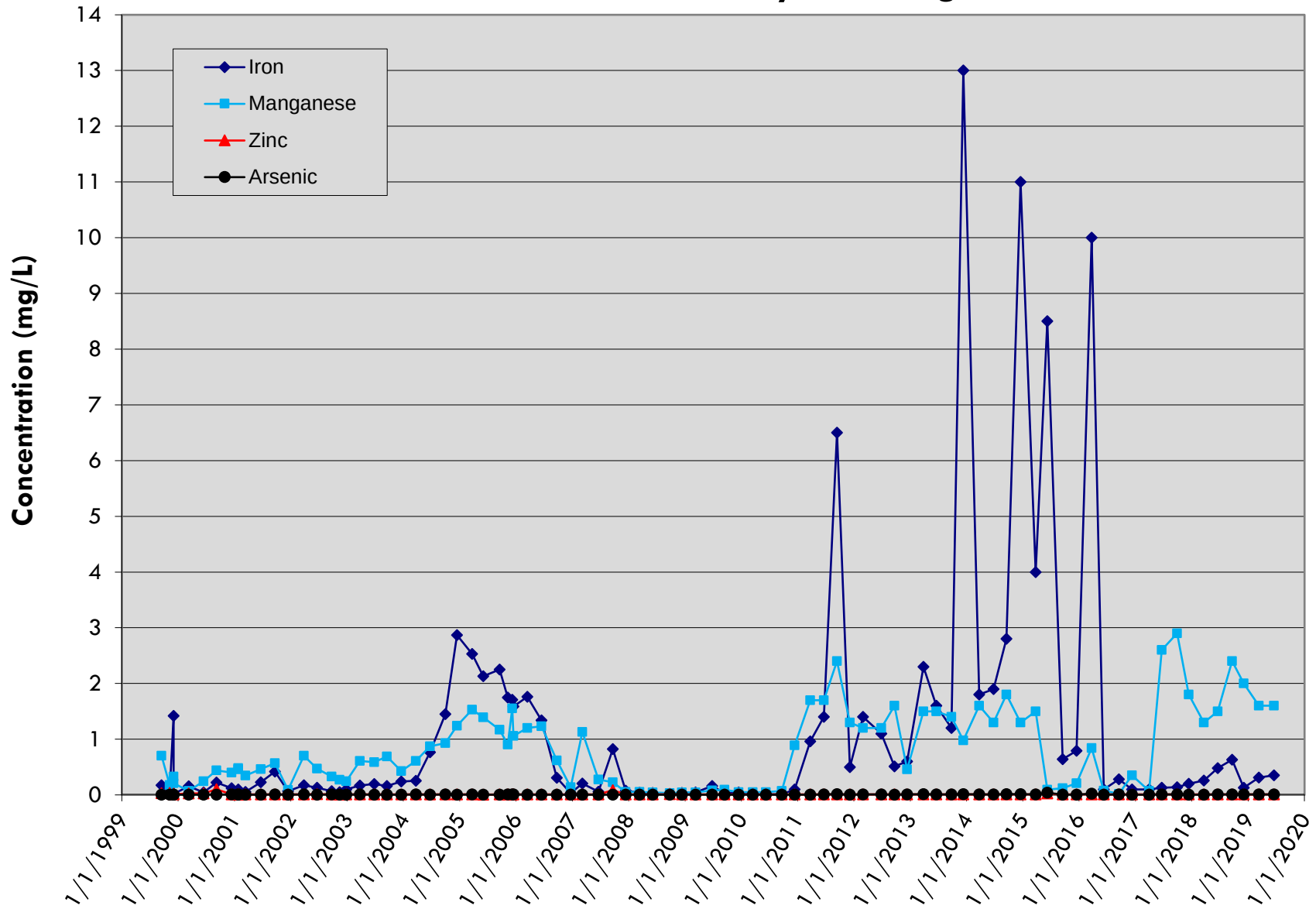
LDCS-6A

LRI Landfill, Pierce County, Washington



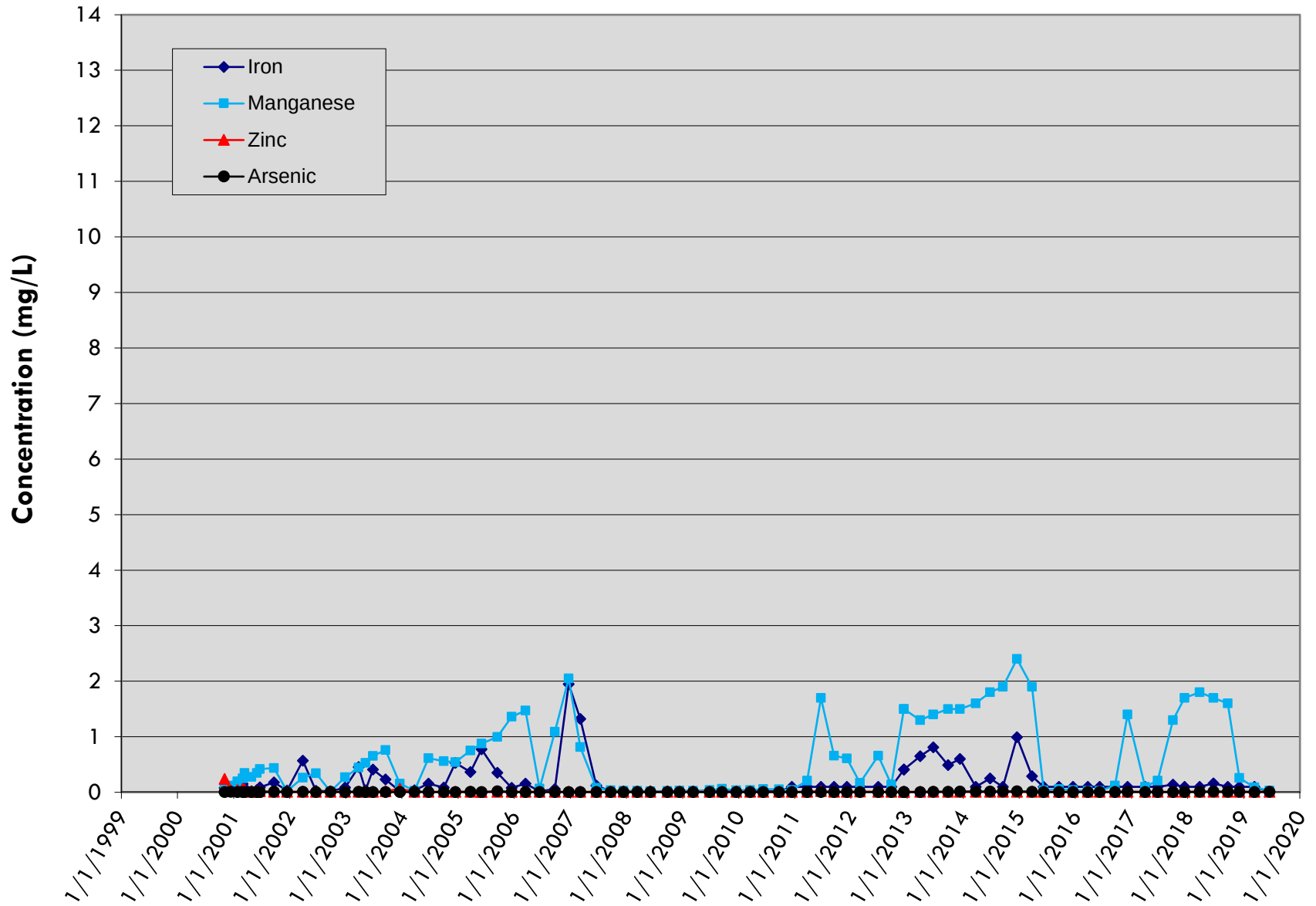
LDCS-1

LRI Landfill, Pierce County, Washington



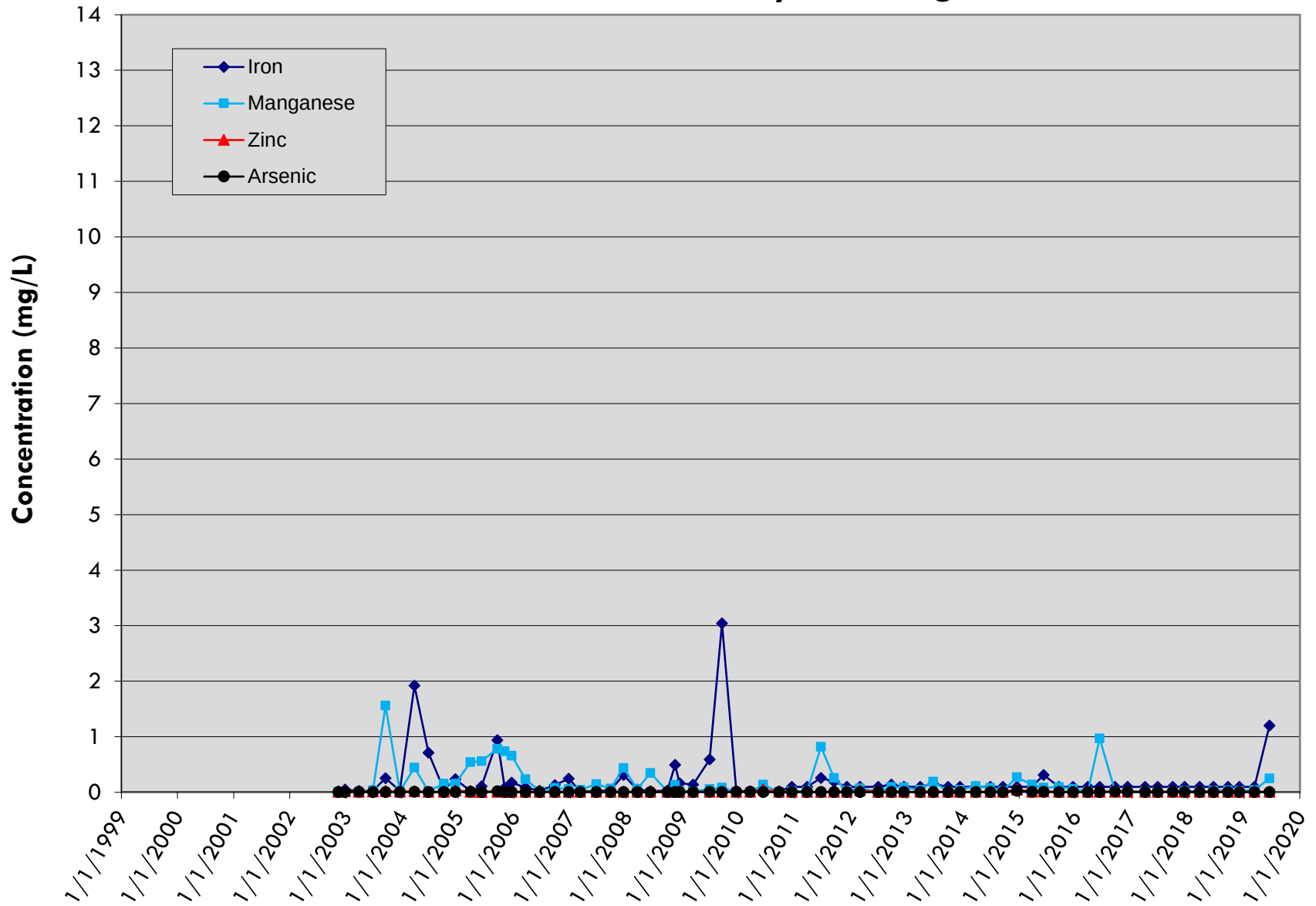
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LRI Landfill, Pierce County, Washington



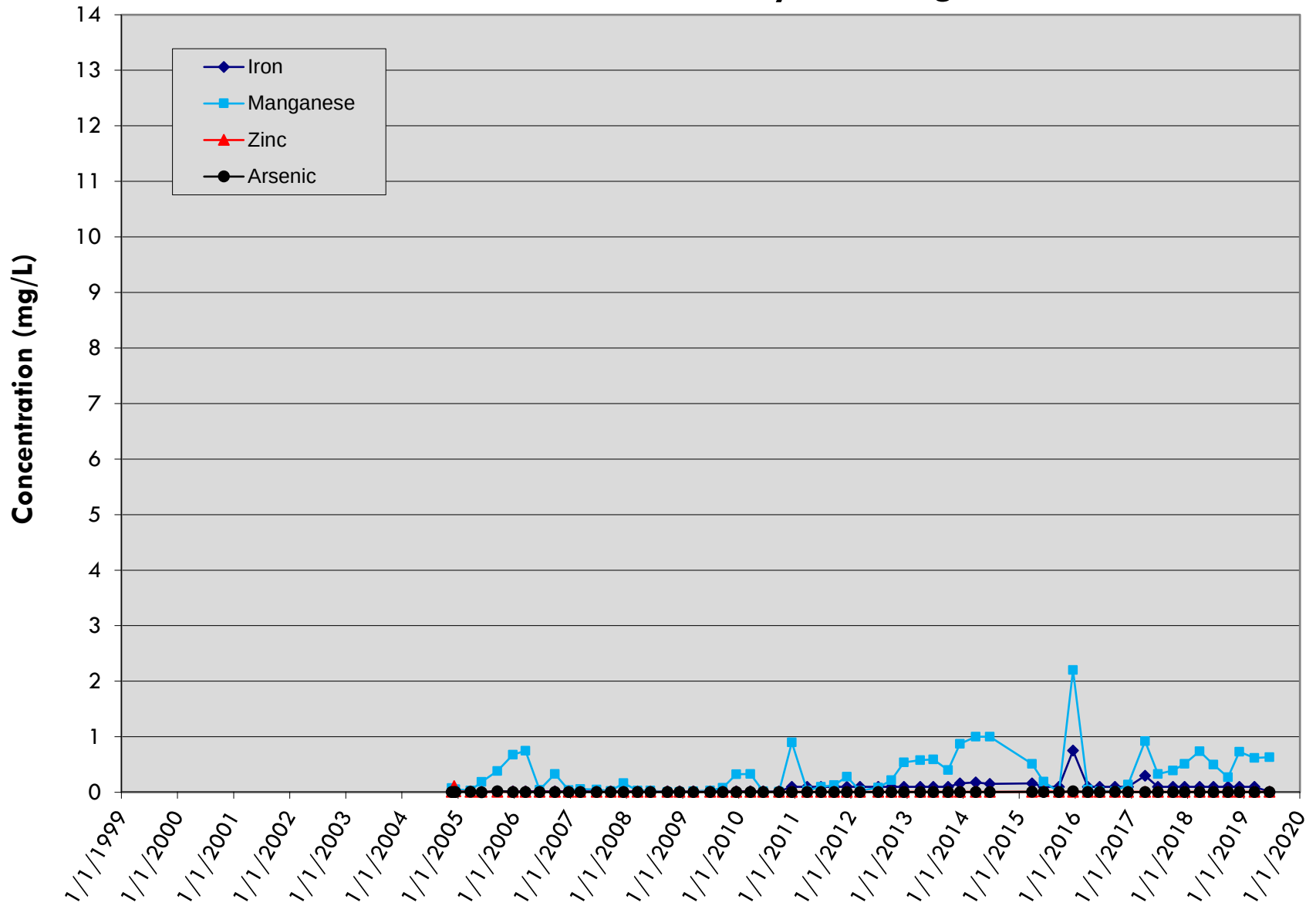
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LRI Landfill, Pierce County, Washington



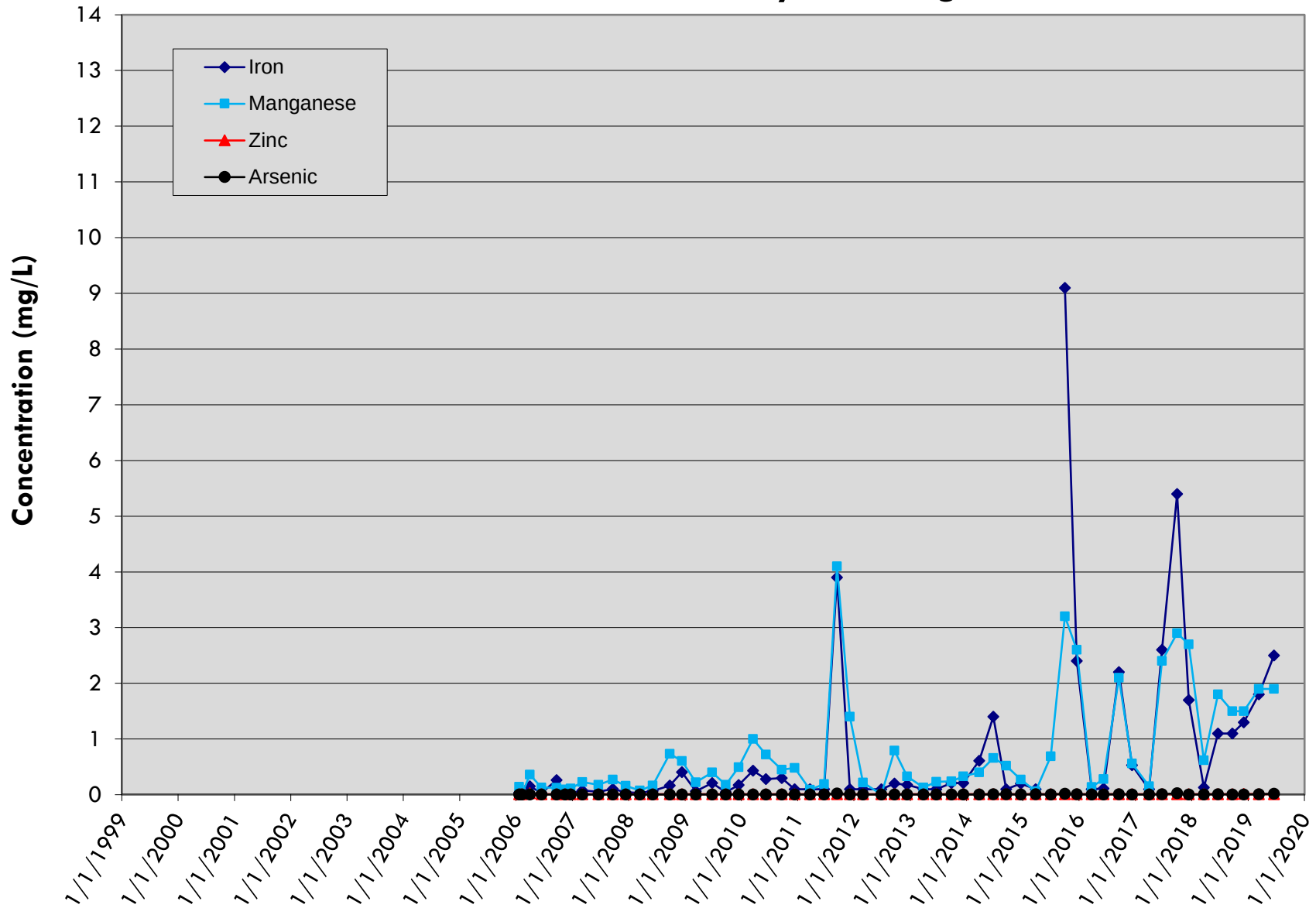
LDCS-3A

LRI Landfill, Pierce County, Washington



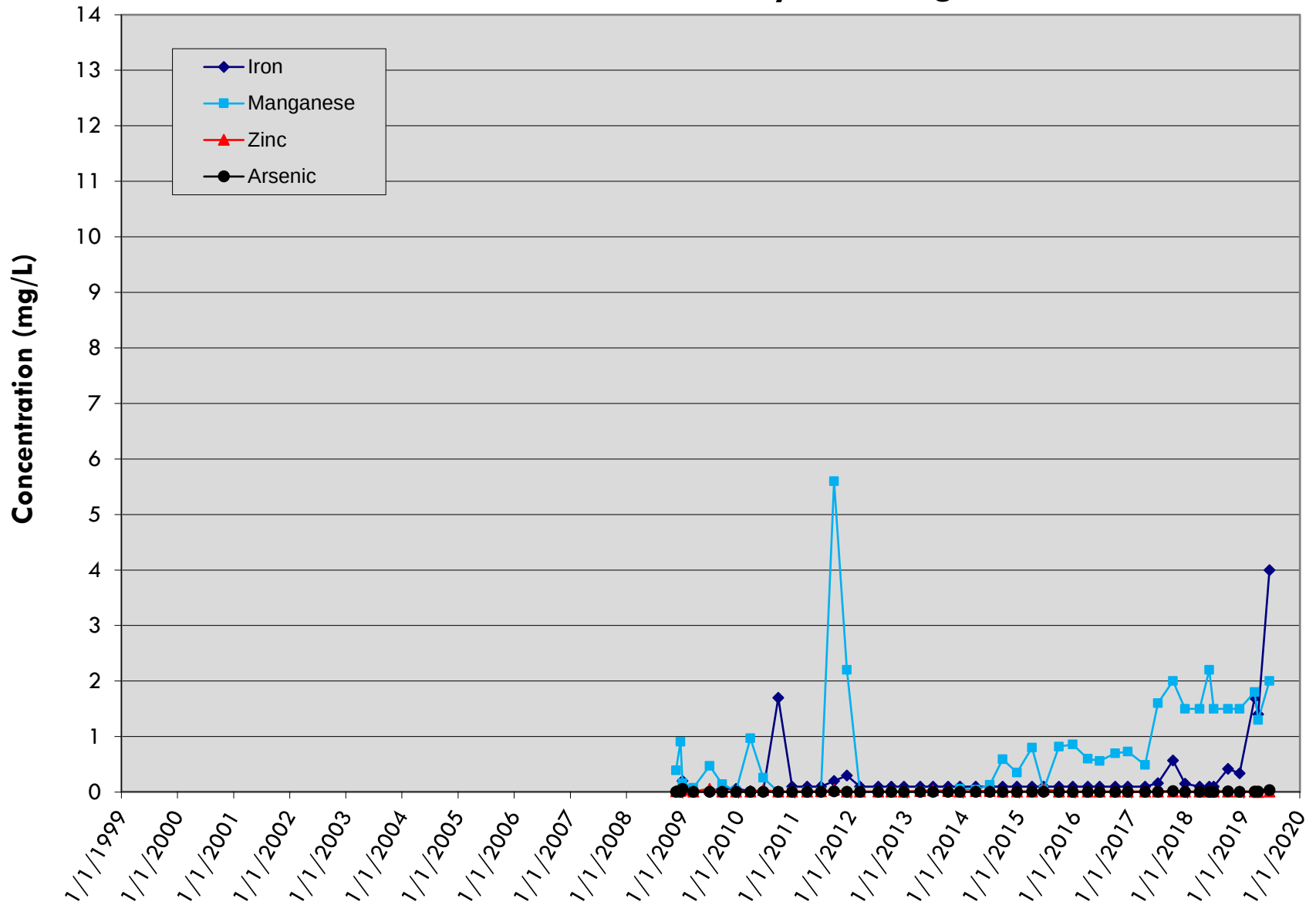
LDCS-4A

LRI Landfill, Pierce County, Washington



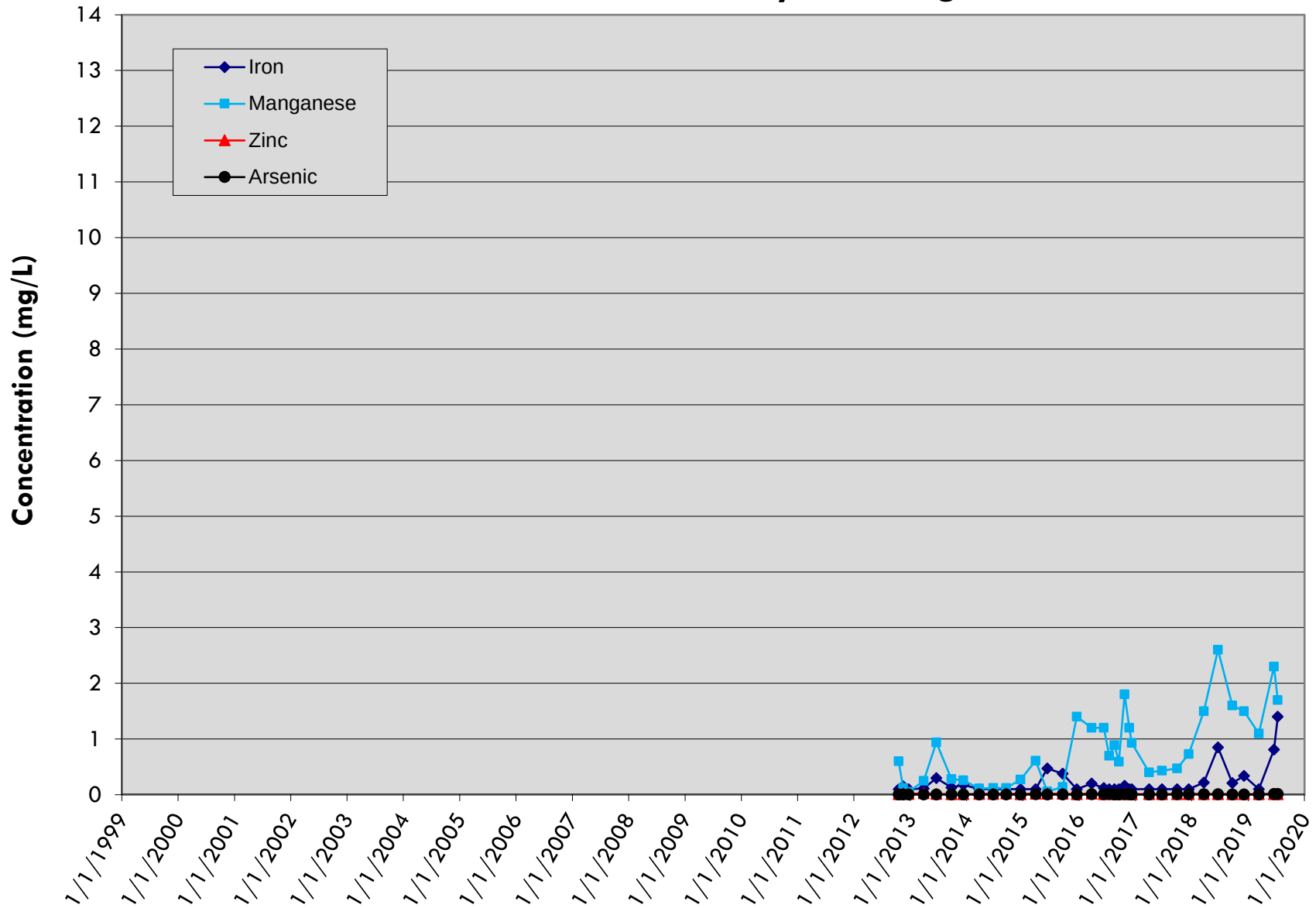
LDCS-4B

LRI Landfill, Pierce County, Washington



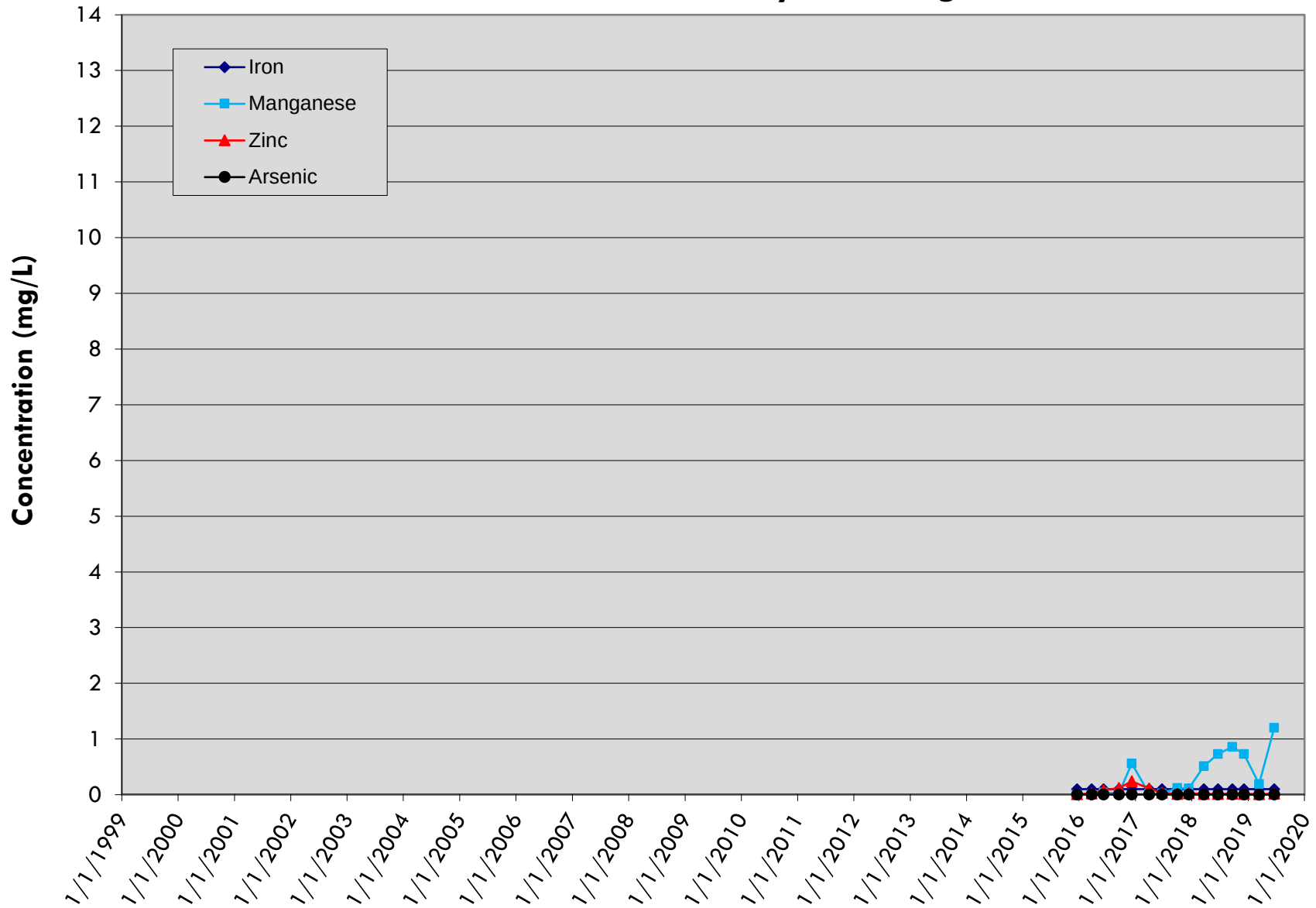
LDCS-5

LRI Landfill, Pierce County, Washington



LDCS-6A

LRI Landfill, Pierce County, Washington





Appendix H

LDCS Pumping Records and Conductivity Measurements



Summary of Leachate Volume and Depth Data
Second Quarter 2019
LRI Landfill, Pierce County, Washington

Date	Cell 1 Leachate Volume (GPD)	Cell 1 Leachate Level (in.)	Cell 2A Leachate Volume (GPD)	Cell 2A Leachate Level (in.)	Cell 2B Leachate Volume (GPD)	Cell 2B Leachate Level (in.)	Cell 3A Leachate Volume (GPD)	Cell 3A Leachate Level (in.)	Cell 4A Leachate Volume (GPD)	Cell 4A Leachate Level (in.)	Cell 4B Leachate Volume (GPD)	Cell 4B Leachate Level (in.)	Cell 5 Leachate Volume (GPD)	Cell 5 Leachate Level (in.)	Cell 6 Leachate Volume (GPD)	Cell 6 Leachate Level (in.)
4/1/2019	3,134	10.5	5	7.1	3,516	8.5	5,278	10.1	21,824	12.5	15,474	10.5	13,161	5.1	10,964	11.9
4/2/2019	2,265	10.9	0	8.5	3,291	8.4	6,379	10.3	15,794	7.8	12,256	8.9	38,354	4.1	11,370	11.0
4/3/2019	2,054	11.0	0	9.7	3,707	9.0	5,617	9.5	11,931	7.3	15,868	10.7	25,864	4.2	10,779	11.3
4/4/2019	4,505	10.4	7,902	9.7	3,354	8.4	4,967	9.4	18,289	9.6	10,296	9.0	21,904	4.2	10,860	11.4
4/5/2019	3,015	10.7	0	6.9	3,292	8.3	5,619	9.7	13,087	7.4	27,628	9.7	20,566	4.1	13,546	11.1
4/6/2019	2,193	10.7	0	7.9	3,341	8.5	7,376	9.1	14,566	7.5	20,502	9.6	13,513	4.3	11,582	11.3
4/7/2019	1,184	11.4	1	9.0	3,277	8.6	5,448	9.1	11,843	6.9	23,848	9.8	13,513	7.1	15,553	10.8
4/8/2019	3,082	10.8	0	10.5	3,280	8.7	5,897	9.4	11,841	7.1	7,032	9.1	13,513	8.5	12,699	11.3
4/9/2019	2,285	10.9	0	11.1	2,263	8.6	5,130	9.3	10,962	6.6	32,886	10.1	20,110	9.0	16,151	11.5
4/10/2019	2,504	10.8	8,018	7.5	2,734	8.7	5,039	9.4	11,151	7.0	13,532	8.6	20,890	9.3	12,086	11.0
4/11/2019	2,674	10.9	0	8.5	3,175	8.5	9,881	9.3	7,151	7.6	27,108	10.3	16,804	9.9	15,872	10.9
4/12/2019	2,719	10.9	0	9.6	3,137	8.6	6,027	9.1	12,639	9.3	15,774	9.4	15,510	10.4	11,896	11.2
4/13/2019	3,461	10.8	1	11.1	3,946	9.1	8,680	9.7	17,409	9.7	9,852	9.6	26,511	11.0	15,171	10.9
4/14/2019	2,892	10.6	7,837	8.0	3,078	8.4	4,758	9.3	14,129	8.8	13,338	9.3	26,511	11.7	13,031	10.9
4/15/2019	3,891	10.6	0	8.6	3,271	8.4	7,332	9.5	13,260	7.8	17,338	9.8	26,511	12.0	12,005	12.1
4/16/2019	2,774	10.8	0	9.3	3,925	8.9	9,658	9.2	10,528	8.9	19,336	8.3	--	12.0	12,622	11.1
4/17/2019	2,775	11.4	0	10.1	3,941	8.6	4,576	9.6	14,200	9.3	13,572	8.0	24,088	12.2	11,723	11.8
4/18/2019	1,568	11.6	6,781	6.6	3,140	9.5	5,968	9.8	14,216	8.0	10,318	10.0	28,304	12.0	11,723	8.5
4/19/2019	2,850	11.9	0	8.1	3,111	11.4	5,956	10.2	15,272	6.2	11,832	11.0	27,744	11.6	11,035	11.6
4/20/2019	2,605	11.9	0	8.1	3,532	11.4	7,134	10.2	13,949	6.2	19,446	11.0	14,615	11.6	12,966	11.6
4/21/2019	2,605	11.9	0	8.1	3,532	11.4	7,134	10.2	13,949	6.2	19,446	11.0	14,615	11.6	12,966	11.6
4/22/2019	2,605	11.1	7,854	6.9	3,532	8.3	7,134	10.4	13,949	7.5	19,446	8.0	14,615	12.7	12,966	8.6
4/23/2019	2,208	11.5	19	8.5	3,622	7.1	4,894	9.7	13,652	11.8	12,068	8.0	32,822	12.4	13,436	11.8
4/24/2019	2,208	11.8	0	9.5	2,544	11.7	5,382	10.1	21,376	11.2	5,816	11.0	35,574	11.5	11,557	11.9
4/25/2019	2,851	10.8	0	11.7	3,061	8.6	5,590	9.7	12,991	8.7	714	10.4	28,488	10.2	10,046	11.9
4/26/2019	2,647	10.8	5,230	6.9	3,480	8.6	6,290	9.2	8,898	9.3	17,170	9.2	23,636	10.5	9,845	11.4
4/27/2019	3,718	10.6	1	8.2	3,163	8.5	6,339	9.6	11,836	9.4	20,082	10.1	16,969	10.0	9,687	11.2
4/28/2019	2,096	10.7	0	9.5	2,830	9.0	4,835	9.2	11,724	8.9	11,720	9.8	16,969	10.3	9,746	11.1
4/29/2019	2,849	10.7	7,393	10.3	3,049	8.7	5,422	9.7	8,794	9.9	1,552	9.2	16,969	10.7	9,490	11.4
4/30/2019	3,268	--	7,394	--	3,050	--	7,306	--	17,112	--	8,872	9.0	21,452	11.1	9,427	8.8
5/1/2019	2,979	11.7	0	8.0	4,276	6.4	7,306	8.8	14,024	7.2	9,212	11.0	23,478	11.0	88	9.0
5/2/2019	2,347	10.9	0	9.9	3,479	8.8	7,472	9.5	11,672	7.2	13,288	8.8	34,394	11.0	9,181	11.4
5/3/2019	3,472	10.5	6,082	7.8	3,276	8.7	5,788	9.0	12,244	8.2	35,554	9.1	18,388	10.9	9,394	11.5
5/4/2019	2,141	11.1	0	7.6	3,830	9.2	5,024	9.5	14,781	9.7	19,377	9.5	22,417	10.5	9,471	11.4
5/5/2019	4,937	11.0	0	9.1	3,830	8.7	5,024	9.2	14,781	9.4	19,377	9.7	22,417	10.7	9,297	11.2
5/6/2019	2,736	10.9	6,060	10.5	3,830	9.0	5,024	9.1	14,781	10.7	19,377	9.3	22,417	10.5	9,153	11.3
5/7/2019	2,074	11.1	0	9.7	3,680	8.9	5,168	9.2	13,624	10.1	16,910	9.6	28,642	10.4	8,846	11.6
5/8/2019	4,251	11.1	7,985	7.2	3,758	8.6	5,865	9.1	14,084	9.7	17,516	9.4	21,340	10.2	9,075	11.4
5/9/2019	2,140	11.4	0	8.6	3,226	8.6	4,659	9.3	12,164	9.5	4,738	9.5	5,956	10.5	8,961	11.6
5/10/2019	3,037	11.0	0	10.0	4,380	10.1	5,539	9.6	13,909	9.6	16,588	9.3	30,228	10.3	9,186	11.5
5/11/2019	2,229	11.2	0	11.4	2,922	8.9	5,327	9.1	11,450	9.9	11,870	10.3	17,754	10.0	9,169	11.2
5/12/2019	2,891	10.9	7,608	7.7	4,351	8.7	5,144	9.1	15,201	9.3	17,056	9.2	17,754	11.0	8,910	11.1
5/13/2019	3,122	10.9	16	8.6	3,867	8.6	5,185	9.4	30,821	10.0	34,482	9.9	17,754	11.4	8,918	11.4
5/14/2019	2,953	11.0	0	9.7	2,849	8.7	6,477	9.3	17,524	9.8	12,306	9.8	28,160	11.0	9,450	11.3
5/15/2019	4,302	10.6	7,523	9.5	4,055	8.6	4,964	9.4	10,278	9.7	8,270	9.5	18,272	11.1	10,123	11.4
5/16/2019	2,026	11.5	0	7.5	3,467	8.3	5,968	9.4	11,831	9.6	11,436	9.3	21,304	11.1	12,796	11.0
5/17/2019	1,713	11.1	1	8.3	3,847	8.8	9,836	9.1	16,802	9.9	17,810	9.4	25,760	11.6	12,291	11.4
5/18/2019	2,478	11.1	0	10.2	2,956	8.5	5,162	9.1	13,383	9.8	14,388	9.9	17,833	11.9	9,559	11.2
5/19/2019	2,977	10.9	0	11.3	3,056	8.7	6,355	9.2	8,137	10.5	21,026	9.5	17,833	12.2	10,620	11.6
5/20/2019	4,817	10.3	9,081	9.0	3,177	9.7	9,601	11.8	13,718	12.2	12,126	11.1	17,833	12.8	15,393	13.4
5/21/2019	3,181	10.6	0	7.4	3,245	10.0	7,422	9.1	9,694	10.1	28,444	11.1	23,048	12.9	11,555	12.2
5/22/2019	1,356	11.2	0	8.7	4,191	8.8	8,531	9.4	12,257	10.1	14,674	9.4	17,608	13.0	9,252	11.3
5/23/2019	1,716	11.5	1	10.4	4,015	8.7	5,217	9.5	13,222	9.4	14,672	9.0	37,500	13.0	9,050	11.2
5/24/2019	2,510	11.3	0	11.4	3,924	7.0	10,882	8.6	12,824	8.8	12,162	8.0	25,478	13.1	9,453	11.7
5/25/2019	3,245	11.3	0	11.4	3,089	7.0	7,727	8.6	14,151	8.8	13,675	8.0	15,158	13.1	10,954	11.7
5/26/2019	3,245	11.3	0	11.4	3,089	7.0	7,727	8.6	14,151	8.8	13,675	8.0	15,158	13.1	10,954	11.7
5/27/2019	3,245	11.3	7,762	9.7	3,089	10.5	7,727	10.4	14,151	10.9	13,675	9.0	15,158	13.7	10,954	11.8
5/28/2019	2,703	11.0	0	11.0	2,923	11.6	10,028	8.7	16,572	9.2	14,930	9.0	21,552	13.8	9,208	11.8
5/29/2019	2,004	11.7	7,672	6.8	3,220	11.8	8,348	9.5	16,248	9.0	9,550	9.0	17,930	14.0	3,595	15.8
5/30/2019	3,377	11.0	0	8.3	4,217	7.0	7,758	9.2	14,360	6.1	6,748	11.0	16,336	14.1	14,751	10.7
5/31/2019	1,820	11.7	0	9.5	3,815	8.2	6,194	9.6	11,640	10.3	19,104	9.0	33,040	14.1	9,653	11.9

**Summary of Leachate Volume and Depth Data
Second Quarter 2019
LRI Landfill, Pierce County, Washington**

Date	Cell 1 Leachate Volume (GPD)	Cell 1 Leachate Level (in.)	Cell 2A Leachate Volume (GPD)	Cell 2A Leachate Level (in.)	Cell 2B Leachate Volume (GPD)	Cell 2B Leachate Level (in.)	Cell 3A Leachate Volume (GPD)	Cell 3A Leachate Level (in.)	Cell 4A Leachate Volume (GPD)	Cell 4A Leachate Level (in.)	Cell 4B Leachate Volume (GPD)	Cell 4B Leachate Level (in.)	Cell 5 Leachate Volume (GPD)	Cell 5 Leachate Level (in.)	Cell 6 Leachate Volume (GPD)	Cell 6 Leachate Level (in.)
6/1/2019	3,432	11.3	0	11.1	3,058	11.7	6,008	10.5	15,172	9.9	15,984	7.0	17,754	14.2	9,619	11.9
6/2/2019	2,358	11.3	0	11.1	3,377	11.7	6,446	10.5	13,684	9.9	9,955	7.0	13,086	14.2	8,546	11.9
6/3/2019	2,358	11.6	7,399	10.5	3,377	9.0	6,446	9.8	13,684	11.9	9,955	7.0	13,086	14.9	8,546	11.3
6/4/2019	3,792	8.1	1	9.5	2,958	10.6	6,012	9.8	12,032	8.8	15,698	11.0	22,736	14.6	8,916	11.4
6/5/2019	3,097	8.1	3,191	9.5	2,931	10.6	6,206	9.8	16,396	8.8	250	11.0	29,572	14.6	9,062	11.4
6/6/2019	3,480	11.8	4,325	7.5	3,162	11.1	5,884	9.8	10,708	9.2	19,278	9.0	30,774	14.3	9,530	12.2
6/7/2019	1,907	11.8	0	8.9	4,391	12.0	6,464	10.0	6,952	12.0	16,848	8.0	59,498	14.8	13,152	11.8
6/8/2019	2,588	11.8	0	8.9	3,303	12.0	13,737	10.0	14,117	12.0	14,184	8.0	44,211	14.8	11,285	11.8
6/9/2019	2,588	11.8	0	8.9	3,303	12.0	13,737	10.0	14,117	12.0	14,184	8.0	44,211	14.8	11,285	11.8
6/10/2019	2,588	11.6	7,365	7.8	3,303	11.1	13,737	8.7	14,117	7.6	14,184	8.0	44,211	12.4	11,285	11.8
6/11/2019	2,897	11.6	0	8.7	3,041	11.0	5,542	10.8	13,192	7.5	4,044	11.0	25,354	12.2	9,234	11.7
6/12/2019	2,794	11.9	0	10.6	3,145	10.9	7,940	11.0	18,160	8.0	20,342	8.0	54,470	10.8	9,329	8.7
6/13/2019	5,181	11.8	0	11.7	3,361	9.1	8,218	10.4	16,620	8.0	6,204	10.0	36,042	10.4	9,340	11.9
6/14/2019	4,680	11.3	7,879	6.9	2,637	11.9	7,862	10.4	12,560	7.6	19,860	8.0	36,842	10.1	9,178	11.9
6/15/2019	2,713	11.3	0	6.9	3,528	11.9	8,609	10.4	12,588	7.6	10,654	8.0	20,285	10.1	9,178	11.9
6/16/2019	2,713	11.3	0	6.9	3,528	11.9	8,609	10.4	12,588	7.6	10,654	8.0	20,285	10.1	9,178	11.9
6/17/2019	2,713	7.3	1	11.0	3,528	6.5	8,609	11.5	12,588	8.1	10,354	10.0	20,285	10.5	9,178	12.3
6/18/2019	3,045	6.7	7,294	6.3	2,785	11.5	12,344	7.2	15,116	7.4	11,202	9.0	15,984	10.9	8,312	11.9
6/19/2019	2,692	11.4	0	7.3	3,196	11.3	4,294	10.0	15,256	7.5	4,830	11.0	57,366	10.5	8,682	11.9
6/20/2019	3,333	11.5	0	8.8	3,268	11.5	8,890	10.3	15,184	7.6	24,360	8.0	40,932	9.5	9,133	12.0
6/21/2019	2,446	11.6	0	10.1	3,296	11.4	6,872	11.4	15,880	7.6	3,780	10.0	36,704	8.2	9,426	11.8
6/22/2019	1,414	11.6	0	10.1	2,897	11.4	6,398	11.4	11,195	7.6	13,860	10.0	15,375	8.2	9,093	11.8
6/23/2019	1,414	11.6	0	10.1	2,897	11.4	6,398	11.4	11,195	7.6	13,860	10.0	15,375	8.2	9,093	11.8
6/24/2019	1,414	12.6	8,074	9.6	2,897	11.5	6,398	8.6	11,195	6.0	13,860	8.0	15,375	9.7	9,093	11.8
6/25/2019	2,844	12.8	8	10.1	4,087	6.7	4,038	11.2	13,092	7.7	5,040	11.0	36,626	10.0	9,497	9.6
6/26/2019	2,844	11.4	1	11.3	2,478	9.8	6,450	9.9	13,196	7.7	24,990	9.0	30,376	9.2	9,114	11.8
6/27/2019	3,823	11.9	8,446	7.0	4,170	7.0	7,182	8.9	18,244	7.8	22,260	8.0	60,344	7.1	11,969	9.5
6/28/2019	1,091	11.6	0	7.7	2,454	10.8	5,608	9.0	15,760	7.6	18,360	9.0	34,402	5.3	12,448	7.7
6/29/2019	4,537	11.6	0	7.7	3,337	10.8	5,916	9.0	11,667	7.6	17,820	9.0	24,026	5.3	9,166	7.7
6/30/2019	4,537	11.6	0	7.7	3,337	10.8	5,916	9.0	11,667	7.6	17,820	9.0	24,026	5.3	9,166	7.7

-- = No data collected, meter not functioning properly



Appendix I

Surface Water Monitoring Data





Permit Number: WAR002603

Permittee: LRI 304th Street Landfill

Facility County: Pierce

Receiving Waterbody:

Monitoring Period: 04/01/2019 - 04/30/2019

Outfall: 001 - NEWB 2

Version: 1

Week	Monitoring Point	Turbidity (NTU) Measured NTU Optional Grab	Turbidity (cm) Measured Centimeters Optional Grab	pH Standard Units Optional Grab
		001	001	001
1-Th	4/4/19	12		7.0
2-Th	4/11/19	10		6.9
3-Th	4/18/19	11		6.9
4-M	4/22/19	8		7.0
Minimum				6.9
			BM: >= 33 (RO)	BM: >= 6.5 (RO)
Maximum		12		7
		BM: <= 25 (RO)		BM: <= 8.5 (RO)

Overall DMR Notes/Comment

Listed BMP's were in operation for the entire month.

BMPs

Monitoring Point	Week	BMP
001		Check Dams
001		Other
001		Sediment Trap
001		Silt Fence
001		Straw Wattles

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

George Duvendack

5/14/2019 4:35:12 PM

Signature

Date



Permit Number: WAR002603

Permittee: LRI 304th Street Landfill

Facility County: Pierce

Receiving Waterbody: South Creek

Monitoring Period: 05/01/2019 - 05/31/2019

Outfall: UNK - South Creek

Version: 1

Week	Monitoring Point	Turbidity (NTU) Measured NTU Weekly Grab	pH Standard Units Weekly Grab	Turbidity (NTU) Measured NTU Weekly Grab	pH Standard Units Weekly Grab	Turbidity (NTU) Measured NTU Weekly Grab	pH Standard Units Weekly Grab	Turbidity (NTU) Measured NTU Weekly Grab	pH Standard Units Weekly Grab
		C7-1	C7-1	C7-2	C7-2	C7-3	C7-3	C7-4	C7-4
1-W	5/1/19	M	M	M	M	M	M	M	M
2-Su	5/5/19	M	M	M	M	M	M	M	M
3-F	5/17/19	5	M	C	M	C	M	C	M
4-F	5/24/19	M	M	M	M	14	M	M	M
5-Su	5/26/19	M	M	M	M	M	M	M	M
Minimum			M		M		M		M
			BM: >= 6.5 (RO)		BM: >= 6.5 (RO)		BM: >= 6.5 (RO)		BM: >= 6.5 (RO)
Maximum		5	M	C	M	14	M	C	M
		BM: <= 25 (RO)	BM: <= 8.5 (RO)	BM: <= 25 (RO)	BM: <= 8.5 (RO)	BM: <= 25 (RO)	BM: <= 8.5 (RO)	BM: <= 25 (RO)	BM: <= 8.5 (RO)

Reporting Codes Used: C - No Discharge, M - Monitoring Is Conditional/Not Req This MP

Overall DMR Notes/Comment

The construction site was inactive and temporarily stabilized during the month of May. Listed BMPs were in operation for the entire month.

BMPs

Monitoring Point	Week	BMP
C7-1		Check Dams
C7-1		Other
C7-1		Sediment Trap
C7-1		Silt Fence
C7-1		Straw Wattles
C7-2		Other
C7-3		Other
C7-4		Check Dams
C7-4		Other

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

George Duvendack

6/12/2019 9:44:18 PM

Signature

Date



Permit Number: WAR002603

Permittee: LRI 304th Street Landfill

Facility County: Pierce

Receiving Waterbody: South Creek

Monitoring Period: 06/01/2019 - 06/30/2019

Outfall: UNK - South Creek

Version: 1

Week	Monitoring Point	Turbidity (NTU) Measured NTU Weekly Grab	pH Standard Units Weekly Grab	Turbidity (NTU) Measured NTU Weekly Grab	pH Standard Units Weekly Grab	Turbidity (NTU) Measured NTU Weekly Grab	pH Standard Units Weekly Grab	Turbidity (NTU) Measured NTU Weekly Grab	pH Standard Units Weekly Grab
		C7-1	C7-1	C7-2	C7-2	C7-3	C7-3	C7-4	C7-4
2-T	6/4/19	C	M	C	M	16	M	C	M
3-M	6/10/19	C	M	C	M	11	M	C	M
4-Th	6/20/19	C	M	C	M	C	M	C	M
5-Th	6/27/19	C	M	C	M	C	M	C	M
Minimum			M		M		M		M
			BM: >= 6.5 (RO)		BM: >= 6.5 (RO)		BM: >= 6.5 (RO)		BM: >= 6.5 (RO)
Maximum		C	M	C	M	16	M	C	M
		BM: <= 25 (RO)	BM: <= 8.5 (RO)	BM: <= 25 (RO)	BM: <= 8.5 (RO)	BM: <= 25 (RO)	BM: <= 8.5 (RO)	BM: <= 25 (RO)	BM: <= 8.5 (RO)

Reporting Codes Used: C - No Discharge, M - Monitoring Is Conditional/Not Req This MP

BMPs

Monitoring Point	Week	BMP
C7-1		Check Dams
C7-1		Other
C7-1		Sediment Trap
C7-1		Silt Fence
C7-1		Straw Wattles
C7-2		Other
C7-3		Other
C7-4		Check Dams
C7-4		Other
C7-4		Silt Fence

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

George Duvendack

7/15/2019 7:20:10 AM

Signature

Date



Permit Number: WAR002557

Permittee: Pierce County Recycling - 304th Street L

Facility County: Pierce

Receiving Waterbody: South Creek

Monitoring Period: 04/01/2019 - 06/30/2019

Outfall: NEWB - NEWB 2

Version: 1

Week	Monitoring Point	Turbidity (NTU) Measured NTU Quarterly Grab	pH Standard Units Quarterly Grab	Oil & Grease Yes/No Quarterly Visual Observation	Copper Total Micrograms/L (ug/L) Quarterly Grab	Zinc Total Micrograms/L (ug/L) Quarterly Grab	Total BOD5 Total Milligrams/L (mg/L) Quarterly Grab	Solids (Residue) Total suspended (TSS) Milligrams/L (mg/L) Quarterly Grab	Ammonia Total Milligrams/L (mg/L) Quarterly Grab	Alpha-terpineol (3-Cyclohexene-1-methanol, alpha, alpha, trimethyl-) Micrograms/L (ug/L) Quarterly Grab	Benzoic Acid Micrograms/L (ug/L) Quarterly Grab	p-Cresol (4-methylphenol) Micrograms/L (ug/L) Quarterly Grab
		NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB
Limit Set		ISGP Western WA - 2015 Permit	ISGP Western WA - 2015 Permit	ISGP Western WA - 2015 Permit	ISGP Western WA - 2015 Permit	ISGP Western WA - 2015 Permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit
1-Th	4/4/19	12	7.0									
2-W	4/10/19	10		No	2.1	J 3.7	2.1	3.4	0.11	B 9.8	B 59	B 9.8
2-Th	4/11/19	10	6.9									
3-Th	4/18/19	11	6.9									
4-M	4/22/19	8	7.0									
7-F	5/17/19	17										
8-T	5/21/19	12										
Minimum			6.9 BM: >= 5.0 (RO)									
Average		11.7 BM: <= 25			2.1 BM: <= 14	J 3.7 BM: <= 117						
Maximum			7.0 BM: <= 9.0 (RO)									
Month 1 Average							2.1 <= 37	3.4 <= 27	0.11 <= 4.9	B 9.8 <= 16	B 59 <= 71	B 9.8 <= 14
Month 2 Average							2.1 <= 37	3.4 <= 27	0.11 <= 4.9	B 9.8 <= 16	B 59 <= 71	B 9.8 <= 14
Month 3 Average							2.1 <= 37	3.4 <= 27	0.11 <= 4.9	B 9.8 <= 16	B 59 <= 71	B 9.8 <= 14

Reporting Codes Used: B - Below Detection Limit/No Detection, J - Estimated Value/Below Quantitation Limit

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

George Duvendack

Signature

8/12/2019 9:11:34 AM

Date



			</	



Appendix J

Landfill Gas Monitoring Data



Exhibit 3 - Results of Landfill Gas Probe Monitoring

Landfill Gas Control System

LRI Landfill

SCS Engineers

04219001.04

April-19

Location Refer <i>Design.</i>	Date	Time	P _(well) (in W.C.)	Gas Composition - <i>Note 1</i>					Depth to Water <i>Note 2</i> (ft-TOC)	Exposed Portion of Perforations - <i>Note 3</i>		Comments
				CH ₄ Spike (% by vol.)	CH ₄ (% by vol.)	CO ₂ (% by vol.)	O ₂ (% by vol.)	Balance (N ₂ & H ₂ O) (% by vol.)		(ft)	(%)	

Normal Operating Range:

(min)			-		0.3	0.3	-				20.0	
(max)			5.00		5.0	5.0	20.3				90.0	

Perimeter Gas Probes

GP-1	4/25/2019	7:49	0.1	3.0	1.7	3.0	15.5	79.8	16.5	9.5	100.0	
GP-2	4/25/2019	7:56	0.2	17.1	16.1	17.7	0.0	66.2	15.8	8.8	100.0	
GP-3	4/25/2019	8:02	0.1	--	0.0	9.4	8.6	82.0	11.5	7.5	100.0	
GP-4	4/25/2019	8:10	0.1	--	0.0	2.0	18.6	79.4	9.0	5.0	99.4	
GP-9	4/25/2019	8:17	0.1	--	0.0	7.9	7.6	84.5	11.5	0.0	0.0	
GP-10	4/25/2019	7:41	0.1	7.1	16.1	25.6	1.4	56.9				
GP-10P	4/25/2019	7:37	0.1	20.8	20.4	26.2	2.9	50.5				
GP-11	4/25/2019	7:31	0.1	--	0.0	10.5	11.1	78.4				
GP-12	4/25/2019	7:24	0.0	31.9	28.6	56.9	0.1	14.4				
GP-13	4/25/2019	7:15	0.1	1.6	1.5	24.0	0.1	74.4				
GP-14	4/25/2019	8:44	0.1	--	0.0	0.1	20.7	79.2	10.6	0.0	0.0	
GP-15	4/25/2019	8:37	0.2	--	0.0	0.2	20.8	79.0	9.2	0.0	0.0	

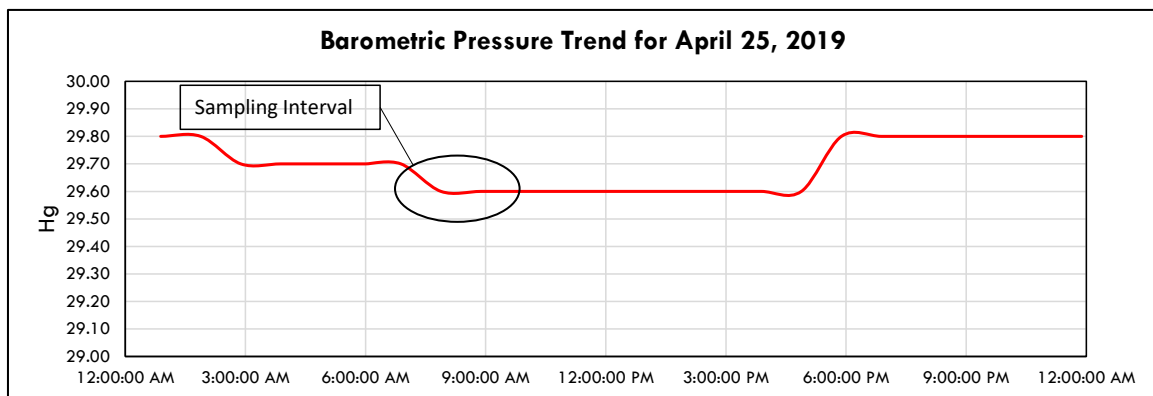
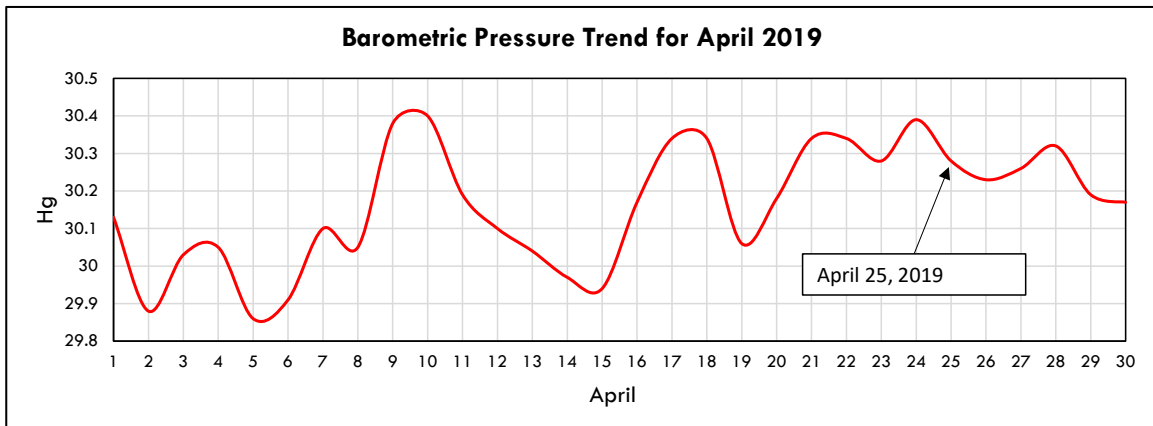
General Data:

			Beginning	Ending	Average	Starting Date:	4/25/2019
Weather:			Sunny	Sunny	Sunny	Starting Time:	7:15
Temperature, T (deg F):			42	52	47	Finishing Date:	4/25/2019
Wind Speed (mph):			2	2	2	Finishing Time:	8:44
Wind Direction:			120	120	120	Monitored by:	T. Berndahl
Barometric Pressure, P (in Hg):			30.44	30.44	30.44	Instruments:	GEM 2000
24hr Baro.Trend (rising / falling / steady / unsteady)			-			Calibration Date:	4/25/2019

Headings:

P _(well)	Relative Pressure	1.	Measurement for spike concentrations of CH ₄ and CO ₂ are recorded as a comment if observed during sampling.
CH ₄	Methane	2.	Water level measurements made where gas probe monitoring port allows for measurement, or where there is an adjacent measurement piezometer.
CO ₂	Carbon Dioxide		
O ₂	Oxygen	3.	Exposed Perforation = perforated pipe section not submerged by liquid.
H ₂ O	Water Vapor	4.	GP-10P added in January 2018. Monitoring performed at water level piezometer installed in the same boring as GP-10.
N ₂	Nitrogen		
TOC	Top of Casing		

Barometric Pressure Trend - April 2019
LRI Landfill, Pierce County, Washington



Source: Pierce County - Thun Field Station
Lat: 47.1 Long: 122.29 Elev: 538 ft-AMSL

Data Source: <https://www.wunderground.com/history/daily/us/wa/puyallup/KPLU/date/2019-4-25>

SCS Engineers

04219001.04

May-19

[illegible]

Normal Operating Range:	
-------------------------	--

(min)			-		0.3	0.3	-				20.0	
(max)			5.00		5.0	5.0	20.3				90.0	

Perimeter Gas Probes

GP-1	5/29/2019	8:21	0.1	2.4	1.5	2.7	16.3	79.5				
GP-2	5/29/2019	8:26	2.1	17.0	15.9	18.5	0.0	65.6				
GP-3	5/29/2019	8:33	0.0	--	0.0	6.7	12.7	80.6				
GP-4	5/29/2019	8:37	0.0	--	0.0	3.4	16.8	79.8				
GP-9	5/29/2019	8:41	0.0	--	0.0	8.7	6.5	84.8				
GP-10	5/29/2019	8:13	0.0	13.8	13.7	25.8	0.4	60.1				
GP-10P	5/29/2019	8:11	0.0	19.2	23.2	29.4	0.0	47.4				
GP-11	5/29/2019	8:04	0.0	--	0.0	7.7	12.5	79.8				
GP-12	5/29/2019	7:59	0.1	31.8	29.9	61.8	0.0	8.3				
GP-13	5/29/2019	7:54	0.0	0.3	0.4	24.6	0.4	74.6				
GP-14	5/29/2019	8:54	0.1	--	0.0	0.1	20.5	79.4				
GP-15	5/29/2019	8:49	0.1	--	0.0	0.1	20.4	79.5				

General Data:

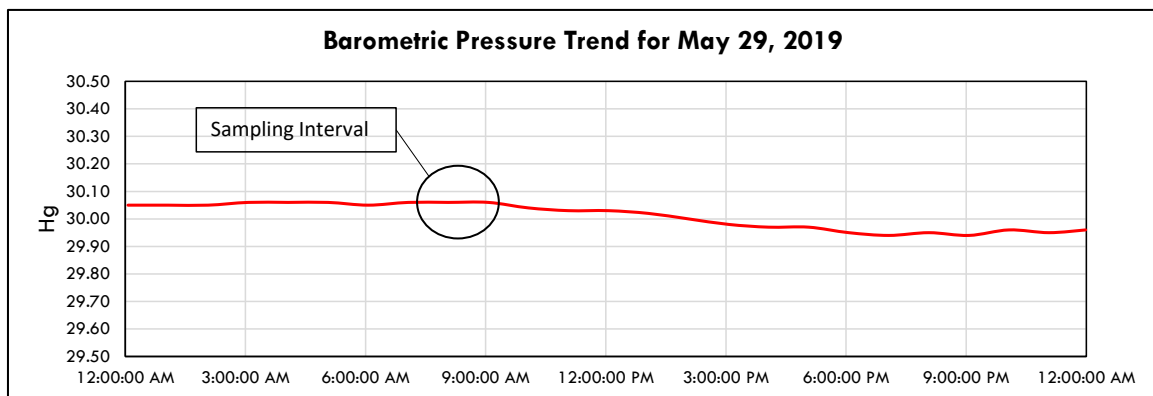
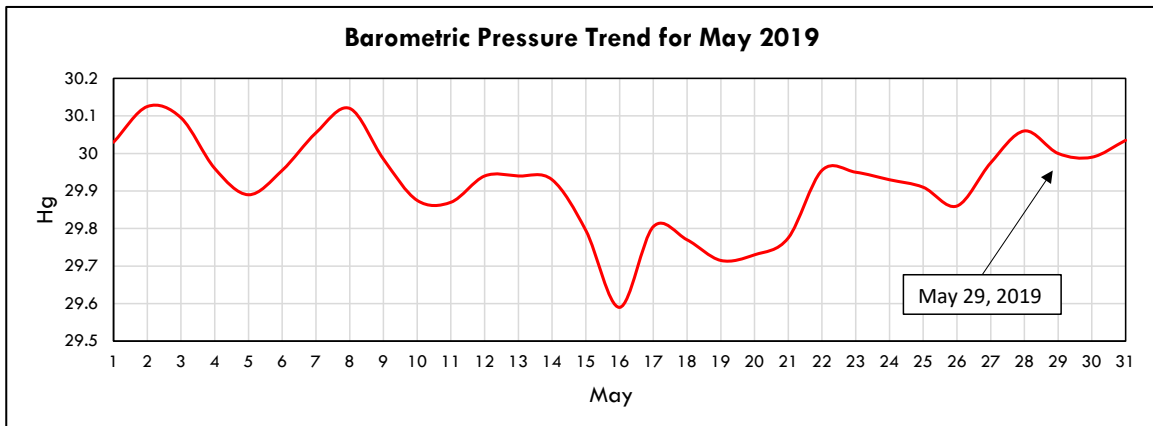
	Beginning	Ending	Average	
Weather:	Overcast	Overcast	Overcast	Starting Date: 5/29/2019
Temperature, T (deg F):	53	62	57.5	Starting Time: 7:54
Wind Speed (mph):	2	2	2	Finishing Date: 5/29/2019
Wind Direction:	210	210	210	Finishing Time: 8:54
Barometric Pressure, P (in Hg):	30.21	30.21	30.21	Monitored by: T. Berndahl
24hr Baro.Trend (rising / falling / steady / unsteady)	-			Instruments: GEM 2000
				Calibration Date: 5/29/2019

Headings:

Notes:

P _(well)	Relative Pressure	1.	Measurement for spike concentrations of CH ₄ and CO ₂ are recorded as a comment if observed during sampling.
CH ₄	Methane	2.	Water level measurements made where gas probe monitoring port allows for measurement, or where there is an adjacent measurement piezometer.
CO ₂	Carbon Dioxide		
O ₂	Oxygen	3.	Exposed Perforation = perforated pipe section not submerged by liquid.
H ₂ O	Water Vapor	4.	GP-10P added in January 2018. Monitoring performed at water level piezometer installed in the same boring as GP-10.
N ₂	Nitrogen		
TOC	Top of Casing		

Barometric Pressure Trend - May 2019
LRI Landfill, Pierce County, Washington



Source: Puyallup WA
Lat: 47.12 Long: 122.26 Elev: 591 ft-AMSL

Data Source: <https://www.wunderground.com/dashboard/pws/KWAPUYAL125/table/2019-05-29/2019-05-29/monthly>

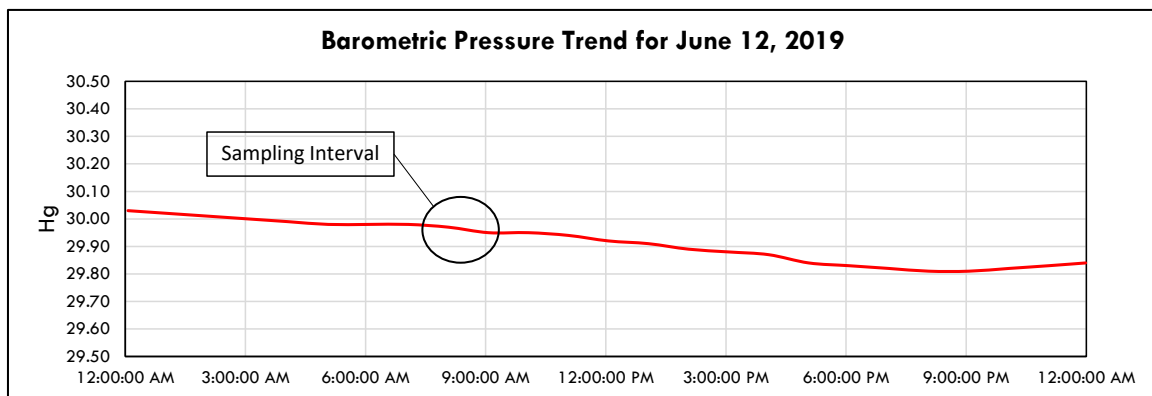
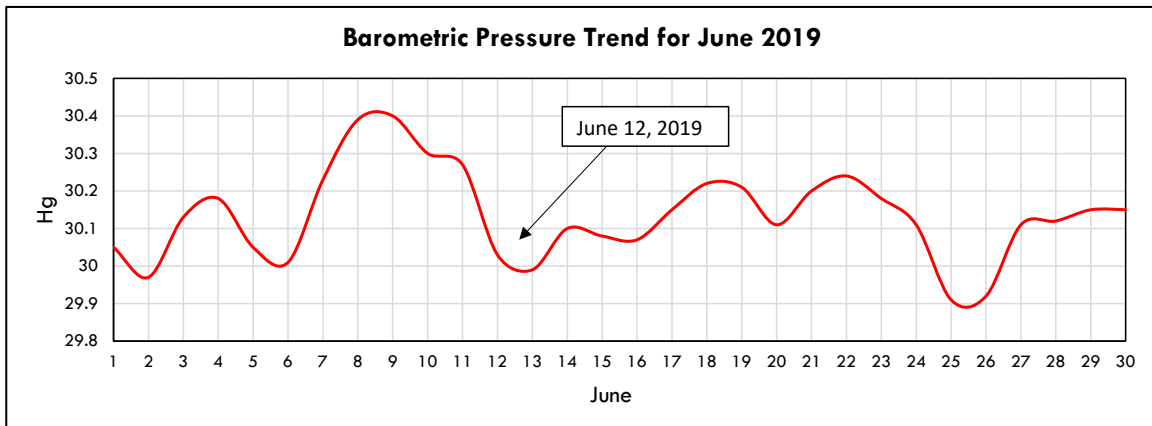
SCS Engineers

04219001.04

June-19

P _(well)	Relative Pressure	1.	Measurement for spike concentrations of CH ₄ and CO ₂ are recorded as a comment if observed during sampling.
CH ₄	Methane	2.	Water level measurements made where gas probe monitoring port allows for measurement, or where there is an adjacent measurement piezometer.
CO ₂	Carbon Dioxide		
O ₂	Oxygen	3.	Exposed Perforation = perforated pipe section not submerged by liquid.
H ₂ O	Water Vapor	4.	GP-10P added in January 2018. Monitoring performed at water level piezometer installed in the same boring as GP-10.
N ₂	Nitrogen		
TOC	Top of Casing		

Barometric Pressure Trend - June 2019
LRI Landfill, Pierce County, Washington



Source: Puyallup WA
Lat: 47.12 Long: 122.26 Elev: 591 ft-AMSL

Data Source: <https://www.wunderground.com/dashboard/pws/KWAPUYAL125/table/2019-06-12/2019-06-12/monthly>

LRI 304th Street Landfill

Landfill Gas Monitoring of On-site Buildings

Project Number: 04219001.04

Date: 6/12/19

Weather Conditions: Sunny

Instrument: Micro Flo

Measured By: Travis Berndahl

The atmosphere inside buildings at the landfill were monitored for possible intrusion of methane gas. Per WAC 173-351, concentrations of methane in on-site structures must not exceed 25% of the lower explosive limit (LEL). If off-site gas migration is suspected, concentrations of methane in off-site structures must not exceed 100 ppm methane.

The areas monitored included:

- The general overall work area
- Floor drains
- Underground conduit protrusions
- Closed areas where landfill gas could collect, such as under cupboards and inside closets

The gas detection instrument must be calibrated using calibration gas containing methane equal to 50 % LEL. Calibration must be performed before and after the survey is completed.

Checked boxes indicate that the survey revealed **no detectable methane**.

- ☒ Main Office - individual office spaces, storage areas and within open crawl-space area. 5.2 ppm max
- ☒ Repair Shop - survey atmosphere conditions throughout (lower height levels). 2.5 ppm max
- ☒ Pay/Scale Booth - interior of building. 110 ppm max
- ☒ Work Shop - interior of shed adjacent to stormwater ponds.

Background (Main Office)

Upwind → 2.3 ppm

Downwind → 2.7 ppm

Signature

- * Strong incense smell, highest reading close to incense.
- In building methane monitor reading no methane
- No previous detections before incense.