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June 4, 2019
Parametrix No. 553-1625-014

Jeff Williamson
Coal Creek Development LLC
PO Box 1743
Bellevue, WA 98009

Re: March 2019 Groundwater Sampling Event, Newcastle Demolition Landfill

Dear Mr. Williamson:

INTRODUCTION

This report summarizes the groundwater monitoring data collected in March 2019 at the Newcastle Demolition Landfill. Sample collection and data analyses were conducted in accordance with the Newcastle Demolition Landfill Post-Closure Plan (Parametrix 1998).

The landfill was formerly owned and operated by Coal Creek Development Corporation and accepted demolition and inert waste until 1992. It was formally closed in June 1993 and has since been developed as a golf course by Newcastle Golf LLC.

The Newcastle Demolition Landfill is located in an area historically mined for coal (Parametrix 1991). The underlying geology of the site consists of a thick sequence of inclined interbedded coal, sandstone, and shale beds of the Eocene Renton Formation. The site is underlain by a complex network of coal mine workings that appear to control much of the groundwater flow beneath the site. Southwesterly regional groundwater flow is substantially intercepted by the mine workings that drain to the west and discharge directly or indirectly into the Richmond Tunnel that flows into Coal Creek. The monitoring wells are installed within bedrock between the workings, and the observed water levels are at elevations expected for groundwater influenced by the draining of the mine workings by the Richmond Tunnel.

MONITORING PROGRAM HISTORY

The downgradient monitoring wells on the golf course (MW-2, MW-3, and MW-4) were disturbed during golf course construction beginning in 1996. Some interim repairs were made during the golf course construction to allow groundwater monitoring to continue, although final completion of the well monuments did not occur until February 2000. At that time the wells were redeveloped and were thought to be suitable for detecting potential impacts to groundwater quality from the former landfill. However, during the golf course construction period there may have been some impacts to groundwater quality in the monitoring wells due to surface water or soil intrusion. The history of activity associated with the wells during golf course construction was summarized in the November 1999 report (Parametrix 2000).

Damage to well MW-4 indicated by high turbidity was first noted in December 2000. Attempts to redevelop the well in February 2001 were unsuccessful. Well MW-4 was decommissioned and replaced in August 2001 with new monitoring well MW-5. MW-5 is located approximately 500 ft northwest of MW-4 (see Figures 1 and 2). The installation of well MW-5 was documented in a letter from Parametrix to Landmarc Technologies (Parametrix 2001).

From 1996 through 2000, a variable groundwater monitoring schedule was established by the Seattle-King County Department of Public Health (Coal Creek Development Corporation 1996). However, the downgradient wells, particularly well MW-3, were frequently dry during much of the year. During the September 2001 sampling event, all the wells were dry except for upgradient well MW-1. Therefore, no samples were collected, and an alternative sampling schedule was proposed to the Health Department (now known as Public Health – Seattle & King County). The proposed sampling schedule consisted of sampling in January and April when water volumes were expected to be adequate for sampling, and measuring depth to groundwater during the fall when groundwater levels were expected to be at their lowest point.

The current groundwater monitoring program for the closed Newcastle Demolition Landfill consists of sampling four groundwater monitoring wells (MW-1, MW-2, MW-3, and MW-5) and two off-site surface water stations (SW-6 and SW-7). Well MW-1 is upgradient of the landfill, and the other wells and stations are downgradient or downstream of the landfill. Surface water station SW-6, located at the Richmond Tunnel mine discharge, is thought to be representative of groundwater intercepted by a network of mine workings beneath the site that discharges into Coal Creek. Surface water station SW-7 is located farther downstream along Coal Creek. The monitoring well locations are shown on Figures 1 and 2, and the surface water station locations are shown on Figure 3. The locations of the downgradient wells with respect to landfill and golf course features are shown on Figure 2.

In September 2006, recommendations were submitted by Landmarc Technologies, Inc. to Public Health for reducing the monitoring frequency and parameters at the Newcastle Demolition Landfill (Parametrix 2006). It was recommended that the frequency of groundwater monitoring be reduced to annual, and analyses for volatile organic compounds, semi-volatile organic compounds, and metals (except for arsenic) be discontinued. These parameters are not required by Chapter 173-304 Washington Administrative Code (WAC), and the historical data since landfill closure have not indicated any detections of these parameters associated with impacts from the landfill. Reduction in monitoring frequency and parameters based on consistent lack of contamination from the landfill is in accordance with the language of the Post-Closure Monitoring Plan. These recommendations were implemented beginning with the February 2007 event.

MARCH 2019 SAMPLING EVENT

Samples were collected on March 27, 2019, by Parametrix personnel. Samples were collected from wells MW-1 and MW-2 using dedicated Hydrostar pumps, and from wells MW-3 and MW-5 using dedicated electrical submersible pumps. Samples were collected using low-flow purging methods. Samples to be analyzed for dissolved metals were field-filtered through 0.45-micron filters. A duplicate sample was collected at monitoring well MW-3 (designated MW-6).

Samples were delivered directly to Analytical Resources, Inc. (ARI) in Seattle, Washington, for analysis. Samples were measured for field parameters (pH, specific conductivity, and temperature), and analyzed for chloride, nitrite, nitrate, ammonia, sulfate, hardness (dissolved calcium and magnesium), dissolved arsenic, dissolved iron, dissolved manganese, dissolved zinc, chemical oxygen demand (COD), total organic carbon (TOC), and total dissolved solids (TDS). Additional field parameters measured included Dissolved oxygen (DO) and oxygen reduction potential (redox).

SAMPLING RESULTS

The analytical results for the monitoring wells and surface water stations are summarized in Table 1. The laboratory report and chain-of-custody forms are presented in Appendix A.

Data Validation

Parametrix conducted a quality assurance (QA) review of the laboratory data, including holding times, field duplicate results, and blank results. The laboratory QA internal standard data were also reviewed, including matrix spikes, matrix spike duplicates, surrogate recoveries, and laboratory control samples. None of the data required qualification.

Data Analysis

Data analysis consisted of comparing groundwater data (from monitoring wells and surface water station SW-6) and surface water to established state groundwater quality standards (GWQSs; 173-200 WAC) and state maximum contaminant levels (MCLs) for drinking water (246-290 WAC), preparing time-series plots, and conducting Mann-Kendall trend analyses for selected analytes in monitoring wells.

Comparison of Data to Groundwater Quality Standards

The following constituents were present at concentrations above secondary GWQSs and/or MCLs (established based on aesthetic characteristics such as taste, appearance, and/or staining):

- Specific conductivity and TDS in samples from well MW-1 (upgradient) and surface water station SW-6;
- pH in in samples from well MW-2 and surface water station SW-7;
- Sulfate in the sample from well MW-1 (upgradient);
- Dissolved iron in samples from wells MW-1 (upgradient), MW-2, MW-3, MW-5, and surface water station SW-6;
- Dissolved manganese in samples from wells MW-1 (upgradient), MW-2, and surface water station SW-6.

Dissolved arsenic concentrations in samples from wells MW-1 (upgradient well), MW-2, MW-3, and surface water stations SW-6 and SW-7 exceeded the carcinogenic GWQS but not the MCL. As previously observed, the dissolved arsenic concentration in well MW-5 also slightly exceeded the MCL.

The presence of constituents above their GWQS and/or MCL upgradient from the landfill at MW-1 indicates that the aesthetic characteristics of groundwater in the landfill vicinity are a natural artifact of the local geochemistry.

Time-Series Plots

Groundwater and surface water time-series plots were prepared for dissolved arsenic, ammonia, dissolved calcium, chloride, chemical oxygen demand (COD), hardness, dissolved iron, dissolved manganese, specific conductivity, sulfate, and total organic carbon (TOC). These constituents were selected for statistical analyses to include parameters that were elevated in leachate with respect to groundwater (Pacific Groundwater Group 1994a).

Dissolved arsenic has been added because it was a constituent of interest discussed in Ecology's Periodic Review (Ecology 2013). These plots are presented in Appendix B and show data collected since 1994. Based on the time-series plots, the following observations can be made:

- Sulfate and hardness (and dissolved calcium) concentrations continued to be highest in upgradient well MW-1, and the March 2019 sulfate concentration in MW-1 was higher than typically observed.
- In MW-2, concentrations of dissolved iron continued to be lower than the relatively high concentrations measured between 1999 and 2000, although the March 2019 results for dissolved manganese, TOC, and COD were higher than typically observed. Specific conductivity and concentrations of chloride and hardness (and dissolved calcium) increased beginning in 2007 but have been declining since then, and the results for March 2019 were lower than typically observed.
- In MW-3, concentrations of most parameters have remained stable or decreased over the last few years. Specific conductivity, and concentrations of ammonia, chloride, hardness (and dissolved calcium), dissolved iron, dissolved manganese, and TOC continued to be lower compared to the relatively high values observed during 2002.
- In MW-5, stable or decreasing trends in most parameters have been observed in the last few years. Dissolved manganese and dissolved iron concentrations, however, have remained generally stable. Because this is a low-yield well, continuing development over several years is likely to occur, resulting in improving water quality.
- At SW-6, concentrations of hardness, sulfate, and dissolved manganese have decreased since over the history of monitoring.

Mann-Kendall Tests

The Mann-Kendall test for trends (Gilbert 1987, Gibbons 1994) was used to evaluate the Newcastle Demolition Landfill groundwater data (Pacific Groundwater Group 1994a,b,c). Trends in each well were evaluated separately because the upgradient well continues to show higher concentrations of some constituents than the downgradient wells. The trend analyses used all data collected between April 1988 and March 2019 (except for specific conductivity results for the second 1998 semi-annual monitoring event, which are suspected to be erroneously low due to an error in calibrating the meter). All non-detected values were given a value equal to the reporting limit (Gilbert 1987, Gibbons 1994).

The results of the trend analyses are summarized in Table 2. The Mann-Kendall tests indicate the following:

- MW-1: statistically significant increasing trends in chloride, COD, and TOC; statistically significant decreasing trends in dissolved arsenic and dissolved manganese, upgradient from the landfill;
- MW-2: statistically significant increasing trends in ammonia, dissolved calcium, chloride, COD, hardness, dissolved iron, dissolved manganese, specific conductivity, and TOC; a statistically significant decreasing trend in dissolved arsenic;
- MW-3: statistically significant increasing trends in ammonia, COD, dissolved iron, specific conductivity, and TOC; statistically significant decreasing trends in dissolved calcium, chloride, hardness, and dissolved manganese; and
- MW-5: statistically significant decreasing trends in arsenic, dissolved calcium, chloride, hardness, specific conductivity, and sulfate.

GROUNDWATER LEVEL MONITORING RESULTS

Groundwater levels were measured at three of the four monitoring wells prior to sampling. Depth to water could not be measured at MW-1 due to wellhead constraints. The measurements are presented in Table 3 with calculated water elevations.

DISCUSSION AND CONCLUSIONS

Analysis of the March 2019 groundwater data from the Newcastle Demolition Landfill indicates the following:

- The differences in groundwater chemistry between monitoring wells suggest that the observed water chemistry is influenced by local geochemical conditions, and therefore do not clearly demonstrate landfill impacts. Concentrations exceeding secondary GWQSs or MCLs (specific conductivity, TDS, sulfate, dissolved iron, and dissolved manganese) occurred in the upgradient well and in downgradient wells and the surface water stations. Dissolved arsenic concentrations exceeded the carcinogenic GWQS in all wells (including the upgradient well) and surface water stations. All arsenic concentrations were below the MCL except for well MW-5. Statistically significant increasing trends in indicator parameters were also observed in both upgradient and downgradient wells.
- Some of the variations in concentrations may be related to changed geochemical conditions associated with golf course development activities. In recent years data for wells MW-2 and MW-3 have indicated lower concentrations for parameters that were elevated following the golf course construction period during 1996 through 2002 (including dissolved iron, dissolved manganese, and TOC). However, the March 2019 concentrations of dissolved manganese, TOC and COD in well MW-2 were higher than typically observed.

Please contact me at (206) 394-3667 or lgilbert@parametrix.com if you have questions regarding this report.

Sincerely,

Parametrix

Lisa A. Gilbert, LHG
Project Hydrogeologist

cc: Richard Morck, P.E. – Landmarc Technologies, Inc.
Darshan S. Dhillon, Public Health – Seattle & King County
Eugene Freeman, Cleanup Program, NWRO, Washington State Department of Ecology
Tim O'Connor LG, LHG, Solid Waste Management Program, NWRO, Washington State Department of Ecology

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Coal Creek Development Corporation. 1996. Letter to Parametrix. February 2, 1996.

Gibbons, R.D. 1994. Statistical Methods for Groundwater Monitoring. John Wiley and Sons, Inc. New York

Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. Van Nostrand Reinhold. New York

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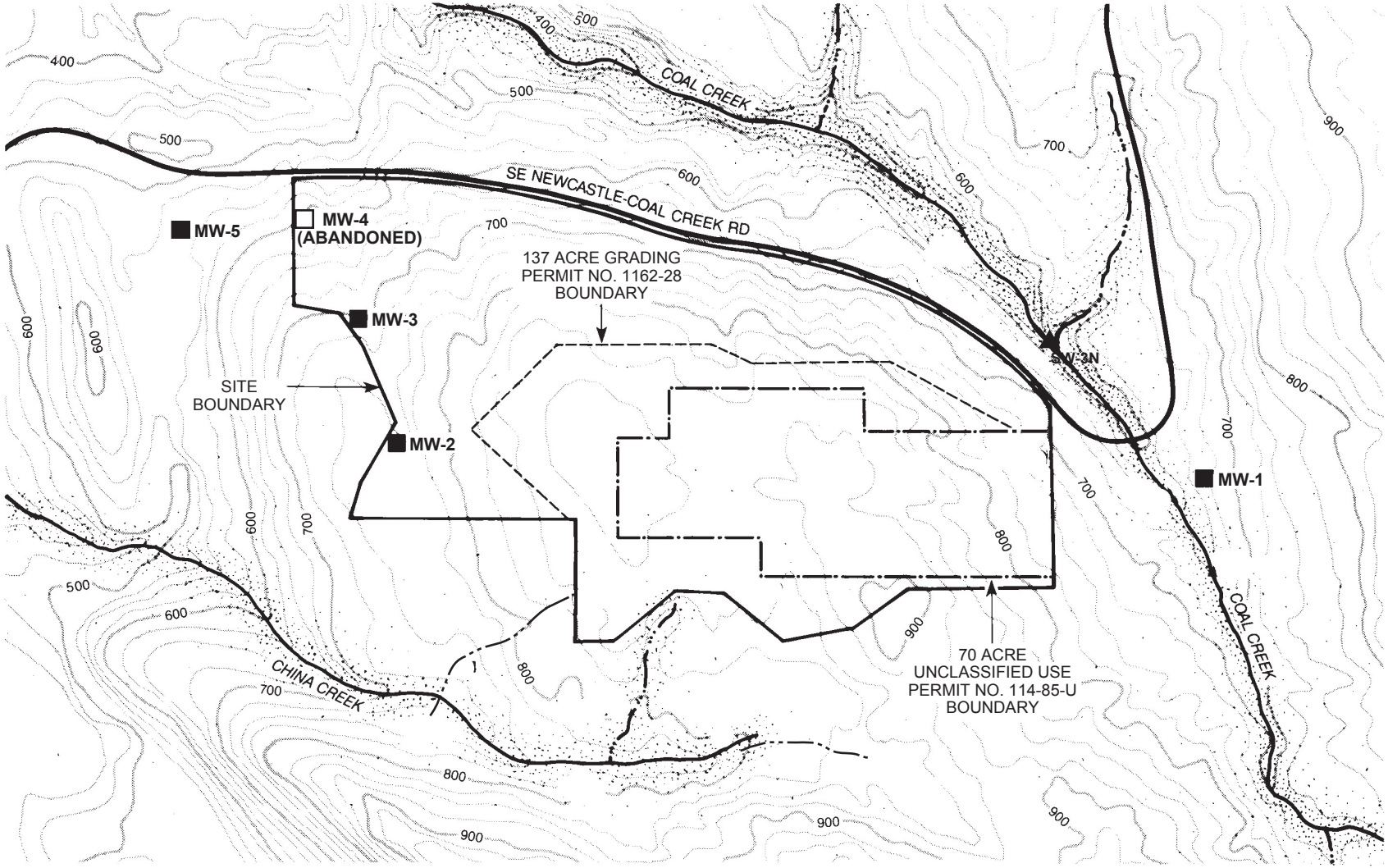
Figures



Parametrix 555-3747-001/01(01) 5/09 (B)

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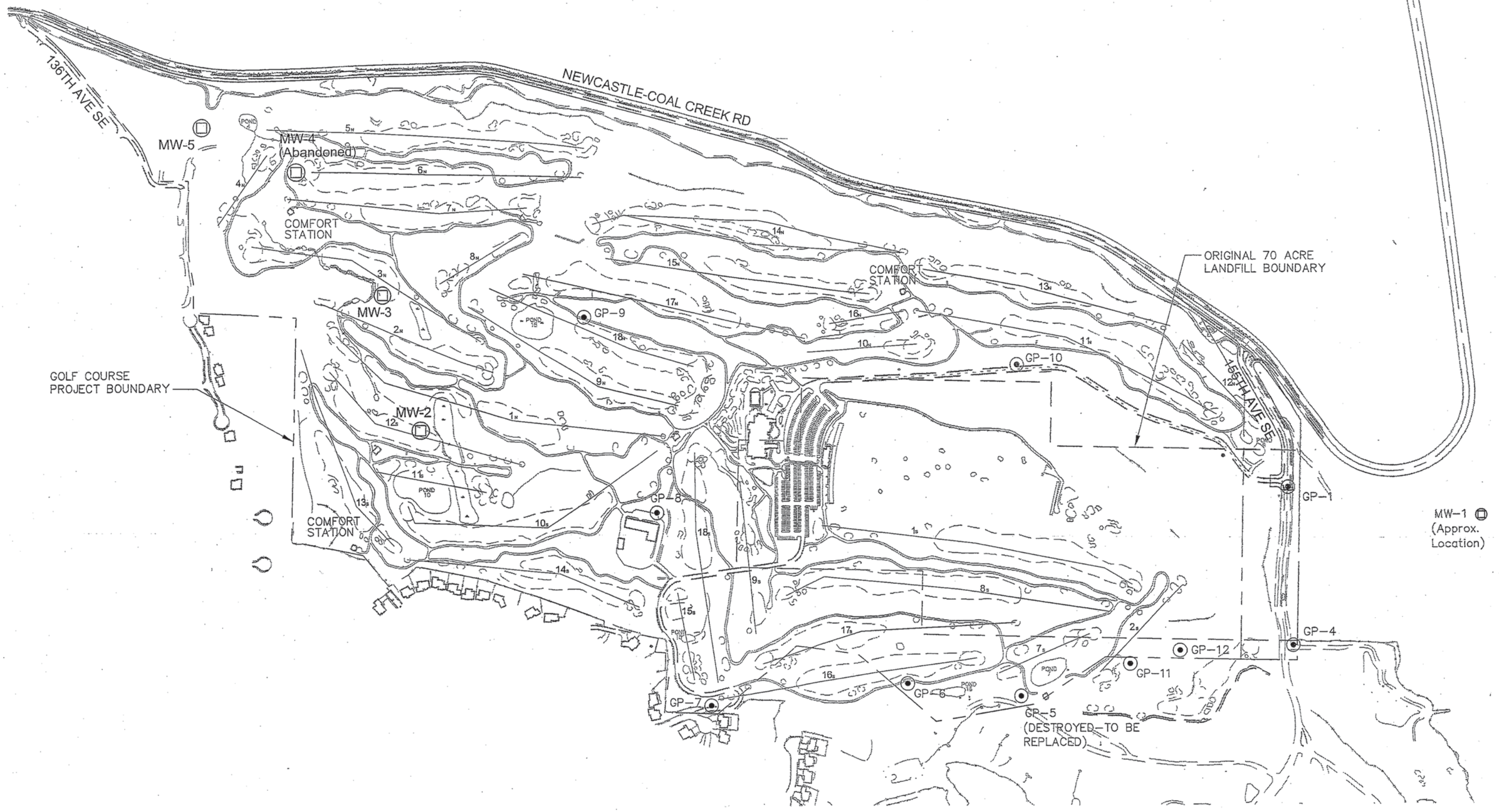
SCALE IN FEET

■ **MW-1** Groundwater Monitoring Well

Figure 1
Groundwater Monitoring Locations in Site Vicinity
Newcastle Demolition Landfill



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DATE: 04/10/03

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SCALE IN FEET

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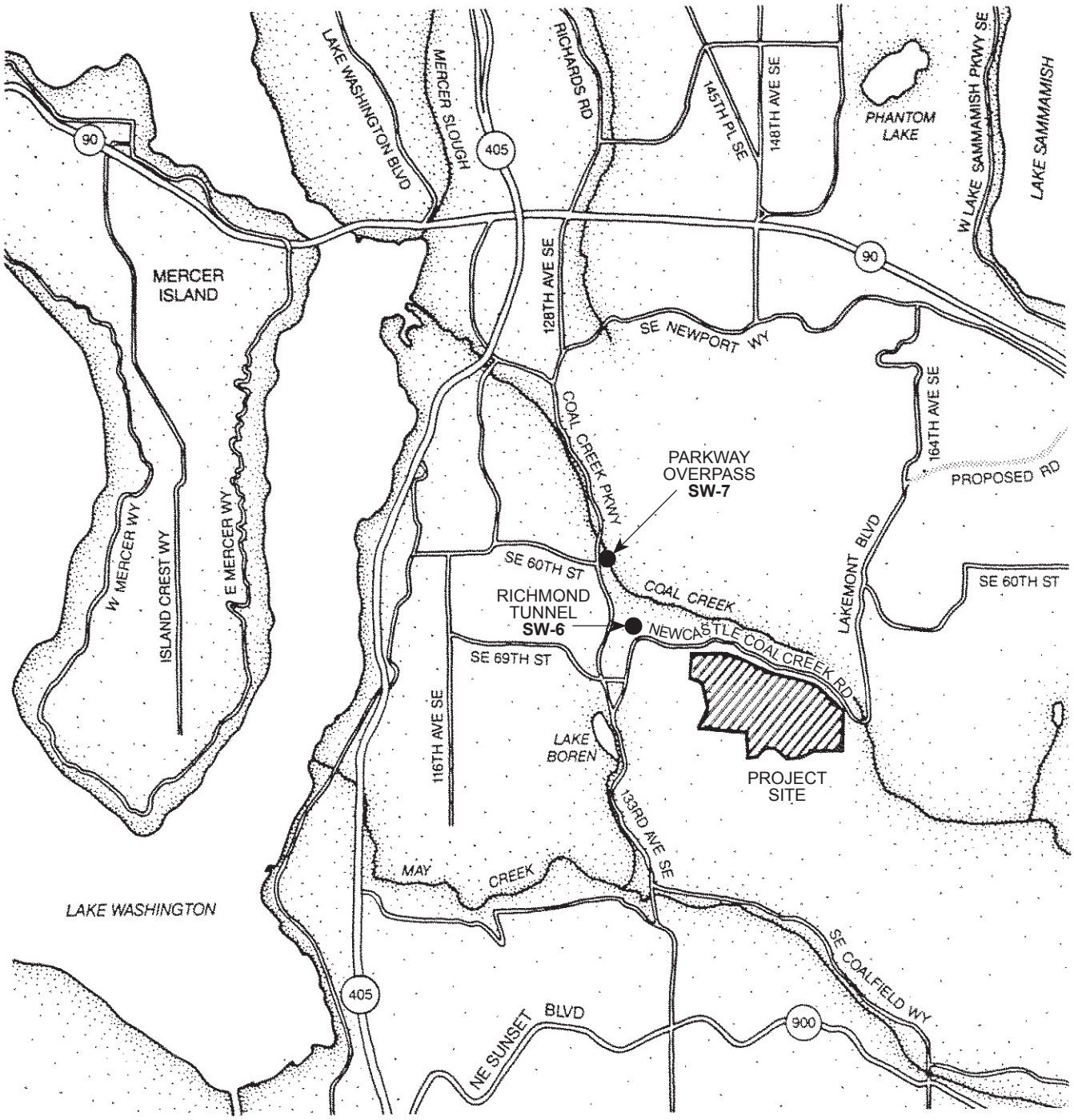
LEGEND

- MW-2 — Groundwater Monitoring Well (Field Located 10/22/01)
- GP-1 — Gas Probe Location (Field Located 10/22/01)
- COMFORT STATION — Comfort Station (Restroom)
- Pond and "Creek" System
- Storm Drainage Control Facility
- Golf Cart Path
- 14s — Golf Course Fairway Alignment and Number

Figure 2
Groundwater Monitoring Well Locations and Golf Course Features, Newcastle Demolition Landfill Area



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SCALE IN MILES

● Surface Water Monitoring Site

Figure 3
Off-site Monitoring Locations
Newcastle Demolition Landfill

Tables

Table 1. Newcastle Groundwater and Surface Water Data

				Groundwater					Surface Water	
Parameter	**Units**	**GWQS**	**MCL**	**MW-1 3/27/2019**	**MW-2 3/27/2019**	**MW-3 3/27/2019**	**MW-6 (MW-3 Dup) 3/27/2019**	**MW-5 3/27/2019**	**SW-6 3/27/2019**	**SW-7 3/27/2019**
Field Data										
Temperature	°C			9.7	11.0	13.1	- -	11.4	12.0	6.9
pH	standard	6.5-8.5 **		7.11	**6.40**	7.63	- -	6.54	7.19	**8.76**
Specific Conductivity	uS/cm		700 **	**950**	142.3	632.8	- -	482.6	**852**	373.5
DO	mg/L			1.28	0.20	0.89	- -	0.25	11.53	13.42
Redox	mV			4.0	18.9	-18.8	- -	29.0	45.7	26.4
Conventionals										
Total Dissolved Solids	mg/L	500 **	500 **	**700**	92	400	384	287	**525**	234
Chloride	mg/L	250 **	250 **	3.68	1.21	6.62	7.04	5.60	7.47	12.4
Ammonia	mg-N/L			0.132	0.571	0.406	0.367	0.040 U	0.136	0.040 U
Nitrate	mg-N/L	10 *	10 *	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.120 U	0.0240	0.788
Nitrate + Nitrite	mg-N/L			0.012	0.020	0.010 U	0.010 U	0.100 U	0.024	0.788
Nitrite	mg-N/L		1 *	0.010 U	0.013	0.010 U	0.010 U	0.020 U	0.010 U	0.010 U
Sulfate	mg/L	250 **	250 **	**495**	7.54	46.5	36.2	69.1	203	84.1
Chemical Oxygen Demand	mg/L			10.0 U	92.1	17.3	16.8	10.0 U	10.0 U	10.0 U
Total Organic Carbon	mg/L			0.73	24.27	5.21	4.97	1.64	1.29	2.06
Dissolved Hardness	mg/L			596	58.0	64.5	63.2	248	335	138
Dissolved Metals										
Arsenic	mg/L	0.00005 ***	0.01 *	**0.000896**	**0.00152**	**0.00263**	**0.00254**	**0.0161**	**0.00501**	**0.00100**
Calcium	mg/L			158	17.2	13.5	13.2	57.5	66.1	30.4
Iron	mg/L	0.3 **	0.3 **	**0.910**	**1.51**	**1.18**	**1.20**	**4.41**	**2.22**	0.0734
Magnesium	mg/L			49.3	3.66	7.50	7.35	25.3	41.2	15.0
Manganese	mg/L	0.05 **	0.05 **	**0.136**	**5.81**	0.0478	0.0492	0.417	**0.213**	0.0316
Zinc	mg/L	5 **	5 **	0.0062 J	0.112	0.0100 U	0.0024 J	0.0041 J	0.0100 U	0.0139

Notes:

GWQS = Water Quality Standards for Ground Waters of the State of Washington (173-200 WAC)
MCL = Maximum Contaminant Level, Washington State Drinking Water Regulations (Chapter 246-290 WAC)
* = Primary contaminant criteria
** = Secondary contaminant criteria
*** = Carcinogenic contaminant criteria
= Exceeds GWQS or MCL
U = Compound undetected at the specified reporting limit
J = Estimated concentration below reporting limit

Table 2. Results of Mann-Kendall Tests for Trend, Newcastle Demolition Landfill, March 2019

Well ID	Analyte	n	S	Variance	Z	Trend
MW-1	Ammonia-N[1]	59	294	23354.7	1.92	Positive
	Arsenic	**21**	**-133**	**1065.7**	**-4.04**	**Negative**
	Calcium, Dissolved	56	48	19977.3	0.33	No Trend
	Chloride	**59**	**514**	**23271.3**	**3.36**	**Positive**
	COD	**59**	**359**	**12888.3**	**3.15**	**Positive**
	Hardness	58	33	22153.7	0.21	No Trend
	Iron, Dissolved	59	288	23361.3	1.88	Positive
	Manganese, Dissolved	**59**	**-313**	**23355.7**	**-2.04**	**Negative**
	Specific Conductivity	58	44	22222.7	0.29	No Trend
	Sulfate	59	51	23353.7	0.33	No Trend
	TOC	**59**	**401**	**21075.0**	**2.76**	**Positive**
MW-2	**Ammonia-N**	**53**	**323**	**16992.3**	**2.47**	**Positive**
	Arsenic	**21**	**-102**	**1000.7**	**-3.19**	**Negative**
	Calcium, Dissolved	**48**	**531**	**12657.7**	**4.71**	**Positive**
	Chloride	**53**	**817**	**16965.7**	**6.26**	**Positive**
	COD[1]	**53**	**278**	**16814.7**	**2.14**	**Positive**
	Hardness	**50**	**523**	**14233.0**	**4.38**	**Positive**
	Iron, Dissolved	**53**	**629**	**16987.7**	**4.82**	**Positive**
	Manganese, Dissolved[1]	**52**	**285**	**16049.7**	**2.24**	**Positive**
	Specific Conductivity	**50**	**467**	**14291.7**	**3.90**	**Positive**
	Sulfate	52	-84	16050.7	-0.66	No Trend
	TOC	**53**	**561**	**16985.7**	**4.30**	**Positive**
MW-3	Ammonia-N[1]	**39**	**167**	**6831.7**	**2.01**	**Positive**
	Arsenic	19	14	811.3	0.46	No Trend
	Calcium, Dissolved	**36**	**-242**	**5388.0**	**-3.28**	**Negative**
	Chloride	**40**	**-318**	**7358.0**	**-3.70**	**Negative**
	COD	**40**	**239**	**7197.0**	**2.81**	**Positive**
	Hardness	**37**	**-285**	**5833.0**	**-3.72**	**Negative**
	Iron, Dissolved	**40**	**179**	**7363.7**	**2.07**	**Positive**
	Manganese, Dissolved	**39**	**-383**	**6827.0**	**-4.62**	**Negative**
	Specific Conductivity	**40**	**209**	**7365.7**	**2.42**	**Positive**
	Sulfate	40	18	7362.7	0.20	No Trend
	TOC	**40**	**335**	**7361.7**	**3.89**	**Positive**

n = Sample size

S = Mann-Kendall test statistic. Positive number implies an increasing trend; negative number implies a decreasing trend.

Z = Approximate normal test statistic; calculated based on S and the estimated variance when the sample size is greater than 10.

The comparison level (critical value of Z) at 1.0 - (α/2) = (0.05/2) = 97.5% confidence level = 1.97737 for a two-tailed Mann-Kendall test.

If the absolute value of the calculated Z statistic (|Z|) > 1.97737, a significant trend is present in the data. There is no trend in the data when |Z| < 1.97737.

[1] When run as a one-tailed test, there is a trend (i.e., |Z| > 1.65463). The comparison level (critical value of Z) at 1.0 - (α) = (0.05) = 95% confidence level = 1.65463.

Trends significant at a confidence level of 97.5% are shown in **BOLD BLACK FONT.**

Table 2. Results of Mann-Kendall Tests for Trend, Newcastle Demolition Landfill, March 2019 (continued)

Well ID	Analyte	n	S	Variance	Z	Trend
MW-5	Ammonia-N	21	-49	1093.7	-1.45	No Trend
	Arsenic	**15**	**-49**	**408.3**	**-2.38**	**Negative**
	Calcium, Dissolved	**21**	**-146**	**1096.7**	**-4.38**	**Negative**
	Chloride	**21**	**-86**	**1094.7**	**-2.57**	**Negative**
	COD	21	-9	1051.7	-0.25	No Trend
	Hardness	**21**	**-150**	**1084.7**	**-4.52**	**Negative**
	Iron, Dissolved	21	45	1095.7	1.33	No Trend
	Manganese, Dissolved	21	41	1095.7	1.21	No Trend
	Specific Conductivity	**21**	**-91**	**1095.7**	**-2.72**	**Negative**
	Sulfate	**21**	**-153**	**1095.7**	**-4.59**	**Negative**
	TOC	21	-33	1095.7	-0.97	No Trend

n = Sample size

S = Mann-Kendall test statistic. Positive number implies an increasing trend; negative number implies a decreasing trend.

Z = Approximate normal test statistic; calculated based on S and the estimated variance when the sample size is greater than 10.

The comparison level (critical value of Z) at 1.0 - (α/2) = (0.05/2) = 97.5% confidence level = 1.97737 for a two-tailed Mann-Kendall test.

If the absolute value of the calculated Z statistic (|Z|) > 1.97737, a significant trend is present in the data. There is no trend in the data when |Z| < 1.97737.

[1] When run as a one-tailed test, there is a trend (i.e., |Z| > 1.65463). The comparison level (critical value of Z) at 1.0 - (α) = (0.05) = 95% confidence level = 1.65463.

Trends significant at a confidence level of 97.5% are shown in **BOLD BLACK FONT.**

Table 3. Groundwater Elevations for Newcastle Landfill, March 2019

Well	Date	Reference Elevation[1]	Depth to Groundwater[2]	Groundwater Elevation[1]
MW-1	3/27/2019	649	NM	NM
MW-2	3/27/2019	753	32.31	721
MW-3	3/27/2019	716	157.32	558
MW-5	3/27/2019	542	63.21	479

Notes:

[1] Reference Elevation and Groundwater Elevation approximate

[2] Depth to groundwater measured from well seal

NM = Not Measured

Appendix A

Laboratory Report and Chain-of-Custody Forms

Analytical Resources, Incorporated
Analytical Chemists and Consultants

19 April 2019

Lisa Gilbert
Parametrix, Inc.
719 2nd Avenue, Suite 200
Seattle, WA 98104

RE: Newcastle Landfill

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
19C0441	N/A

Shelly Fishel

Digitally signed by Shelly Fishel
DN: c=US, st=Washington, l=Tukwila, o=Analytical Resources, Inc., cn=Shelly Fishel, email=shelly.fishel@arilabs.com
Date: 2019.04.19 08:04:40 -07'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it" entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 19C0441	Turn-around Requested: 2 weeks
ARI Client Company: Parametrix, Inc.	Phone: 206-394-3700
Client Contact: Lisa Gilbert	
Client Project Name: Newcastle Landfill	
Client Project #: 553-1625-014	Samplers: Trey Parry

Date: 3/27/19
Page: 1 of 1
No. of Coolers: 1
Cooler Temps: 5.2 °C

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Cl,SO4,NO2 /NO3,TDS	Ammonia, COD, TOC	D Fe,Mn,Zn, As, hard	TDS					Notes/Comments
MW-1	3/27/19	11:50	water	3	✔	✔	✔	✓					Dissolved metals samples field filtered
MW-2		14:30	water	3	✔	✔	✔	✓					
MW-3		13:20	water	3	✔	✔	✔	✓					
MW-5		16:05	water	3	✔	✔	✔	✓					
MW-6		13:30	water	3	✔	✔	✔	✓					
SW-6		9:15	water	3	✔	✔	✔	✓					
SW-7		9:50	water	3	✔	✔	✔	✓					

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Trey Parry	Printed Name: Jacob Walter	Printed Name:	Printed Name:
	Company: Parametrix	Company: ART	Company:	Company:
	Date & Time: 3/27/19 1700	Date & Time: 03/27/19 1700	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	19C0441-01	Water	27-Mar-2019 11:50	27-Mar-2019 17:00
MW-2	19C0441-02	Water	27-Mar-2019 14:30	27-Mar-2019 17:00
MW-3	19C0441-03	Water	27-Mar-2019 13:20	27-Mar-2019 17:00
MW-5	19C0441-04	Water	27-Mar-2019 16:05	27-Mar-2019 17:00
MW-6	19C0441-05	Water	27-Mar-2019 13:30	27-Mar-2019 17:00
SW-6	19C0441-06	Water	27-Mar-2019 09:15	27-Mar-2019 17:00
SW-7	19C0441-07	Water	27-Mar-2019 09:50	27-Mar-2019 17:00

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Work Order Case Narrative

Revised Report - April 19, 2019

This report was revised to remove Arsenic by 6010C and to include Arsenic by 6020A.

Sample receipt

Samples as listed on the preceding page were received April 27, 2019 under ARI work order 19C0441. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Dissolved Metals - EPA Method 6010C

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

The Duplicate RPD and Matrix Spike percent recoveries were within control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

The Duplicate RPD and Matrix Spike percent recoveries were within control limits.

Dissolved Metals - EPA Method 200.8

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

WORK ORDER

19C0441

Client: Parametrix, Inc.	**Project Manager: Shelly Fishel**
Project: Newcastle Landfill 2018	**Project Number: 553-1625-014**

Preservation Confirmation

Container ID	Container Type	pH	
19C0441-01 A	Large OJ, 1000 mL		
19C0441-01 B	Small OJ, 500 mL		
19C0441-01 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	Pass (P)
19C0441-01 D	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
19C0441-02 A	Large OJ, 1000 mL		
19C0441-02 B	Small OJ, 500 mL		
19C0441-02 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19C0441-02 D	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
19C0441-03 A	Large OJ, 1000 mL		
19C0441-03 B	Small OJ, 500 mL		
19C0441-03 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19C0441-03 D	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
19C0441-04 A	Large OJ, 1000 mL		
19C0441-04 B	Small OJ, 500 mL		
19C0441-04 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19C0441-04 D	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
19C0441-05 A	Large OJ, 1000 mL		
19C0441-05 B	Small OJ, 500 mL		
19C0441-05 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19C0441-05 D	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
19C0441-06 A	Large OJ, 1000 mL		
19C0441-06 B	Small OJ, 500 mL		
19C0441-06 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19C0441-06 D	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
19C0441-07 A	Large OJ, 1000 mL		
19C0441-07 B	Small OJ, 500 mL		
19C0441-07 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19C0441-07 D	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P

JBr
Preservation Confirmed By

03/27/19
Date

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Parametrix | Project Name: Newcastle Landfill

COC No(s): NA | Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: 19C0441 | Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1700 | 5.2°C

If cooler temperature is out of compliance fill out form 00070F | Temp Gun ID#: D00520b

Cooler Accepted by: JBw Date: 03/27/19 Time: 1700

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: Equipment: Split by:

Samples Logged by: JBw Date: 03/27/19 Time: 1833 Labels checked by: JBw

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/27/2019 11:50

Instrument: ICPMS2 Analyst: MCB — Analyzed: 04/17/2019 16:41

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 19C0441-01 D 02

Preparation Batch: BHD0458 — Sample Size: 25 mL

Prepared: 17-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	**0.896**	ug/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C — Sampled: 03/27/2019 11:50

Instrument: ICP2 Analyst: TCH — Analyzed: 04/09/2019 14:46

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 19C0441-01 D 01

Preparation Batch: BHD0241 — Sample Size: 25 mL

Prepared: 09-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0051	0.0500	**158**	mg/L	
Iron, Dissolved	7439-89-6	1	0.0013	0.0500	**0.910**	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0160	0.0500	**49.3**	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0003	0.0010	**0.136**	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0021	0.0100	**0.0062**	mg/L	J

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/27/2019 11:50

Instrument: BAL2 Analyst: KLE — Analyzed: 03/29/2019 04:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-01

Preparation Batch: BHC0805 — Sample Size: 100 mL

Prepared: 29-Mar-2019 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	**700**	mg/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 11:50

Instrument: DX500 Analyst: KOTT — Analyzed: 04/10/2019 23:45

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-01 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	200	20.0	20.0	**495**	mg/L	D

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/27/2019 11:50

Instrument: LACHAT2 Analyst: BF — Analyzed: 04/11/2019 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-01 C

Preparation Batch: BHD0144 — Sample Size: 10 mL

Prepared: 11-Apr-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	**0.132**	mg/L	

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/27/2019 11:50
Instrument: [CALC] Analyst: BF — Analyzed: 04/03/2019 15:10

Sample Preparation: Preparation Method: [CALC]; Preparation Batch: [CALC]; Prepared: 03-Apr-2019; Final Volume: 1 — Extract ID: 19C0441-01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT2 Analyst: BF — Analyzed: 03/28/2019 12:11

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHC0782; Prepared: 28-Mar-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-01 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHD0093; Prepared: 03-Apr-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-01 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	**0.012**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/27/2019 11:50

Instrument: UV1800-1 Analyst: WCW — Analyzed: 03/29/2019 09:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-01 C

Preparation Batch: BHC0784 — Sample Size: 2 mL

Prepared: 28-Mar-2019 — Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Wet Chemistry

Method: EPA 9060A — Sampled: 03/27/2019 11:50

Instrument: TOC-LCSH Analyst: BF — Analyzed: 04/02/2019 17:11

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-01 C

Preparation Batch: BHD0067 — Sample Size: 20 mL

Prepared: 02-Apr-2019 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	**0.73**	mg/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/27/2019 11:50
Instrument: [CALC] Analyst: TCH — Analyzed: 04/09/2019 14:46

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 09-Apr-2019 Final Volume: 1

Extract ID: 19C0441-01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	**596**	mg/L CaCO3	

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-1

19C0441-01RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 11:50

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 00:02

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-01RE1 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	2	0.200	0.200	**3.68**	mg/L	D

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/27/2019 14:30
Instrument: ICPMS2 Analyst: MCB — Analyzed: 04/17/2019 16:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 19C0441-02 D 02
Preparation Batch: BHD0458 — Sample Size: 25 mL
Prepared: 17-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	**1.52**	ug/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C — Sampled: 03/27/2019 14:30
Instrument: ICP2 Analyst: TCH — Analyzed: 04/09/2019 15:18

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 19C0441-02 D 01
Preparation Batch: BHD0241 — Sample Size: 25 mL
Prepared: 09-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0051	0.0500	**17.2**	mg/L	
Iron, Dissolved	7439-89-6	1	0.0013	0.0500	**1.51**	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0160	0.0500	**3.66**	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0003	0.0010	**5.81**	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0021	0.0100	**0.112**	mg/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/27/2019 14:30
Instrument: BAL2 Analyst: KLE — Analyzed: 03/29/2019 04:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-02
Preparation Batch: BHC0805 — Sample Size: 200 mL
Prepared: 29-Mar-2019 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	**92**	mg/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/27/2019 14:30

Instrument: LACHAT2 Analyst: BF — Analyzed: 04/11/2019 15:23

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-02 C

Preparation Batch: BHD0144 — Sample Size: 10 mL

Prepared: 11-Apr-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	**0.571**	mg/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/27/2019 14:30
Instrument: [CALC] Analyst: BF — Analyzed: 04/03/2019 15:11

Sample Preparation: Preparation Method: [CALC]; Preparation Batch: [CALC]; Prepared: 03-Apr-2019; Final Volume: 1 — Extract ID: 19C0441-02

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT2 Analyst: BF — Analyzed: 03/28/2019 12:14

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHC0782; Prepared: 28-Mar-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-02 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	**0.013**	mg/L	

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHD0093; Prepared: 03-Apr-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-02 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	**0.020**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/27/2019 14:30
Instrument: UV1800-1 Analyst: WCW — Analyzed: 03/29/2019 09:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-02 C
Preparation Batch: BHC0784 — Sample Size: 2 mL
Prepared: 28-Mar-2019 — Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	**92.1**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02 (Water)

Wet Chemistry

Method: EPA 9060A — Sampled: 03/27/2019 14:30

Instrument: TOC-LCSH Analyst: BF — Analyzed: 04/02/2019 17:35

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-02 C

Preparation Batch: BHD0067 — Sample Size: 20 mL

Prepared: 02-Apr-2019 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		10	5.00	5.00	**24.27**	mg/L	D

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/27/2019 14:30
Instrument: [CALC] Analyst: TCH — Analyzed: 04/09/2019 15:18

Sample Preparation: Preparation Method: [CALC] — Extract ID: 19C0441-02
Preparation Batch: [CALC]
Prepared: 09-Apr-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	**58.0**	mg/L CaCO3	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 14:30

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 13:04

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-02RE1 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	5	0.500	0.500	**7.54**	mg/L	D

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-2

19C0441-02RE2 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 14:30

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 13:20

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-02RE2 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.100	**1.21**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/27/2019 13:20
Instrument: ICPMS2 Analyst: MCB — Analyzed: 04/17/2019 16:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 19C0441-03 D 02
Preparation Batch: BHD0458 — Sample Size: 25 mL
Prepared: 17-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	**2.63**	ug/L	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C — Sampled: 03/27/2019 13:20
Instrument: ICP2 Analyst: TCH — Analyzed: 04/09/2019 13:27

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 19C0441-03 D 01
Preparation Batch: BHD0241 — Sample Size: 25 mL
Prepared: 09-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0051	0.0500	**13.5**	mg/L	
Iron, Dissolved	7439-89-6	1	0.0013	0.0500	**1.18**	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0160	0.0500	**7.50**	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0003	0.0010	**0.0478**	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0021	0.0100	ND	mg/L	U

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/27/2019 13:20
Instrument: BAL2 Analyst: KLE — Analyzed: 03/29/2019 04:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-03
Preparation Batch: BHC0805 — Sample Size: 100 mL
Prepared: 29-Mar-2019 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	**400**	mg/L	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 13:20

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 00:36

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-03 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	50	5.00	5.00	**46.5**	mg/L	D

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/27/2019 13:20
Instrument: LACHAT2 Analyst: BF — Analyzed: 04/11/2019 15:24

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-03 C
Preparation Batch: BHD0144 — Sample Size: 10 mL
Prepared: 11-Apr-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	**0.406**	mg/L	

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/27/2019 13:20
Instrument: [CALC] Analyst: BF — Analyzed: 04/03/2019 15:18

Sample Preparation: Preparation Method: [CALC]; Preparation Batch: [CALC]; Prepared: 03-Apr-2019; Final Volume: 1 — Extract ID: 19C0441-03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT2 Analyst: BF — Analyzed: 03/28/2019 12:16

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHC0782; Prepared: 28-Mar-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-03 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHD0093; Prepared: 03-Apr-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-03 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/27/2019 13:20
Instrument: UV1800-1 Analyst: WCW — Analyzed: 03/29/2019 09:41

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-03 C
Preparation Batch: BHC0784 — Sample Size: 2 mL
Prepared: 28-Mar-2019 — Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	**17.3**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Wet Chemistry

Method: EPA 9060A — Sampled: 03/27/2019 13:20
Instrument: TOC-LCSH Analyst: BF — Analyzed: 04/02/2019 18:01

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-03 C
Preparation Batch: BHD0067 — Sample Size: 20 mL
Prepared: 02-Apr-2019 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	**5.21**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/27/2019 13:20
Instrument: [CALC] Analyst: TCH — Analyzed: 04/09/2019 13:27

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 09-Apr-2019 Final Volume: 1

Extract ID: 19C0441-03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	**64.5**	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-3

19C0441-03RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 13:20

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 00:52

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-03RE1 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	5	0.500	0.500	**6.62**	mg/L	D

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/27/2019 16:05
Instrument: ICPMS2 Analyst: MCB — Analyzed: 04/17/2019 16:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 19C0441-04 D 02
Preparation Batch: BHD0458 — Sample Size: 25 mL
Prepared: 17-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	**16.1**	ug/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C — Sampled: 03/27/2019 16:05
Instrument: ICP2 Analyst: TCH — Analyzed: 04/09/2019 13:32

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 19C0441-04 D 01
Preparation Batch: BHD0241 — Sample Size: 25 mL
Prepared: 09-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0051	0.0500	**57.5**	mg/L	
Iron, Dissolved	7439-89-6	1	0.0013	0.0500	**4.41**	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0160	0.0500	**25.3**	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0003	0.0010	**0.417**	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0021	0.0100	**0.0041**	mg/L	J

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/27/2019 16:05
Instrument: BAL2 Analyst: KLE — Analyzed: 03/29/2019 04:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-04
Preparation Batch: BHC0805 — Sample Size: 200 mL
Prepared: 29-Mar-2019 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	**287**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/27/2019 16:05
Instrument: LACHAT2 Analyst: BF — Analyzed: 04/11/2019 15:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-04 C
Preparation Batch: BHD0144 — Sample Size: 10 mL
Prepared: 11-Apr-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/27/2019 16:05
Instrument: [CALC] Analyst: BF — Analyzed: 04/03/2019 15:56

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 03-Apr-2019 Final Volume: 1 — Extract ID: 19C0441-04

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	10	0.120	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/27/2019 16:05
Instrument: UV1800-1 Analyst: WCW — Analyzed: 03/29/2019 09:41

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-04 C
Preparation Batch: BHC0784 — Sample Size: 2 mL
Prepared: 28-Mar-2019 — Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04 (Water)

Wet Chemistry

Method: EPA 9060A — Sampled: 03/27/2019 16:05
Instrument: TOC-LCSH Analyst: BF — Analyzed: 04/02/2019 18:23

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-04 C
Preparation Batch: BHD0067 — Sample Size: 20 mL
Prepared: 02-Apr-2019 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	**1.64**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/27/2019 16:05
Instrument: [CALC] Analyst: TCH — Analyzed: 04/09/2019 13:32

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 09-Apr-2019 Final Volume: 1 — Extract ID: 19C0441-04

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	**248**	mg/L CaCO3	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 16:05
Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 01:26

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-04RE1 B
Preparation Batch: BHD0294 — Sample Size: 5 mL
Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	5	0.500	0.500	**5.60**	mg/L	D

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04RE1 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/27/2019 16:05
Instrument: LACHAT2 Analyst: BF — Analyzed: 03/28/2019 12:26

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHC0782; Prepared: 28-Mar-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-04RE1 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	2	0.020	0.020	ND	mg/L	Y1, U

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHD0093; Prepared: 03-Apr-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-04RE1 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		10	0.100	0.100	ND	mg/L	Y1, U

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-5

19C0441-04RE2 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 16:05
Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 13:37

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-04RE2 B
Preparation Batch: BHD0294 — Sample Size: 5 mL
Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	50	5.00	5.00	**69.1**	mg/L	D

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/27/2019 13:30
Instrument: ICPMS2 Analyst: MCB — Analyzed: 04/17/2019 17:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 19C0441-05 D 02
Preparation Batch: BHD0458 — Sample Size: 25 mL
Prepared: 17-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	**2.54**	ug/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C — Sampled: 03/27/2019 13:30
Instrument: ICP2 Analyst: TCH — Analyzed: 04/09/2019 13:36

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 19C0441-05 D 01
Preparation Batch: BHD0241 — Sample Size: 25 mL
Prepared: 09-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0051	0.0500	**13.2**	mg/L	
Iron, Dissolved	7439-89-6	1	0.0013	0.0500	**1.20**	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0160	0.0500	**7.35**	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0003	0.0010	**0.0492**	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0021	0.0100	**0.0024**	mg/L	J

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/27/2019 13:30
Instrument: BAL2 Analyst: KLE — Analyzed: 03/29/2019 04:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-05
Preparation Batch: BHC0805 — Sample Size: 100 mL
Prepared: 29-Mar-2019 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	**384**	mg/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 13:30

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 01:43

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-05 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	20	2.00	2.00	**36.2**	mg/L	D

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/27/2019 13:30

Instrument: LACHAT2 Analyst: BF — Analyzed: 04/11/2019 15:27

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-05 C

Preparation Batch: BHD0144 — Sample Size: 10 mL

Prepared: 11-Apr-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	**0.367**	mg/L	

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/27/2019 13:30
Instrument: [CALC] Analyst: BF — Analyzed: 04/03/2019 15:20

Sample Preparation: Preparation Method: [CALC]; Preparation Batch: [CALC]; Prepared: 03-Apr-2019; Final Volume: 1 — Extract ID: 19C0441-05

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT2 Analyst: BF — Analyzed: 03/28/2019 12:18

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHC0782; Prepared: 28-Mar-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-05 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHD0093; Prepared: 03-Apr-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-05 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/27/2019 13:30

Instrument: UV1800-1 Analyst: WCW — Analyzed: 03/29/2019 09:42

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-05 C

Preparation Batch: BHC0784 — Sample Size: 2 mL

Prepared: 28-Mar-2019 — Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	**16.8**	mg/L	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Wet Chemistry

Method: EPA 9060A — Sampled: 03/27/2019 13:30

Instrument: TOC-LCSH Analyst: BF — Analyzed: 04/02/2019 19:21

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-05 C

Preparation Batch: BHD0067 — Sample Size: 20 mL

Prepared: 02-Apr-2019 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	**4.97**	mg/L	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/27/2019 13:30
Instrument: [CALC] Analyst: TCH — Analyzed: 04/09/2019 13:36

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 09-Apr-2019 Final Volume: 1 — Extract ID: 19C0441-05

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	**63.2**	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

MW-6

19C0441-05RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 13:30

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 01:59

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-05RE1 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	5	0.500	0.500	**7.04**	mg/L	D

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/27/2019 09:15

Instrument: ICPMS2 Analyst: MCB — Analyzed: 04/17/2019 17:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 19C0441-06 D 02

Preparation Batch: BHD0458 — Sample Size: 25 mL

Prepared: 17-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	**5.01**	ug/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C — Sampled: 03/27/2019 09:15

Instrument: ICP2 Analyst: TCH — Analyzed: 04/09/2019 15:13

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 19C0441-06 D 01

Preparation Batch: BHD0241 — Sample Size: 25 mL

Prepared: 09-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0051	0.0500	**66.1**	mg/L	
Iron, Dissolved	7439-89-6	1	0.0013	0.0500	**2.22**	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0160	0.0500	**41.2**	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0003	0.0010	**0.213**	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0021	0.0100	ND	mg/L	U

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/27/2019 09:15

Instrument: BAL2 Analyst: KLE — Analyzed: 03/29/2019 04:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-06

Preparation Batch: BHC0805 — Sample Size: 100 mL

Prepared: 29-Mar-2019 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	**525**	mg/L	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 09:15

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 02:50

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-06 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	100	10.0	10.0	**203**	mg/L	D

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/27/2019 09:15

Instrument: LACHAT2 Analyst: BF — Analyzed: 04/11/2019 15:28

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-06 C

Preparation Batch: BHD0144 — Sample Size: 10 mL

Prepared: 11-Apr-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	**0.136**	mg/L	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/27/2019 09:15

Instrument: [CALC] Analyst: BF — Analyzed: 04/03/2019 15:21

Sample Preparation: Preparation Method: [CALC]; Preparation Batch: [CALC]; Prepared: 03-Apr-2019; Final Volume: 1 — Extract ID: 19C0441-06

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	**0.0240**	mg/L	

Instrument: LACHAT2 Analyst: BF — Analyzed: 03/28/2019 12:24

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHC0782; Prepared: 28-Mar-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-06 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHD0093; Prepared: 03-Apr-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-06 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	**0.024**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/27/2019 09:15

Instrument: UV1800-1 Analyst: WCW — Analyzed: 03/29/2019 09:43

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-06 C

Preparation Batch: BHC0784 — Sample Size: 2 mL

Prepared: 28-Mar-2019 — Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Wet Chemistry

Method: EPA 9060A — Sampled: 03/27/2019 09:15

Instrument: TOC-LCSH Analyst: BF — Analyzed: 04/02/2019 19:52

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-06 C

Preparation Batch: BHD0067 — Sample Size: 20 mL

Prepared: 02-Apr-2019 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	**1.29**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/27/2019 09:15

Instrument: [CALC] Analyst: TCH — Analyzed: 04/09/2019 15:13

Sample Preparation: Preparation Method: [CALC] — Extract ID: 19C0441-06

Preparation Batch: [CALC]

Prepared: 09-Apr-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	**335**	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-6

19C0441-06RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 09:15

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 03:07

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-06RE1 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	5	0.500	0.500	**7.47**	mg/L	D

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Parametrix, Inc.	Project: Newcastle Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/27/2019 09:50

Instrument: ICPMS2 Analyst: MCB — Analyzed: 04/17/2019 17:09

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 19C0441-07 D 02

Preparation Batch: BHD0458 — Sample Size: 25 mL

Prepared: 17-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0220	0.200	**1.00**	ug/L	

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C — Sampled: 03/27/2019 09:50

Instrument: ICP2 Analyst: TCH — Analyzed: 04/09/2019 14:12

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 19C0441-07 D 01

Preparation Batch: BHD0241 — Sample Size: 25 mL

Prepared: 09-Apr-2019 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0051	0.0500	**30.4**	mg/L	
Iron, Dissolved	7439-89-6	1	0.0013	0.0500	**0.0734**	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0160	0.0500	**15.0**	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0003	0.0010	**0.0316**	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0021	0.0100	**0.0139**	mg/L	

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/27/2019 09:50

Instrument: BAL2 Analyst: KLE — Analyzed: 03/29/2019 04:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-07

Preparation Batch: BHC0805 — Sample Size: 200 mL

Prepared: 29-Mar-2019 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	**234**	mg/L	

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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/27/2019 09:50

Instrument: LACHAT2 Analyst: BF — Analyzed: 04/11/2019 15:29

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-07 C

Preparation Batch: BHD0144 — Sample Size: 10 mL

Prepared: 11-Apr-2019 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/27/2019 09:50

Instrument: [CALC] Analyst: BF — Analyzed: 04/03/2019 15:23

Sample Preparation: Preparation Method: [CALC]; Preparation Batch: [CALC]; Prepared: 03-Apr-2019; Final Volume: 1 — Extract ID: 19C0441-07

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	**0.788**	mg/L	

Instrument: LACHAT2 Analyst: BF — Analyzed: 03/28/2019 12:25

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHC0782; Prepared: 28-Mar-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-07 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem; Preparation Batch: BHD0093; Prepared: 03-Apr-2019; Sample Size: 10 mL; Final Volume: 10 mL — Extract ID: 19C0441-07 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	**0.788**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/27/2019 09:50

Instrument: UV1800-1 Analyst: WCW — Analyzed: 03/29/2019 09:44

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-07 C

Preparation Batch: BHC0784 — Sample Size: 2 mL

Prepared: 28-Mar-2019 — Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07 (Water)

Wet Chemistry

Method: EPA 9060A — Sampled: 03/27/2019 09:50

Instrument: TOC-LCSH Analyst: BF — Analyzed: 04/02/2019 20:11

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-07 C

Preparation Batch: BHD0067 — Sample Size: 20 mL

Prepared: 02-Apr-2019 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	**2.06**	mg/L	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/27/2019 09:50

Instrument: [CALC] Analyst: TCH — Analyzed: 04/09/2019 14:12

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 09-Apr-2019 Final Volume: 1 — Extract ID: 19C0441-07

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	**138**	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 09:50

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 03:40

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-07RE1 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	5	0.500	0.500	**12.4**	mg/L	D

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Parametrix, Inc.	Project: Newcastle Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

SW-7

19C0441-07RE2 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/27/2019 09:50

Instrument: DX500 Analyst: KOTT — Analyzed: 04/11/2019 13:54

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 19C0441-07RE2 B

Preparation Batch: BHD0294 — Sample Size: 5 mL

Prepared: 10-Apr-2019 — Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	50	5.00	5.00	**84.1**	mg/L	D

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Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHD0241 - WMN (No Prep)

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0241-BLK1)				Prepared: 09-Apr-2019 Analyzed: 09-Apr-2019 13:19							
Calcium, Dissolved	ND	0.0051	0.0500	mg/L							U
Iron, Dissolved	0.0040	0.0013	0.0500	mg/L							J
Magnesium, Dissolved	ND	0.0160	0.0500	mg/L							U
Manganese, Dissolved	ND	0.0003	0.0010	mg/L							U
Zinc, Dissolved	ND	0.0021	0.0100	mg/L							U
LCS (BHD0241-BS1)				Prepared: 09-Apr-2019 Analyzed: 09-Apr-2019 13:45							
Calcium, Dissolved	9.55	0.0051	0.0500	mg/L	10.0		95.5	80-120			
Iron, Dissolved	1.99	0.0013	0.0500	mg/L	2.00		99.3	80-120			
Magnesium, Dissolved	10.2	0.0160	0.0500	mg/L	10.0		102	80-120			
Manganese, Dissolved	0.505	0.0003	0.0010	mg/L	0.500		101	80-120			
Zinc, Dissolved	0.523	0.0021	0.0100	mg/L	0.500		105	80-120			
Duplicate (BHD0241-DUP1)		**Source: 19C0441-01**		Prepared: 09-Apr-2019 Analyzed: 09-Apr-2019 14:41							
Calcium, Dissolved	156	0.0051	0.0500	mg/L		158			1.00	20	
Iron, Dissolved	0.919	0.0013	0.0500	mg/L		0.910			0.91	20	
Magnesium, Dissolved	48.6	0.0160	0.0500	mg/L		49.3			1.36	20	
Manganese, Dissolved	0.129	0.0003	0.0010	mg/L		0.136			4.58	20	
Zinc, Dissolved	0.0063	0.0021	0.0100	mg/L		0.0062			1.95	20	J
Matrix Spike (BHD0241-MS1)		**Source: 19C0441-01**		Prepared: 09-Apr-2019 Analyzed: 09-Apr-2019 14:50							
Calcium, Dissolved	161	0.0051	0.0500	mg/L	10.0	158	35.5	75-125			HC
Iron, Dissolved	3.19	0.0013	0.0500	mg/L	2.00	0.910	114	75-125			
Magnesium, Dissolved	56.7	0.0160	0.0500	mg/L	10.0	49.3	73.8	75-125			HC
Manganese, Dissolved	0.651	0.0003	0.0010	mg/L	0.500	0.136	103	75-125			
Zinc, Dissolved	0.538	0.0021	0.0100	mg/L	0.500	0.0062	106	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHD0458 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0458-BLK1)					Prepared: 17-Apr-2019 Analyzed: 17-Apr-2019 16:32							
Arsenic, Dissolved	75a	ND	0.0220	0.200	ug/L							U
LCS (BHD0458-BS1)					Prepared: 17-Apr-2019 Analyzed: 17-Apr-2019 16:36							
Arsenic, Dissolved	75a	25.5	0.0220	0.200	ug/L	25.0		102	80-120			

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Wet Chemistry - Quality Control

Batch BHC0782 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0782-BLK1)				Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 12:09							
Nitrite-N	ND	0.010	0.010	mg/L							U
LCS (BHC0782-BS1)				Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 12:10							
Nitrite-N	0.495	0.010	0.010	mg/L	0.500		99.0	75-125			
Duplicate (BHC0782-DUP1)		**Source: 19C0441-01**		Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 12:12							
Nitrite-N	ND	0.010	0.010	mg/L		ND					U
Matrix Spike (BHC0782-MS1)		**Source: 19C0441-01**		Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 12:13							
Nitrite-N	0.519	0.010	0.010	mg/L	0.500	ND	104	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Wet Chemistry - Quality Control

Batch BHC0784 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: WCW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0784-BLK1)				Prepared: 28-Mar-2019 Analyzed: 29-Mar-2019 09:31							
COD	ND	10.0	10.0	mg/L							U
LCS (BHC0784-BS1)				Prepared: 28-Mar-2019 Analyzed: 29-Mar-2019 09:32							
COD	103	10.0	10.0	mg/L	100		103	90-110			

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719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Wet Chemistry - Quality Control

Batch BHC0805 - No Prep Wet Chem

Instrument: BAL2 Analyst: KLE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0805-BLK1)				Prepared: 29-Mar-2019 Analyzed: 29-Mar-2019 04:40							
Dissolved Solids	ND	5	5	mg/L							U
LCS (BHC0805-BS1)				Prepared: 29-Mar-2019 Analyzed: 29-Mar-2019 04:40							
Dissolved Solids	486	5	5	mg/L	500		97.2	90-110			
Duplicate (BHC0805-DUP1)		**Source: 19C0441-01**		Prepared: 29-Mar-2019 Analyzed: 29-Mar-2019 04:40							
Dissolved Solids	714	10	10	mg/L		700			1.98	20	

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Wet Chemistry - Quality Control

Batch BHD0067 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0067-BLK1)				Prepared: 02-Apr-2019 Analyzed: 02-Apr-2019 15:33							
Total Organic Carbon	ND	0.50	0.50	mg/L							U
LCS (BHD0067-BS1)				Prepared: 02-Apr-2019 Analyzed: 02-Apr-2019 15:56							
Total Organic Carbon	18.94	0.50	0.50	mg/L	20.00		94.7	90-110			

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Wet Chemistry - Quality Control

Batch BHD0093 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0093-BLK1)				Prepared: 03-Apr-2019 Analyzed: 03-Apr-2019 14:44							
Nitrate + Nitrite as N	ND	0.010	0.010	mg/L							U
LCS (BHD0093-BS1)				Prepared: 03-Apr-2019 Analyzed: 03-Apr-2019 14:45							
Nitrate + Nitrite as N	0.512	0.010	0.010	mg/L	0.500		102	90-110			

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Wet Chemistry - Quality Control

Batch BHD0144 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0144-BLK1)				Prepared: 11-Apr-2019 Analyzed: 11-Apr-2019 15:20							
Ammonia-N	ND	0.040	0.040	mg/L							U
LCS (BHD0144-BS1)				Prepared: 04-Apr-2019 Analyzed: 11-Apr-2019 15:21							
Ammonia-N	0.495	0.040	0.040	mg/L	0.500		99.0	90-110			

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Wet Chemistry - Quality Control

Batch BHD0294 - No Prep Wet Chem

Instrument: DX500 Analyst: KOTT

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0294-BLK1)				Prepared: 10-Apr-2019 Analyzed: 10-Apr-2019 22:21							
Chloride	ND	0.100	0.100	mg/L							U
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BHD0294-BS1)				Prepared: 10-Apr-2019 Analyzed: 10-Apr-2019 22:38							
Chloride	1.51	0.100	0.100	mg/L	1.50		101	90-110			
Sulfate	1.42	0.100	0.100	mg/L	1.50		94.7	90-110			

Parametrix, Inc.	Project: Newcastle Landfill	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 UCT-KED in Water	
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 300.0 in Water	
Chloride	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
EPA 353.2 in Water	
Nitrate + Nitrite as N	NELAP,DoD-ELAP,WADOE
Nitrite-N	WADOE,NELAP,DoD-ELAP
EPA 410.4 in Water	
COD	DoD-ELAP,NELAP,WADOE
EPA 6010C in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Iron	WADOE,NELAP,DoD-ELAP
Magnesium	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
Zinc	WADOE,NELAP,DoD-ELAP
EPA 9060A in Water	
Total Organic Carbon	DoD-ELAP,WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-011	05/12/2019
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019

Parametrix, Inc.	Project: Newcastle Landfill	
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Seattle WA, 98104	Project Manager: Lisa Gilbert	19-Apr-2019 07:46

Notes and Definitions

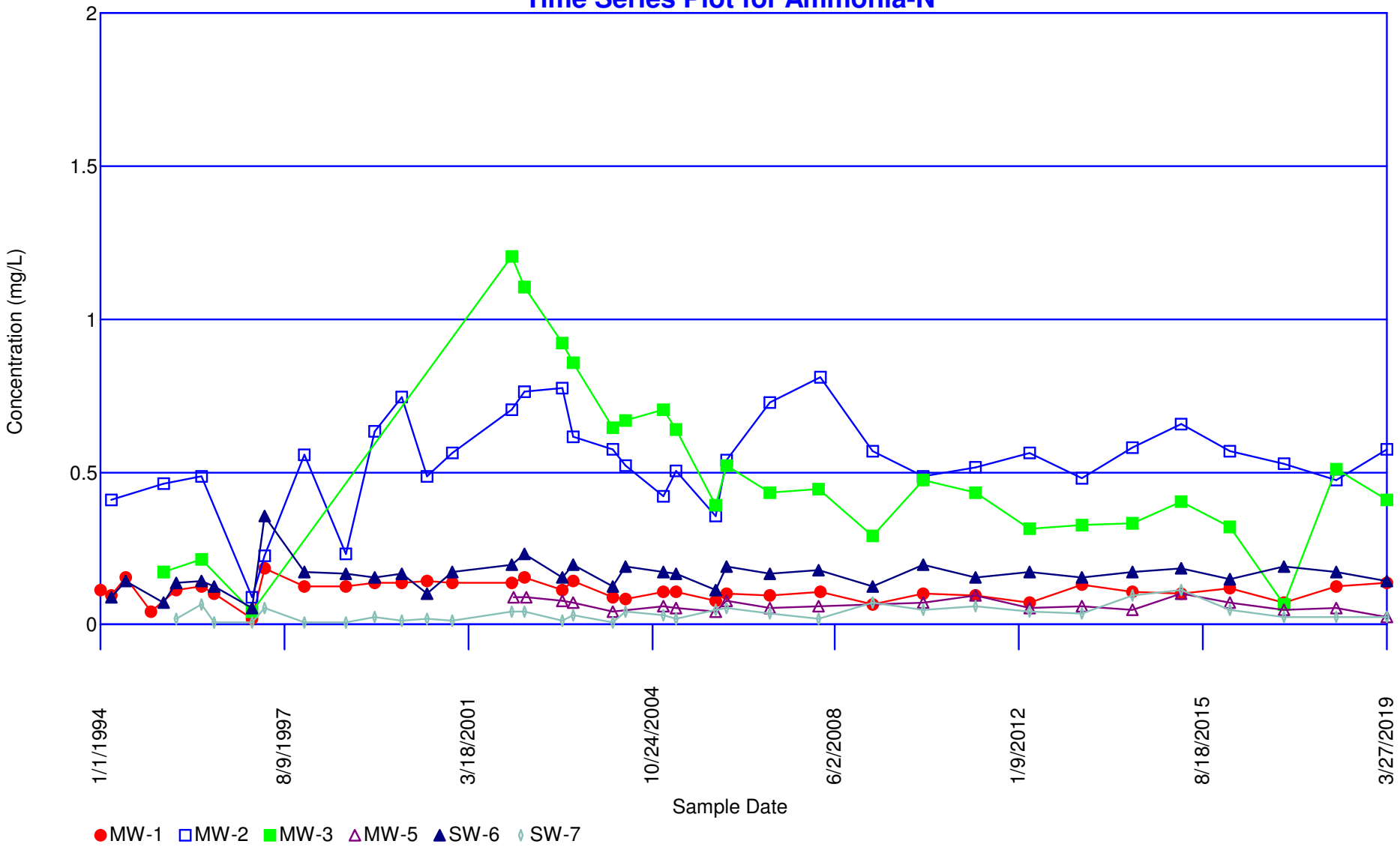
*	Flagged value is not within established control limits.
D	The reported value is from a dilution
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
Y1	Raised reporting limit due to interference
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Appendix B

Time-Series Plots

Newcastle Landfill

Time Series Plot for Ammonia-N

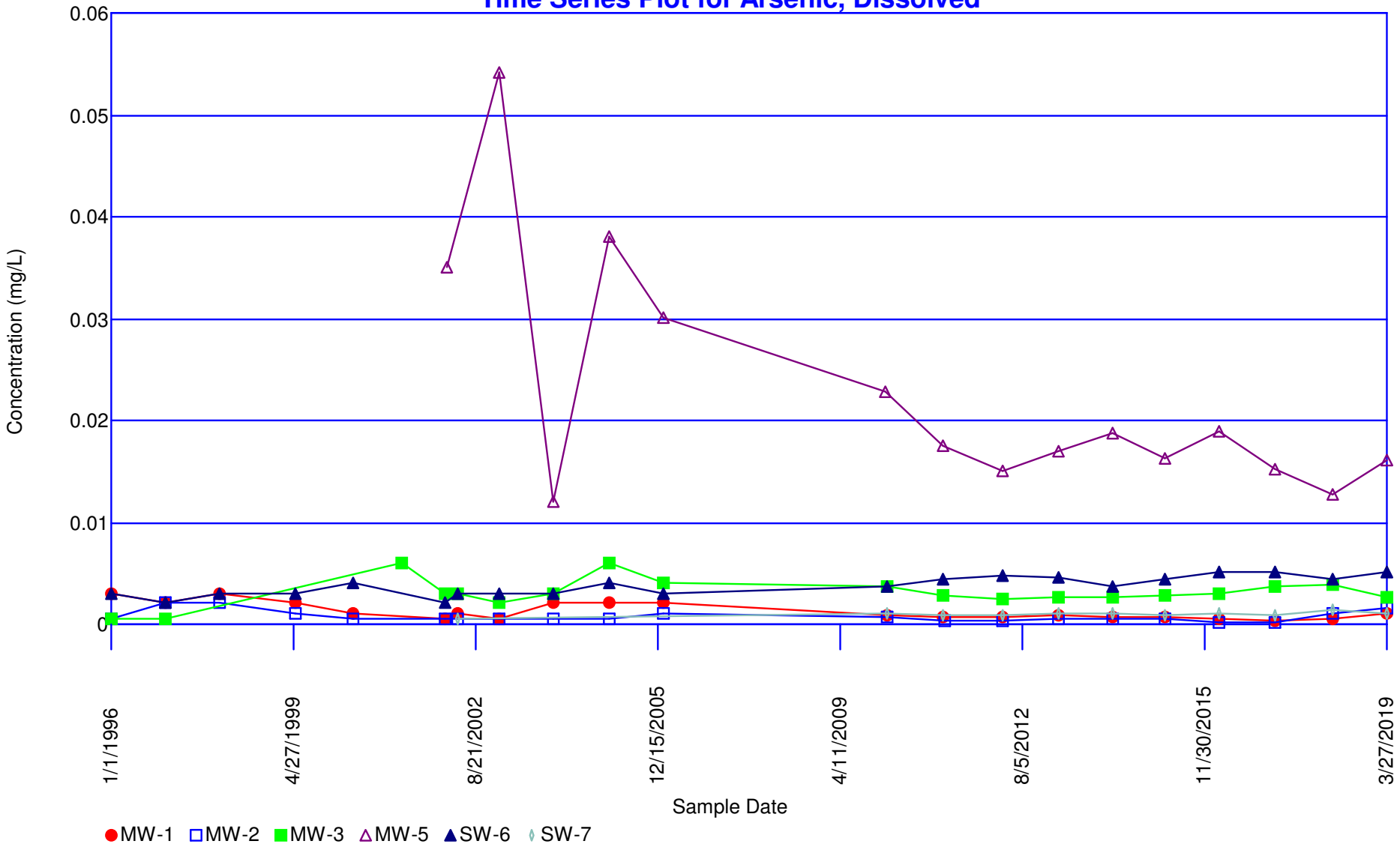


Ammonia-N

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Arsenic, Dissolved

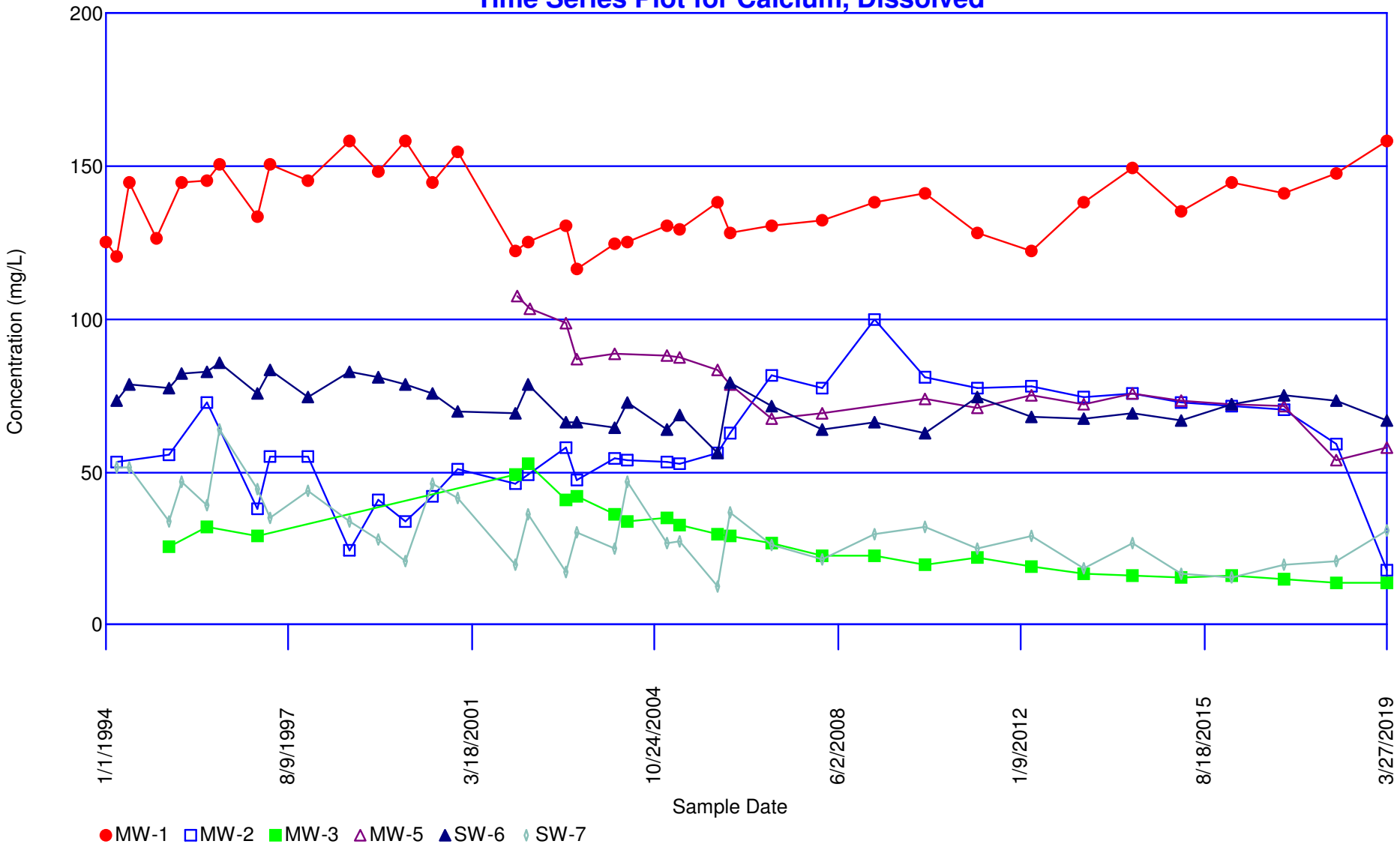


Arsenic, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Calcium, Dissolved

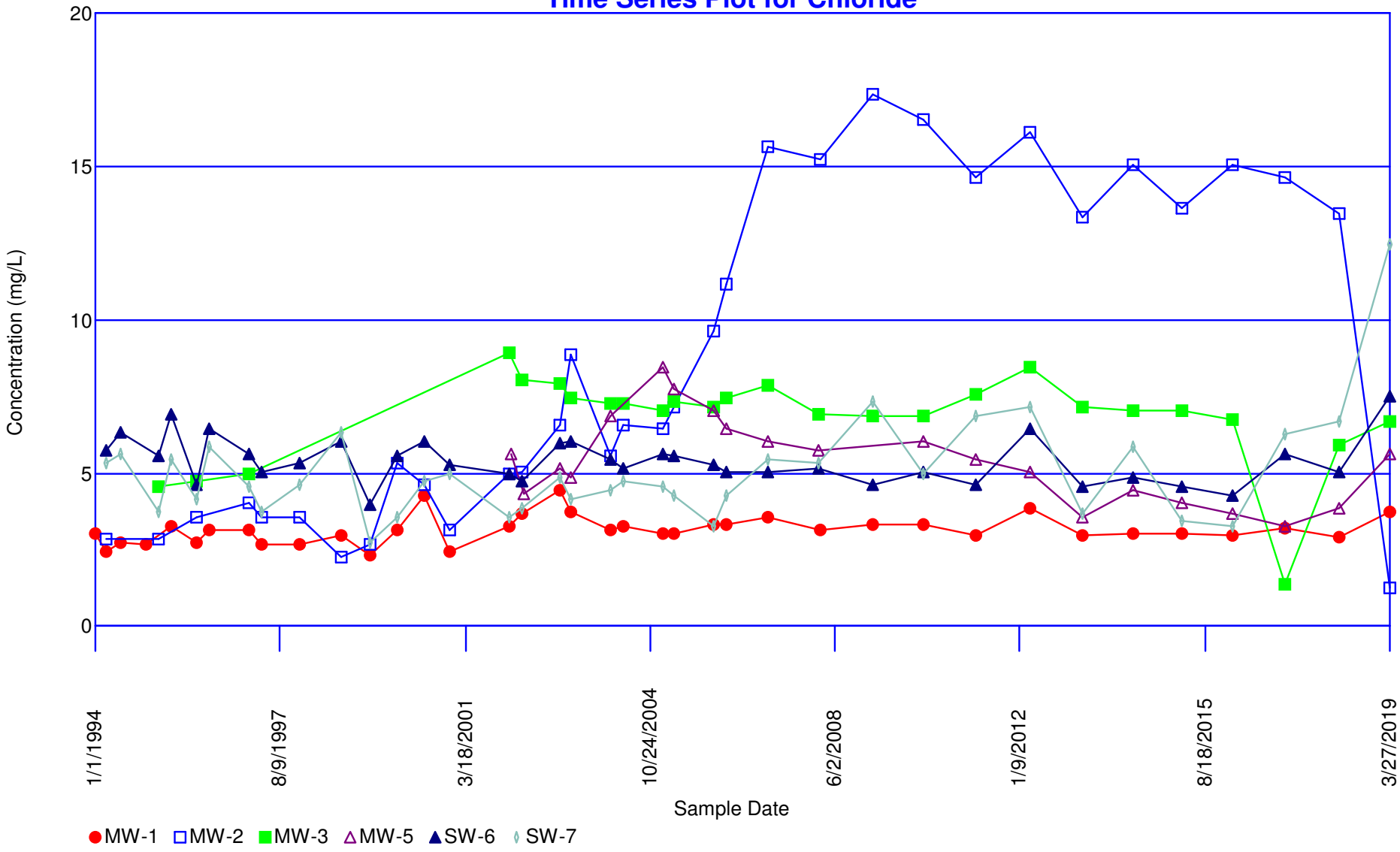


Calcium, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Chloride

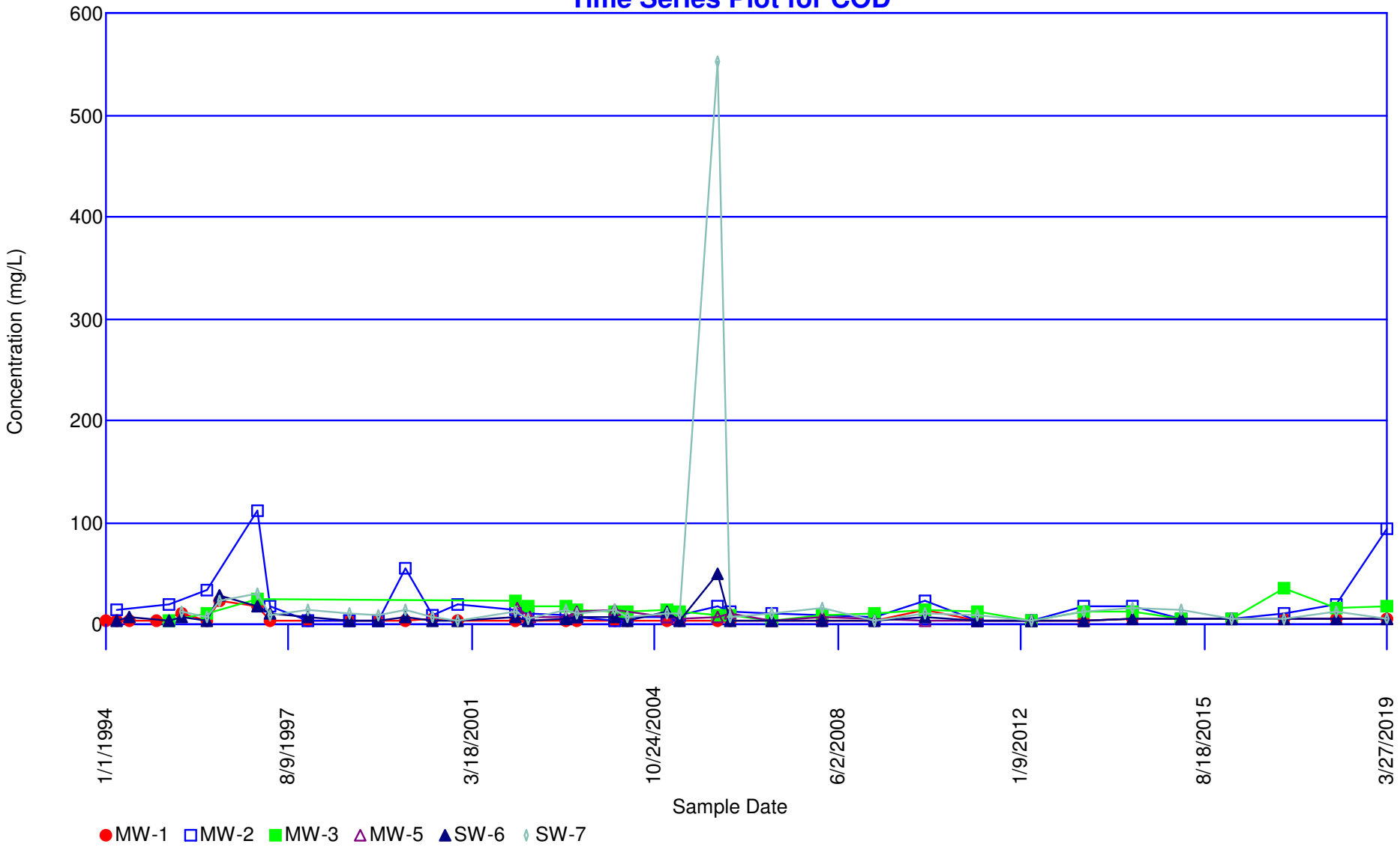


Chloride

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for COD

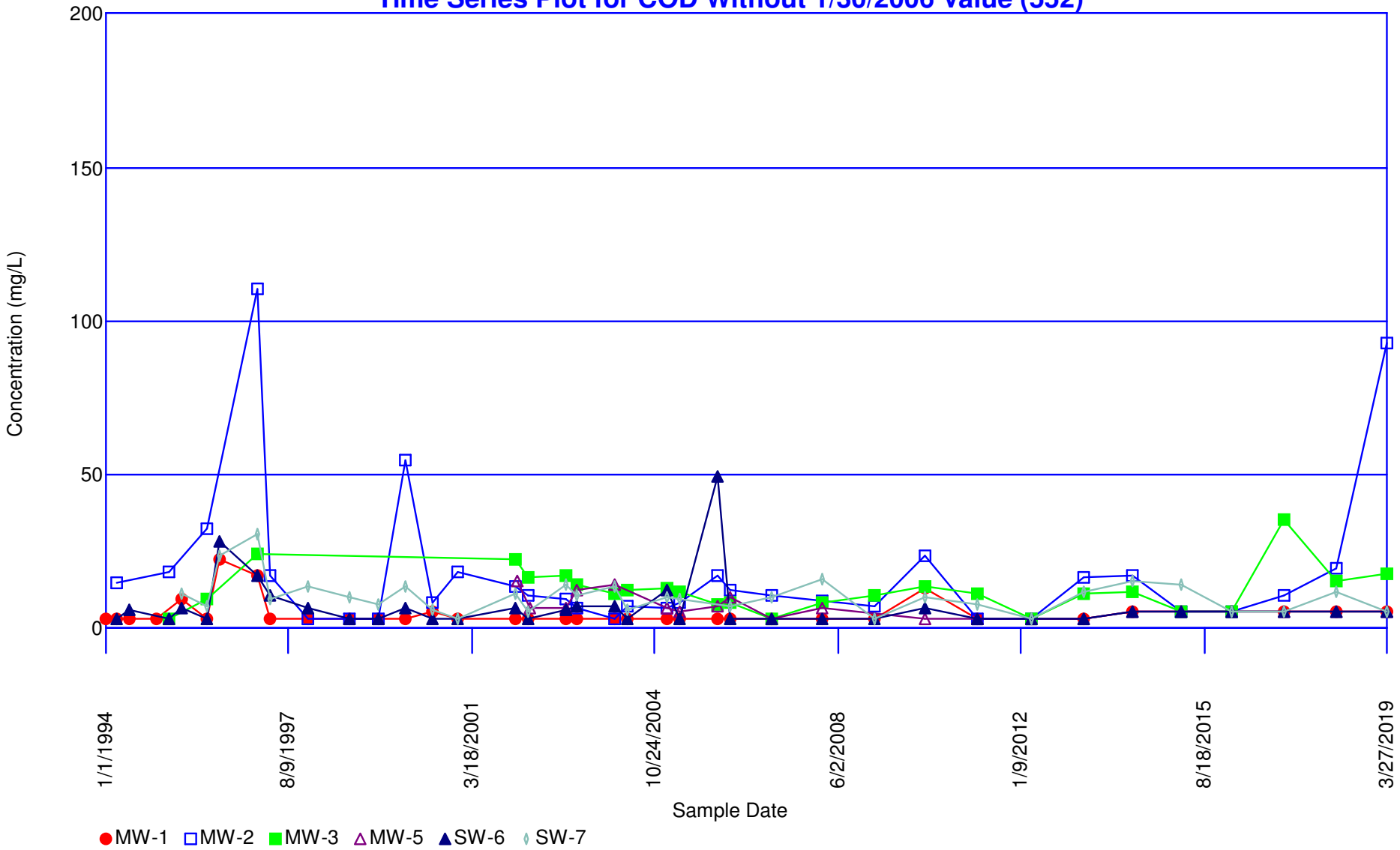


COD

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for COD Without 1/30/2006 Value (552)

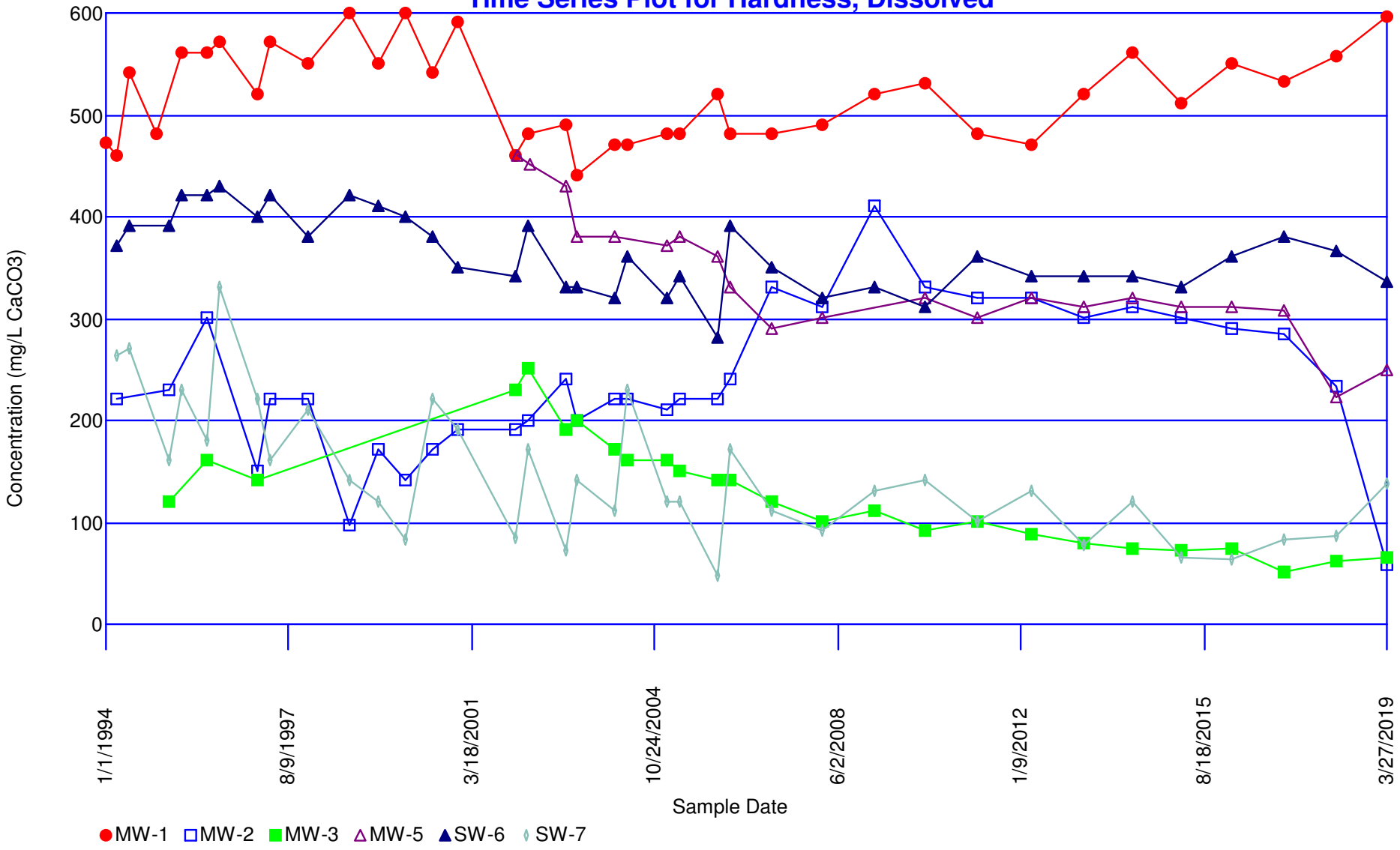


COD

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Hardness, Dissolved

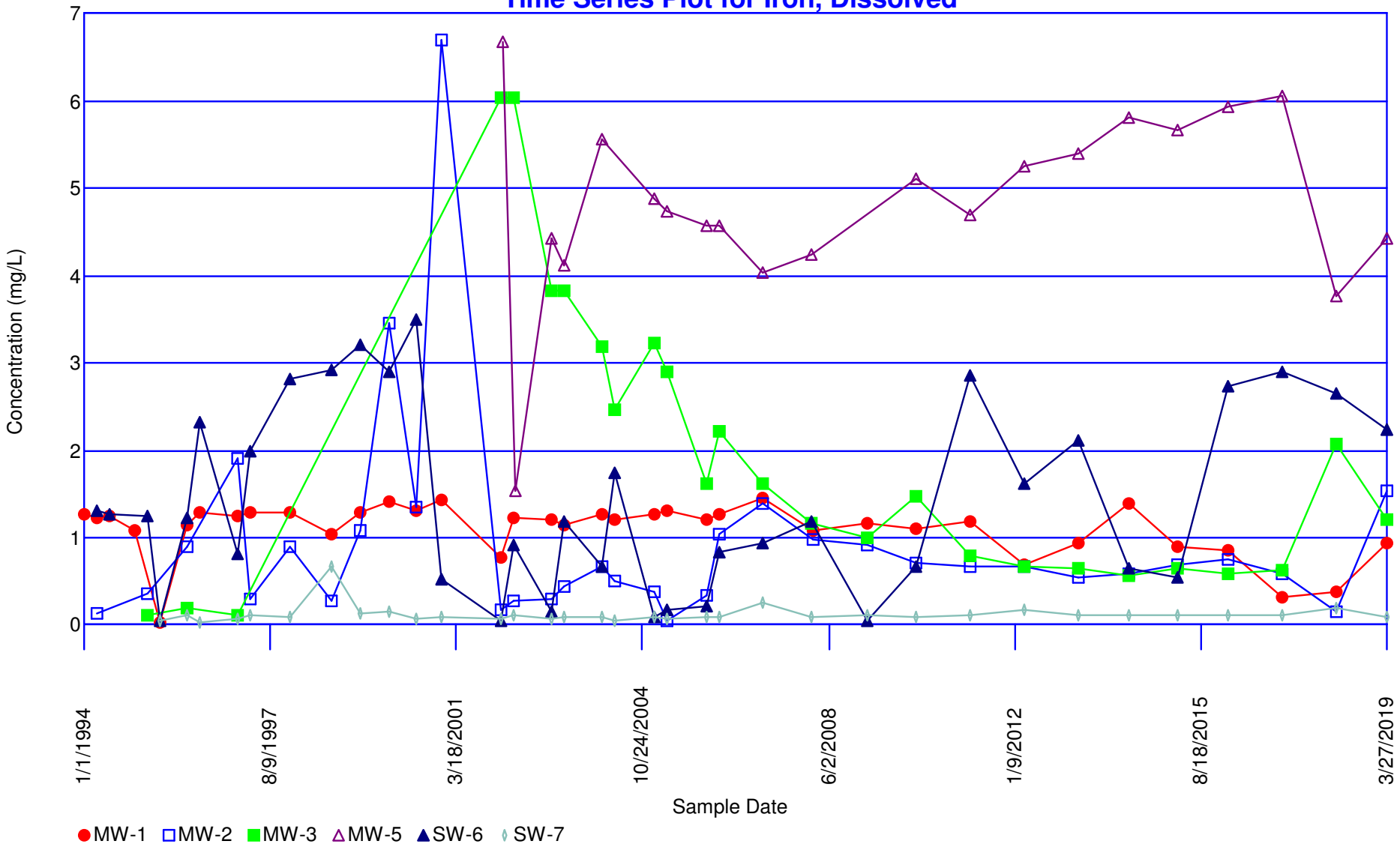


Hardness, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Iron, Dissolved

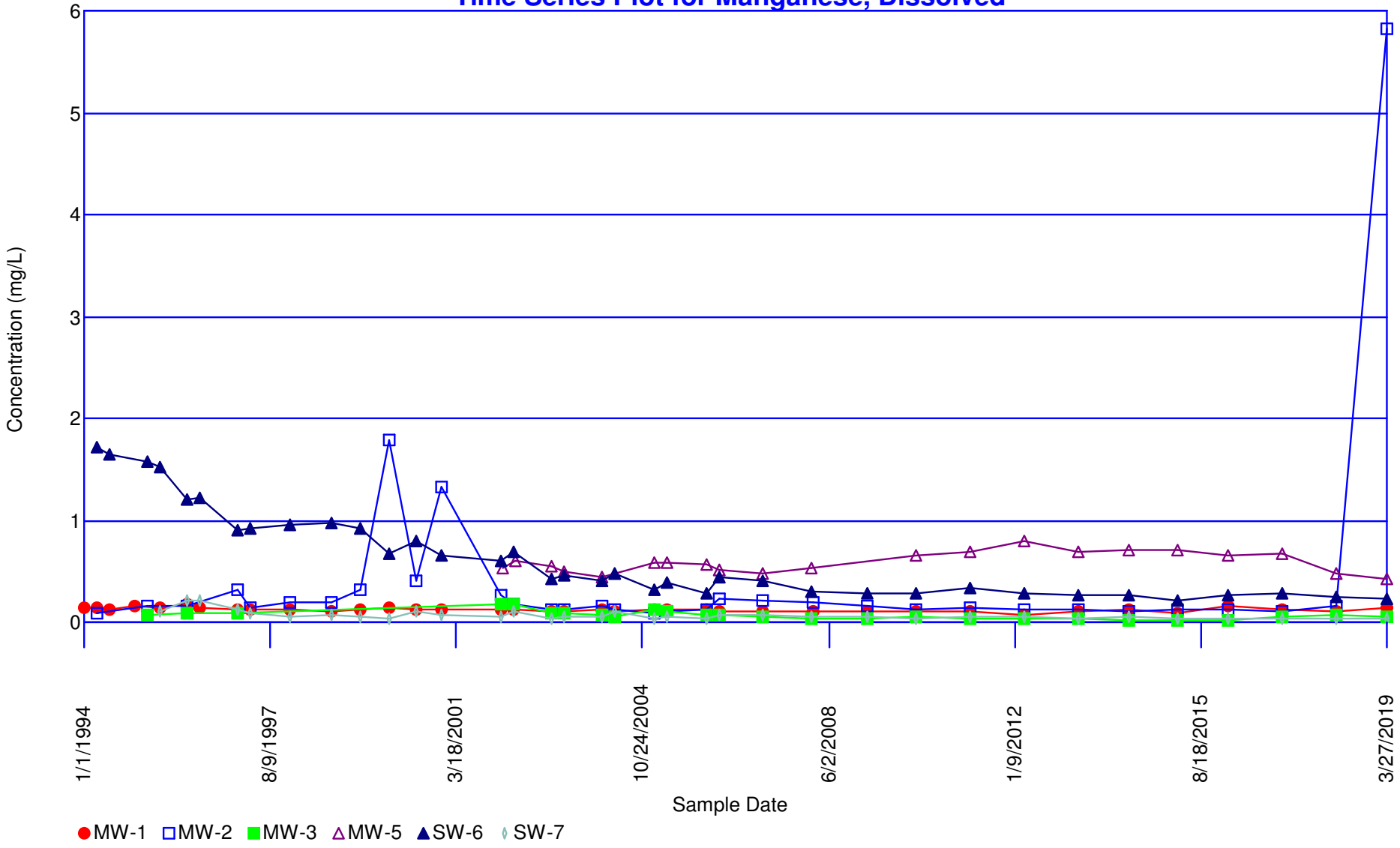


Iron, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Manganese, Dissolved

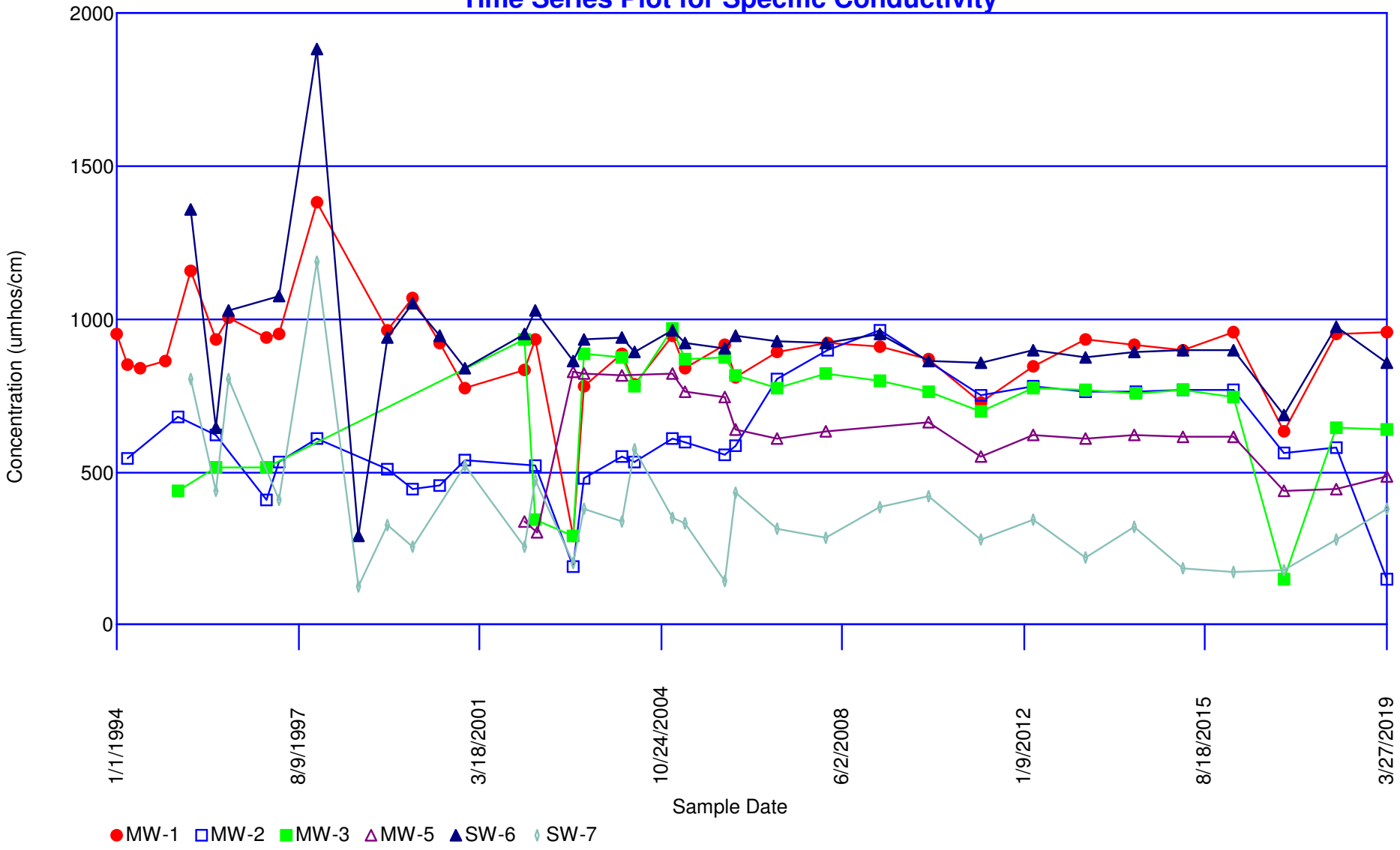


Manganese, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Specific Conductivity

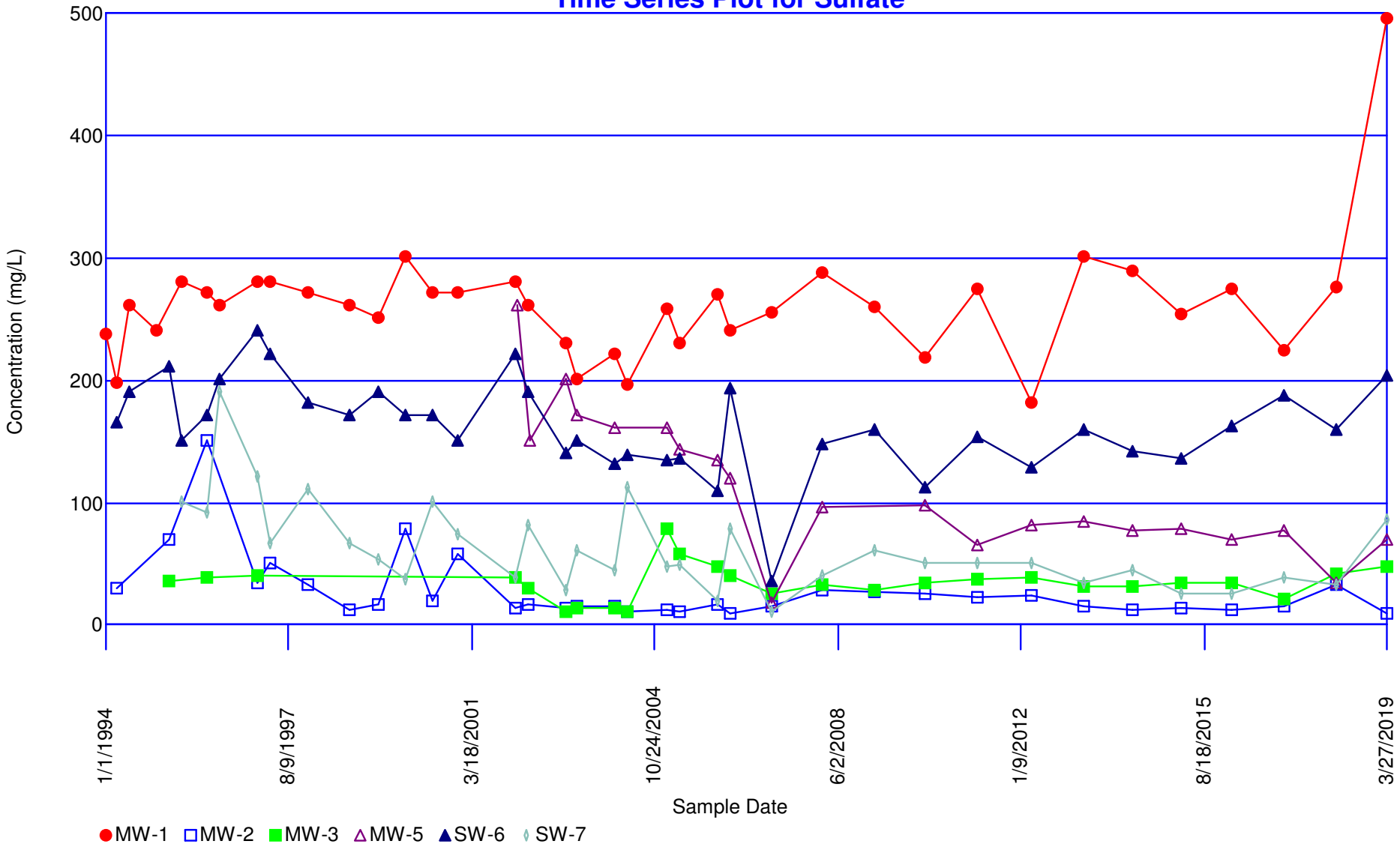


Specific Conductivity

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Sulfate

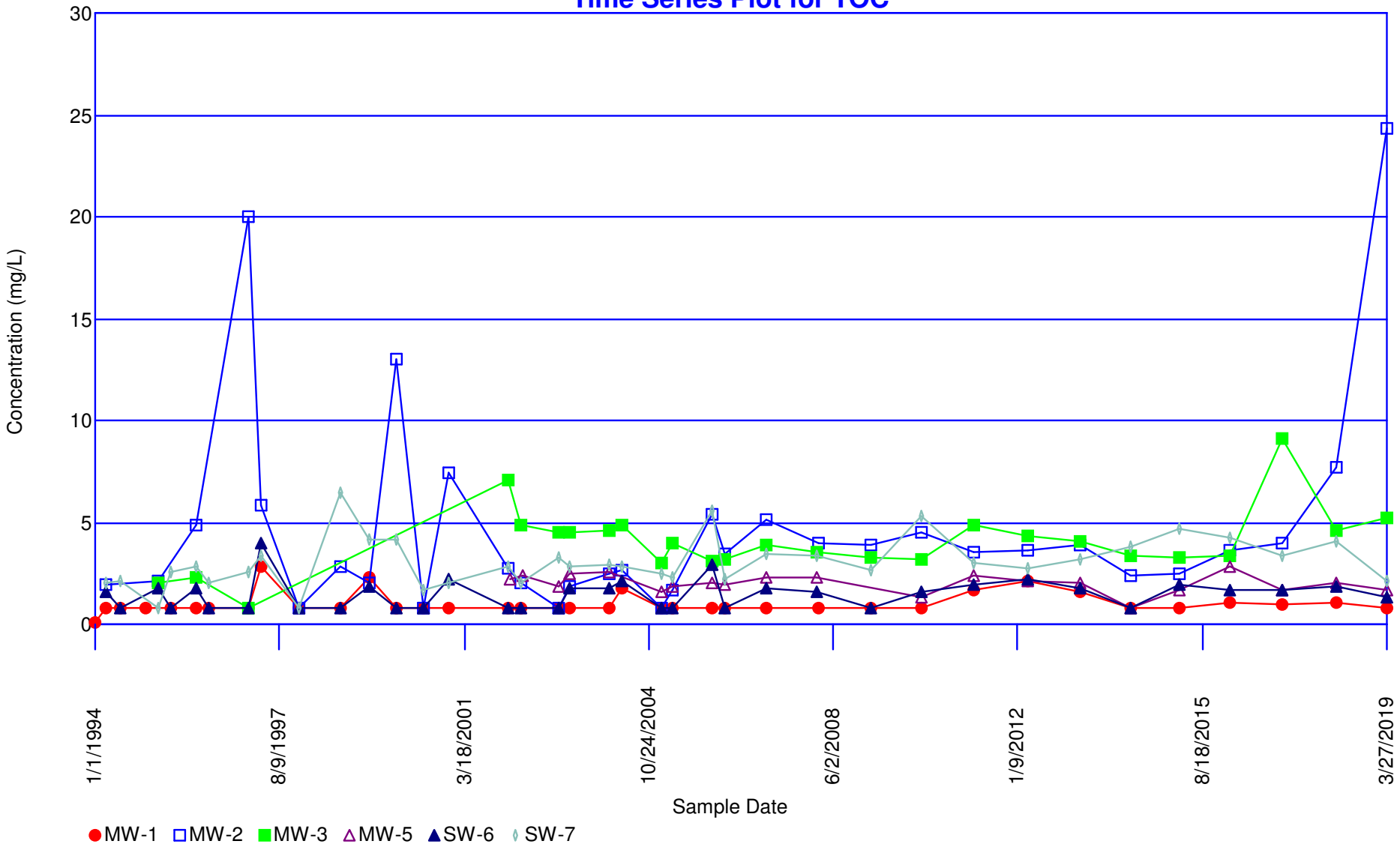


Sulfate

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for TOC



TOC

Non-Detects Replaced with 1/2 DL